JULIJONAS

URBONAS

GRAVITATIONAL

AESTHETICS

VILNIAUS DAILĖS AKADEMIJA

VILNIUS ACADEMY OF ARTS

JULIJONAS URBONAS

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GRAVITACINĖ ESTETIKA

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The Artistic Research Project will be defended externally at a public meeting of the Academic Board of Fine Arts at Vilnius Academy of Arts composed of the following members:

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The public defence of the Artistic Research Project will be held on November 28, 2025, 2 p.m., at VAA Campus C, Chess Hall (Malūnų str. 5, Vilnius).

The art project is available at Martynas Mažvydas National Library of Lithuania, and the library of Vilnius Academy of Arts.

VILNIUS ACADEMY OF ARTS

JULIJONAS URBONAS

Artistic Research Project
GRAVITATIONAL AESTHETICS

Vilnius, 2025

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Summary

This practice-led research project treats gravity as an artistic medium, designing and testing devices and situations that modulate g-conditions (hyper-, micro-, fluctuating) to choreograph new perceptions and critical social space. Through making, field experiments, and post-phenomenological analysis, it establishes gravitational aesthetics—a set of new creative tools such as vehicular poetics, design choreography, critical vertigo—and outlines an exodisciplinary approach for future art. In sum, gravitational aesthetics is both cartography and provocation: a map of how weight, fall, and flight already infiltrate art practices, and a call to cultivate new gravities, on Earth and far beyond.

Key claims

- **Artefacts and setups that modulate gravity reconfigure embodiment.**
  Gravitational artefacts such as roller coasters, dumbbells, wind-tunnels, and muscle fatigue suppressors alter hyper-, micro-, or fluctuating g-conditions, reshaping orientation, balance, motility, and social relations—i.e. they change how bodies sense, think, imagine, and inhabit space.

- **Gravitational aesthetics is relational and practice-led, not an object property.**
  It is not an intrinsic quality of "gravitational artefacts," but a field that designs, stages, and analyses conditions that make gravity perceptible otherwise, using practice-based experiments, design fiction, and post-phenomenology to engage the whole body and imagination.

- **As a creative toolkit, it choreographs movement and agency—and studies the effects.**
  Through vehicular poetics and design choreography, it treats vehicles/environments (real and imagined) as instruments that script motion and agency, and it evaluates their sensory, psychological, and social consequences.

Methodological outline

To achieve the aim of the thesis, the establishment of gravitational aesthetics, this project seeks to:

- Build a curated corpus: collect and codify gravity-related works/technologies and key texts with explicit inclusion criteria to demarcate the scope of gravitational aesthetics.

- Analyse relationally: conduct a postphenomenological/variational analysis of how these artefacts mediate embodiment (orientation, motility, social choreography), clustering methodological dimensions.

- Make–test–evaluate: prototype and stage artworks that modulate g-conditions; gather embodied and participant data; evaluate against aesthetic/ethical criteria; iterate; synthesise results into a transferable toolkit (concepts, methods, glossary).

Structural outline

1. Intro

My childhood in a Soviet amusement park becomes the departure point for the central question: what happens to art—and to the perceiving body—when it is submitted to altered gravities (hyper-, micro-, fluctuating)? After reviewing the gaps in motion-based art—of which the key one is that the spectators are often rendered static—and in the philosophy of technology, I frame my response as a practice-led enquiry that couples post-phenomenology with art, design, architecture, and sci-fi in expanded field. The chapter sets four objectives:

Conceptual—to coin "gravitational aesthetics" and map its intellectual genealogy;

Methodological—to develop unique creative tools such as design choreography, vehicular poetics, and critical vertigo;

Practical—to build or stage experimental devices ranging from piano centrifuges to dream hotels in order to establish gravitational aesthetics;

Extrapolative—to speculate on gravitational sensations in alternative realities and art beyond the Kármán Line.

2. Standing

"Standing" probes weight as the primordial human relationship with gravity and a dynamic interplay among physical and psychosocial reality, embodied awareness, and the human drive to reimagine constraints as fertile ground for artistic and experiential possibilities.

Three experiential clusters structure the discussion:

- Equivalence principle—hypergravity created by rotating machines like my *Cerebral Spinner* or *Hyper-gravitational Piano* turns exhibition halls into epistemological theatres where viewers must re-learn balance, direction, and even musical phrasing.

- Wearable mass—a 35 kg sand-filled suit and mechanised "massage" gyms reveal how added or simulated load reshapes proprioception, social space, and body image, while mentalimagery training extends the idea of "imaginary weight".

- Ascensional psychology—historical and contemporary "energising machines" are reread through sports psychology to show that levity and heaviness can be induced purely by suggestion.

3. Falling

"Falling" centres on *Euthanasia Coaster*—a fictive thrill ride engineered to kill its passengers through six sequential 10 *g* inversions—as the paradigmatic "vehicular poem". Treating the

track as both a sculpture and a lethal script, I show how cross-disciplinary plausibility (roller coaster physics, aerospace medicine, bioethics) let a scale model and drawing migrate from galleries to tabloids, academic conferences, and tattoo parlours, generating a poly-real public imaginary where “millions are already riding it”. The project exemplifies:

- Risk fiction—a “riskless risk” pushed to its extreme;
- Fiction design—objects that operate simultaneously as a technical proposal, moral fable, and social media meme;
- Critical vertigo—a method that uses centrifugal or free-fall forces to unseat ethical and aesthetic certainties.

4. Levitating

The longest empirical chapter catalogues six technologies of lift—flesh-hook suspension, neutral-buoyancy contraptions, aerodynamic hovering, parabolic flight, orbital free-fall, and oneiric (dream-induced) levitation. Each technology functions as a probe revealing specific affordances—rhythmic time loops, volumetric empathy, reciprocal touch—that conventional earthbound art can barely glimpse. Aesthetic practice, the chapter argues, should therefore design not objects but g-fields: choreographed conditions where bodies co-author space. A running self-experiment, it shows that genuine kinaesthetic lightness is labour-intensive, technologically scaffolded, and temporally fragile. When it does occur, the body’s “vertical contract” dissolves, vestibular cues scramble and social conventions about territory, choreography, and even narration collapse. I distill two recurrent phenomenologies with series of comments into aesthetic insights:

- Kinaesthetic lightness—graceful negotiation with weight after arduous adaptation;
- Mental lightness—brief derealisation resembling out-of-body states.

5. Glossary

- The final main section condenses dozens of neologisms that emerged from practice:
- Design Choreography—designing things for how they move you, not how they look;
- Gravitational Readymade—relocating gravitational artefacts and percepts to galleries as embodied sculpture;
- Gravitational Relativism—treating 1 *g* as just another local condition;
- Exodisciplinary Art—the inevitable destabilisation of all Earth-born disciplines when they migrate off-planet.

Together they form a toolkit that expands gravitational aesthetics from mere spectacle to a nuanced ecology of embodied negotiations with—or without—weight.

I.

INTRO:
context, aims, objectives, methodology, structure

Despite having spent a great part of my life in an amusement park, only recently I realised I had a little professional misfortune: I never liked to ride the rides, but rather preferred to wonder about those peculiar phenomena. My disinterest in submitting my body to the funfair machinery perhaps lies in the fact that I'm motion-sickness-prone, and that I grew up with Soviet-built amusement rides that rather functioned as Communist propaganda engines, soothing and relaxing labour power from physical and mental exhaustion. The amusement park, which was headed by my father, was my substitute kindergarten. Its employees—ride operators, event managers, technicians, cashiers, administrators—were my nannies, who taught me subtle ways of twisting the guts and psyche of the public. Thus, I've been intimately connected to the amusement park, but also retained a substantial or, better put, critical distance. Nonetheless, in spite of (or thanks to) the latter, I felt that some form of underdeveloped but powerful—often stomach-churning—beauty was lurking in the park. And soon I realised that, for instance, it was a unique (if not only) hybrid artistic form that engaged its audience by moving their bodies in space. Such insights fuelled my experimentation with the rides, and when I took over my father's position, I set out to raise the phenomenon to the level of art, labelling the venture "Gravitational Aesthetics". I turned the park into my studio and started two PhD research projects: one, thesis-based, at Vilnius Academy of Arts, and another, studio-led, at the Royal College of Art. In the meantime, in the park I was recho-reographing the motion repertoire of the machinery—mostly just

slowing them down, and commissioning experimental soundtracks for the rides (partly provoked by another occupation: running an underground music club at that time). So, in a way my artistic research began by placing or infusing art into amusement rides, in other words, exposing art to altered states of gravity. This is where one of the key questions of gravitational aesthetics emerged:

What happens to the field of art under diverse gravities such as weightlessness, hypergravity, fluctuating gravity etc.? And—vice versa—what gravities may art come up with?

Before expanding the questions, let me put forward a bold insight about the rather passive role motion has played in arts. From the perspective of spectatorship, in any field of motion-oriented art, be it cinema, (post)kinetic art, or dance, it has been the performer (human or non-human), not the spectator, who has been moving. Except for roller coasters, ferry wheels, carousels, etc. Yet funfair machinery as a form of art has been rather lowbrow, overly pleasure-addicted, conceptually poor, and constrained by a thin motion vocabulary.

What if we combine the aesthetics of motion arts with the active choreographic power of thrill rides?

Imagining an artistic ride is one thing, building one is extremely different. Developing, engineering, and manufacturing a people mover is a very slow, complex, and expensive activity. Feasibility decreases exponentially with the growth in the magnitude of dynamism and the complexity of the choreographic repertoire of a ride. My increased awareness of the restraints and limits made me consider the art domain as some sort of safety zone, free of stringent safety regulations and engineering requirements, where I could push the body and imagination to new limits, building quasi-real rides, and merging reality and fiction.

One of the first examples materialising such a shift in thinking was *Euthanasia Coaster*, a hypothetic euthanasia machine in the form of a roller coaster, based on real scientific, technological, engineering, and medical research. The project, comprising a scale-model, technical drawing, and video footage, has been presented at very diverse—art, design, architecture, sci-fi to engineering, physics,

physiology, bioethics, etc.—venues and to very wide audiences. The combination of the employed artistic techniques paid off—the project has drawn an enormous international attention from the public and media, costing me a crashed server from the overload of visitors to my website and several years of non-stop travelling to shows, conferences, filming ventures, etc., which not only demonstrated people's desire to engage with such a narrative, but also resulted in extensive and extremely diverse feedback ranging from technical or artistic to absurd and silly. This has extended the project from the realm of fiction to the domains of public imagination, professional dispute, domestic conversation, artistic factoid, and urban anecdote, without actually building it. Nonetheless, I could say that there are already millions of people "riding" the coaster in their own way: musicians dedicate songs, filmmakers direct movies about it, academics curate shows and conferences around it, online enthusiasts produce virtual replications, some make tattoos, others gather in pro-euthanasia coaster activist groups, etc.

The success of the coaster project could be partially attributed to grounding fiction in cross-disciplinary footing. Such fictional design is an important method elaborated in various forms—from academic, experimental writings, movie scripts, micro novels to prototypes, set design, and hybrid media, but it is but one of many other methods employed in this research.

Drawing on choreography, (post)kinetic art, thrill ride psychology, aerospace medicine, vehicle engineering, postphenomenology, and gravitational biology, the study integrates experimental textual, design, sculptural, choreographic, and experiential forms of research process. Together with traditional methods such as literature review and consulting with experts, the combination of carnal and autoethnographic approaches gives a substantial impetus for the entire project.

The latter includes, but is not limited to, attending and experiencing activities that are "motion-led" or open for bodily submission, such as thrill rides, participatory dance performances, medical machines used for inducing, studying, and training for spatial disorientation and high acceleration forces; choreographic heuristics—performative experiments using one's own body as a medium for sketching and testing ideas, for example, bodystorming. The experiences gained

from these experiments were used both as a material for the study and as a method of enquiring, but also as a source of inspiration. For example, for the bodystorming sessions I developed a system of straps and harnesses that were worn around the body and allowed suspending and moving a person mid-air in various postures held by 4-5 people. It turned out to be a unique choreographic tool for simulating various gravitational experiences, but also a pedagogical device that I have been using for various performative lectures to illustrate certain insights into the subtleties of the bodily experiences of zero gravity.

In fact, this research is abound with such unique methods, the majority of which is of my coinage. Under the umbrella term of Gravitational Aesthetics, I have established Critical Vertigo, Design Choreography, Expanded Field of Sci-fi, Exodisciplinarity, Gravitational Readymades, Gravitational Relativism, Highbrow Fairground, and Vehicular Poetics—methodologies and approaches examining the complexity of the cross-interactions between gravity, aesthetics, technologies, and philosophy to create revelatory and enriching experiences that engage the whole body and imagination. Choreographing the bodies through things, imagining alternative gravities, and provoking the innards shaken by souped-up vehicles to think are a few examples of gravitational aesthetics.

Design choreography and vehicular poetics have received most of my attention, and have been extensively employed in my artistic research via written word and various artistic projects.

Design choreography focuses on the unique choreographic power of things and the material environment to affect our movements, to "dance" our bodies. Shifting the creative attention from conventional design and architecture goals such as usability, visual appearance, semantics, economy, ecology, and safety to the conditions and effects of design choreography, I propose an alternative and dancing-experience-oriented design approach. Design here, in essence, is turning its attention to kin*aesthetic* and whole-body-engaging dimensions of things. It encourages moving the body(ies) instead of pushing image or word.

Vehicular poetics is concerned with the poetic potential of human locomotion, particularly the technological means that actively assist, amplify, or hinder human movement, for example, cars, roller

coasters, etc. It is neither vehicle design nor poetry on transportation. Not interested in the comfort or ergonomics of travel, this creative approach shifts its creative attention from the efficiency of displacement—the design metrics of moving from A to B—to the experiential poetics of the very commuting. Namely, vehicular poetics focuses on the aesthetic, imaginary, and evocative qualities of travel. Yet, by its function the design object here is a vehicle, a technical means used to transport people, but also, and more importantly, a narrative vehicle carrying its passenger to the aesthetic realms of poeticised travel, be it physical or imaginary.

Gravitational aesthetics focuses on bodily experiences, and by bodily I mean including sensual, psychological, social, and imaginary dimensions. Since all the qualities converge and manifest themselves in the human ability of locomotion—both bodily and technological—a prerequisite for perception,[1] gravitational aesthetics is concerned with human movement and orientation in space, in other words, motility, mobility, and choreography. And this is where gravity plays the key role—it is a reference point from which orientation in space makes sense. Alter the relationship with gravity, and all the dimensions of the embodied experience are altered accordingly. Think, for example, of the orbiting habitat eliminating gravity or, to put it more technically, the experience of weight. It is radically altering the astronaut's perception of space and locomotion since there is no difference of "up" and "down" nor between the usage of hands and legs. Moreover, there are many more perceptual changes such as the diminished sense of taste, or handicapped facial expressions and thus also interpersonal communication due to the redistribution of the bodily fluids. However, gravity becomes even more noticeable—astronauts need to deliberately exercise to compensate the loss of muscle and bone density; and to orient themselves, they have to imagine the terrestrial dimensions by feigning a certain plane as "vertical" or "horizontal".

1 In phenomenology, the way in which one moves is considered to influence one's adaptation to the environment, other individuals, and experience of the self. Our movement affects our interaction with people and things, and the way in which people and things move affects our perception of others as well as our sense of self in the environment and in our interactions.

Merleau-Ponty, M., 2002. *Phenomenology of perception*. Translated from French by C. Smith. London: Routledge, pp. 112-171.

Gibson, J.J., 1986. *The ecological approach to visual perception*. Hillsdale, N.J.: Lawrence Erlbaum Associates.

Acknowledging that no single g-field is the yard-stick for embodiment, the research framework is experimental, dynamic, and in-becoming, aiming at destabilising both the body and its habits, constantly searching for new bodily dimensions and its multiple gravities-realities. What remains stable here is just gravity, which itself is grasped only by instability, the cultivated loss of balance of the body. This approach directly echoes the consideration of the body as a dynamic, dancing, and constantly in-becoming entity, which makes living and experiencing possible. These bodily qualities, however, are largely absent in today's mainstream design world preoccupied with a shallow and narrow understanding of the body that is reduced to its surface or "skinbag", in the words of Andy Clark, or textual meanings and interpretations, or to separated—especially the visualist—sensorial qualities[2]. Gravitational aesthetics responds to this deprivation of the bodily richness, but does not limit itself to the extended insights into the body's qualities—it rather aims to constantly seek new definitions as well as to explore the potentials of the established ones by energising the body—by choreographing its movements, destabilising it to induce self-awareness, introducing to new physical dimensions, and nurturing the possibilities of imagined gravity.

As an example of such an approach, the French philosopher and architect Paul Virilio's idea of oblique architecture—a habitat with inclined floors and walls that force inhabitants to constantly bodily negotiate gravity—introduced the body as a dancing body, an "energised body, that is a body with reflexes and anticipatory qualities, a body that is constantly in-becoming."[3] Living on sloped planes that required climbing and descending as a part of living, according to Virilio, heightened bodily awareness, thus space was perceived not visually, but rather through the body, and habitation was open to new modes of living where the passive and the active, rest and dance merged.

2 I familiarised myself with the genealogy of ocularcentrism (the privileging of vision in Western thought and culture) via extensive writings by Jonathan Crary, Martin Jay and David Michael Levin, but the most relevant ones were Richard Shusterman and Any Clark. Shusterman points out that much of modern aesthetics assumes an "armchair" model of detached looking, while his somaesthetic approach insists on the embodied, multisensory, and performative dimensions of art and life. Meanwhile, Clark contrasts the idea of a self bounded by the skin (what he calls the "skinbag" conception of the self) with his own extended mind view, where the body and identity stretch into tools, technologies, and environments.

In fact, gravitational aesthetics approach is not new—there is quite a number of individual examples of artistic, design, architectural, and engineering work that might be "labelled" as such. These examples abound yet there is no person who has/had pursued an extensive and systematic study in this area. This research—including my extensive list of publications—partially aspires to this remedial post by surveying the examples and designing new ones, striving to unify and synthesise them in a single creative approach, and give it poetic orientation, something that the individual can apply to an artistic or design practice.

As to the examples of relevant artistic or design-led practice, there are few creators, but the most productive ones could be found in the disciplines of choreography, architecture, amusement ride engineering, and vehicle design. For example, Paul Virilio and Claude Parent had been working on new architectural habitation modes by altering relationship with gravity. the artist Carsten Holler has been relocating funfair machinery from parks to galleries, hence coating the thrill with conceptual and poetic layers. The Belgian artist Panamarenko has envisaged thoroughly and poetically the most diverse means of transport that introduce unique potentials for fantastic travelling trajectories and orientations, challenging prejudices of what gravity is and how it could be defied or harnessed, mostly by imagination. The Art Catalyst's curated projects and participant artists have been creatively investigating the topics of weightlessness and altered gravities; however, they are sporadic and the majority of the projects would work in earthly gravity with no big difference. One exception is Kitsou Dubois' choreographic work produced specifically for weightless environment, which, besides introducing a new vocabulary of dance aesthetics, also had a pragmatic approach aimed at helping astronauts better adapt to their space habitat.[4] There are also a handful of other choreographers who have been exploring deliberately the phenomena of gravity, mostly with the help of special—appropriated, customised, or invented—contraptions. The following are a few names of such choreographers, who will

4 In 1999, The Arts Catalyst initiated a long-term collaboration between Dr Dubois and the Biodynamics research group at Imperial College to investigate the control of the bodies in altered states of gravity, including weightlessness. The team participated in 7 parabolic "zero gravity" flights with the European Space Agency in Bordeaux, France, and the Gagarin Cosmonaut Training Centre, Russia. Outputs included a series of video installations, performances and demonstrations, as well as masterclasses and a scientific paper.

be considered as the most relevant for the thesis: Trisha Brown, William Forsythe, and Elizabeth Streb.

As for the most extensive theoretical work done in this area, Paul Virilio's writings are perhaps the most substantial. Analysing the ways of how technologies change our orientation in space, locomotion, and, most importantly for him, speed, he demonstrates that these changes affect our perception, bodily experiences, behaviour, and thinking. Although he quite rarely mentions explicitly what role gravity plays in his work, yet deciphering his at times elusive language and asking him directly on these matters, it becomes clear he is not indifferent to this force and holds that "[w]eight and gravity are key elements in the organisation of perception."[5] What makes his work less relevant to the thesis, however, is that it is too fragmentary—rarely referring to "real" empirical observations, let alone extensive and rigorous study of particular technologies, situations, or experiences. Furthermore, he tends to generalise technologies and attack them almost always with an alarming tone. Nevertheless, Virilio's ideas and quotes have been inspiring and facilitating the research, and appear occasionally throughout the thesis.
Other writers such as Italo Calvino and Gaston Bachelard have written on the poetics of gravity, and could add to the list of the thinkers of gravitational aesthetics, but their work is largely restricted to the literary arts. Therefore, they also serve the thesis just for a few quotes and poetic clarifications of some gravitational aesthetics ideas. More recently, in 2004, Dr Catherine James gained her doctorate at the London Consortium (Tate, ICA and AA), focusing on the theme of gravity in art, particularly, painting, graphic arts, and sculpture.[6] In general, the work deals with visual culture, more precisely, the hermeneutics of images, and has very little to do with phenomenological insights of gravitational bodily experiences that my thesis focuses on. For the latter reason, it was informative and helpful more as an extensive database of unique gravitational artefacts. In 2005, the online scholarly journal *Contemporary Aesthetics* published a special issue with 10 articles dealing "with questions of aesthetics in the context of mobility, i.e., in connection with traffic, mobile information technology, tourism, sports, arts involving or thematising movement, and other mobile phenomena, many of which play a crucial role in the contemporary world."[7] Also, there is a wide range of practices around mobile participatory art today, which might involve acoustic walks, psychogeographic drifts,

site-specific storytelling, public annotation, digital graffiti, collaborative cartography, mobile gaming, balloon surveillance and grassroots mapping projects, bike-riding experimental theatre, and "mixed-reality" interactions.[8] They inform certain points of my research, mostly in terms of technology-mediated choreography, but very few have a direct connection with the topic of gravitational aesthetics.

Curatorial practice is also considered as a relevant reference for the research, but also as a method of enquiry. As a result, many examples used in my research came from exhibitions that I visited myself or analysed their catalogues. One of the most influential exhibitions was *Move. Choreographing You: Art and Dance Since the 1960s*, 2011, Hayward Gallery, London, UK, that presented a collection of artworks that exemplified various historical and current relationships between visual arts and dance. Not only has it been a great bibliographical source that helped me establish the approach of design choreography, but it also served as a test site for my double weight costume (see more on this in "Wearable Mass"). Other, less influential shows included *Gravity Art* (2008), curated by Rene Daalder for Telic Arts Exchange. It featured 31 conceptual filmmakers who had used gravity as their creative medium or topic. I found a few intriguing artworks such as the filmic studies of the act of falling by the Dutch artist Bas Jan Ader, although I could not find where to fit these works in the thesis. However, together with movies for large screens such as *2001: Space Odyssey* (1968) by Stanley Kubrick or *Inception* (2010) by Christopher Nolan, they made me to think of how gravitational aesthetics could function within such a feigned realm, but also serve as a unique method of creating and transmitting bodily experiences to the public remotely and exclusively visually. On the other hand, the exhibition helped demarcate the scope of my research and single out gravitational artefacts for further analysis. Since the exhibited works were restricted to a singular (filmic) medium, so was the experience limited to the eye; and even further from the purposes of my research project, it dealt with symbolism, conceptualisation, and interpretation of the metaphors related to gravity. Quite similar issues, both inspiring and informing, follow other exhibitions such as *Defying Gravity: Contemporary Art and Flight* (2003), held at the North Carolina Museum of Art, US, which exhibited artistic work celebrating aviation and imagination through art created during the last twenty-

five years; or *SpacePlace: Art in the Age of Orbitization*, an online exhibition curated by ZKM (2006); more recently, in 2011, *The Art of Flying*, curated by Thomas Hauschild and Britta Heinrich at the House of World Cultures, Berlin, Germany, that explored how the desire to fly is a universal human trait that has decisively influenced some of our greatest achievements.

This investigation may unfold within a Lithuanian lineage of experimental art that is both local and international. For example, the Fluxus movement, initiated by the Lithuanian émigré George Mačiūnas, provides an important precedent: its "event scores" treated ordinary bodily actions—falling, balancing, stumbling—as aesthetic material. Such practices resonate with my notion of design choreography, where gravity is not background but medium. But a long art-historical review of such instances wouldn't advance my project's empirical-technical core, and would re-center interpretation over embodied experimentation, misaligning methods and diluting the contribution. Closer to the present, the choreographer Erika Vizbaraitė's *Apnea* (2020) develops a sustained, research-based exploration of breath-holding across four states—on land, in water, in sleep, and in death—combining choreographic experiment with physiological self-testing. *Apnea's* controlled deprivation and buoyant immersion provide a local, contemporary analogue to my own carnal experiments: both practices manipulate basic life-support variables (air, pressure, tempo) to recompose proprioception, social spacing, and felt gravity—preparing the ground for my research on levitating. Even more recently, since 2021, we have been collaborating on a project that combines a robotic amusement ride with live dance performance.

Searching for a relevant writing approach, style and personal "voice", I've been writing in both conventional academic ways and more experimental techniques spanning the forms of fiction, observation log, diary, autobiography, etc., or hybrid forms of them. I wanted to echo the eclectic and interdisciplinary background of the project but also create a lively encounter with the examined phenomena. Having written a dozen of essay-like texts, varying in style, structure, and length, I found that an autobiographic-phenomenological analysis mated with speculative fiction writing works best in terms of relevancy to the thesis, efficiency of writing, and uniqueness. The text mostly revolves around introspective

empirical evidence, but when I reach personal limits and the limits of my knowledge, I shift towards extrospection and even a sort of speculative phenomenology. This customised writing approach supports the idea of the experiential journey, writing in such a way that the reader would sensually encounter the material entities analysed by the texts: technologies, designs, artworks, bodily techniques, etc. Thus, the texts written in this way might be taken as a sort of experiential vocabulary of gravitational aesthetics.

The research journey has been quite full of rearrangements, diversions, discoveries, and failures, yet the thesis is organised simply in five sections: "Introduction", "Standing","Falling", "Levitating", and "Glossary".

The first section introduces to the key components of the research: questions, aims, objectives, relevancy, and methodology, starting with an inaugural essay that briefly presents the impact gravity has had on the human evolution and technological progress, and sort of sets the tone for the following three chapters representing the fundamental interactions with gravity: resisting (standing), giving up (falling), and escaping (levitating) it. The survey does an artistic-cum-(post)phenomenological enquiry into the experiential peculiarities of various technologies that mediate our relationship with gravity. Embedded into the study my projects expand an experiential vocabulary for the establishment of various unique methods of gravitational aesthetics. The selected methods are collected and presented in a condensed format in the section "Glossary". The fourth, final section concludes the thesis by summarising the major arguments, findings, strengths and weaknesses, giving suggestions to future practitioners and scholars interested in the topic.

The thesis does not seek to become a complete primer of such a creative paradigm; it is rather meant to serve as a rudimentary basis for the future development of such field, but also an inspirational material open to wider creative employment and interpretation by art, design, and architecture professionals.

Postphenomenological perspective: bodies, technologies, aesthetics, experimentation

At the beginning of the research, I was reading extensively various "phenomenologies" of technology, especially those by Paul Virilio, Martin Heidegger, and others that I found somewhat related to my topic. Soon, I found them quite similar in the way they, as it seemed to me, used ample generalisations, dystopian tone, or exercised a romantic inclination towards negative criticism of technologies.[9] Sometimes it felt the insights and arguments of the writings contradicted my experience or were too much conceptualised and sort of soaring in the air. Eventually, this observation and minor dissatisfaction made me search for other thinkers. I turned to more recent phenomenologists and soon came across Don Ihde, whose theory and mode of thought healed my criticism of the classical phenomenologists. I made it one of the key philosophical perspectives of the thesis.

First, why phenomenology? As the very focus of the project is experience, or, to be more precise, aesthetic experiences mediated or affected by gravity-related technologies, there are not so many options but a few philosophies such as phenomenology and pragmatism that place experience in the central role for analysis.

The classical phenomenologist Maurice Merleau-Ponty repeatedly emphasised our "being in the world" as grounded in gravitational forces. His accounts of posture, equilibrium, and the body schema implicitly treated gravity as a constant background condition of human embodiment. For Merleau-Ponty, the body is the "vehicle of being-in-the-world".

While "doing" phenomenology, in the beginning, I was reading works in philosophy of technology by such figures as Paul Virilio, Bernard Stiegler, Bruno Latour, Graham Harman, and soon realised

9 Actually, I am not alone here, as Virilio's work has been judged by some philosophers to be overly negative or pessimistic with regard to technological development. Some of the instances could be found in Virilio's discussions on technology and politics with Philippe Petit. Virilio, P., 1999. *The Politics of the very worst*. New York: Semiotext(e), p. 47. As to Heidegger, a nice survey of what I mean by romantic inclination or what Don Ihde calls "techno-romanticism" could be found in his book *Heidegger's technologies: Postphenomenological perspectives* (2010).

they are all basing their thoughts on phenomenology; some explicitly, some less so.[10] This culminated in reading Don Ihde's work and focusing on his postphenomenology which blends classical phenomenology, pragmatism, hermeneutics, philosophy of technology and science. I chose this strand of thought not only because of its focus on experience, but also because it felt more grounded in contemporaneity, its rigorous inclusion of philosophy of technology, extended hermeneutics, and "down-to-earth" pragmatic perspective.

Coining the title "postphenomenology," Don Ihde marks a break-up from the classical phenomenology and calls for the need to adapt it to the contemporary world saturated with the abundance of various technologies and sciences. This modification of phenomenology responds and adapts to radical changes in philosophies, technologies, and sciences: philosophies—bodily, thingly and empirical turn; technologies—miniaturisation, rapid increase in the technological expansion both outwards and inwards the body, diversification of the nature (bio, nano, quantum, etc.); sciences—science is today understood as encultured, political, engendered, empirical, and technologised[11].

To overcome what Ihde observes as the common interpretation of classical phenomenology as a "subjective" style of philosophy, Ihde mates it with pragmatism, as well as experience-based philosophy, especially that of John Dewey's. Pragmatism is chosen not accidentally—it has many connections with phenomenology, both theoretical and time-related (both were developed at the same time). Plus, both philosophies share an experimental methodology. Phenomenology's experiments are conducted according to a carefully worked out set of controls and methods that are more rigorous than those of pragmatism.[12] It is relevant to note that what is seen as aesthetic, especially in Dewey's perspective, is a sort of successful experiential experiment, "an organic whole with its own pervading quality that stands out from the normal run of life, such as a special meal, a storm at sea, a transforming conversation and thus do not require a "work of art".[13] Rather, it is "the clarified and intensified development of traits that belong to every normally complete experience."[14] This nicely echoes my decision to not discriminate art or design against the domains of engineering, technologies, medicine, pop culture or entertainment, etc. Moreover, my take on aesthetics treats it not so much as some sort of intrinsic quality of things,

but an approach, a revelatory study, studying and establishing new ways of perceiving the world, the perspective which directly refers to postphenomenology's interests: "postphenomenology is interested in finding out how technologies mediate our experience in various ways rather than seeking one method which reveals single essences."[15] This is the key approach I use to analyse the gravitational phenomena in this thesis.

As to the methodology of phenomenology, it is important to mention the key elements that shape experiential analysis: *variational theory*, *embodiment*, and the concept of the *lifeworld*. For the first element, *variations* are used to determine the "essences" of experienced objects. It is done by describing my perception without any preconceptions or prior knowledge—I look, listen, feel, and describe again and again, always with reference to emotional, textural, or tangible qualities like rough and smooth, small and large, thrilled or calm, vertiginous or oriented, etc.: descriptions with a context in experiencing. Then, varying the frames of reference and the perspectives, employing polarities and reversals, different moods, spatiotemporal conditions, etc., I synthesise the condition or quality without which a thing would not be what it is: the very essence of the inquired object.[16] However, Don Ihde emphasises that things have more "essences" or complex structures, or what he calls *multistabilities*, thus decentralising the very definitions, creating a sort of networks of "centres" or phenomenological nodes. A roller coaster is an amusement ride, but it could also be considered as a unique kinetic sculptural-architectural object, an escape vehicle used for emergencies on a rocket launch pad, or even a killing machine, etc. Moreover, it could be something else that has not yet manifested itself. Thus, what multistability basically means is that anything could be many things at the same time, some of them known, and others yet to be discovered. In other words, this approach treats things as inexhaustible source of exploration, full of open potentialities for new experiences and speculative-phenomenological insights. This pluralistic approach is extensively used in my investigation of gravity-related phenomena.

As to *embodiment,* it is already implied in the variation of phenomena. For example, changing the position of the body changes the point of view, and thus a new perspective—an alternative visual (or any other sensual) variant—on the visible object is introduced. Thus, it implies

that movement is a prerequisite for perception. In phenomenology, the way in which one moves is considered to influence one's adaptation to the environment, other individuals, and experience of the self. Our movement affects our interaction with people and things, and the way people and things move affects our perception of others as well as our sense of self in the environment and in our interactions. Such theorists as Paul Virilio,[17] Tim Ingold[18] and Don Ihde[19] have written extensively on how (embodied) technologies that alter our bodily movements and orientation simultaneously choreograph our perception and experience of the surrounding space and ourselves. "Embodiment is, in practice, the way in which we engage our environment or "world," and while we may not often explicitly attend to it, many of these actions incorporate the use of artefacts or technologies."[20] The car, for example, mediates the human's locomotion, speeding up one's pace, and introducing unique landscape imagery akin to a road movie, but also constraining the driver's perception by the infrastructure of the automobile— tactile contact with a tree or a building is prevented. The telephone mediates conversing, eliminating the need for the involvement of the feet in socialising, but also excluding bodily language. It is important to note that such things are often embodied or *incorporated* in such a way that they (quasi)disappear, that is, become part of us, our tacit bodily being. Therefore, for analysing embodiment, the model of cross-mediating experience is used basing on the relationship "human<>technologies<>experience".

The concept of the *lifeworld* (German: Lebenswelt) may be conceived as a universe of what is self-evident or given, in both its physical and cultural-social dimensions. In other words, it emphasises the fact that humans, things, and their surroundings are inexorably intertwined together, and thus are understood only by delving into their lifeworlds.

Once a comprehensive investigation and characterisation of the entire horizon of a thing is done, then it is usually subjected to *hermeneutics*, the art of interpreting, explaining, and translating the meanings of things (or usually texts). I do it as well, interpreting and juxtaposing phenomenologically described experiences (or essences) in regard to gravitational aesthetics, supplementing them with conceptual, scientific, or technical notes, and connecting with (or positioning within) certain references from art, fiction literature, cinema, poetry, etc. This eclectic and dynamic approach also echoes the extended definition of aesthetics, a rich concoction of both

form-centred and content-centred aesthetics that I also apply to studio work. This approach aims at intermingling sensory-aesthetic appreciation (aisthesis, e.g., feelings, emotions, sensorial textures, tangible grasp) with contemplation-oriented (e.g., reception and reflection of meanings or conveyed messages) approach. To interpret and incorporate it in material form, my projects have no pivotal "function" or "meaning", but are multilayered and understood in regard to context. Take my *Euthanasia Coaster*. It is designed as an object that is rich both bodily-experience-wise (e.g. sensations of the ride, tactile and visual sense of speed, thrilling elements, pleasurable death, etc.) and conceptually (an object for contemplation, critical discourse, a sci-fi narrative, a pedagogical device), and is thus open for diverse receptions/interpretations.

The gravitational aesthetics approach and the practice-led research method correlate with material hermeneutics, also an integral part of postphenomenology.[21] What this type of hermeneutics is meant to indicate is the sensitivity of material entities to the activity of interpretation, such that meaning or significance can be read out of, rather than just into, what are otherwise non-linguistic items. Such a hermeneutics in natural science, for example, might be illustrated by its imaging practices. Take the technologies of telescopes and microscopes that make visible the things which which previously were not visualisable, such as the mountains of the Moon, the satellites of Jupiter, single-celled animals, plant cells, and even sperm. The objects—both the discovered phenomena and the instruments themselves—of this visual hermeneutics are not texts nor linguistic phenomena, but things which come into vision through instrumental magnifications, allowing perception to go where it had not gone before. Another example, closer to my artistic practice, might be the Bárány chair, a simple swivel seat used in pilot physiology labs. It not only played a crucial role in discovering the vestibular system, but also served as a textbook case of material hermeneutics: a pre-digital instrument that, when inserted into an art context, becomes both an embodied probe and a text for interpreting how gravity and disorientation are materially mediated.[22] It lets Ihde's abstract schema spin you—literally—into felt evidence. In 2014, I restored a Soviet-built Bárány chair and began presenting it in galleries as an "epistemological engine", inviting blindfolded public to ride the chair, triggering spatial hallucinations of tilt, drift, or levitation. The installation was thus half ride, half critical phenomenology lab.

Julijonas Urbonas, *The Bárány Chair*, 198?-2014, various materials, readymade. Installation shot from the solo show *Standing, Falling, Levitating*, Vartai Gallery, Vilnius, 2014. Photo by Arnas Anskaitis.

II.

STANDING

"Today every branch of science seems intent on demonstrating that the world is supported by the most minute entities, such as the messages of DNA, the impulses of neurones, and quarks, and neutrinos wandering through space since the beginning of time...," writes an expert in literary lightness, the Italian writer Italo Calvino in his book *Six Memos for the Next Millennium*.[23]

Such an insight perfectly coincides with the contemporary lived experience of heaviness shaped or, rather, diminished by escalators, power tools, telecommunications, and muscle fatigue blockers. In earlier eras, the experience of weight was a near-constant, integral aspect of daily life—carrying water, walking long distances, manual labour—providing an intimate and continuous familiarity with bodily heft and gravitational pull.

Today, while we still inhabit bodies bound by gravity, much of our environment, work, and recreation have become detached from direct physical encounters with weight. We often engage heaviness only intentionally (through exercise, or tech-mediated

movement such as means of transport including amusement rides) or abstractly (through scales, medical metrics, or anxiety about body image). This has reshaped the phenomenology of weight: from something woven into the fabric of everyday existence to a more compartmentalised, mediated, aestheticised, or even virtual encounter.

It might seem that we live in the era of weightlessness, yet there is more weight than ever: today, the number of obese people is the highest in human history, and novel heft-inducing machines, from gyms to thrill rides, proliferate. At the same time, the repertoire of ways in which a person can consciously experience heaviness has expanded, became more controlled, specialised, and engineered.

Given this insight, I set out to conduct an experiential review of the phenomena of weightiness through the usage of various technologies (including my own art projects as well as those done by others) that heighten the awareness of the body's weight. I'll track the moments when weight comes to my own or somebody else's conscious awareness and perceptual peculiarities open to aesthetic appreciation. What follows is a "heavy" research journey into different ways of experiencing weightiness, roughly grouping weight into three categories: acceleration-based ("Equivalence principle"), add-on ("Wearable mass"), and mental weight ("Ascensional psychology").

The first two categories are directly related to the way physics define weight, which is the force which gravity exerts on an object. In simple terms, it is calculated by multiplying an object's mass (how much matter it has) by the gravitational acceleration (how strong gravity is). Thus, the magnitude of an object's weight is directly proportional to its mass and to the local gravitational acceleration. Mathematically:

Weight = Mass × Gravitational Acceleration

I chose such reference to physics to establish a poetic link to hard science, but also as an organising device for the text. I will show that this formula does not always come true and the phenomenon of experienced weight is much more complicated and nuanced, especially when it comes to something that is difficult if not impossible to define by physics, such as imaginary gravity.

Before delving into the phenomenology of weight, the essay "Standing Up" briefly presents the impact gravity has had on the human evolution, hinting at the hypothesis of the intrinsic creative manifestation of the human-gravity relationship in the development of technologies, and drawing from the phenomenological-anthropological enquiry of the human upright posture. The text implicitly anchors the argument for the study's importance, thereby inaugurating the thesis.

Prologue

Standing Up: The Origins of How Gravity, the Human, and Technology Overlapped

The pre-human stood up and became a human. Erecting ourselves against gravity skywards, we literally and symbolically moved away from the ground and acquired an unprecedented distinction: the upright posture. Since then, standing has been considered evidence of humans' intrinsic ability to negotiate creatively with gravity. "Upright posture characterises the human species," writes Erwin Straus, well-known for his work on how this posture has played a significant role in human evolution and development.[24]

Although gravity may seem inconspicuous in our daily lives, its impact is such that our evolution would be unthinkable without it. Gravity has both burdened and inspired living beings, compelling humans in particular to develop various technologies to counter or negotiate its force. This has made gravity a key element in human development, leading to changes in our perceptual capacities and a host of inventions, both pragmatic and poetic, like rockets, shoes, and roller coasters.

Today, as humans have developed to be standing creatures, we create and enjoy a myriad of gravity-related activities. It should come as no surprise that most of these activities provide unprecedented

forms and modalities of perception with corresponding aesthetic qualities. While gravity has always remained constant, recently we have been defying and experiencing it in extraordinary ways. One of the key drivers of technological development in our negotiations with gravity includes the pursuit of lightness and balance, manifesting itself in technologies like powered exoskeletons, orbiting satellites, or even muscular fatigue blockers. They all create new possibilities for new types of locomotion and consequently new types of perception. Little by little, we have been raising ourselves away from the ground: humans stood up, took off, and flew away, eventually reaching escape velocity and escaping Earth's gravity.

The capacity to counteract and appropriate gravity has been a vital and intrinsic feature of all living organisms. On the one hand, gravity has forced these organisms to develop skeletons and systems, from bones to muscles, which help to retain form and overcome gravity-enforced size limits. On the other hand, gravity's downward force, which is constant and has a fixed direction, has been used as an appropriate cue for orientation and postural control.[25] Nevertheless, humans have gone even further by attaining the ability to radically alter their relationship with gravity or even escape it. It is this new mode of gravitational life that made us homo sapiens.

The idea that bipedal locomotion liberates the hands and endows human

beings with an intellectual advantage–or, rather, more ecoethically put, peculiarity––over all other creatures has been argued by many theorists. This idea can be traced back to classical Antiquity and found in the writings of Xenophon, Aristotle, Vitruvius, and Gregory of Nyssa.[26] It was also commonplace among the naturalists of the 18th and early 19th centuries, such as Charles Darwin, and continued in the work of Erwin Straus, Andre Leroi-Gourghan and most recently Craig Stanford.[27] For instance, Erwin Straus notes that the upright posture gave rise to a type of locomotion that would affect the development of human anatomy ("[G]ravity is never fully overcome; upright posture always maintains its character of counteraction. It calls for our activity and attention.") and perceptual conditions (the particular "gaze of upright posture"). These developments in turn gave birth to human characteristics such as self-awareness, intelligence, planning, and language.[28]

Once we stood up, we began to acquire the gaze of an upright being, offering broad perspectives and views on the world that would allow us to plan and order the environment. Unlike non-human primates who use their hands to move around, we humans found our hands liberated and could start playing around with our environment while inventing tools to understand it better and to harness or alter it for our needs. In other words, by erecting or raising the body away from the ground we literally moved away from "nature" (by

nature here I mean a previous non- or less technological state); or as Wills David, quoting Leroi Gourhan, puts it in his book *Dorsality*: "standing upright the simian turned anthropoid and, in so doing, immediately turned technological."[29] Rather than considering how human nature was confronted with technology, Wills suggests we imagine an overlapping of nature and technology that begins with a dorsal turn (the straightening of our back)––"a turn that takes place behind our back, outside our field of vision."[30] If technology is an integral part of the human, we must not forget that the impetus of such a development is the adaptation to a terrestrial environment governed by gravity.

"To posit that man walks on two feet is also to posit everything implied by feet. That is where man begins: with his feet, and not with his brain," claims Leroi Gourhan.[31] If man begins with his feet, we are acrobats, that is, *high walkers* (acrobat in ancient Greek means high walker), possessing unique capabilities to defy gravity. A question arises: is the connection between this event of standing up and our great dream of flying or attaining ultimate lightness a coincidence?

Maybe "standing up" was itself an expression of that dream. Whatever it was, the posture has had an enormous effect on what we are, what we desire, and what we invent. "If the greatest human responsibility––both physical and moral––is the responsibility for our verticality, that makes us dynamically upright, that arches our body from

31 Crucial to Leroi-Gourhan's understanding of human evolution is the notion that the transition to bipedality freed the hands for grasping and the face for gesturing and speaking, and thus that the development of the cortex, technology, and language all follow from the adoption of an upright stance.

Stiegler, B.,1998) *Technics and time*. Stanford: Stanford University Press, p. 112.

the heels to the neck, that rids us of our weight, that gives us our first and only aerial experience! How salutary, comforting, marvellous, and moving this dream must be!" Gaston Bachelard writes in admiration of vertical posture.[32]

Could we deduce that technological advancement might be largely driven by a tendency to lessen physical effort, lessen earthly life's burdensomeness? Isn't our upright posture already evidence of this hypothetical tendency? Marshall McLuhan asserted that technologies are a kind of materialisation of an economy of gesture––"the immediate expression of any physical pressure which impels us to outer or to extend ourselves, whether in words or in wheels."[33] Paul Virilio would add that "the progress of contemporary technoscience is itself conditioned by the need to economise the efforts of the individual subject to Earth's gravity and therefore to the nervous and muscular fatigue resulting from his own mass and physiological density."[34]

Aren't we bound inescapably to a gravity-driven surface in the absence of technological developments? Do such technologies—from shoes to spacecraft—that are used to lift us from this surface hint at an ultimate goal of leaving the ground entirely? And if we did lift off and away, what new human features would we develop?

Equivalence Principle

According to the equivalence principle of Einstein's general relativity theory, gravitational force is the same as the effect caused by an acceleration, therefore, experienced weight increases with increasing acceleration. If you have visited an amusement park and swirled in a centrifuge or rode a roller coaster, you already know what it is like to feel the fluctuating weight of your own body, and thus might have noticed a close resemblance between the gravitational force and the effects of acceleration.

An amusement park, or gravitational theatre, as I like to call it, is equipped with kinetic machines that might serve as educational props for familiarising with this equivalence principle intimately. Here you can find acceleration probably in all possible forms of motion: spinning, spiralling, swinging, rocking, oscillating, and so forth. As non practical, non-destination-oriented means of transport, these machines in fact transport you into different worlds of gravitational fields: extreme or absent, fluctuating or slowly pulsing, changing its direction or exposing your individual body parts to gravities of different size. And it is done in such a directed, composed, choreographed way that I can't help but liken it to theatre or, better, label it as gravitational art. Even more, the majority of these kinetic apparatuses are open for your deep bodily submission, twisting your guts, circulating the inner bodily fluids in new directions and speeds,

shaking and rattling the muscles and bones, and disorienting the psyche.

In my artistic research, I have been employing the means of revolving humans and non-humans as one of the easiest and economical ways of producing a simulated form of gravity aka artificial gravity or *g*-force[35]. As an example, let me take you on a ride of my *Cerebral Spinner*, a multifunctional spinning venue that could be used as a high *g*-force stage, a highbrow amusement ride, a revolving lecture auditorium, or a kinetic public square. The machine is a circular structure containing a spinning platform that can accommodate a group of people – whether performers or spectators – around its spinning centre. Under motion, the spinner is capable of "pinning" thirty people to its circular wall due to the centripetal acceleration. The modular wall consists of an array of curvilinear elements, shaped in such a way that, once at full speed, the riders' bodies slide upwards the surface, leave the floor, and then suspend in mid-air.

35 G-force is a way of expressing acceleration in terms of the acceleration due to Earth's gravity. One "*g*" is equivalent to the acceleration caused by gravity at Earth's surface, which is about 9.8 meters per second squared (m/s^2). When you hear someone mention "2 *g*'s" or "3 *g*'s", they mean an acceleration that is two or three times 9.8 m/s^2, respectively.

Once inside the prototype of the machine, I lean against one of these morphed wall panels. With increasing rotational velocity, I feel the outward force is increasingly taking over that of downward force of gravity, thus forcing my body upwards the slant and ripping off from the floor. At full speed, I feel I am sort of "superlying" vertically, as my back is so stuck that it is hard to move limbs and head. But if I try hard and with great care, now I can even stand horizontally. Once succeeded, I soon

find myself super focused and thoughtful of any tiny bodily movement, just to sustain my upright––or rather inward (>-|o ·)––posture. Balancing is much more difficult here in comparison to the stable horizontal ground not just because of my double or triple weight, but due to the variable distribution of the force along the body, as the strength of *g*-force is proportional to the body's distance from the spinning centre. The force decreases with smaller rotation radius, thus in *Cerebral Spinner* my feet feel greater force (about 3 *g*) than my head (about 2 *g*). Even more complicated is walking. Trying to walk or run forward or backward, that is, with or against the rotation tangent, I feel heavier or lighter. Even more thrilling, as well as dangerous, are head movements; just performed a slight tilt, and the rush of vertigo made me fall down, or, to be more exact––fall outwards, which is extremely painful. Hypergravitational fall it is! The culprit of these sensations is the Coriolis effect[36], proving that centripetal-acceleration-based artificial gravity is quite different from Earth's gravity. It requires a set of new skills of bodily coordination and orientation.

36 The Coriolis effect is a force that is found in a rotating object. Gaspard Gustave de Coriolis first described the Coriolis effect in 1835 using mathematics. The Coriolis effect can best be seen in hurricanes. In the Northern Hemisphere, they spin counter-clockwise (because the Earth spins counter-clockwise), and in the Southern Hemisphere they spin clockwise.

Here, on Earth, our orientation in space is largely governed by relationship with gravity. Consider the sense of direction. As a result of the presence of gravity and its effect on the body, that is, the effort required to move in any given direction, we know the directions of down and up. Regarding that anisotropic character, that is, being directionally dependent, we differentiate horizontal

dimension, which, due to the phenomenon of the bodily construct, might be branched into the four other directions: left, right, front, and back. When we are standing on Earth, up and down are distinct and irreversible directions. However, back, front, right and left can be changed in our frame of reference by simply turning around. Hence, when standing in Earth gravity, the number of principal directions is reduced to the three: up, down and horizontal. These correspond or perhaps have given rise to the three basic architectural elements: the ceiling or roof, the floor, and the walls.[37]

In *Cerebral Spinner* (2021), or actually in any other centrifuge, the only viable means of providing prolonged artificial gravity[38], there are other directions to be considered due to Coriolis effects, as I have just experienced riding it. Space architects, speculating on the architecture of artificial gravity or centrifuge-led outer space habitat for the emulation of the effects of gravity felt on a planetary surface, call the orientation cues as follows: up (toward the centre of rotation), down (away from the centre), east (tangential with the rotation), west (tangential against the rotation) and axial (parallel to the axis of rotation)[39]. Unlike centripetal acceleration, which provides a constant sense of vertical, Coriolis acceleration and cross-coupled rotations are transient, proportionally related to an inhabitant's motion. The transients might catch an inhabitant off guard as they sit down, stand up, walk, tilt their heads, and go through myriad ordinary actions––exactly what I have

experienced on the *Spinner*. Since in order to maintain the sense of orientation and adapt to such an environment, with respect to the rotation, an inhabitant has to be aware of these spatial peculiarities, it is one of the most important issues for artificial gravity architecture:

"The emergence of east and west as gravitationally distinct directions, the concave landscape, the inversion of earth and sky, and the rotating celestial scene, combine to present a profoundly abnormal environment that artificial-gravity design studies have yet to come to terms with."[40]

When it comes to the history of artificial gravity experiments, they have mostly been limited to strictly scientific––physiological, cognitive, and psychosocial––fields. Partly to fill the gap, namely to test art under heightened force of gravity, I've developed a series of various spinning environments open for artistic exploration. For example, I built *Cerebral Spinner* with an aim to use it as a venue for exhibitions, performances, and lectures––a sort of project space for researching the effects of hypergravity upon thinking, imagination, and aesthetic appreciation. However, the project is still in a prototyping stage, and the outcome is yet to be seen.

One of the most tested revolving platforms was used in the opera *Honey, Moon!*. It was a sort of repurposed scientific human centrifuge[41] fused with a grand piano, which I later improved for a long term performance piece exploring

41 Human centrifuges are training devices for acceleration aspects of complex flight missions, and a tool that aeromedical scientists use to study effects of g-forces on human body and equipment.

Julijonas Urbonas, *Cerebral Spinner*, 2021, 1:50 scale model, PMMA, stainless steel. Photo by Karolis Milaševičius.

Julijonas Urbonas, *Hypergravitational Piano*, 2018, grand piano, custom electromechanics, stainless steel, acrylic marker scribbles. Installation shot from the solo show *Planet of People*, Vartai Gallery, Vilnius, 2018. Photo by Aistė Valiūtė and Daumantas Plechavičius.

Julijonas Urbonas, *Cumspin*, 2015, 1:50 scale model, custom electronics, electromechanics, LED display, stainless steel. Installation shot from the solo show *Cumspin*, Vartai Gallery, Vilnius, 2016. Photo by Aistė Valiūtė and Daumantas Plechavičius.

Cumspin is an orgasm enhancing funfair machine. Based on the principle of a centrifuge, it exposes the love riders to variable gravitational forces. Such an extreme sex environment not only introduces new love making positions, but also pushes the peaks of pleasure to new dimensions.

Spinning in one of the eight spherical capsules, the lovers may control the centripetal force by changing the distance between the axis and the capsule. The farther from the axis, the greater the force that pushes them against the wall. The riders would have to coordinate their movements with the forces to control the flow of blood in their bodies. Pumping blood in and out of the love parts would heighten intercourse or masturbatory sensations. Meanwhile, directing the blood to the lower extremities would cause a sudden loss of oxygen flow to the brain, accompanied by a surge of euphoria. The latter, in tandem with orgasm, triggers a sensation that is beyond any definition of pleasure. Hypergravitational orgasm.

Julijonas Urbonas, *Lawn Centrifuge*, 2022, custom electromechanics, turf, steel. Installation shot from the solo show *Moonshineology*, Vilnius University Observatory, Vilnius, 2023. Photo by Aistė Valiūtė and Daumantas Plechavičius.

Julijonas Urbonas, *Lawn Centrifuge*, installation shot from the show *Media Art is Here*, Karlsruhe Botanical Garden, Karlsruhe, 2025. Photo by Felix Grünschloß.

Lawn Centrifuge is a revolving lawn patch. Buried underneath the grass, a platform spins a disc of sod five metres in diameter. Due to the centrifugal force the grass grows inwards and forms a unique pattern. A piece of kinetic land art, an astrobotanical machine, a green thrill ride, an interspecies carousel.

the effects of high *g*-force on piano music. The first occasion in which *Hypergravitational Piano* was tested was the solo show *Planet of People* at Vartai Gallery. It was staged as a three-month performance-cum-training session with weekly concerts by Gailė Griciūtė, in which we were increasing the speed of the platform and contemplating the effects of altered gravity on both the piano player and the composer, the instrument and the sound, the music and the listenership. Capable of producing 3 *g* (three times greater force than that of Earth's gravity), the centrifuge became a hypergravitational sound-stage. Gailė's brief account of the experience:

"I didn't feel as stable in the way my fingers made contact with the keys, and the way I controlled my body weight, which resulted in a certain tension in my hands and that, of course, affected the sound. The composition that I wrote for the moving prepared piano had certain patterns and quite an open form; I had the freedom to experiment and choose the material. The physical conditions made an impact on my choices of course, but they also conditioned the precision of execution."[42]

In addition to this, the centrifugal force of spinning produced unique gravitational fields that varied at different points in relation to both the player and the piano. As I have already elaborated in riding *Cerebral Spinner*, the force increased when Gailė's body parts moved further away from the spinning axis. Thus, the fingers on the keyboard,

for example, felt a weaker pull than the head or the back. Furthermore, the movement of the playing hands were affected by the complex Coriolis forces, as were the piano strings. The constantly changing orientation of the instrument affected the way the sound was transmitted. I like to think that all of these unique physical and mental conditions gave birth to what can be called an extraterrestrial sound.

Such experiments elicit novel emotional or sensory responses, challenge perceptions, and foster interdisciplinary dialogues, but also could be seen as a sort of analog missions simulating extraterrestrial gravity environments for making art and music, dancing, and just new ways of living, reminding that outer space is not the boundary for art and culture.

Wearable Mass

In 2010, I built an improvised weighted costume[43] weighing around 35 kg, with which I could experience a very crude approximation of normal earth gravity increased by around 150%. The costume was basically a set of wearable garments filled with fine sand––a vest, a helmet, a pair of wristbands, and a pair of trousers with a dozen pockets scattered around my body. While wearing it for a few months, an hour or a few at a time, I was performing my everyday tasks––cooking, sleeping, walking my dog to toilet activities, and occasionally doing something art-related––experimenting

43 Weighted clothing are garments that have heavy materials incorporated into them, to add weight to various parts of the body, usually as part of resistance training. The effect is achieved through attaching weighted pieces to the body (or to other garments) which leave the hands free to grasp objects. Unlike withheld weights or machines, weighted clothing can leave users more able to do a variety of movements and manual labour. In some cases, certain weighted clothing can be worn under normal clothing, to disguise its use to allow exercise in casual environments.

The use of weighted clothing is a form of resistance training, generally a kind of weight training. In addition to the greater effect of gravity on a person, it also adds resistance during ballistic movements, due to more force needed to overcome the inertia of heavier masses, as well as a greater momentum that needs deceleration at the end of the movement to avoid injury. The method may increase muscle mass or lose weight; however, there have been concerns about the safety of some uses of weights, such as wrist and ankle weights.

It is normally done in the form of small weights, attached to increase endurance when performed in long repetitive events, such as running, swimming,

in my studio or attending an exhibition or a concert.

The very first thing that I became aware of was that everyday movements that I had usually been performing seamlessly and almost unconsciously––from just standing to picking up a cup––were brought into the conscious foreground as if they neeedd to be relearnt. At first, my movements were very cumbersome, requiring my full attention and proper planning before executing them. Also, the enlarged volume of my body required new ways of negotiating surroundings and reaching for stuff. In addition to this, as an extra "weight", was my irritated awareness of those particular locations of the garments either due to their loose connections to my body rubbing against my skin, or compression soreness when I tried to fix the former issue by overtightening the straps. Also, worth noting, my weight gain was very localised and far from something overweight people or bodybuilders experience. I could have designed an even more extreme version of the suit covering more areas like fingers and face, but still there would be bodily parts that would be impossible to artificially 'infuse' with weight. For example, eyelids, armpits, or genitals would be either too complicated or painful.

After a few days, slow and meditative, my bodily motility soon incorporated the new body schema[44]––switching from something that I was *thinking about* to that of starting to *live through*. My locomotion was now much smoother, but distances still felt longer and surroundings larger, whilst inhabited or occupied space shrunk. Apparently, I could walk shorter distances, thus approaching and experiencing less territory. Yet, my sluggishness made me notice things that I would not usually pay attention to without the costume. For example, having had two times visited––with and without my costume––the show *Move. Choreographing You: Art and Dance Since the 1960s* in the Hayward Gallery, London, UK, I spent much more time there with my increased weight. The whole tour was peppered with brief breaks that provoked me to zoom into the smaller scale of the show, appreciating details of the installations, but also, due to more time spent in one place, noticing the way people moved and interacted with the exhibits and between each other. I especially noticed the effortless and graceful circulation of the figures, while sympathising with those a bit clumsier and fleshier ones.

There were a lot of participative installations that demanded all sorts of bodily interactions with the visitors. I spent most of my time on *Bodymotionspacesthings* (1971) by the American sculptor Robert Morris. Not because I enjoyed it very much, but simply because it required much more effort and diligence to get through it with my extra weight. This is where I also noticed a changed perception of scale, as the installation looked and felt smaller when I was visiting it without my costume. The installation was a series of playground-like objects organised as a sequence of spaces in

punching, kicking or jumping. Heavier weighted clothing can also be used for slow, controlled movements, and as a way to add resistance to body-weight exercises.

44 In the phenomenological tradition—especially in thinkers like Maurice Merleau-Ponty—the "body schema" is understood as the pre-reflective, dynamic organization of one's bodily capacities. It is not merely an intellectual or visual representation of the body. Rather, it is the lived sense of one's body as a center of action in the world.

which his objects—huge props based on beams, weights, platforms, rollers, tunnels, and ramps—encouraged the visitors to climb, balance, crawl, and roll on or in them. Morris intended his objects to turn spectators into thoughtful participants, providing an opportunity to "become aware of their bodies under different conditions."[45] Apparently informed by choreography (his wife Simone Forti was a dancer and choreographer), he envisioned his audience as contemporary dancers who, by carrying out his motion script, would experience gravity, effort, and fatigue anew. A lot like my costume.

Soon after undressing my weights, for a while I felt very light and unexpectedly lighthearted and joyful. A bit like after a gym. A wearable gym. Surprisingly, my bodily movements, agile and springy, demanded readjustment as if I had to relearn them in similar way as it was at first while wearing the costume. Such lightness was temporal, lasting a dozen minutes or so, yet there was a long-term effect upon my body with increased kinaesthetic awareness and acute sensitivity of muscles that I previously had been unaware of.

Gym, I felt, was a logical step towards advancing the study of weight. It is, after all, one the most popular places to familiarise oneself with gravity. There, a group of people negotiate with gravity mechanically and deliberately with the help of various machines. Those machines, from dumbbells to cable machines, and from stair climbers to treadmills, reclined bikes, erect bikes,

elliptical trainers with movable rowing arms, to mention just a few, substitute those "natural" physical activities that once were prevailing, from hunting to working in a factory. Once, for example, it was daily labour or a natural terrain, now it is an artificial landscape or rather an adjustable gravitational space—whenever one cycles on a simulated terrain selected from the complex menu of a stationary gym-bike, or climbs on the custom-composed "staircase" of a stair climber. These virtual machines transform seemingly meaningful human activity — the individual phases of repetitional production processes—into meaningless physical exertion. Nothing is produced but sweat and the burning sensation in the muscles.

Of course, the gym is much more than a factory of sweat and fatigue. It is more akin to a lab of the body—here, unique exercise technologies, pharmaceuticals, nutrition science, knowledge of human physiology, sports/workout techniques, psychology, and aesthetics are married—all to redesign the body and open new perspectives on the weighty life. For athletes, whether weightlifters, runners, jumpers, etc., it is a way to increase their specific bodily resistance to gravity; for bodybuilders—an aesthetic sculpting of the body; for the non-sport audience—a way to compensate for the lack of physical activity, for the ameliorative transformation of their bodies, whether in terms of health and performance or a sort of spiritual or cultural knowledge;[46] for others—a space to familiarise oneself with their own body, socialise,

46 In postmodern urban culture, gyms and fitness centres proliferate, largely replacing the church and the museum as the preferred site of self-meliorative instruction, where one is obliged to visit on one's leisure or as a duty to oneself, even if it involves inconvenience and discomfort.

Shusterman, R., 2000. *Performing live : aesthetic alternatives for the ends of art.* Cornell University Press, p. 137.

and relate to other bodies; meanwhile, other gym users work out merely for the decorative purposes (curiously, there are quite popular exercise classes that concentrate on different body parts—for example, some even have patented gym programs focusing just on the buttocks, or solely on the "abs" and thighs). Of course, there are more perspectives and the intentions cross-relate in reality, but the point I want to make here is to show the complexity of effects and perceptions of weightlifting and other weighty gym activities to contribute to an experiential vocabulary of weight.

With the help of barbell technology, I perform a bench press, that is, lift the weight from my chest with precise rhythm and speed, accompanied with special breathing techniques, and I try to make my body define what kind of thing weight is. It takes not so long until the muscles come to that inner burning feeling—the experiential manifestation of gravity, so to say. Even more, soon after a few last lifts, I discover muscles I have never experienced before, such as serratus anterior that originates on the surface of the upper eight or nine ribs at the side of the chest, or coracobrachialis, the muscle located along the biceps. Repeating the procedure, I notice other changes occurring with my body, which gets warmer and wetter, breathing gets deeper and more frequent, as does the pulsation of my heart. I start to believe there is a sort of "human motor" revving up within me. But not for long: my bodily investigation into weight gets obscured (or rather enlightened?) by the

inner resistance to continue it. Nothing can be done here, fatigue is inexorably kicking in. Nonetheless, when I leave the barbell fixed, all of a sudden I feel very light, especially when performing the same movements without weights. But later I feel much heavier when lugging my 70 kilograms of flesh from the gym. Then, already resting at home, all this slowly turns into a unique sore sensation within these exercised muscles, letting me contemplate on the investigation in retrospect.[47] Now I realise that it is exactly this play of lightness and heaviness that makes me aware of my weight as some sort of fluid, in-becoming, constantly changing phenomenon. And all these kinds of discoveries or rediscoveries of my fleshy being continue to occur in the course of the following exercises, as I monitor and adjust my embodiment of gym, and do minor modifications of the workout techniques. The awareness of my body weight has become complicated, yet increasingly compartmentalised and disciplined as though I was a landscape designer of my body surfaces.

47 The most common contemporary theory links this pain to so-called microtrauma, aka micro-tears to the muscles being trained that are caused by weight training. These micro-tears in the muscle contribute to the soreness felt after exercise, called delayed onset muscle soreness. It is the repair to these micro-trauma that result in muscle growth. Normally, this soreness becomes most apparent a day or two after a workout. However, as muscles become adapted to the exercises, soreness tends to decrease.

MacDougall, J.D. et al., 1980. "Effects of strength training and immobilization on human muscle fibres", in: *European Journal of Applied Physiology and Occupational Physiology*, 43(1), pp. 25-34.

The more time I spend in gym, the more I become socially entangled in it. I become friends with a small community of local professional bodybuilders. Our conversations are short, concrete, and specialised, yet full of artistic references. One of them quite often refers to his practice as a sculptor's workshop. He says bodybuilders are not much interested in athletic but rather in representational

strength, the aesthetics of masculinity (either muscle size or muscle tone) of the body. Thus, essentially they perceive (or pursue for) weight as a peculiar visual entity. Experimenting on themselves—performing special exercises that make muscles bigger and "dry" rather than stronger, creating[48] the most "powerful" recipes of specialised diet, appropriating show techniques to demonstrate their physique (worth mentioning are tanning, lighting, and choreography that are specific to this sport), monitoring studiously their changing builds and relating them to that of others, especially the winning ones—they custom tailor their fleshy garments to create a massive and strong (or weighty?) impact on the eye, the illusion of superiority over gravity. Weight, although situated in the flesh and embodied, is interpreted as a realm reigned by the eyeballs, as though it was made up of weightless photons.

48 Weight training aims to build muscle by prompting two different types of hypertrophy, sarcoplasmic hypertrophy and myofibrillar hypertrophy. Sarcoplasmic hypertrophy leads to larger muscles so is favored by bodybuilders more than myofibrillar hypertrophy which builds athletic strength. Sarcoplasmic hypertrophy is triggered by increasing repetitions, whereas myofibrillar hypertrophy is triggered by lifting heavier weights.

In 2018, I collaborated with a group of bodybuilders as a living set for the opera *Honey, Moon!*, commissioned by Operomanija, a Lithuanian production house for new musical theatre. Collaborating with the composer Gailė Griciūtė, librettist Gabrielė Labanauskaitė-Diena, and others, I turned the opera into something between a participatory performance and a live sculptural installation. Scattered across the 1000 sq. m exhibition hall of the Contemporary Art Centre in Vilnius were seven revolving platforms on which twelve performers—vocalists and instrumentalists—were strapped and performing. Covered with fabrics custom designed by the illustrator Célestin Krier, the platforms looked like extraterrestrial landscapes, yet on closer inspection those semi-transparent textiles revealed various conglomerates of narrators, singers, a flautist, a clarinettist, a violinist, a cellist, a pianist, and a synthesiser player. The public was invited to walk around the constellation of sets and explore the play between micro, macro, and cosmic scales, encouraging a confusion between what could be perceived as human and planetary. Within the set and embedded between the viewers, a group of bodybuilders were roaming randomly, occasionally stopping and posing, flexing and positioning the muscles in a certain sync with the music, highlighting the features of their muscular landscapes: size, definition, symmetry, and proportion.

The opera audience could appreciate the bodybuilders' bodies as a sort of biokinetic scenography and, under closer inspection, encounter the "non-human" nature of the choreography: the muscular contractions were actually triggered artificially by a special device. Collaborating with the medical electronics engineer Dmitrij Snegin, I developed a wearable apparatus based on the so called Electrical Muscle Stimulation (EMS) that would administer a controlled electrical current via special electrodes targeting certain group of muscles, stimulating the motor neurons and thereby triggering muscle contractions, similar to (but not exactly the same as) voluntary muscle activation. Sometimes, the "duo" of the performers' chest and their abdominal "sex-

Julijonas Urbonas, *Honey, Moon!*, 2018, custom electronics, electromechanics, custom surtitle LED display, printed textile and outfit. A view from the New Opera Festival, Contemporary Art Centre, Vilnius, 2018. Photo by Martynas Aleksa.

Photo by Aistė Valiūtė and Daumantas Plechavičius.

Photo by Aistė Valiūtė and Daumantas Plechavičius.

tet" would pulsate with frequency and precision that would be impossible to perform voluntarily. It looked as though some sort of external force of unidentified nature was in operation, dismembering the muscles from the body. An uncanny dance to imaginary fluctuating gravities.

Ascensional Psychology

The first "gym'" in the sense that we know it today was invented by the Swedish physician Gustav Zander, who opened a training institute in 1865. The gym was unique in being equipped with custom-built mechanically driven gymnastic apparatuses, with which specific groups of muscles could be trained in exact dosages. Coinciding with the discovery of fatigue[49] (or coming to professional parlance as a result of it), Zander's gym equipment was developed in an attempt to reenergise the productive force of the industrial era, on the one hand, and as "preventative against the evils engendered by a sedentary life and the seclusion of the office,"[50] on the other. But his machines were significantly different from contemporary fitness equipment, as most of these iron aggregates didn't require the user's physical effort to act upon them. All the user had to do was sit or stand still as the exercises were performed upon the body without involving exertion on the user's part, giving an "energising" massage that supposedly increased the user's physical strength. In order to workout, a gym visitor, usually dressed

49 It was not until the late 1870s that fatigue was inaugurated as a medical term, basically referring to a modern disorder.

Rabinbach, A., 1992. *The human motor: energy, fatigue, and the origins of modernity*. University of California Press, p. 38.

up in a formal suit (note that Zander's spas were places for businessmen or upper-class socialising), would have to attend, or rather give up himself (yes, male clientele made up an absolute majority) to the machine, which in turn would do everything, by kneading, shaking, vibrating, swinging, turning, or rubbing, to ensure that, as one of Zander's advertisement brochures stated, "sunken vital energy [was] raised."[51] . What that energy was was most probably a sort of mental effect—both a sensation of being connected with a mechanised machine,[52] a sort of cyborgian amalgamation, reconciliation with modern machinism, feared as the cause of ill health and sedentarism, and simply the same positive effects produced by conventional massage.

Standing still between two iron pipes—one driven by an engine-propelled (the machines required an external power source such as a steam engine, a gas engine, or an electric motor[53]) wheel, and the other a back support—a white-collared user is clamped in the arms of the iron masseur composed of gears, counter-weights, transmission belts, and axes. Listening to the humbling sound of the engine accompanied by the orchestra of the well-oiled iron instrument's spinning, oscillating, and trembling parts, the listener gazes the subtly designed moving mechanisms, so extraordinary that one can hardly find a proper name for them, part rolling mill, part medical devices, part amusement rides. The sonic and visual experience is crowned with the synchronicity of

the machine's rhythmic punches of the wheel-shaped fists to the abdomen. The sensation should be truly immersive, engaging all the senses and energising as one can feel to be part of a tireless machine (or the machine itself). Although today it would be hard to believe that such devices could be equally effective and convincing, I would imagine its subtle design, scientific look, unique medical aura, and iron machinic techno-phantasms of that time as powerful factors for creating a persuasive effect not just on the buying/attending decisions, but on the very body itself. Whether the effect was true or not, the popularity and quick spread of similar spas suggests that it was convincing enough.

If that make-believe effect still sounds questionable, I shall turn to contemporary sports psychology, particularly to so-called imagery training or mental rehearsal. Imagining extensively their sport practice with all the senses[54] helps professional athletes build their strengths and eliminate their weaknesses. Most interestingly, this technique helps not just to stay motivated along the way and deal with competition-related anxieties, but to directly boost athletic strength. The imaginary exercise can be done on or off the field, very short or prolonged, sitting up, lying down, in complete silence, with music, eyes closed or open. And there are different kinds of it, involving various characters and perspectives: appearance imagery (for example, images related to the attainment of a fit-looking body), technique imagery (mostly images related

54 The imagination should not be misunderstood as solely a visual practice or as having a single eye-led perceptual dimension, as the term itself is misleading since it comes from the word "image". In fact, all our sensorial qualities can be engaged to the realm of the imagination. There are aural, olfactory, gustatory, tactile, and motor modes of the imagination.

to performing the skill and techniques correctly with good form, so basically concentrating on kinaesthetic imagery), and energy imagery (images related to getting "psyched up" or feeling energised)[55], perhaps the one which was provoked by Zander's machines.

Research in sports psychology and neuroscience has demonstrated that the effects of so-called visualisation-guided brain activation (VGBA)—sometimes referred to as "imaginary exercise"—are so profound that simply "imagining" performing an exercise with the same diligence and concentration as actually performing it can have marked effects on increasing muscular strength. Although different research teams have found the gains in strength to be variable[56], from nearly as much as physically doing the exercise to significantly less, the effect is still apparent and the experience of motor imagery is very similar to that of actual physical training in many cases.[57] For example, both imaginary and physical practices are comparably exhausting. Thus, it seems that imaginary weight is a very strong counterpart of the real one (if there is such), except that the practices require different specific skills, and the ability to perform them varies between persons.

"Weight tends to drop, but we desire to lift it; and when we cannot, we imagine that we can,"[58] Bachelard refers here to one of our fundamental poetic drives—vertical movement and desire for lightness, but also to the possibility of transcending one's own capabilities by

imagination. That is where imaginary weight differs from the real one.

I can imagine juggling a heavy barbell, or carrying a house on my back, or even spinning the planet Earth on my fingertip, all with (physical) ease and safety without a drop of sweat and risk of injury, let alone that burning sense in the muscles. Of course, the realism wouldn't be so vivid, yet I can enrich the simulated experience by continuing to depict the subtle details and perceptual entities that would be encountered in reality: what device I'd need to anchor my imaginary super strong finger on our astronomical body to hold such a crushing weight, what support I'd stand on, what it would be like to balance such a huge sphere, etc. To make it even more vivid, I may learn to stand upside down and spin myself on my fingertip and imagine it is not me that is spinning but the Earth itself around me. Alternatively, should my imagination run short, I can turn to fiction in literature, cinema, theatre, and conceptual art.

Fiction serves as a series of textual or theatrical props that fuel the reader's or the viewer's imagination into producing all sorts of surrogate states[59] such as experiencing weightlessness[60], or oscillating gravity fields[61]. It is important to emphasise that all are saturated with various technologies—mechanical, animal-assisted, magical, usually based on the technological developments of a writer's lifetime. As narrative devices, these technophantasms become embodied props, and by triggering imagination

60 Francis Godwin's *The Man in the moone,* which appears to be the first description of the idea of weightlessness in space; Jules Verne's *Earth to the Moon* in which Verne attempted to do some rough calculations as to the requirements for spacetravel; hovering on some sort of magic carpet or winged horses in Antoine Galland's *Thousand and One Nights*.

61 For example, Kurt Vonnegut's *Slapstick or Lonesome No More!* (1976), a sci-fi novel, depicts erection inducing gravity tides, which on some days prompt people to crawl, and on others they could toss hubcaps miles distant. Or, as another example, a city crawling on rails in order to stay ahead of a crushing, slowly moving gravity field that has transformed life on Earth in Christopher Priest's *Inverted World* (1974).

they make the reader believe the story or the simulated experience. Given all the power fiction is capable of exerting on a person, this sort of literary (fiction) design might be likened to the design of a talisman, voodoo puppet, inert pill, placebo—all of which has no direct effect but imaginary power, capable of causing bodily, behavioural, psychological changes within a person. Taken from literary form and transformed into the a tangible realm open for bodily submission, the props can have even more persuasive power. Take Zander's machines as an example.

The Polish artist Zbigniew Libera's *Body Master* (1997) is another good example of such fiction design. Libera's cable machines are similar to those found in gyms, but with almost weightless paper "weights" and ergonomically designed for 7-9 years old boys. The weighty "body" of such technology is removed, and the function of the device is disembodied—offloaded or, rather, "burdened" on imagination. Having children's unbridled imagination in mind, I suppose this set of exercise equipment might indeed have some effect on the young athletes' body or at least psyche. But what if we consider the opposite: what effect would it have on the body if one exercised mentally on imagined weightlessness with Olympic athletic effort and rigour?

Having had thought about the latter question, I had been imagining an adult version of *Body Master* and looking into the establishment of a sort of imaginary-

exercise-oriented design. In 2010, I developed *Thought Gym*, a mental gym device based on a brain-computer-interface (BCI). The device was a modified conventional gym cable machine with real weights that were lifted by an imagined equivalent of the actual act of lifting or raising the weights. With *Thought Gym* I was speculating upon an alternate reality in which thought had taken over the manual, physical negotiation with gravity, a sort of a dramatised version of brainhood.[62] I built a low-tech prop based on the commercially available BCI device Emotiv EPOC, a neuro-signal acquisition and processing wireless neuroheadset. The 14-electrode device was capable of recognising a number of conscious thoughts such as various movements of an imagined object, and emotions such as excitement. For the project, I used only one input: imagined vertical movement, in other words, lifting an object. I planned to link the input's real-time data to an electromechanical device that would lift the weights of the cable machine to a certain height, thereby marking the strength of the signal, that is, the level of concentration on the imagined act of lifting, a sort of psychological weight. I did a series of experiments on myself — mostly testing the device's BCI with onscreen feedback, lifting a 3D virtual cube. The system worked in the following way: first, I had to properly put the headset and electrodes on my head, then teach the system to associate my specific brain waves patterns provoked by certain thoughts such as lifting an object, because the patterns were not

62 Brainhood is a concept that highlights how contemporary Western culture has increasingly come to see a person's identity, selfhood, and agency as stemming primarily—if not exclusively—from the brain. In other words, it's the idea that "we are our brains."

universal and differed between individuals. Once the system was set up, any input coming from the headset was compared to the reference pattern. If the pattern was recognised, its strength was measured and sent as a control signal, which determined how high I could lift a virtual cube, for example. I found it quite a difficult task; so it was for all the people I invited to test the thing. We tried all sorts of different imagination techniques, such as varying imagined images and forced sensorial modes, timing, eyes shut, eyes wide open, etc. One of the most effective facilitators was intense concentration and the physical pantomime of the act. Soon this make-believe lifting act turned out to be demanding compared to quite a similar or even larger effort as its physical equivalent, such as exercising with barbels. Sometimes I could not do it any longer than just for a few minutes. On the other hand, the task was very different, because it required unique skills of generating imaginary images. By images I mean percepts constructed not just visually, but also by other senses, such as sweating, intense breathing, increased pressure in the arms, etc. Particularly difficult was forming a holistic image incorporating more than one sense. Me and others were mostly thinking about one singular percept like seeing our own hands raising an object or feeling burden and burning sensation in the muscles. However, after some practice it became a bit easier, so with more time it would probably become even lighter. Another unique aspect was the possibility of actions that would be

impossible in the real world, such as lifting yourself upward with some kind of "magic" force or dealing with extremely heavy things like celestial bodies.

Having undertaken a series of such experiments, I noticed that not only proper concentration or effective imagination technique were of key importance, but also (if not more important) a proper hardware setup. The system turned out to be highly sensitive to an inappropriate setup, such as wrong positioning of the electrodes, lack of saline lubrication, or electromagnetic interference with other electronic devices. In the end, all these issues added to the difficulty of effectively teaching the system to recognise a certain brain wave pattern, which impeded further development of an installation open to the public. However, I realised those hurdles could have been considered a technologically mutated form of weight. Once the technology is improved, I might return to the project and build a new setup to retest whether such a weight still persists, and if so, where it reincarnates itself.

Later on, having had explored such diverse ways in which fictional weight—gravitational fiction—could be defined and designed, I expanded the scope of this study even more by delving into the extremes of make-believe experiences (see the following chapter "Falling"), exploring the phenomena of gravitational dreams (see the last few subchapters of "Levitating"), and experimenting with an expanded notion of scenography in

cluding digital media, a mockstitution[63], textual set design[64], etc.

63 Mockstitution, n. (neologism) similar to the concept of Artificial Institution (see Marina Naprushkina), or para-fictional institution (C. Lambert-Betty, C. Bishop), a mock institution or "Mockstitution" is an informally structured art agency that overtly mimics the name and to some degree the function of larger, more established organizational entities including schools, bureaus, offices, laboratories, leagues, centers, departments, societies, clubs, bogus corporations and institutions.

Summary

In "Standing", I have explored the experience of weight from multiple perspectives—scientific, cultural, aesthetic, and personal—showing the diversity, complexity, and the relationship between the sensual, social, and aesthetic realms. Also, throughout the text I have briefly looked into how our relationship with gravity has transformed over time. In earlier eras, weight was a constant presence through everyday tasks like carrying water and manual labor; today, advanced technologies, sedentary lifestyles, and structured workouts (rather than organic physical exertion) mean that weight is encountered more intentionally or in compartmentalised settings. I have emphasised that, despite this seeming "lightness" of modern life, weight still exerts a powerful influence on us, whether through obesity rates, controlled gym environments, or engineered experiences in amusement parks.

The text has highlighted various artistic projects and technologies illustrating how weight can be heightened or manipulated. For instance, revolving platforms and centrifuges underscore the physics of weight by simulating high-gravity environments, creating experiences that mix scientific principles with aesthetic enquiry. I have exper-

imented with a 35 kg wearable suit to experience intensified gravity in daily routines, revealing how added bulk reshapes ordinary motions and perceptions, as well as aesthetic appreciation. Gym culture has been presented as a modern "laboratory" for consciously negotiating gravity, whereas an overview of historical "mechanical gyms" (like those of Gustav Zander) and more recent brain-computer-interface tech has shown that imagination, technology, and psychology can all be harnessed to create novel encounters with heaviness.

In sum, this exploration of weight reveals it to be far more than a simple physical measure of force. Rather, it is a richly layered phenomenon shaped by culture, technology, imagination, and the particulars of each body's lived experience. From amusement rides that exploit acceleration to "wearable mass" suits that alter one's sense of gravity, and from gym equipment that harnesses mechanical force to mental exercises that conjure weight's effects through sheer thought, we see that the feeling of heaviness is as much about creative perception and psychological engagement as it is about mass and gravitational pull. By examining how weight can be deliberately invoked, manipulated, or even virtually constructed—whether through art installations, performance, or purely imaginative effort—this account underscores the complexity of our relationship to bodily heft. Ultimately, the study suggests that weight is not merely a static, universal constant; it is a dynamic interplay among physical reality, embodied awareness, and the human drive to reimagine constraints as a fertile ground for artistic and experiential possibilities.

Julijonas Urbonas, *Euthanasia Coaster*, 2010, 1:500 scale model, brass, black iron oxide powder. Photo by Aistė Valiūtė and Daumantas Plechavičius.

The coaster is presented as a scale model accompanied by a technical drawing and sometimes a video footage showing pilots' faces during high-g training in a human centrifuge. The 1:500 scale model is one metre high, and consists of just a single coaster track supported by a series of string-thin columns erected from a pile of black fine-grained sand. The track accentuates the engineered falling trajectory, the key object of the project. The drawing, a stylised engineering draft in 1:1000 scale, depicts just the front projection of the coaster, and presents the physical calculations of the coaster's track. The video composition is created from real footage of pilots' high-g training, showing the effects on the body such as the distortion of the facial tissues, fainting, intense breathing, etc.

III.

FALLING

"[A roller coaster] is as revolutionary, if not more so, than the greatest works of art."[65]

If a roller coaster is an artwork, it would definitely belong to the genre of falling art. Compared to parachutes, wingsuits, crash pads, bungee jumping cords, and drop towers, roller coasters are the most sophisticated, the ultimate expression of gravity-driven art. They are horror devices, kinetic architecture, participatory sculptures, vehicular poetics, gravitational theatre, but above all, they are falling machines driven by gravity. It is because the majority of them work by dropping a train from a tall hill. Most interestingly, the fall here is not just a propelling force, but a creative material; it is suspended, exaggerated, twisted creatively, and experienced with the whole body. The downward curve is no longer bound to a (hazardous if not fatal) straight line—now it is stretched, bent, and entangled, yielding to gravity in a graceful, controlled manner. A roller coaster is an epitome of the art of falling—a skilful, intentional, expressive act of descending, while maintaining enough awareness and grace to transform what might otherwise be a collapse into some sort of chaos.

Seated, harnessed with a health monitoring system, and strapped to the seat of a single-seater roller coaster vehicle, you are slowly towed to the top of the drop-tower, while building gravitational potential energy. It takes a while, as the ride is about half a kilometre long! Hence, you have a dozen minutes to contemplate your decision and life in retrospect. You even find enough time to adapt to the height and get through a series of imaginary fatal falls, while realising that the objects on the ground are getting smaller. Slow lift is an important illusion that intensifies the perception of height. The slightest movement of the car triggers drumming heartbeats and tests your decision... The top! If this test has not changed your mind yet, then at this point you have no choice but to submit yourself to the very last fall. Yet you still have a few minutes for the last words and goodbyes, or just enjoying the exhilarating bird's-eye view of the surroundings. You relax and press the FALL button. Whirrr... swish—the ultimate surrender to gravity! No, you realise, in fact it is even greater than just succumbing to gravity, as in the blink of an eye your pounding heart enters the heart-line, the whirling element of the coaster track, where your heart stays roughly in line with the centre of the fall trajectory, while your buttocks spin around the heart while you fall. The scooting gust of wind, goosebumps, suspension of breath, and

vertigo—a set of experiences comprising a sort of fairground anaesthesia—prepare you for the fatal part of the ride.

Welcome to my *Euthanasia Coaster*, a hypothetical death machine designed as a roller coaster, intended to end a person's life in a humane, euphoric, and aesthetically graceful manner. As the rider travels along its track, they experience an intense sequence of motion that evokes sensations ranging from exhilaration to tunnel vision, unconsciousness, and ultimately death. By collaborating with experts from aerospace medicine, mechanical engineering, thrill ride psychology, and bioethics, I wanted to transform a fatal experience into something poetic and profound. As a tribute to the physical limits of the human body, it represents the ultimate thrill ride.

The most important part of a roller coaster is generally its track, which shapes the "story-line" of the ride, usually taking the shape of a creatively distorted falling trajectory. Every drop, twist, and turn as "plot points" is crafted for emotion: suspense, exhilaration, surprise, relief. The very experience of the ride depends on the curvature of the track, and therefore all the design and engineering

involved in building a roller coaster is basically structured around this linear element: its play with gravitational forces, the resulting effects on the rider's body, dynamic loads on the supporting architectural structure, and the physics of the ride, such as the tendency to slow down due to air drag and friction, etc.

In *Euthanasia Coaster*, the track incorporates both the aesthetic and the functional aspects of the ride. Both converge in the human-gravity design interface, and permeate the personal and public levels of aesthetics, dealing with the bodily experiences of the ride, including pleasurable death, ritual, but also the sculptural appeal of the coaster's construction.

You grip the coaster cabin's armrest (or whatever you're holding onto) so hard your knuckles turn white. Now you are already falling at a speed close to the terminal velocity, when the force of air drag becomes equal to the force of gravity, thus cancelling the acceleration. You feel your body as if supported by an air pillow. Just after this point, the track smoothly straightens forward, entering the first loop of the coaster, a continuously upward-sloping section of the track that eventually results in a complete

360-degree circle, completely inverting the riders at the topmost part. The centrifugal force drives the car upward, and you are literally pinned to the seat, your buttocks' flesh is pressed against the ergonomic planes of the seat so hard that your whole body is almost immobilised. The tissues of your face start drooping down—it looks like ageing remarkably. Breathing requires more effort, as the ribs and the rest of the internal organs are pulled down, which empties air from the lungs. But most probably you are already unconscious, as this force rushes the blood to the lower extremities of the body, hence causing oxygen deficiency in the brain. It is exactly this cerebral suffocation, also known as cerebral hypoxia, that is going to kill you.

It has been observed that "jumpers", people who commit suicide by falling to the ground, often demonstrate some sort of aesthetic preference for a nice place or structure to kill themselves. They will, for example, travel long distances to find a suitable venue, but they also perform some ritual acts such as folding their clothes neatly before jumping or holding a hat on their head with both hands all the way down.[66] What's more, sometimes the jumpers are undressed or perform some choreography—it seems that they care about how their bodies meet the air. All this testifies that not all

self-murderers are apathetic in relation to the ritual of killing themselves, and quite a few seek some sort of aesthetic meaning in it.

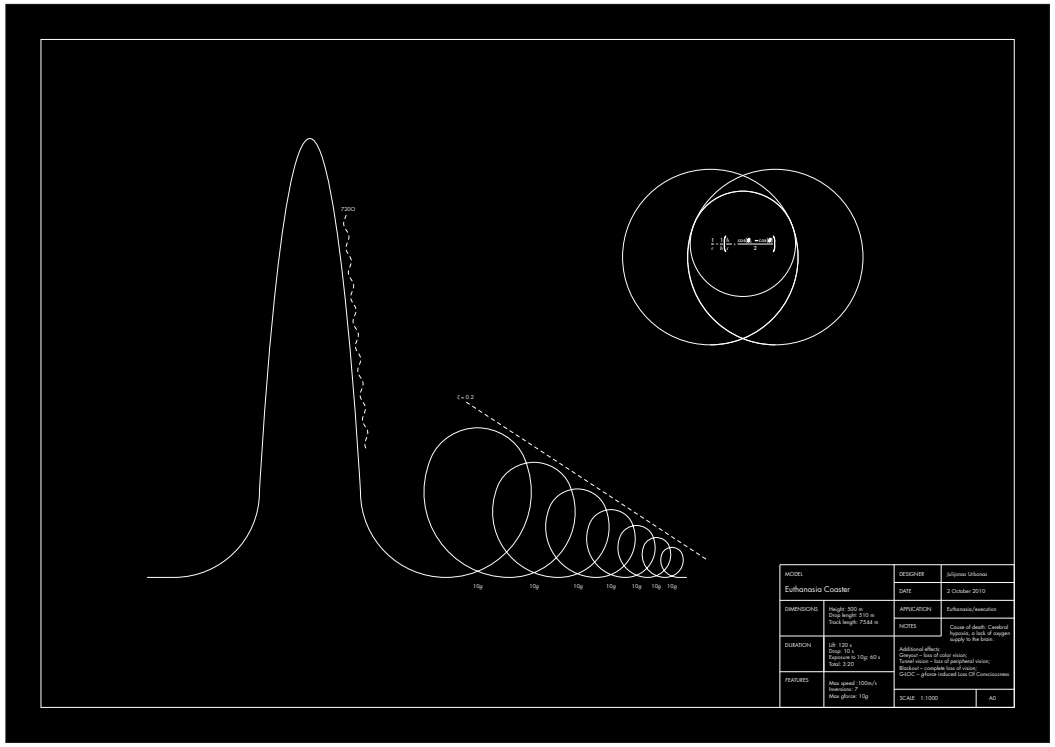
In fact, falling is a unique experience that sets itself apart from other types of death by suicide: while rushing towards the ground or, in the case of *Euthanasia Coaster*, towards the loop, knowing and anticipating with the whole body the exact time of death, there is still a fraction of time for reflection. This real-time interface and the inherent dramatic structure of a three act tragedy—the leap, the fall, the impact—are not present in lethal injection, shooting yourself, or in overdosing on drugs, for example. Pull the trigger and you receive the shot—there is no gap between the act and its denouement, while with lethal injection or overdose there is an unknown time interval. In *Euthanasia Coaster*, the ritualistic drama is exaggerated even more. There is the ride up the tower, the drop, the serpentine fall, the vertiginous and euphoric entry to a series of loops, and eventually the fatal ride within the loop. Moreover, another unique aspect is that this dramatic spectacle is open to the public, be it the relatives of the rider or the victims of those sentenced to capital punishment, revealing the full drama of their

demise.[67] Given all that, the coaster incorporates the private and public aesthetics of a humane and emotionally enriched death: for the faller it is a painless, whole-body-engaging, and ritualised death machine, for the observers a monumental mourning machine.

Euthanasia (from the Greek "good death") refers to the practice of ending life in a manner which relieves pain and suffering. Euthanasia is categorised in different ways, which include voluntary, non-voluntary, or involuntary, as well as active or passive. The word usually implies active euthanasia, and in this sense, euthanasia is generally considered to be criminal homicide, but voluntary, passive euthanasia is widely non-criminal. Euthanasia conducted with the consent of the patient is termed voluntary euthanasia. Voluntary euthanasia is legal in Belgium, Luxembourg, the Netherlands, Switzerland, and the U. S. states of Oregon and Washington. When the patient brings about his or her own death with the assistance of a physician, the term assisted suicide is often used instead. Leaving aside the ethical question whether euthanasia should be legalised or not, I looked into contemporary euthanasia in the countries where it is legal, and what drew my attention was that the

procedures of terminating a patient's life were highly hospitalised and not much different from the mundane injection of medicine. For example, usually the sedative sodium thiopental is intravenously administered to induce a coma. Once it is certain that the patient is in a deep coma, typically after some minutes, pancuronium is administered to stop breathing and cause death. There is no special ritual nor is death given any special meaning apart from the legal procedures and psychological preparation. It is as if death is divorced from our cultural life just as death rituals are in our secular and postmodern Western society. But if it is already legal, why not make it more meaningful, not in a way some indigenous people mourn the deceased by ecstatic singing and dancing around a bonfire, for example, but as a ritual adapted to the contemporary world, where churches and shrines are being replaced by theme parks, or at least the latter achieve equal power by producing spiritual effects (more and more people attend theme parks for self-meliorative purposes—relaxation, self-cultivation, and socialisation; or, as an alternative testimony, take the increasing number of spiritual theme parks around the world, such as Holy Land in the US, Hindu Park in India, and many others[68]).

Julijonas Urbonas, *Euthanasia Coaster*, 2010, 1:1000 technical drawing. Euthanasia Coaster's loops are specially engineered in the shape of a clothoid loop to sustain a uniform and constant g-force throughout the ride. Specifically, it sustains 10 g which is not enough to render graphic images of bodily damage such as evacuated bowels, yet will not allow the subject to return alive.



Generally, a roller coaster is considered an icon of thrilling entertainment and the source of white-knuckle pleasure. *Euthanasia Coaster* questions such prejudices and preconceptions by dramatising them conceptually. Hence, the drama of the ride builds not only the sensual and psychological layers, but also a unique social space, distorting the status quo of both the cultures of entertainment and of death. In fact, such a cultural dramatisation may retain its presence only temporarily: were the coaster to be built, it is very likely that this cultural tension would diminish over time. Most probably the coaster would become accessible only to the elite or at least a very tiny fraction of the population, and new tensions related to inequality and unsustainability would arise. I believe the project works at its finest and most powerful while it is still a hypothetical yet feasible idea or, in other words, a true fiction. In such an unrealised form, it appeals to a much wider audience, as it is open for a myriad of imaginary uses and abuses, but also accessible to almost everybody.

If you are still conscious, you are more resistant to the high g-forces than the majority of people, but don't worry: the loop is engineered in such a way that the force will remain constant despite the changes in

speed, thus ensuring that the painful level of acceleration is not reached. And be assured, the second loop will definitely do its job. In the meantime, if you are lucky, or, rather, g-force-resistant enough to be awake, your vision may blur, lose colour (greyout) and peripheral sight (tunnel vision), or even disappear completely (blackout), together with hearing. Eventually, this experience—accompanied by disorientation, anxiety, confusion, and, most importantly, euphoria—is crowned with G-LOC (g-force induced loss of consciousness), during which the body is completely limp, and vivid bizarre dreams occur, such as being in a maze and unable to get out, or floating in a white space, not knowing who you are, why you are here, etc. Of course, you can tell the story only if you survive, which is virtually impossible. But you might ignore this and suppose you have survived. You would soon recover from G-LOC, remaining unconscious, and your body would flail around in a chaotic fit called 'funky chicken' in aeromedical slang, as the neurons in the brain—replenished with extra oxygenated blood pumped harder from the heart—begin firing once again. This causes arms and legs to twitch uncontrollably. Finally, coming around, although still confused and disoriented, unable to remember anything, you would regain your memories in a few hours, and they would be one of the most memorable, with a

peculiar souvenir on your legs: little red pinpoints all over the skin as a result of blood leaks through the blood vessels, a sort of gravitational measles.

The rest of the ride, six or five loops, proceeds with your body being numb, ensuring that the trip ends your life. You die, or, more accurately put, your brain dies of complete oxygen deprivation, a legal indicator of death in many jurisdictions. The biomonitoring suit double-checks if there is a need for the second round, which is extremely unlikely — it is guaranteed by the seven-fold redundancy!

Roller coasters are sort of risk fiction. Humans have a primal fear of falling—roller coasters weaponise that instinct in a safe, engineered environment. The illusion of danger combined with actual safety makes the ride emotionally powerful — a performance art of fear and thrill. Russel Nye has described the public appeal of the contemporary roller coaster as a "riskless risk, a place where one may take chances that are not really chances."[69] Thus, a roller coaster focuses on carefully balancing the sense of danger with the feeling of safety—essentially creating a convincing, interactive experience of simulated risk.

70 The project has been featured in dozens of media entries, blogs and hundreds of online discussions and forums that vary quite radically in content, perspectives and audience. Since its first presentation to the public in the HUMAN+ exhibition in the Science Gallery, Dublin in April 2011, the coaster has drawn more than 6M visitors who have accessed the project's website, 600K watched the video on Vimeo, and more than 2M read the Wiki article.

In *Euthanasia Coaster,* this relationship between perceived danger and safety is exaggerated to its most extreme. Not only because it pushes the opposite sides of the continuum towards the very limit, but also because the coaster functions on multiple reality levels: both real and imaginary. It is real, of course, not in the sense that it is open for a ride, but in terms of its feasibility: it could be built today. This feature not only offsets the absence of a physical ride, but also makes the project a unique imaginary ride, one of its kind. Even though comprising merely a scale-model and a technical drawing (and sometimes a video footage), the project has generated a wide and deep resonance within the public, private, and professional domains.[70] This has extended the project from the realm of fiction to the domains of public imagination, professional dispute, domestic conversation, artistic factoid, and urban anecdote without actually building it. Nonetheless, I could say that there are already millions people "riding" the coaster in their own way: musicians dedicate songs to it, poets write poems, filmmakers direct movies about it, online enthusiasts produce virtual replications, some make tattoos, others conduct thorough expert discussions online, etc. Let's take a look at what has been revving up the engine of this

ultimate quasi-fictional fall. Having discussed the vehicular poetic approach, the sensual and psychological aspects, and social repercussions, I will now delve into my artistic—sculptural, cinematic, and textual—decisions that could be considered a discussion of an extended notion of scenography.

Sculptural Fall

To materialise the real and the imaginary aspects of the coaster project, I decided to combine conventional architectural representation with a somewhat sculptural approach. That is how I came up with the idea to focus on the formats of a scale model and technical drawing.

Since the design of the coaster consists of one key element, the track, I omitted any other coaster elements. Therefore, the final shape of the scale model resulted in a single coaster track supported by a series of string-thin columns. There is no operating booth, no

landscape design, no hospital, just the track. Actually, the structural design of the model is unrealistic, as those thin columns could in no way support the structure, but they are the way they are to dramatise nothing but the curvilinear falling trajectory. On the other hand, I spent quite a substantial amount of time researching different designs of the coaster track to make its scaled-down version as realistic as possible. Having tried 3D printing, wire bending, and metal etching, I chose the latter method because of the higher strength of materials and precision. The result was the long and narrow strips of etched brass that were later bent at the centre axis, glued into one continuous track, and then bent according to the 3D geometry of the ride.

The selection of black matte coating came naturally due to the sinister context of the coaster. For the base of the model, I tried different black materials such as black soil, carbon powder, and black sand. The last one looked best, as its fine grains nicely emphasised the massive scale of the model. Later, when the model started to travel from gallery to gallery, I noticed that many people thought the sand resembled the ashes of human remains (which are actually

grey). It could be taken as a testimony of the powerful imaginary effect the model exercised upon the audience.

Such a minimalist or suprematist approach was employed intentionally, to open up an imaginary space for a possible ride experience—in other words, to prompt the public to construct their own interpretative trajectories. On the other hand, my aim was to disorient the public, the imaginary riders, to such an extent that they would have a somewhat similar experience to the extreme fall-led trip.

Cinematic Fall

In 2014, I was contacted by the British filmmaker Glenn Paton, who was asking if I was interested in co-authoring a short movie based on the idea of *Euthanasia Coaster*. Afterwards, over the course of almost a year, I went on to develop various script proposals, conversing back and forth with the idea of a cinematographic engine of the roller coaster. I will overview three of the most developed ones.

Each script is based on the actual trip of *Euthanasia Coaster*, i.e. the sequence of events is lined up on the very trajectory of the ride. Yet the scripts develop different plots and employ original dramatic devices that help to convey certain experiences that are unique to *Euthanasia Coaster*. Thus, the coaster here is both a cinematographic device and a non-human protagonist.

Even though had I developed *Euthanasia Coaster* without having in mind its possible translation into the medium of film, in my responses to various gallery and media requests I was experimenting with textual and videographic supplementary materials. One of the texts that outlined the sensations to be experienced on the coaster became a starting point for the scripts. And the video of a pilot training in a human centrifuge was a source of inspiration for the development of the empathy links in the scripts.

The first idea of the script was based on the coaster's literal translation into a cinematographic ride. I wanted the audience to experience as many and as strong ride sensations as possible. Except death, of course. So that their perceptions would be destabilised,

their innards shaken, and eventually they could barely detach their sunken rears from the cinema seat. To create such an affective drama, I looked into various cinematic techniques that would produce the sensations of heights, speeds, nausea, etc. For example, using first-person perspective of the rider might already be sufficient. Or adding subtle wobbling movements to the camera might produce dizzying effects. Thinking of a soundtrack, I came up with the integration of the natural sounds of the clicking, clacking, and creaking roller coaster structure. To intensify the thrill and play with the imagery, I added the metronomic sound of the coaster's lifting mechanism. Soon I realised it could be developed into one of the key dramatic devices: the frequency of clicking could be synchronised with the fast beating heart, and the rhythm would also direct the change of the shots or events.

In addition to all of that, not less important was the development of empathetic links such as stretched and distorted facial tissues, goosebumps, beating heartbeats, etc. Researching the visible effects on the body caused by *g*-forces, wind, and other forces experienced on the coaster, I noticed that one of the most visually affect-

ed body parts was the face. Since the latter is a very, if not the most, effective empathetic bridge, I decided to focus on the "choreography" of the facial tissues, its distortion patterns, facial expressions, and the dramatic play of lights and varying scale shots.

Once brought on paper, these techniques, I felt later, were somewhat too straightforward and lacked space for the spectator's imagination. Therefore, I came up with some dramatic devices that would heighten the sensual, visceral impact of the depicted sensations, but would also be open to some personal reflection. For example, I was considering shots of dancers choreographically depicting certain elements of the coaster. For example, in order to deliver the sensation of the pressure of the wind drag, the shot would comprise dancers slowly climbing on a lying person's face, covering the chest, the belly, the hands, the face, and eventually the whole frontal surface of the body.

This is where the second line of thought started to emerge, adding to the script a sequence of flashbacks that would supposedly occur while taking the very last trip of one's life. This idea was welcomed by the producer, and therefore it eventually became the most developed script.

The story depicts a character whose whole life was intimately connected to and yet so distant from amusement rides. He literally grew up in a fairground, developing an obsession with funfair machinery, and eventually becoming a ride designer. But he has never has given any ride a try in his life. Growing tired of his fear, dissatisfaction, or who knows what that kept rides at bay from him, he designs a very unique ride. The ride that he rides for the very first and the last time: *Euthanasia Coaster*. At the end of the movie, the coaster operator's face is showed for the first time, revealing that he is the same man who just died on the ride.

This story is nonverbal and is told by riding *Euthanasia Coaster*, in which a series of brief shots of flashbacks of the rider are triggered by the coaster's clicking lift mechanism. While the coaster's car is lifted up to the drop tower, the lift clicks at a pace close to that of rushing heartbeat, thus adding to the white-knuckle anticipation of the top. The click becomes the metronome not only of the ride, but of the flashback events as well. Thus, the sound sort of sounds as the heartbeat of the movie.

Still from the short H Positive (London, 2015, dir. Glenn Paton).

The flashbacks reflect the idea of the crucial moment of the coaster ride, when the rider has the last minute to rethink the fatal decision in retrospect. Moreover, the content of each shot also features a certain sensation somewhat close to that of the coaster ride. Here is an extract, in which the cradling of a baby is introduced:

1) CLICKING coaster car lifts up. The coaster frontal POV. PRESENT.

2) CLICK: INT. THE OFFICE OF AN AMUSEMENT PARK CEO. PAST.

3) POV of a little baby boy who is rocked in the hands of the CEO to the rhythm of the coaster's CLICKING. The CEO sits at his desk full of amusement park memorabilia and a few scale models of rides. We see—through the eyes of the baby—the interior decorated with various photos, pictures, and posters of an amusement park.

It is also worth to note that the script, namely the flashbacks, is largely based on my own biography. I thought it would add some authenticity and intimate interaction between the audience and the author. Hopefully, it would also intensify the engagement in the sensual realm rendered by the cinematic engine.

Whether my speculations on the experience of the audience are true or not will be hopefully revealed soon, when the film will have reached the big screens.[71]

Textual Fall

Crucial to the proliferation of the project was not only the vehicular storymaking, sculptural, and cinematic approach, but also various texts of mine, such as interviews, conference papers, lectures, texts specially tailored for shows, documentaries and media, as well as extensive involvement in various online discussions (Reddit, comment fields below articles about the project, etc.).

Therefore, first I will briefly outline the feedback the project received as a testimony for a successfully designed imaginary travel. Later, I will look into my methodology that was responsible for its success.

One of the culprits for the extensive response might be, of course, the project's sensationalist context. It is all in the title "euthanasia roller coaster" itself—death combined and contrasted with amusement. I thought this was a good start for a quick and effective spark. Therefore, I simplified the title to just "euthanasia coaster", so the public would quickly get the idea. But once hooked, the audience is provided with more subtle hints on the contextual background. Let's look at some of these hints in the introductory text that was put on my website and copied by the media in thousands of occasions.

> *Euthanasia Coaster is a hypothetical death machine in the form of a roller coaster, engineered to humanely—with elegance and euphoria—take the life of a human being. Riding the coaster's track, the rider is subjected to a series of intensive motion elements that induce various unique experiences: from euphoria to thrill, from tunnel vision to loss of consciousness, and, eventually, death. Thanks to the marriage of advanced cross-disciplinary research in aeronautics/space medicine, mechanical engineering, material technologies, and, of course, gravity, the fatal journey is made pleasing, elegant, and meaningful. Celebrating the limits of the human body, this "kinetic sculpture" is in fact the ultimate roller coaster: John Allen, former president of the famed Philadelphia Toboggan Company, once said that "the ultimate roller coaster is built when you send out twenty-four people and they all come back dead. This could be done, you know."*[72]

In the text, the reader is given a very brief info on the aesthetic, ethical, sensual, medical, technical, scientific, and entertaining context. I wanted to integrate as many and as diverse perspectives as possible, and yet to retain its concise and relevant form and punch. The reasons behind this were the potential appeal to people from different backgrounds, but also an appearance of feasibility. This aesthetic and ethical vocabulary was also supposed to tone down the controversy. This brief paragraph could be considered the

backbone for the later and still ongoing conceptual development of the project.

My intentions embodied in the text were more than successfully affirmed. As I mentioned earlier, the response spans from tabloid to prestigious and specialised media channels, both online and offline, radio, TV, and print. The content and form of the feedback ranged from knee-jerk and expert online comments, dedicated songs, a film script, a project for a school science fair, and a tattoo to extensive and thorough coverage by journalists. And the audience itself has been very diverse, varying in professional background, expert areas, and age. To gauge the effects of the response, I will categorise the latter into several groups that correspond to the topics found in the introductory paragraph: sensual, psychological, aesthetic, ethical, sociocultural, engineering, and medical. In reality, all these intertwine with each other, but for the sake of constructive discussion, I will briefly look into each of them individually.

First of all, I will repeat again that one of the key purposes of the coaster was to provide the audience with a make-believe ride with

high experiential verisimilitude. To tell if somebody has truly ridden such an imaginary ride is to speak of its sensual and psychological impact upon the psyche.

> *Oh no, I think it sounds like a horrible way to go, and after reading this I may never really enjoy riding rollercoasters again.*[73]

There are quite a few comments like this around the internet that show how affective such a minimal idea may be. Those that incline towards more negative response are usually terrified, while the positivists are more diverse: some would be thrilled, perceiving the project as a horror story, whereas others would see it as a very likeable euthanasia machine. Whatever response it is, once you get to know it, it is extremely difficult, if not impossible, to undo the awareness of it—your perception of the real thing is changed forever. In much the same way the movie *Jaws* literally made people avoid swimming in the sea where sharks could swim[74], whereas Alfred Hitchcock's *Psycho* caused a decline in the sales of opaque shower curtains.[75]

In a few notable occasions, several scientists, an anonymous biophysicist[76] and the renowned neuroscientist Antonio Damasio,[77]

gave an extensive opinion write-up that looked quite biased by their rather emotional response to the coaster. Narrowing themselves to a singular scientific narrative, both of them dismissed this fatal method as painful. Not getting into their medical details, what they were actually missing was just the simple fact that even if there was such a pain, it would occur while the rider was unconscious. Even pilots with anti-*g*-force equipment pass out under such centrifugal force. But if they were right, such a hypothetical medical counter-argument reduces pleasure and death ritual as merely some sort of biochemistry play. What is really missing here is the aesthetics of the ritual and the wider understanding of pleasure, peacefulness, and dignity.

Nevertheless, I still partially took such negative responses as a result of the project's miscommunication, failing to open up the field of interpretation. There were quite a few occasions where the author would sound confident and take serious thought on the coaster, and yet would stay close-minded as in those medical examples. Therefore, I decided to take a more active role in such communication.

On 25 Feb 2016, at 02:49, Barbara <becalabro@comcast.net> wrote:

Dear Julijonas,
This is one great idea. I am a 64 year old female and former thrill seeker. I live in Boca Raton, FL and I can tell you hundreds of former thrill seekers would love to "go" this way.

I gave up horse back riding (fast riding) because I rode very well but felt my reflects slowing down enough to know it was time to quit. Giving up that passion made me very sad because Boca has no roller coasters (my second passion) and it is a real empty, boring feeling. Used to live in CT. where access to several coasters was easy. Moved to Florida and the nearest thrill place is Disney World. Too far away. These older people force themselves to play cards and boringly wait to die. Especially depressing for former thrill seekers.

I hope you succeed with this project and if you know anyone who would build a regular coaster with a few other rides, you'd give a

lot of people great pleasure in living again.

Sincerely,
Barbara E. Calabro

This took a substantial amount of time in the first year, taking about an hour or two almost every day of answering online comments and replying to various critical questions for print and online media, TV, and radio. Notable are also my talks in conferences, lectures, and events worldwide. Although I wanted the coaster's agency to materialise itself freely, I also started to feel my own responsibility for the sparked debates on the sensitive topic of euthanasia. This made me build an intellectual background for the coaster by consulting ethicists, a suicide psychologist, a philosopher of death, aerospace physiologists, etc. Quite soon I noticed the positive effect of my active presence. Not as in turning negativists into positivists (even though it was often the case), but as an activator, complicator, and expander, making people understand it all under different light, change their views on the topics of death and pleasure, and appreciating the coexistence of different, nuanced, and complicated

contexts. For example, after a conference in the US, where I delivered a talk on the coaster, one listener who was firing off angry questions came to me during the drinks evening and said how my answers echoed his own ambivalent encounter with euthanasia, that is, how he was struggling with his parent's decision to undergo euthanasia when their illness became too painful, and how it all lacked options for methods, setups, and intimacy.[78] Eventually he said the coaster bore urgent and positive meanings.

Of course, there are still many negativists who find the project rather morbid. One of the reasons behind this might be the project's inherent deadpan humour, which I would consider an appropriate delivery of a sensitive topic. Those who lack a sense of humour might just not get the poetics of it. Nonetheless, the coaster is not universal. Not everybody likes thrill rides, horror movies, and spicy food, after all.

Mr. Urbonas,
Thank you very much for writing back.
You make very strong arguments. I simply want to point out that

as a scientist, your brain has the potential to change the world in irreversible ways. I believe that with that ability comes responsibility. I cannot argue with your inventions or concepts. They are brilliant. I simply ask you to exercise caution because there are evil men that cannot wait to misuse your genius for destructive purposes. Think of the concept of Vonnegut's Ice Nine.
Thank you again for your time,

Sincerely,
Luther Blissett[79]

While actively monitoring the public response and clarifying the context, I tried to retain my neutral position, stating that I neither promoted euthanasia nor discouraged it, and shifting the attention towards the poetics and sci-fi. Yet there were a few occasions that made me concerned about the effect the project had on some people. For example, I received a few emails and calls from suicidal people who considered the coaster as the way to go; one of them even thought that the project was at the stage of testing, and offered himself as a guinea pig. I consulted with a suicide psychologist,

and she reassured me that such a provocation might actually have a positive impact, especially humour, as it eases and facilitates a stressful debate.

Moreover, humour also widens the space for creative imagination. In fact, the comic nature of the death coaster was well received by various comedians. In a special episode on BBC's comedy show QI, one of the guest comedians, Alan Davies, suggested building a chapel at the end of the track, while Ross Noble came up with an accessory to the ride: a death triggered photo camera. On the NYC based radio comedy show, The Jay Thomas Show, I received a quite unusual yet ethically relevant question: what would I do with the *g*-force evacuated poo? Aware of this phenomenon, I came up with g-diapers. This show was actually where I got nicknamed Dr. Death. On his finance TV show, Keiser Show, Max Keiser devoted more than half an hour to the discussion of economical strategies of Wall Street using *Euthanasia Coaster* as a metaphorical model. Spanning a wide range of interpretations, between religion, technologys, economy, and culture, most of those anecdotal stories are actually quite pragmatic, contributing to the experiential texture of

the distributed socially scripted fiction. The hybridity of the reception also blazes new imaginary trails. Thereby the twisted fatal fall becomes an execution machine, the most extreme ride, a cinematic prop for a non-existent horror movie, a black humour anecdote, a kinetic sonic-participatory sculpture, and educational material for physics, mechanics, extreme medicine, bioethics, etc.

The discussion on the feedback demonstrates that such vehicular poetics may exist as a unique platform for conventional design and engineering, but also persist just in the realm of comedy and fiction, distributed across diverse media and channels. Both domains are intertwined, but if one wanted to separate them, it would offer specific advantages for each. For conventional design, it may be considered a safe, economic, quick, and democratic means of testing ideas. As for the perspective of storymaking, the project calls for an expanded notion of sci-fi (or vehicular fiction) with a unique sensual, interactive, immersive, pervasive, ubiquitous, thought-provoking appeal and a beyond-book-and-screen means of expression.

Summary

This chapter examines falling as a designed experience and a critical method. Treating descent not as an accident, but as a *composed sequence of forces*, it analyses fairground drops, roller coasters and allied "vehicular poems", in which tracks, restraints, and timing script the body through alternations of weightlessness (airtime), heaviness (positive g), and directional inversion. The emblematic case is *Euthanasia Coaster*—a speculative ride engineered as a lethal narrative of six high-g inversions—which functions simultaneously as a technical proposal, moral fable, and media object. Through this and related examples, the chapter shows how falling can be mobilised as critical vertigo: a controlled disorientation that makes visible our tacit contracts with gravity, safety, and consent. Methodologically, "Falling" couples field observation, simple modelling, scenario writing, and post-phenomenological analysis. It foregrounds the affect curve of a ride—the patterned rise and fall of g-loads and *jerk* (rate of change)—as the ride's "meter", with lift-hill anticipations, first-drop shocks, and recovery plateaus read as

stanzaic structure. It also attends to the social dramaturgy around the machine (queues, warnings, restraints, operator calls) as an ethics interface, where participants negotiate risk, authorship, and responsibility.

Key findings: (1) Embodied multistability. The same device supports multiple coherent ways of being-with it—thrill, terror, transcendence—depending on posture, expectation, and prior experience. (2) Surrendered agency as technique. Temporarily yielding control to a vehicle expands imaginative bandwidth; riders report time dilation, horizon loss, and re-anchoring of self/other boundaries. (3) Designable thresholds. Negative-g airtime, sustained positive-g "heaviness", lateral snaps, and roll sequences are composable materials with perceivable limits; their arrangement can be scored like choreography. (4) Poly-real circulation. The coaster's migration across galleries, tabloids, classrooms and bioethics debates demonstrates how risk fiction proliferates iterations and publics, turning a blueprint into a cultural instrument.

Together, these insights consolidate vehicular poetics as a core tactic of gravitational aesthetics: vehicles are not only carriers, but poetic engines that choreograph bodies, surface ethics, and reorganise social space. "Falling" thus establishes descent as both a laboratory and lexicon for composing with gravity, setting up "Levitating" to probe what happens when the ground—and the horizon—disappear altogether.

IV.

LEVITATING

Levitation––in its enormous variety of incarnations, from the purest lightness of angels to the diamagnetic levitation of living matter––has been perhaps the most dreamed of and desired state of being. It threads through the worlds of mythology, science fiction, poetics, science, and technology. It is profoundly contagious and, like its opposite––gravity, one of the greatest mysteries of physics, and I'd dare say of experience too.

Desired as levitation may be, few can actually recount experiencing it in reality. It is because very few have skills, access to, and the knowledge of the technical requirements to have this experience. Fewer still (if any) have experienced the full range of what levitation can be. To fill this gap in knowledge, I have spent more than a decade familiarising myself intimately with various levitating technologies, embodying them, and comparing their experiential subtleties.

Avoiding myths, supernatural fantasy, pseudo-science as well as (quasi)weightless phenomena like OBE (out-of-body experience), astral projection, and all kinds of drug-induced altered states of consciousness, I'll try to bring to the ground the floating ideas

about what it is like to levitate with my (and at times with somebody else's) own body. Submitting myself to a series of bodily investigations of various levitation technologies––flesh hook suspension, neutral buoyancy, aerodynamic hovering, free fall, orbiting, and dreaming––I'll enquire into the phenomenology of the absence of gravity's burden and how lightness may become part of "naked" experience.[80] Such experiences usually require different bodily techniques, environmental conditions, and technologies to stabilise the condition (which is usually temporary), making each situation unique. Such paraphernalia, techniques, and spatiotemporal limits complicate the (generalised) definition of levitation, and make me question the very possibility of experiencing pure lightness *per se*; I wonder if perhaps it is best to leave it to artists, poets, illusionists, and theoretical physicists to make levitation possible through our imagination alone.

But I don't want to come to such a conclusion too hastily. So, first I'll look into what it takes to get into levitation: (1) preparation, training, or adaptation; (2) embodiment and incorporation of technology that enables the experience and disappears from the subject's attention; then I will reflect on (3) what new perceptions and relations are provoked by particular body-technology-environment setup. Each analysis will be conducted via common spatiotemporal and kinaesthetic criteria, probing what kind of experiential space is produced, what the timing and temporal limits are, what the motion repertoire is in terms of new movements and the ones that are disabled or prevented from taking place. What the body can do that it cannot do otherwise––reaching new sensual and social realms––these are key questions. In other words, I'll try to live with or through levitation technologies, performing both daily activities such as walking, eating, sleeping, and more specific ones that would gauge the freedom of movement and performativity. By doing so, I'll look into the common patterns such technologies share, thereby defining what the experience(s) of levitation is and could be.

The technologies range from as simple as ropes to more advanced such as bespoke falling aircraft and dream inducing machinery, and majority of them are part of art projects, both of mine and others. Worth noting is that the text itself has been used as the backbone of a series of performative lectures called *Nonfiction of Levitation* that I

80 By "naked" I mean the unconstrained sensation of lightness or an embodied condition of such an experience. For example, after practising cycling for a long time, the bicycle pulls out of the conscious foreground and is incorporated into the cyclist's body, becoming as "silent" as her lungs and heart. In this way, cycling becomes a "naked" experience. This kind of "nakedness" is similar to what post-phenomenologist Don Ihde refers to as a "ratio' between the objectness of the technology and its transparency in use.

Ihde, D., 1990. *Technology and the lifeworld: From garden to earth.* Bloomington: Indiana University Press. pp. 82-94.

have delivered in various events around the world. For the lecture I employ a specially designed system of belts that I originally came up with for my bodystorming sessions during the research. The system, strapped all over my body, allows me to be raised like a marionette in mid-air by 5-7 people. During the lectures, the assistants-cum-suspenders keep me suspended and move my limbs at certain times according to specific "choreographies" that illustrate the different kinds of levitation I am talking about. Sometimes it is well rehearsed in advance and sometimes I ask for volunteers from the audience, who are later given an assignment of deep listening to what I am lecturing on and improvising on my movements accordingly. In other words, they have to act out being ropes, air, water, etc., thereby collectively running a human-led simulator of levitation. For example, when I am talking about neutral buoyancy and breath-in, they have to raise me, because this is what would happen under real circumstances. Or, if I gesticulate violently while talking about skydiving, they have to come up with some sort of very complex and inarticulate motion of mine. Actually, such miniaturised levitation choreographies pepper the whole study.

Julijonas Urbonas, *Walking on the Wall*, 2012, lecture-performance. A view at the Lithuanian National Gallery of Art, 2012. Photo by Ernestas Parulskis.

Julijonas Urbonas, *Nonfiction of Levitation*, 2011, lecture-performance. A view from the Kosmica festival, Laboratorio Arte Alameda, Mexico, 2013. Photo by Nahum Mantra.

Suspension

The weightlessness of ballet, according to dance historians, was invented by the ballet masters Charles-Louis Didelot and Marie Taglioni. Probably having had served and flown as a boy marionette in the late eighteenth century Parisian Theatre Audinot, where sometimes puppets were exchanged for real children, or just inspired by the imagery of his childhood, Didelot invented an adult version of the wire and harness machinery that lifted dancers upward, allowing them to stand on their toes before leaving the ground.[81] The choreographer noticed and developed the ethereal quality the "flying machine" brought to the dance, and the audience was won. Meanwhile, almost at the same time, Marie Taglioni was moving away from the heavy, ornate costumes of earlier periods, embracing lighter, shorter, flowing, translucent fabrics that facilitated the dancer's movement, but also enhanced the illusion of weightlessness. Her demand for a shoe that allowed her to dance on the tips of her toes contributed to experimental designs enabling the subtle, controlled movements required for dancing on tips and supporting

the dancer's weight while maintaining a minimal, light profile. That is how *pointe*, the on-the-tip classical ballet technique, was established. Thus, it could be said that the vocabulary of ballet was designed as much as choreographed.

Between 1968 and 1972, the American dancer and choreographer Trisha Brown, an aerial dance pioneer, was using various custom-made harness devices as well as ready-made mountain climbing equipment for her performance series *Equipment Dances*, which studied choreographic transformations of the body's relationship to gravity. Brown focused on ordinary movements like standing, walking, or dressing up to demonstrate how they were intrinsically governed by earthly downward pull. One of the first performance pieces, *Floor of the Forest* (1970), was about dressing up horizontally. It was as much a dance as a choreographic prop: a 4 by 5 metre pipe frame, across which were tied ropes densely threaded with clothes with sleeves woven beneath pant legs, forming a solid rectangular surface. The audience was free to move around in the periphery of this kind of wearable architecture as the performers dressed and undressed their way through this structure. Watching a video doc-

umentation of the performance, it is hard not to notice the dramatised power of gravity—even well trained dancers struggle with the quotidian and normally vertical activity.[82] Other dance pieces involved dancers performing on surfaces perpendicular to the ground. In *Man Walking Down the Side of a Building*, Trisha Brown sent her dancer down the façade from the rooftop of her SoHo loft, a seven-storey building. The dancer, strapped into a mountaineering harness, simply walked down the side of the building with arms held tightly to the sides of his body. The quotidian pedestrian activity turned on its side is no longer recognisable, challenging the bodily knowledge in such a way that even the well trained choreographer Elizabeth Streb walked like Frankenstein, as she struggled to keep herself fully upright while moving forward and downward, and holding her arms as if they were very heavy, during a historical recreation of the dance piece.[83] In Brown's *Walking on the Wall*, performed at the Whitney Museum of Art, harnessed dancers were perpendicularly hung and could walk, run, or remain still at varying heights on two right-angled walls with the aid of climbing ropes and extended tracks that curved around the room.[84] The performers were walking "horizontally" as though taking a casual stroll in the street, stepping around corners, meeting and parting and never looking down, where the spectators were actually situated. But which way is down? Much like in weightlessness, it is up to the spectator to decide. The only difference is that this question is posed not up there, in outer space, but down here, where gravity pulls us incessantly and irresistibly. Therefore, it should come with no surprise that almost an identical performance was staged a decade earlier by NASA for the Apollo 11 mission. It was the device called *Reduced Gravity Walking Simulator*, also based on ropes and harnesses, used to evaluate the effects of lunar gravity (one-sixth of that of the Earth) on a human's walking and running capabilities. An 80 kg astronaut perpendicularly hung against a near-right-angled wall and "standing" on it would have exerted a force of only 15 kg—the same as if he was standing upright on the lunar surface.[85]

In 2012, commissioned by the Lithuanian National Gallery of Art, I set out to reconstruct *Walking on the Wall* on the facade of the gallery as a performative lecture about design choreography[86], a specific artistic methodology I had established by blending dance, art, design, and architecture.[87] Before the lecture, I installed the

85 The initial version of the *Reduced Gravity Walking Simulator* was located inside a hangar at NASA's Langley Research Center. Later a larger version would be located at the Lunar Landing Facility. The purpose of this simulator was to study the subject while walking, jumping, or running. Researchers conducted studies of various factors such as fatigue limit, energy expenditure, and speed of locomotion. Francis B. Smith wrote in his paper *Simulators For Manned Space Research*, "I would like to conclude this talk with a discussion of a device for simulating lunar gravity which is very effective and yet which is so simple that its cost is in the order of a few thousand dollars at most, rather than hundreds of thousands. With a little ingenuity, one could almost build this type simulator in his backyard for children to play on. The principle is ...if a test subject is suspended in a sling so that his body axis makes an angle of 9 1/2 degrees with the horizontal and if he then "stands" on a platform perpendicular to his body axis, the component of the Earth" gravity forcing him toward the platform is one times the sine of 9 1/2 degrees or approximately 1/6 of the Earth's normal gravity field. That is, a 90 kg astronaut "standing" on the platform would exert a force of only 15 kg—the same as if he were standing upright on the lunar surface."

Hansen, J.R., 1995. *Spaceflight revolution: NASA Langley Research Center from Sputnik to Apollo*. NASA SP-4308. Washington, D.C.: National Aeronautics and Space Administration.

Smith, F. B., 1966. "Simulators For Manned Space Research," in: 1966 IEEE International Convention, New York, NY.

equipment in my studio with the track encircling in such a way so that I could walk around the space continuously. Experimenting with different types of harnesses, adjusting the suspension angle, I settled on the most comfortable setup. Spending a substantial amount of time fooling around and trying to perform mundane activities such as eating and sleeping, the novelty wore off quite quickly, leading to all sort of discomfort. First, even though I tried to make the harness as comfortable as possible, I quite soon became quite irritated by skin pressure, chafing, and general discomfort. Second, as my bodily fluids shifted toward my head, I encountered issues like puffy face and even slight vision changes. Third, the limited motion repertoire constrained by the harness and the ropes would often develop into frustration (actually, later this sort of hassle almost disappeared and I was moving around without putting much thought in it). So, this is the price of lightness.

Since such wire-enabled sensual realms are mostly limited to professionals, air dancers, stuntmen etc., I decided to open up the performative reconstruction to the public participation, providing people (older than 5 yr) with an opportunity to take a stroll on the façade of the National Art Gallery. One of the most reoccurring responses of those who stepped on the wall was "I thought it would be much lighter."

86 See Glossary.
87 See Glossary.

Flesh Hook Suspension

Having looked into more "naked" suspension experiences, I decided to try flesh hook suspension. It is a ritual in which a performer is suspended by hooks that have been put through temporary body piercings, and which uses the strength and resistance of the skin to remain elevated. I was determined to try it, although I was rather sceptical about the genuineness of the levitation experience and the spiritual, body modifying, pseudo-science associations that are often accompanying it. However, having increasingly encountered the reports of flesh hook suspension experiences revolving often around euphoric sensations that are shared across cultures, environments, and people despite the fact that the ritual is approached with different preparations and intentions, I gave it a go.

Consulting some experienced suspendees online,[88] I decided to hire a personal suspension supervisor. I'm told that I have to be prepared mentally and to be positively centred, because if I am frightened, I can have a traumatic experience or even fall into a state of shock. So, take two days off and do some easy hiking. I am also advised to start drinking plenty of water at least two days before the suspension. The more hydrated I am, the more flexible and stretchy my skin will be. Also, one of our standard prep steps is having glucose tablets on hand. Suspension can sometimes cause blood sugar to drop, and a quick sugar boost usually does the trick. When it comes to choosing the right type of suspension, it really comes down to your comfort level.

Feeling well prepared, I rush to my supervisor's "hook lab" and lie on his stainless steel bed. He inspects my body to decide the placement, number, and size of metal hooks (these are often deep-sea fishing hooks with the barbs carefully removed). Finding the proper hook placement and number involves a great deal of experience, knowledge of physics, and an acute understanding of human anatomy, physiology, and durability of the individual's skin. If the number of the hooks is too

low or distributed unevenly, the suspended individual's skin might be unable to withstand the body's weight, and can rip. I'm going to be suspended in a horizontal, or "Superman" position, which is often performed by beginners. This is because the body's weight can be distributed across more hooks (usually about twelve), placed around the shoulders, upper arms, back, thighs and calves.

The supervisor starts inserting the hooks. My hook master pinches a small portion of my skin and pierces the first sterilised hook. Oof! Painful. Well, in fact, anticipation is more painful than the act itself. My supervisor says that once I have undergone this torture, I'll be rewarded. After about twenty minutes of this slaughter, I am slowly and carefully lifted off the bed with a block-and-tackle device. To be honest, this is the worst part: as the weight starts stretching the skin, I start to feel the true nature of this very intimate and alien penetration into my body. It is quite a shocking experience as it is burning everywhere and on top of that I'm becoming aware of the absurdity of this ordeal, which makes me dizzy. But hanging for a few minutes, sighing deeply and trying to soothe myself with thoughts of my (scientific) intentions here, I have an

extraordinary experience as the pain fades away and the body becomes lighter. Do sensory overload and pushing the body to its limits trigger an out-of-body experience?[89]

It is truly something that cannot compare with anything else, producing a peculiar sense of levitation thanks to either the mental (because of the intensity of experience) or physical (because of the distribution of weight across the body) effect, or maybe both.

Trying to explore this experience further by increasing, my motility is constrained by the ropes, as they can easily get in a tangle, and by the number of the flesh hooks. In other words, the magnitude of weight distribution is adversely proportional to the freedom of movement. Light but stiff. Of course, I can do 4-point or even 2-point suicides, lotus, comas (terms defining different positions)—they offer a lot more freedom of movement since the arms and legs aren't that restricted, but still in one way or another I would get entangled.

Another limiting feature of this levitation is its ephemerality, as it lasts a maximum of one hour (and after, I have to go through the

ordeal of waiting for the skin to heal before I can participate in another session). Truly, the enlightened "pays the physical penalty for being suspended", as the Australian artist Stelarc, who did a series of flesh hook based performances, once commented.[90]

All in all, it is a very unstable levitation indeed: on top of the mobility constraints and its temporariness, there is an experiential variation between individuals. On one end of the spectrum, there are people that enter a trance-like state or can feel a meditative lightness and sense of spiritual inspiration, feeling no pain whatsoever; on the other end, there are those who experience extreme pain, nausea and panic attacks—perhaps ironically, a heightened awareness of gravitational pull. As for me, I'm perhaps somewhere in the middle of the spectrum.

Buoyancy

In 2005, I visited *INERS_Double and Microgravity Positions*, an exhibition by the Hungarian artist Antal Lakner, at the Trafó House

of Contemporary Arts, Budapest, Hungary. There I came across *Black Hole*: a black box-shaped booth with a door on one side and a table full of makeup stuff with a mirror next to it. Responding to my face radiating with curiosity, an elderly lady standing in front of this booth and dressed like a nurse tried to inspire me further: "Hey boy, want to experience zero gravity? Strip naked!" I was amazed: this was exactly what I was looking for, a "naked" experience of lightness!

All of a sudden I realise this booth is, in fact, a redesigned floatation tank.[91] Having not experienced one before, I accept the invitation, provocative as it is (not least because I have to undress in a gallery space). I take a shower and get into the soundproof and slightly illuminated capsule. There is a mini pool filled half a metre deep with highly salinated water at skin temperature. I lie down and switch off the light. I float indeed! Thanks to the added Epsom salt (magnesium sulphate), the density of the water rises above the density of the human body, making me float with my face above the water. My ear-plugged ears are submerged and hearing is reduced. It is extremely calm––no sound, no tactile stimulation, no

91 Originally designed by neuropsychiatrist Dr John C. Lilly in 1954, an isolation tank was used for testing the effects of sensory deprivation. It is usually a lightless, soundproof tank in which subjects float in salted water at skin temperature.

Floatation Tanks (n.d.). [online] *History of the flotation tank*. Available at: http://www.flotation-tanks.co.uk/history_of_the_flotation_tank.html [Accessed 25 October 2009].

smell––and it doesn't take long before I feel as if I am dissolving in this liquid. It is an eerie experience, and I even shake myself a bit to enliven my body.

Having somewhat reached the state between daydreaming and sleep, I start to notice that in fact there is something in this nothingness. My body, the pulse of my heart, and the mild, windy sound of respiration play a live concert with the buzz of tinnitus in the background. Sometimes I feel itchy and find myself fidgeting. These tiny gestures often cause propulsion and I bump into the wall, the border of the levitation experience.[92] After a few tiny bodily technique tests, I find that the small waves caused by my breathing can help centre myself in the solution. Nevertheless, maybe because it requires more practice, my daydreaming, or rather levi-dreaming, is constantly disturbed by the slightest movement. I realise that this floatation experience is constrained not just by the walls of the tank but also by my motoric exploration that is limited by the fact that in order to float I can only engage in micro-movements and stay in a lying position.

92 In fact, this problem might be prevented by a ring heating system which is used around the outer walls of more advanced tanks to warm the water so that it rises up the outside edges of the pool, travels towards the center, and then sinks under the tank user. This very slow water convection flow helps to keep the user centered in the middle of the pool, stopping them from floating to the side and bumping into the walls of the small tank during long float sessions.

Hoping to improve this buoyant experience, I sign up for a professional diving course. Specifically, what I'm looking for here is to learn how to achieve neutral buoyancy, the holy grail of diving. Neutral diving is when you neither float (positive buoyancy) nor sink (negative buoyancy) but remain at a constant depth.[93] Professional divers call it a unique art form in its own right. And as such, it is extremely hard to learn—it takes me more than thirty dive sessions just to get acquainted with it. But it is worth the time and energy devoted to it and now I understand what my tutors are calling 'underwater flying'. In neutral buoyancy I feel extremely light: diving is so effortless, as I am not fighting to stay off the bottom or to stop myself from rising to the surface. And what's more, I breathe less air, so I can extend my underwater exploration time without changing the air tank. But, again, it requires a considerable amount of time to learn to do this. And it proves to be almost impossible to teach it remotely; you can really only learn by practising a lot.
In order to remain neutrally buoyant, I, as well as most divers, use a buoyancy compensator (BC). BC is a wearable diving device, which allows the user to control depth by adjusting its volume, or more technically put, the amount of gas in the device's artificial

93 Due to its similarity to weightless space, neutral buoyancy allows the person to simulate some space activities such as spacewalking or EVAs (Extravehicular Activities). It's for this reason that astronauts or cosmonauts have to complete a part of their training in a space station immersed in a large pool.

bladder. I inject more gas into the BC when I am too heavy and start sinking and vent it when I'm rising. This is the most common technique and it can accommodate divers differing in bodily physique (the overweight tends to float and the muscular to sink) and different waters, whether saltier or with warmer streams. I have to carefully coordinate my movements to avoid any change in depth from the position of neutrality (a bit higher and I start to ascend, lower and I descend) and even small changes in lung volume through breathing. Together with the regulation of BC, I have to learn subtle lung gestures: inhaling deeply causes me to rise, while exhaling to sink. Thus, the maintenance of neutral buoyancy must be a continuous and active procedure—the diving equivalent of the balancing act of a tightrope walker.

Neutral buoyancy is somewhat similar to flesh hook suspension in the way it distributes weight and how the resistance to gravity is felt across the body. However, they differ in the directions of force: the former pulls the skin outwards, whilst the latter pushes the body inwards. As for the experience, this underwater weight-

lessness differs significantly. Perhaps the most noticeable difference and advantage is the freedom of movement and the way in which the whole body is engaged. Underwater, I'm free to dive in all directions and take very little effort in propelling myself horizontally, although I am quite constrained to the level plane and lying position because it's harder to remain stable in neutral buoyancy in a vertical posture. The time taken to learn and to maintain this position underwater is another feature and a disadvantage. To keep the levitating experience stable, I have to coordinate my bodily-technological relations in a fluid environment. It involves subtle lung contractions, whole-body movements (especially those fluttering gestures of the limbs), awareness of the skin's sensitivity to water pressure, and regulation of the volume of the BC and the gas tank. And all this is done in slow movements due to the fluid drag on bodily motion. This means that quick movements are heavy and hard to perform, which is also an intrinsic feature of neutral buoyancy-based levitation. Only after extensive practice and negotiation with this kind of levitation can one move more fluidly and automatically.

Nonetheless, this is not a "naked" phenomenon. As much as I could get used to these special technologies (wetsuit, diving mask, fins, buoyancy control device, lead weights, breathing equipment), balancing this buoyancy effortlessly and automatically is still very temporary. What is more, without any additional oxygen supply, I can stay underwater for a maximum of just a few minutes. That said, the world record for holding one's breath, or what is more precisely known as "static apnoea", a stationary breath-holding technique, is 11 minutes and 35 seconds, while the current record for the world's longest scuba dive (Scuba is an acronym for Self Contained Underwater Breathing Apparatus) is about ten days.[94] Unfortunately, such long stays underwater while sustaining neutral buoyancy are hardly imaginable. And any longer stay would have to do without basic human needs such as food, hygiene, social communication etc. The longer you float, the heavier the habitation becomes. In my case, the experience ultimately remains 'light' or 'transparent' for only a few minutes.

Aerodynamic Levitation

In the past, I had done only one parachute jump and a few bungee jumps, so I don't feel able to comment on these technologies in terms of levitation or lightness. Besides, my experiences were too momentary for more rigorous experiential exploration or analysis. Willing to enrich my falling experience, I approach my friends, holders of numerous awards in various parachuting and skydiving contests, to discuss their parachuting experiences. To make our discussion fuller and empirically backed, they invite me to a vertical wind tunnel to try aerodynamic levitation.

Vertical wind tunnels are tall tunnels in which air is blown vertically from a powerful fan beneath a latticed floor. Such tunnels are also called skydiving simulators, as the sensation they produce is very similar to that of skydiving, enabling people to fly in the air without planes or parachutes. The wind moves upwards at approximately 195 km/h (120 mph or 55 m/s), the approximate terminal velocity of a human body falling belly-downwards, although this can vary

from person to person.[95] Such human body "floating" in mid-air in a vertical wind tunnel is called "bodyflight".

My first steps into the tunnel are far from bodyflight––as soon as the wind starts, it raises me almost a metre and I'm already falling down, staying in the air no longer than a few seconds. It takes me at least a dozen of these Icarus-like failures to understand that the body's posture and the position of my limbs are the key to stabilising floatation, as well as engaging carefully in any descent or ascent and even generating turns, lateral motion and, other acrobatics (or rather aerobatics?). At first glance at my friends, who are pros in this, it appears as if there is no need for physical effort, but in fact, it requires quite an athletic physique and deliberate training to learn how to use one's body effectively in this way. My friends tell me that when they got hold of these techniques, however, they were free to explore space in all dimensions (well, almost: in the tunnel, exploration is constrained by the walls; with real skydiving, by the limits of downward motion and falling time). The whole surface of the body plays a major role in navigating this experience. Air friction differs with subtle turbulences between various parts of the body.

95 The terminal velocity of a falling body occurs during free fall when a falling body experiences zero acceleration because of the retarding force of air resistance. Air resistance exists because air molecules collide into a falling body creating an upward force opposite to the force of gravity. This upward force will eventually balance the falling body's weight and the body will continue to fall at constant velocity known as terminal velocity.

Elert, G., 2007. Speed of a skydiver (Terminal Velocity). [online] *The Physics factbook*. Available at: http://hypertextbook.com/facts/JianHuang.shtml [Accessed 12 May 2010].

The air strokes the surfaces of the skin, propelling the body upwards while clothing it in a kind of "air dress". This unique interaction between the rushing air and the shapes of the body is responsive and subtle. After a dozen training sessions, I manage to stabilise myself mid-air—basically sitting and balancing on an air cushion—and become especially aware of the slightest movements of my limbs, as even a change of finger position may change my orientation and even trigger uncontrollable turbulent spinning. So there is no fooling around, any motion needs to be taken into account and become an integral part of heightened awareness. I am told that after a substantial amount of time spent in such aerial drama, my friends said it all got incorporated in their bodies and became silent (or in my terms, "naked"), so that they believe their body would do the job even asleep while falling (even though they haven't tried it yet).

After becoming confident enough in the tunnel, I joined my friends for a series of skydives to make a better experiential comparison. The very first thing that I, and everybody else, would experience for about the first twenty seconds after jumping out of the plane, is a brief moment of weightlessness. After that, the acceleration decreases to null and the falling speed remains constant due to terminal velocity, although it can be altered by manipulating the position and of the body and limbs. For instance, after some practice, I am able to increase the speed considerably by diving headfirst with my arms against the sides of the body, legs held firmly together, and toes pointed. This posture presents a minimal projected area perpendicular to the direction of motion, thus reducing aerodynamic drag. Special helmets and slick bodysuits may reduce the drag even further. Nonetheless, such levitation is incomplete, as the guts and bodily fluids are still being pulled by gravity – something that is especially felt during rapid changes in head-up to head-down orientations. The main problem of experiencing weightlessness here is generally air resistance and, of course, the limited time of falling. If these were overcome, perhaps true lightness would be possible. At least in terms of physics. And this is possible in parabolic flights.

Free Fall

Still dissatisfied with my current experience of weightlessness and encouraged by my friends, professional fallers no less, I head to the Yuri Gagarin Cosmonauts Training Center in Star City (Zvyozdny gorodok, Russia). The centre is responsible for training cosmonauts for their space missions, and they have also trained candidates from other countries of the former Soviet bloc. Among many training facilities, the centre features a 0 *g* training aircraft, the only means for simulating weightlessness without leaving the earth behind. It is exactly what I'm looking for.

The aircraft achieves weightlessness by following an elliptic or parabolic flight path relative to the centre of the earth. While following this path, the aircraft and its payload are in free fall, and are literally orbiting the earth. During this time the aircraft does not exert any *g*-forces on its contents. These aircraft are nicknamed 'vomit comets', and I get enchanted by the name and take a ride. I can hardly recall my first few sequences of zero-*g*, but I do remember the initial

shock upon my sensorium. Breathing deeply and concentrating on my very being, I gradually start to explore this highly intense experience. After a few moments of violent and clumsy attempts to move in space, I encounter true weightlessness. The experience reminds me of a passage from the American writer Paul Auster's book *Mr Vertigo* (2006), a novel about an orphan boy who was taught to levitate by a quasi-religious master. The passage where the boy finds himself hovering a few inches above the ground depicts the experience so vividly and accurately that it makes me want to steal the words:

"[I] grew still, almost tranquil, and bit by bit a sense of calm spread through me, radiating out among my muscles and oozing toward the tips of my fingers and toes. There were no more thoughts in my head, no more feelings in my heart. I was weightless inside my own body, floating on a placid wave of nothingness, utterly detached and indifferent to the world around me [...] Very slowly, I felt my body rise off the floor. The movement was so natural, so exquisite in its gentleness, it wasn't until I opened my eyes that I understood my limbs were touching only air, [and conscious] only of the air fluttering in and out of my lungs."[96]

Afterwards, when he finds himself lying on the ground, the boy feels his body dull and turbid, and can hardly get up––it is exactly what happens in a "vomit comet". Weightlessness is accompanied by double gravity––quite regular sequences of twenty-second sessions between 0 *g* and 2 *g*. This, in a way, heightens this sensation of lightness. Weightlessness is entered and followed by the double load, during which my weight is doubled and any bodily movement is slowed down as it requires a solid conscious and physical effort. In fact, what is changing here is just the aeroplane's acceleration and relationship with Earth's gravity––but what an effect! It is this intertwined spectacle of altered states of gravitation that allows me to learn what a significant impact gravity has upon us.

What *Mr Vertigo* misses in the description of the weightless experience is vertigo itself: giddiness, loss of balance, and a temporal loss of orientation. It's unsettling, I feel like I'm stepping out into the void and yet I don't fall, like floating in neutral buoyancy without water. When you fall, there's a spatial reference: you fall down from somewhere to elsewhere. But with this kind of weightlessness, you fall without falling; there is no perception of displacement. Freed

from gravity, I also liberate myself from the usual references of orientation––there are no longer such things as vertical and horizontal or up and down––all points and directions are equally significant.

Such sensorial bewilderment, worsened by anxiety, usually results in airsickness: dizziness, nausea, shock, vomiting, or combination of them all, which mostly occurs after five to ten parabolas. My own disorientation and dizziness and, even more radically, my ultimate submission to levitation, weirdly make my bodily boundaries disappear. It is a sort of dissolution into the void––an experience of nothingness! Fortunately, thanks to my natural fidgeting, I am reminded of having a weighty body.

Still fiddling with my disorientation, I am brought back to a state of self-awareness and come to a little discovery of how to orient myself in space. If I close my eyes and make several somersaults, I find myself even more disoriented, as my cognitive powers go wild in trying to anchor a reference point. Thankfully, once I open my eyes, everything settles down and I'm certain the cushioned floor is

"down", the ceiling is "up". In fact, I'm free to build space as I want to: when I turn myself upside down, the floor becomes "down". Nonetheless, one reference source is constant: my own body. This insight or, one could say, my little architectural discovery, maybe is a bit solipsistic and self-centred. However, it is empirically supported by the fact that my head points in an *upward* direction, the legs *downward*, the hands laterally *left* and *right*, whilst my chest is oriented *forwards*, and so on. Thus, I, and probably all of us, "wear" a reliable and *stable* set of reference coordinates, or what the French choreographer Kitsou Dubois calls "subjective vertical"––a heritage of our evolutionary negotiation with gravity––all the time, regardless of our relations with the surroundings.[97]

In these circumstances, locomotion also has to be rediscovered. There are no longer such bodily activities as standing, kneeling, getting up, etc.; familiar movements lose meaning as much as function in 0 *g*. For example, the legs are unbound from their terrestrial locomotive function and become equally significant as the hands. As a result, some new motions emerge that are impossible on Earth. I can quite easily execute movements that are like those of a yawing, rolling,

pitching aeroplane; I can fly quite far just with a gentle lean forward; I can perform a somersault in all three angular directions. All this, however, requires subtle coordination, orientation in space, and an awareness of a peculiar inertia unique to this state of weightlessness. A few astronauts are training in the aeroplane next to me, and it is not hard to notice that their movements are far more fluid and acrobatic than of those who are taking this ride for the first time and who wriggle and convulse without coordination. In any case, I find myself unusually connected, feeling into other bodies: my kinaesthetic empathy turns volumetric, after all! During her dance experiments in parabolic flights, Dubois noticed that spectators watching a performer spin in micro-g reported a sort of vestibular echo—they felt phantom rotations in their own body. Because both the performer and the spectator can now translate freely in 3D, the usual empathetic mirroring spreads across every axis, intensifying the kinaesthetic affect.

I conclude that this type of levitation is thus one of the most unstable I have experienced and researched. There is no lightness without weight, as every phase of 0 *g* is followed by 2 *g*; there is

no movement without touching a stable surface and being aware of one's own inertia, a product of mass; there is no effortless locomotion without deliberate training or acclimatisation; there is no orientation without disorientation, nausea, or vomiting; and finally, it is susceptible to psychological weight.

Airtime

Looking into ways how this temporally (max flight duration is around 2 hours) and spatially restricted fall could be enhanced and made more accessible for experimentation, I set out to build a dropping floor that could liberate those spatiotemporal restrictions and bring the submission to gravity down to earth.

In 2016, as part of the Lithuanian pavilion at the XXI Triennale di Milano, I designed *Airtime*, a dropping floor, which fuses elements of a participatory kinetic sculpture with elements of performative architecture, an anti-gravity machine and a thrill ride. A special

equipment to be installed under the floor that raises and drops those walking on it, occasionally causing a state of weightlessness. "Airtime" is an expression that amusement ride designers use to describe the freefall sensation that passengers feel when they come out of their seats during a ride.

The installation *Airtime* isolates and concentrates this experience, and places it in a space open to interpretation. Instead of trapping passengers in seats and safety harnesses, like free-fall contraptions such as drop towers do, *Airtime* remains open to any physical or social dynamics.

Although it is just a plain plane, its vertical trajectory of movement forms a unique choreographic and psychosocial space. Those standing on it start to behave and move abnormally, unsure of what to do or how to react, and aware of the inevitable fall. Some look at each other and stiffen. Others crouch down, sit, or lie, trying to find the right body position. Some hold hands to relieve the tension of waiting. The fall lasts less than half a second, but at that very moment the most unique dance occurs. It is difficult, if not impossible, to come

up with an example of when a group of open-mouthed people perform a primal dance, balancing in the air and expressing ambivalent sensations of pain, ecstasy, and fear. After the fall, they scream and laugh, and sometimes run away.

"Modern dance spends an enormous amount of time and effort ignoring gravity. They rarely fall. When they fall, they don't fall. They carefully let themselves down. I'm thinking, you're a bunch of sissies,"[98] Elizabeth Streb, a modern dance choreographer, expresses her criticism of dancers obsessed with vertical posture. This criticism can be applied not only to dancers, but to humanity as a whole. Falling, or rather avoiding it, has been one of the evolutionary factors that has most affected us, and has shaped us into what we are today. It is not surprising that, now that falling no longer plays such a significant role in human survival, surrendering to gravity is either stigmatised or extremised. But what happens when this phenomenon is staged, isolated, and transferred into collective experience for corporeal reflection for substantial amount of time? This real ground slipping from under our feet challenges our notion of nature. Who are we at the moment when every molecule that makes us up is stuck in the air?

Julijonas Urbonas, *Airtime*, 2016, custom electromechanics, EPDM rubber, plywood. Installation shot from the Lithuanian pavilion at the XXI Triennale di Milano 2016. Photo by Paulius Vitkauskas.

Once suspended in the air, the fundamental concepts of space––top and bottom, vertical and horizontal––lose their meaning. What is a vertical posture in such a case, when the feet are no longer connected to the ground? These earthly concepts are stuck in the air, becoming mental or imaginary constructs. Space station designers address this problem by establishing a new vocabulary of spatial guidelines by colouring the arbitrary ceilings and floors in different colours. However, by constantly rotating in space, astronauts often lose their bearings, which is sickening and disorienting. They then attribute the "down" to where the Earth is oriented in relation to the spacecraft, or just "stick" it to their feet. Mental and visceral confusion intertwine and complicate the dichotomy between thinking and moving, between imagining and orienting oneself.

Airtime is a self-refuting floor. The floor as a horizontal dimension of space is an essential element of architecture. With the disappearance of the Earth's gravitational pull, the notions of the floor and thus of earthly architecture disintegrate. A new space opens up for the concept of architecture. On the other hand, by extending the falling distance, *Airtime* could become a pragmatic architectural

transport––a fast, efficient, amusing alternative to the elevator. "Hop!"––from one floor to another. In this case, we should remember that a safe and comfortable fall requires an appropriate distance of deceleration before hitting the ground. Such an elevator would require a geometric progression of floors of the building rising downwards. No wonder if there is a new aesthetic of falling architecture here. Consider the impact that the lift has had on architecture, enabling the age of skyscrapers and super-vertical buildings.

Endless Falling

Running out of terrestrial options for experiencing weightlessness, I felt there was time to move a bit further into the outer space, that is, into orbiting around the Earth, an endless falling. Currently there is only a single option: International Space Station (ISS), which circles around Earth at a certain speed (about 27740 km/h), producing a centrifugal force sufficient to cancel out the gravitational force. In other words, as the space station follows the curvature of Earth,

it is always falling, but never hits the ground. It is this endless fall that allows its inhabitants to experience weightlessness.

Living in a space station is perhaps the best weightless experience anyone might have today and the ultimate material for this investigation into levitation. Since it is extremely inaccessible and expensive, let me fictionalise my trip, basing my phenomenological, ethnographic report on various sources such as astronaut diaries, space psychology scholarly papers, etc. By feigning the "authorship" of the experiences, that is, telling you that it is me who undergoes all these levitating experiences, I hope to bring all the data together in a single and coherent tour and produce an empathetic link through my voice, and thus make your encounter more intimate and reachable.

Let me go straight to space, skipping the tough astronaut training I would have to undergo and rigorous educational sessions about various aspects of space missions. Here, weightlessness (or to be more precise, the experience of it) is substantially different from anything I've ever experienced. That is because this experience of weightlessness lasts far longer than its earthly counterparts, leaving me plenty

of time to investigate it and, even more so, to live it. I can hang out, sleep, eat, use the toilet while levitating!

It is my first day, and I can already confirm that the feeling of lightness is genuine. Indeed, if I close my eyes and let myself relax and "dissolve" in this emptiness of gravity-free being, the boundaries of my body disappear, just as with some of my previous "levitations", but in a more vivid way. However, when it comes to more sophisticated bodily investigations––movements and locomotion––I feel very clumsy. It is not light at all! I try walking, swimming, flailing, flying movements to propel myself... nothing helps... hands and legs are equal here, and our earthly choreographies do not work in the same way in this environment. I simply float around helplessly and hit everyone, and everything (and there is a lot to hit as every corner and surface of the four walls of the tube-shaped space module is hung with hardware, cameras, food packages, bags full of clothes, logs...); I make a floating mess and gather a collection of bruises in the process. I am not surprised that some animals that were flown into space never got the hang of it.[99]

99 For example, one set of new-born quails couldn't adapt to life aboard Russia's Mir space station and died after just a few days.

European Space Agency, 2004. Human spaceflight and exploration: Learning to live with the laws of motion. [online] Available at: http://www.esa.int/esaHS/ESABYU0VMOC_astronauts_0.html [Accessed 11 March 2010].

After these “space walking” failures, I start to discern the radical difference between the station-mates who have already lived here for more than several weeks and the newcomers, including myself. The veterans are diving through compartments and turning corners with such speed and grace––sometimes at the same time as writing their logs!––that I can’t help but think of their agility and light-footedness as extraterrestrial choreography. Yes, this is space inhabitation indeed. Mimicking them and learning from my mistakes, I soon find myself to be more confident enacting smoother movements. This is because I become aware of the importance of the body’s centre of mass to bodily coordination. To find the precise location of the centre, I just try to perform a rotation along one axis. The basic physics I learned at school are of vital importance here, at last. If the direction of your push-force is not in a plane perpendicular to the axis and through your centre of mass, you will set off a rotation on more than one axis. By stretching out and rotating along one axis, I discover that my centre is just above the hips. I find it is best to keep my hands by my hips when exerting forces and boldly go headfirst, in a Superman-like manner. This way, my pushing and pulling is directed through my body’s centre of gravity––

a stable reference point of bodily movement––and gives nice controlled motions without unwanted rotations. Now, I no longer hold my arms over my head to grab onto and push off from things as they come whizzing by. When I do this, I invariably impart some unwanted rotations, which have to be compensated with ever more pushes and pulls so that I end up grabbing various fastened things, such as cords and cables, along the flight path and use them as handholds, pulling them out of their receptacles.

Lightness comes back when I manage to negotiate lightly the cramped spaces of the station. Here, effort is configured around delicate and subtle bodily gestures, like the gentle push of a single finger. No sound is produced, but there is an almost undetectable mild wind raised by my flight. No trace of one’s commute is left behind. No fastened object is touched, let alone loosened. Nor are the crew-mates aware that I am passing by their backs. But such a relaxed, tranquil moments may easily turn into the opposite. When I lose momentum and nearby handholds, I remain suspended, unable to navigate anywhere, only finding myself in a predicament. Whatever movements – graceful or violent and inarticulate––I try,

nothing changes the situation. Ego-motion imprisonment! Happily, to mitigate this, the ISS is equipped with fans and a ventilation system that circulate air, creating gentle currents. These airflows can help move a stationary astronaut toward a surface, allowing them to regain control. Gravitational wind!

However, again, the alien choreography is not free from disorientation. Sometimes, by turning around and forgetting to fix my gaze on a discernible feature of the interior or by getting into another compartment in some awkward spinning manner, I lose my sense of orientation. Much more frequently, if I don't strap or stabilise myself to some part of a wall while staying in one place and writing my log, for instance, I float around unaware and change my relation to the surroundings, causing disorientation. If I am unsecured while interacting with a fixed object, even the slightest touch will send me floating away or get me in a twist. I try to open a fastened bottle, for example, only to find that I end up twisting myself instead. And then, the very process of trying to get 'oriented' or find something takes three or more twists and turns to get my bearings or understand what I'm looking at, as any substantial bodily turn

changes the perspective on things and the interiors, making them seem different and unfamiliar.

Should this "perceptual breakdown" occur, I find anything close to "stable" in my field of vision––something which retains its discernibility even from different perspectives. I then use this as a reliable and fixed reference point. This problem of losing one's bearings has been known by space psychologists since the very first space habitation missions, and space architects and designers try to counter this by differentiating the walls by colour while carefully positioning the lights and developing the shape of the module. Taking advantage of that, I pick or designate lights as "up", for example, and everything comes into order: I am reoriented or coupled with my environment, and do not feel any inconvenience from the fact that I might be walking on a wall or a ceiling. I should say that it would be wrong to say that all directions are equal in space, because the orbiting station is subject to its gravitational tug—the reference source of all directions. But also, from a psychological point of view, Earth could be considered as the fixed reference point: I and my space colleagues love occasionally glimpsing at Earth through

the porthole and thus mentally anchoring this direction as "down". "Any place in free space could serve as an excellent bed or an excellent chair," wrote the Russian visionary Konstantin Tsiolkovsky in his book *Free Space* in 1883, predicting what the state of weightlessness would be like for the first time in human history.[100] It is true, and I like to play with placing my bed. Sometimes I hook my space sleeping bag on the "floor", sometimes on the "ceiling". In any case, it has to be in line with a ventilator fan which will ensure I have sufficient supply of oxygen. Otherwise I may end up sleeping in a bubble of my own exhaled carbon dioxide and suffocate, because, unlike on Earth where gravity does the job, in weightlessness these gases, including those of flatulence, have to be separated artificially.[101] If I sleep untethered, floating free, usually I am woken up by the collision with my own hand or with an air filter that is trying to suck me into its grill (by the way, all loose things tend to gather here––it is a perfect place to look for your lost belongings).[102]

This effect of being suspended in the air affects everything, including all the other daily rituals such as meals, hygiene, going to the toilet. I have to be extremely neat and well-coordinated, because otherwise things (very easily) loosen and get lost, which not only messes up my surroundings and makes it difficult to clean, but also poses a threat to air filtering equipment, since they can contaminate or clog the vents, as well as to the astronauts' respiratory system, their eyes, mouth, or nose. Therefore, while brushing my teeth, for instance, I have to keep my mouth closed to prevent the toothpaste foam from getting out. In addition to this specific oral technique, I hold a piece of cloth with another hand to scrupulously capture any stuff that escapes, and then I transfer the dampened cloth to a plastic bag and seal it carefully. It is pretty much the same with food, where the food must be sticky and can be safely moulded so it doesn't fly away in bits. Despite these precautions, I, as well as many other crew-mates, manage to find a thrill in "risky" food: collecting swarms of peanuts with one's mouth, using a straw to penetrate a hovering, wobbling blob of coffee with a sugar cube dissolving in its centre, or forming micro celestial bodies from hovering blobs of different drinks. I imagine food artists would have radically re-authored the cuisine grammar grammar here.

101 In fact, meteorism is a double problem: it does not only tend to stay in one place, but this intestinal phenomenon is quite persistent as digestive gas cannot "rise" toward the mouth and is more likely to pass through the other end of the digestive tract––in the words of the Skylab crewman-doctor Joe Kerwin––"very effectively with great volume and frequency." Happily, this problem is weakened by another trouble: a degraded sense of smell.

Oberg, J.E. & Oberg, A.R., 1986. *Pioneering space: Living on the next frontier*. New York: McGraw-Hill, p. 86.

102 The astronaut's relaxed body tends to curl into a foetus-like posture—the arms are floating in front of the face and the legs in a semi-curled position, in which the push and pull between the different muscles are evenly balanced.

Besides becoming increasingly weary—the very result of the loss of weight—there are other and no less ominous concerns: the loss of muscles and bones, the shrinkage and slowdown of the heart, a drop in blood plasma, etc. To partially compensate for this lack of weighty life, there are some countermeasures such as special nutrition and workouts—usually jogging strapped on a treadmill for a few hours every day. Happily, these bodily changes are not so explicitly felt. For example, as my (and of course others') spinal column expands and grows taller sometimes by up to 8 cm, I feel just a mild backache and a bit of discomfort. Less painfully, my fingernails seem to grow faster and hair longer. The hair grows longer not only on the top of my head but also on my arms and legs. As my feet are no longer used for their heavy terrestrial job, the calluses on my soles soften, hang on in there for a while, then peel off gradually, only to flake off profusely at the end of my stay... turning my feet into baby ones. Our faces here become puffy and expressions become difficult to read, especially when viewed sideways or upside down. On top of these facial distortions, the pitch and tone of the voice change, becoming more nasal, thus contributing to some troubles in interpersonal communication. Eventually, after a substantial amount of time, all these effects of the natural adaptation of the body to weightlessness become less noticeable, almost "natural". What was considered "normal" in terrestrial 1 *g* becomes alien, especially on one's return.

Having come back to the ground, I feel the crushing force of my own body, and have an enhanced awareness of weighty corporeality. I can't even walk without assistance. Things appear as if in a slow-speed animated cartoon and I feel dizzy, even faint several times.[103] I find it difficult to concentrate and speak coherently. It takes me several days to recover as well as start walking again on my own and only in a well-lit space. I had only just learned to rely on visible spatial cues in the space station, and eventually they became thoroughly incorporated into my perceptual mechanism, so back on Earth, if I close my eyes, I can find myself suddenly falling flat on the ground. Nonetheless, it does not take too long to return to the state I was in before the flight, except for a few trivial long-term effects, one of which is letting things go in mid-air and being surprised when they crash to the floor.

103 The speed at which the eyeball moves for discerning an object is not the same in the weightless condition as on the earth.

All in all, the experience of lightness and levitation in this orbiting habitat is, to date, the best available to humans, both in terms of duration and the freedom of bodily investigation (admittedly, the space is cramped, so moving around is limited to a few metres, and, of course, this is a highly privileged experience that only a few hundred people in total have enjoyed).[104] When I got the hang of a careful coordination of bodily movement, perceptual acuity, and technological know-how, my being was especially light, but I also could grasp something that was truly specific to non-down environment. Since my perspective on things and myself was de-centred and mental "ground" was constantly drifting, my proprioceptive map was scrambling to decide where "I" ended and the surrounding/objects began, and poly-centric perspectives opened up.

What is to be noted is that the awareness of the weightiness of my body is not completely absent; it manifests itself in the inertia caused by the fact that the body still has a mass at 0 *g*. Thus, weight does not just disappear completely but is discernible even more, especially in the 'side effects' of the body's adaptation, including disorientation and bodily fluid redistribution. It is also discernible when compensating for such effects, for example with workouts or with bodily reorientation to visual cues, both of which are vital surrogates of gravity and only go to show our life-critical bond to the latter.
The whole experience also requires an enormous amount of technological sophistication to create an entire closed ecological system to support human life in space. This involves not just limiting the number of activities, especially creative ones, but also, crucially, making the space inhabitants extremely dependent on the machine––a machine they have made and must also maintain. As the German philosopher Peter Sloterdijk would say, emancipation and attachment are a single story: "the cosmonaut is emancipated from gravity *because* he or she never lives one fraction of a second outside of his or her life supports."[105]

104 Due to its negative effects on health, astronauts usually stay only a few months, though the longest stay in space was 438 days, by Russian cosmonaut Valeri Polyakov.

Lagrangian Dance

Having run out of means of experiencing weightlessness accessible today, I looked into more hypothetical options and came across

the Lagrange points, stable positions near large celestial bodies in orbit. These are locations in space where gravitational forces and the orbital motion of two celestial bodies like Earth-Sun or Earth-Moon balance each other out. Having no gravity, being super cold, vacuous, and pitch black (some of them), these points are perhaps the closest analogues to what could be considered nothingness.

Of course, it is even less reachable than the aforementioned lower orbiting, and no human has ever ventured into them, hence no empirical data. Yet it is possible to speculate upon its (astro)phenomenological realm by extrapolating similar situations like the orbiting habitats. Actually, there is even a society dedicated on doing exactly this––the L5 Society, established in 1975 by Keith and Carolyn Henson, has championed space colonisation, particularly around the Earth's stable Lagrange point L5, hosting orbital settlements.

Let me conduct a thought experiment and catapult myself into one of those Lagrange points. No space stations, but floating individual bodies. Supposing I wear some sort of costume akin to those used for spacewalking (otherwise I would quite instantly die), the very

first thing I would probably be aware of would be the extremely intimate relationship of the artificial ecosystem, enveloping my skin with just a few centimetres thick atmosphere. Squeezing and wrapping the whole space station into such a scale would definitely increase the difficulties and the psychological "weight" experiences in its counterpart. How would I eat, poo, wash myself, scratch an itchy back, make love, let alone make art? It calls for a cyborgian conjecture that proposes a radical take on the definition of "life" in outer space. Originally the term "cyborg" was coined to define a modified human who could survive the hostile environment of outer space.[106] Having a population of such cyborgs suspended in the nothingness of the cosmos, what would they do there? What would their life look like? If there is no longer need for breathing, eating, sleeping, or defecating, would such phenomena as culture, art, architecture, love exist?

What if we catapult more bodies, many, many more, say, a whole sextillion (10_{36}), a rough equal to the minimum weight of a celestial body that would be defined astronomically as a planet? A cloud of human bodies floats there freely until their weak gravities (any

106 Coined in 1960. NASA consultants Manfred E. Clynes (a physiologist) and Nathan S. Kline (a psychiatrist) introduced the term in their article "Cyborgs and space" in the *Astronautics* magazine (September 1960). They fused cybernetic + organism to describe a self-regulating human-machine system designed to "adapt it to new environments", specifically the rigours of spaceflight.

Clynes, M.E. and Kline, N.S., 1960. Cyborgs and space. *Astronautics*, September, pp.26–27, 74–75.

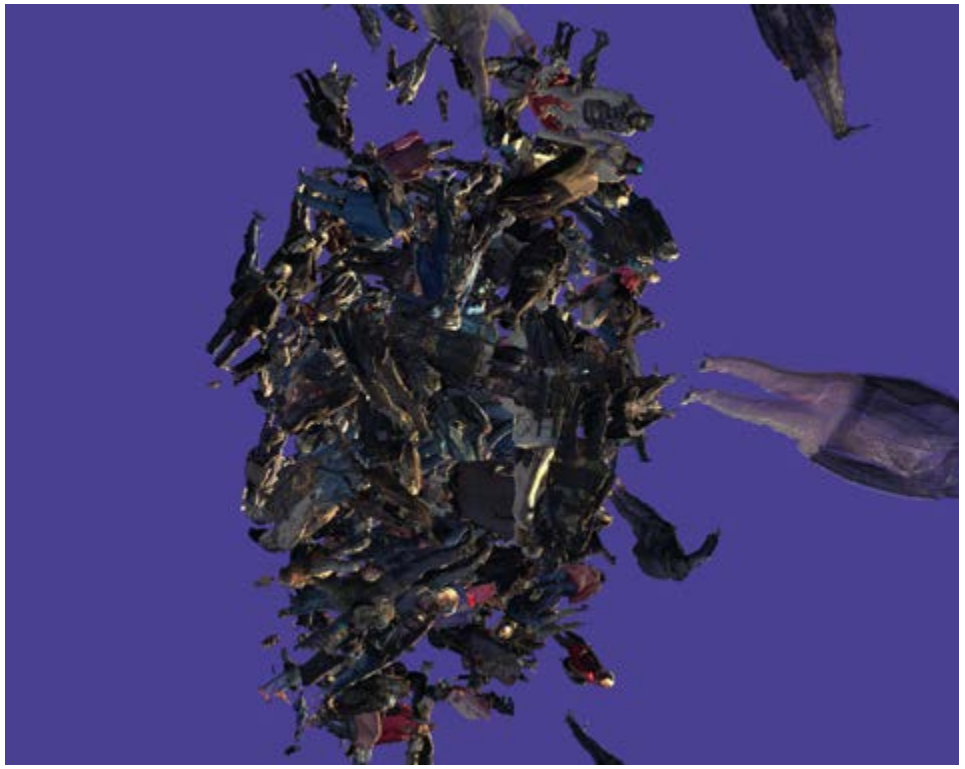
object with mass has gravitational force) make them fall into each other, slowly coalescing into a blob. The massive meat lump at the core starts to decompose itself, releasing enough heat to boil and liquidise its core. Plumes of hot human mass and bubbles of trapped gases periodically rise through the asteroid crust and erupt volcanically from the surface, eventually calming and freezing human landscapes all the way through.

Would it be a dead "planet of people"? The naked, unprotected human bodies would die long before meeting other floating astro-mates after all. However, such a contemplation is rather terrestrially biased—life and death in outer space are no different from each other, speculative astrobiology would say. What "life" it would be for such beings is something that we can just speculate or probably cannot even comprehend until we become them. What if we consider this giant human biomass as a new living being? The organic matter or what is left of it would be bombarded by space radiation and solar winds, damaging or transforming DNA, provoking mutations and extra-terrestrial evolution. All of which would lead to the formation of a life form the size of a planet, or at least human panspermia.

Let's forget our earthly origins and the definition of scale; consider your body a celestial body. Strip yourself from all social, racial, cultural, sexual, political, and even biological constructs. Such earthly attributes dissolve while suspended in space, detached from systems of judgement and classification prevailing on Earth. Now, let's catapult the body into outer space. Depending on particular astrophysical circumstances, your body meets galactic cosmic rays, solar wind particles, and micrometeorite impacts, slowly disintegrating into tiny bits and coming back where they came from. All of us are made of cosmic dust after all, and hence are no different from stones, sand dunes, and asteroids.

This series of thought experiments I staged in the project *Planet of People*, a scientific and artistic feasibility study of an artificial planet made of human bodies. The project is a quasi-real, multimodal fiction based on various narrative devices combining digital animation, set design, interactive art, fiction writing, hypergravitational music, etc. At its core there is a custom engineered 3D scanner that scans human bodies and transposes their 3D models into an astrophysical simulation, where they can see how their bodies, in inter-

Julijonas Urbonas, *Lithuanian Space Agency: Planet of People*, 2021, 3D human scanner, custom electronics and software, astrophysics simulation, stainless steel, recycled plastic. Installation shot from the Lithuanian pavilion at the 17th International Architecture Exhibition, La Biennale di Venezia, 2021.
Photo by Aistė Valiūtė and Daumantas Plechavičius.



Julijonas Urbonas, *Lithuanian Space Agency: Planet of People*, 2021. Screenshot showing the astrophysical simulation with the scanned bodies, La Biennale di Venezia, 2021.

action with other bodies, form a new celestial body. It invites the public to catapult themselves into a multitude of different timelines that are displayed on special screens. All of these simulations are sped up, representing different spatiotemporal circumstances. For example, on the displays, the participants can see themselves being assigned with a specific orbital motion, floating towards each other in the emptiness of space. Each body of theirs is unique in its shape, centre of gravity, and other physical characteristics—all of which make up a unique choreographic presence in space. Realising they have such an extraterrestrial presence, the participants start getting loose, slowly stripping themselves from the earthly preoccupations and biases, and imagining what their body can do up there that it cannot do here on Earth. Unconstrained 3D mobility invites playful exploration and activates choreographic imagination. It is a sort of mirror showing an extraterrestrial reflection of yourself. In another simulation they can see themselves bumping against other bodies and connecting into unique spatial configurations. The simulation provides an unprecedented contact dance that is only possible in the absence of gravity. Even though in a gallery all share a universal up/down, and tacitly align shoulders, form queues, and

keep polite spacing, once in the scanner, social geometry turns radial and rotating. Have you ever tried huddling up with other bodies in an armpit-heel-chin-chin-forefinger composition? At the same time considering this very act of connecting with other people as a means of planetary architecture?

As the "planet" grows, so does the number and diversity of such questions. Thus, *Planet of People* also functions as a unique narrative and discursive platform. As an interactive architectural fiction, the project invites everybody to become a co-architect of the planet made out of human bodies. It is a sort of an expanded form of a sci-fi narrative, powered by deployable structure engineering, kinetic furniture design, speculative material science, extraterrestrial choreography, interactive arts, astro scientific research, and corporate vocabulary—all in tandem to provoke a critical form of cosmic imagination.

Julijonas Urbonas, *Oneiric Hotel*, 2013, custom electronics, plywood, textiles, stainless steel. Installation shot from the Lisbon Architecture Triennale, Lisbon, 2013. Photo by Aistė Valiūtė and Daumantas Plechavičius.

Oneiric Gravities

Having arrived at the discussion of imaginary levitation, the phenomenon of levitation dreams is worth mentioning since I have been exploring it extensively, but also it nicely wraps up the section on “Levitation”, complicating the divide between light/heavy as well as imagination/daydreaming/dreaming, and marking an ongoing, open-ended journey into the experiential multiverse of lightness.

For some time in the 2010s, I had been collecting various scientific references on the topic of “gravitational dreams”, which refers to dreams that feature gravitational activities such as flying, climbing, or levitating. Faced with the sheer volume, I eventually began to filter the material, selecting devices and techniques with a high impact rate, at least on paper. Eventually I started to reconstruct the singled out scientific instruments and turned my bedroom into a laboratory for gravitational lucid dreams, where medical engineering, parapsychology, and DIY design intermingled.

When I was invited to take part in the Lisbon Architecture Triennale in 2013, I decided to share my bedroom lab discoveries. I selected the most effective technical and psychological tools, and proposed to the organisers of the Triennale to set up a temporary hotel with sleeping capsules where visitors could take a nap and try out the equipment by themselves. They gave me a water tower on the LX Factory site, a huge concrete structure, where I set up a working day-time hotel with a reception.

The equipment of *Oneiric Hotel* consists of two groups of devices. The first is an electroencephalograph (EEG), which tracks the stages of sleep and, during dreaming, gives a signal to the second group of devices, which have the function of directing dreams by stimulating a particular sense, thus arousing lucidity and facilitating the control of the dream. Some of the most popular stimulation devices were the "Nielsen pneumatic cuffs" and the "Castaldo and Holtzman voice player" (the devices were named after the authors). The cuffs are inflatable slippers which rhythmically compress the dreamer's feet during dreaming. The voice player plays a voice-recorded narrative that the dreamer had to read and record before their sleep session.

An important part of the equipment was the sleep capsules, which I designed based on the sleep researcher Robert Ogilvie's studies with rocking beds. Sleep capsules rock with increased intensity towards the sleep stage during which the sleeper dreams, thus soothing and at the same time activating the vestibular apparatus, which is directly linked to lucid dreaming.

Dismantling the installation after the Triennale, I noticed that one set of equipment was incorrectly wired, which meant it had been malfunctioning all the time, yet we had noticed no difference in the dream-inducing efficiency upon the sleepers. This finding made me focus on the project's placebo effect and, for the future shows, I began improving all the constituents of the project. The ads, the introductory speech of the instructor, the bed linen, the furnishings, the outfit of the staff, the microclimate, the looks, the smells, the sounds of the equipment and the space – all were treated as something between placebo infrastructure and dream theatre. It became so effective that I would even get calls or receive letters from those who did not even fall asleep, but had a lucid dream in their own bedrooms at home.

The content of the visitors' dreams varied from very realistic, incorporating sounds from the hotel, to fantastic and surreal. Often the sleepers, including myself, noticed that compared to ordinary dreams, levitating ones carried an enhanced sense of reality or some sort of bodily genuineness (perhaps what Rainer Schönhammer, known for his phenomenological study of dreams, calls "hyper-real vividness" that is enhanced by gravitational activities in the dream).[107]

One woman checked in hoping to try to overcome her fear of water. Having dreamt the first day a unique dream about a flowing river of living human bodies instead of water, she would come almost everyday for a few weeks for a siesta nap and conduct oneiric experiments with different kinds of setups and oneiric techniques. She said she had become increasingly reckless in playing with various forms of swimming (with no water, alas) and collisions, since it did not hurt her in any way. Dreams are a safe rehearsal of danger, a lab for courage. She also mentioned how she felt detached from herself, a sort of gaining a bird's-eye overview of her own subject. It reminded me of how Merleau-Ponty called vertical elevation an expansion of the "field of possibles".[108]

Another unusual and, one might say, inhuman dream was about becoming an electron. After leaving the capsule, the sleeper sat for a while and could not say anything, except to mention that the electron had a completely different perception which cannot be put into words. Such proto-out-of-body sensations, blurred or distorted boundaries between the body and surroundings were reoccurring in others' dreams too.

Having lived and slept in the hotel the whole duration of Triennale (three months), I acquired some sort of knowledge and confidence into constructing my own oneiric narratives that are incomparable with any other kind of creative practice. No roads, no walls: the story path is in the air. It allows for shortcutting the plot: flight could let me jump scenes, revisit memories, shift timelines. The substantial duration of time spent on dream directing, I could also sort of verify if the reports of the visitors were honest and not fabricated, which often correlated with Schönhammer's phenomenological insights on levitating dreams. What unified the dreams was not so much narrative content, but rather unusual vestibular and kinaesthetic distortions of the dreamer's body. Dreamers often

reported a slow, weightless ascent or effortless gliding. Schönhammer links this to the brain's vestibular nuclei firing while the body is motionless, so the nervous system "creates" weightlessness to resolve the sensory mismatch. He also notes that dreamers in levitating state nearly never feel their legs propel them; interestingly, pictures of flying bodies in art often, if not always, show the same limp lower limbs, supporting his claim that the kinaesthetic image is "all torso, no stride."[109]

Summary

To summarise and conclude the experiential reality of levitation that I have just lived through in various forms, modes and places, I shall mention a few phenomena that have been recurring. First, lightness does not come naturally; it should be attained, earned, and stabilised (as it is usually unstable) through the deliberate coupling of bodily, technological, and psychological techniques. Changed states of bodily motility, orientation, and life-critical

processes such as eating or sleeping all have to be re-adapted and reorganised in order to negotiate a gravity-altered environment. And this is not light at all. This kind of lightness is more like a graceful reconciliation with the burdensomeness of one's own weighty body and its inseparability from gravity. Let's call it a *kinaesthetic lightness*. The lightness of a bird, not a feather.[110]

Another kind of lightness is more like the state of feeling free of any sensory stimulation or the absence of awareness of one's own body, although it is extremely temporary and not open for full kinaesthetic investigation. It is closely related to an out-of-body experience, in which one experiences the world from a location outside of one's physical body. I have experienced a few episodes of such lightness in the flesh hook suspension, sensory deprivation tank, orbiting, and dreaming. Let's call it a *mental lightness*.

The truth is that any type of levitation and experience of lightness is constrained by limited time or restricted space. And as a rule, the longer or more spacious the levitation is, the more technological backup and thus bodily stabilisation is required. It is as if the weight

110 I am rephrasing the French poet Paul Valéry who once wrote: 'Il faut être léger comme l'oiseau, et non comme la plume' (translated as 'one should be light like a bird, and not like a feather').
Calvino, I., 1993. *Six memos for the next millennium*. New York: Vintage Books, p. 16.

that was removed does not disappear and pops up elsewhere in some other form. If you want to achieve great lightness, be prepared for the equal and opposite weight of great effort and preparation.

Key phenomenological shifts and aesthetic potential:

1. The lived body loses its tacit “vertical contract”.

Under Earth gravity, our body schema is anchored by a permanent vector: down. In the (quasi)absence of gravity, that contract disappears. To orient and stabilise myself, I increasingly relied on visual cues and had trouble reading environmental or architectural cues while rotated at unusual angles. My proprioceptive map was scrambling to decide where “I” ended and the objects began. The gravitational aesthetic act was co-constituted by that search for a new bodily axis.

2. Kinaesthetic empathy turns volumetric.

Phenomenology stresses that we “feel into” what we see. For example, dance researcher Kitsou Dubois demonstrated that in parabolic

flights spectators watching a performer spin in micro-g reported a vestibular echo—they felt phantom rotations in their own body. Because both the performer and the spectator can now translate freely in 3D, the usual empathetic mirroring spreads across every axis, intensifying kinaesthetic affect.

3. Horizonlessness and de-centred vantage.

Classical phenomenological notion of the horizon—the un-thematised backdrop that gives objects meaning—relies on stable ground. In weightlessness, “ground” itself drifts. It echos the postphenomenological view of horizon as dynamic and plural, not a single coherent field but multiple overlapping fields of potentialities, shaped by tools, practices, and users, in which object and subject continually exchange roles.

4. Effort distorts or evaporates, altering the felt passage of time.

Intentional action normally carries an effort signature (muscle tension, energy cost). Push once in weightlessness, and you glide for a

minute; agency becomes punctate rather than continuous, syncing experience to discreet impulses. My long drifts—whether in partial, full, or simulated weightlessness – made micro, blitz performances feel stretched, dreamlike; tiny gestures such as a finger flick obtained dramatic temporal weight. I imagine such ballistic time-loops might be choreographed as part of some sort of aesthetic score.

6. Touch, ambient atmospherics, and material intentionality.

Because gravity no longer pins surfaces against palms or soles, tactile intentionality shifts from weight/texture to kinetic feedback—how the object pushes back through inertia (except for water drag in neutral buoyancy). A light press sends both parties moving; touching becomes a negotiation rather than a unilateral probe. Because every push moves both partners, objects behave like gentle springs. Hard edges feel springy, and very light brushes suddenly matter—an aesthetic of reciprocal motion. With no convection, steam, perfume, or heated air stagnate, creating pockets of smell and warmth that drift like invisible sculptures.

7. Altered intersubjectivity.

In each type of levitation I was briefly imagining how an art gallery was different under these altered states of gravity. One of the recurring insights was about changing inter-bodily relationships between gallery-goers. For example, in a conventional gallery we share a universal up/down, so we tacitly align shoulders, form queues, and keep polite spacing. When gravity turns to zero, everybody may choose their own pitch/yaw, so social geometry turns radial and rotating; eye contact and face orientation must be actively managed. I imagine a piece of participatory art can script these negotiations, transforming spectatorship itself into choreography.

V.

GLOSSARY

Vehicular Poetics

Vehicular poetics is neither vehicle design nor poetry on transportation. Not interested in the comfort or ergonomics of travel, this artistic approach shifts its creative attention from the efficiency of displacement—the engineering metrics of moving from A to B—to the experiential poetics of the very commuting. Namely, vehicular poetics focuses on the aesthetic, imaginary, and evocative qualities of travel. Yet, by its function the design object here is a vehicle, a technical means used to transport people, but also, and more importantly, a narrative vehicle carrying its passenger to the aesthetic realms of poeticised travel, be it physical or imaginary.

This creative approach uses technologies of means of transport and their infrastructures as a material experiential vocabulary for a creative expression, much like words are used in literary poetry. But, unlike in literature, where the reader is usually rendered static, the passenger or the driver in vehicular poetics has to move along to unveil the aesthetic qualities and meanings of the road. Specific creative forms and strategies are used here to suggest alternative perspectives, meanings, knowledge produced by technologically-mediated travel, as well as to elicit aesthetic sensual responses. Such devices include dramatisation and arrangement of the sensual and cultural cues of travel, critique of destination-oriented locomotion, and various imaginary forms of means of mobility.

It is an anti-destination-oriented creative approach to vehicle design. It deals with the poetic and narrative arrangement—aesthetic composition—of the sensual and cultural cues of travel. The approach devotes its creative attention to specific technologised circumstances that generate or

condition a story-like experience, revealing itself on the way. Its aim is to intensify the sensual and cultural "contact" with the surface of travel, heightening a compelling and revelatory experience of being moved along, and recouple perception to locomotion.

As the technologies of means of transport become faster and more comfortable, paradoxically our bodies are increasingly being rendered inert and stationary. Today we travel mostly in a sitting position and the body is less and less involved in the act of travelling. Even worse, the contact with the passing surroundings is diminished by various comforting and isolating shells of the transport, which facilitate the oblivion of the traveling process, thereby virtually speeding up the experience of moving along. What is given prominence is just the final destination, thus the very experience of travel is trivialised. The loss of the sensibility and the alienating effects of such destination-oriented travel have been philosophised by quite a few phenomenologists, but probably most extensively by Paul Virilio.[111] For instance, he suggests taking a look at the evolution of the car cabin to grasp this technological trend:

"In the recent past, for instance, one drove in the open air, in contact with atmosphere, listening to the sound of the engine and the wind, and feeling the cell of the machine vibrate; but today excessive speed has contributed to the driver's being gradually shut away, initially behind the screen of his goggles, then behind the windscreen and finally right inside the sedan."[112] However, according to Tim Ingold, this kind of "purified" transportation is distinguished not by the employment of mechanical means, but rather by the dissolution of the intimate bond that couples locomotion and perception: "The illusion of pure transport can only be sustained by suppressing the embodied experience of place-to-place movement that is intrinsic to life, growth and knowledge."[113] Thus it could be said that the impoverishing experiential outcome is more a result of the destination-oriented design ideology employed and embedded in the technology. Vehicular poetics is not limited to physical travel and includes other forms of locomotion, such as imaginary, hypnagogic, oneiric, etc. In this case, vehicle design is basically fictitious. This approach is informed by fiction in literature or cinema, and aims to transcend or compensate the limitations of these

creative realms, for instance, the experiential and expressive constraints of the word, the infrastructure of the book or the screen. It uses design, more precisely, design fiction, to create vehicles that transport their drivers or passengers to realities that are hardly or not accessible outside imagination, such as bird-like human flight, floating in weightlessness, riding a rainbow in the sky,[114] or such diverse mobile realities at once. Serving as a series of textual or theatrical props that fuel the "traveler's" imagination into producing all sorts of surrogate states,[115] like physical encounter or emotions, this creative approach may function as a unique kind of reality simulator where alternative realities could be encountered, lived out, tested, and discussed. Real or fictional, a vehicle has to transport its passengers. But unlike the real vehicles, the fictitious ones also have to transport the imagination.

Notable articles which expand and advance the approach of vehicular poetics.[116]

Design Choreography

Things have the power to choreograph us, set us in motion (or stasis), establish new vocabularies of dance. The invention of pavement, for example, had introduced the pedestrian traffic, shoes prolonged the step, buildings had given possibility to the emergence of parkour or buildering, while the machinery of ropes and pulleys gave birth to the pointe.

Design choreography focuses on the choreographic power of things to affect our movements and dance our bodies. Shifting the creative attention from conventional design goals such as usability, visual appearance, semantics, economy, ecology, and safety to the conditions and effects of design choreography, I propose an alternative and dancing-experience-oriented design approach. Design here, in essence, is turning its attention to *kinaesthetic*[117] and whole-body-engaging dimensions of things. It encourages

114 In his book "Codex Seraphinianus", the Italian artist, architect, and industrial designer Luigi Serafini depicts an entire visual encyclopedia of an unknown world, written in its unique language, so far undeciphered by anybody else. The Codex is divided into eleven chapters, partitioned into two sections. The first section appears to describe the natural world, dealing with flora, fauna, and physics. The second deals with the humanities, the various aspects of human life: clothing, history, cuisine, architecture, and so on.

One of my favourite machines in the chapter on machinery and vehicles is what could be called "Rainbow Painter," which looks like a bizzare hybrid of a helicopter, boat, and tractor with some sort of crawler tread, the bodywork made from a cloud, dangling some elemental particles, which perhaps can be used to paint rainbows into the sky or ride the rainbow itself.

moving the body(ies) instead of pushing images or words.

Design choreography treats every artefact as a potential choreographer, every user as a performer, and every artistic, architectural, and design process as a rehearsal. Thinking this way expands choreography from staged dance into the texture of daily life—and gives creators a powerful ethical and creative frame for shaping how bodies, technologies, and spaces co-compose movement.

Moreover, design choreography does not deal merely with the organisation of gesticulating and dangling human bodies and their parts; rather, it is concerned with the experiences these movements produce, and not only those sensual ones such as the pleasures of climbing a spiralling staircase or bouncing on a trampoline, but also the specific psychological and social circumstances the choreographies generate. A quick example is Jonathan Miller's poetic analysis of the staircase, which in his words is a unique choreographic "engine, in which the moving parts happen to be the person who uses it", but also often serves as a space allowing people "to stage their preoccupations, choreograph their politics, and dramatise their religions."[118]

Such examples abound, ranging from architectural to implantable scale, from entertainment to military uses, having episodic to long-term choreographic effects, etc. Design choreography may bridge enormous number of disciplines by framing movement as a system that can be tested in diverse media.

In fact, this creative approach is not new. Johann Wolfgang von Goethe noticed the choreographic power of architecture two centuries ago, enjoying the pleasant sensation induced by dancing, and claimed that "we ought to be able to arouse similar sensations in a person whom we lead blindfold through a well built house."[119] Later, Heinrich Wölfflin, the Swiss art historian, theorised in his PhD dissertation aesthetic experiences that were felt by the entire human, today known as kinaesthesia: "[The] body that entered architecture's field of influence was shaken to its bones and stimulated throughout its muscles. Penetrating deep into the inner organs, architectonic irregularity could disrupt blood circulation, and asymmetry could inflict pain as severe as amputation."[120] The choreographer William Forsythe's notion of choreographic objects pushed the idea even further without a live dancer. In his eponymous 2008 essay, Forsythe asks whether choreography can "generate autonomous, accessible expressions of its principles ... without the body." He proposes objects that pose "specific physical circumstances that isolate fundamental classes of motion activation and organisation," open to anyone who encounters them.[121]

Taken together, design choreography sits in between these views, opening itself to creatives from any kind of field. Design choreography keeps one foot in functional design/architectural practice, asking "how should a staircase, app, or wearable feel in motion?", another foot in conceptual art and epistemology, asking "what else can choreography be, once we let go of technique and theatre?".
In fact, my artistic research in general might be considered as establishing and revolving around this approach. At the earliest stages of most of my projects, I often sketch and speculate upon unprecedented choreographic scores of human and non-human bodies. If the choreographic idea is new and nobody has imagined it yet, only then do I start more complex and in-depth research on the potential realisation and implications it would cause.

What do people do, think, and imagine once they are dropped into freefall collectively and synchronously, providing their bodies are free to explore? What kind of inter-body relationships and critical repercussions would take place in nothingness? What is oneiric dance? These are a few design choreographic questions that drive my creative process.

I have written extensively on design choreography since 2011. Notable is a series of articles published in four issues of SPACE (월간 '공간'), South Korea's longest-running monthly magazine devoted to architecture and arts.[122] Each article explores different classes and scales of choreographic artefacts, namely the type of their surfaces or

117 Proprioception, especially when connected with movement, is sometimes called kinaesthesia, and this latter term also emphasises muscle memory and hand-eye coordination. Closely connected with these two systems is the vestibular system, a remarkable sensory organ near the auditory sensory complex that carries out a wide range of coordinated activities. It is connected to the eyes and ears, whose neurons respond to vestibular stimulation; it receives important input from the hands and fingers as well as the soles of the feet; it activates facial and jaw muscles; and it affects heart rates and blood pressure, muscle tone, the positioning of our limbs, respiration, and even immune responses. All of this is done to allow us to stand vertically and move through space with a rhythmic sense of balance.

Mallgrave, H.F., 2011. *The Architect's brain: Neuroscience, creativity, and architecture*. Wiley-Blackwell, p. 201.

the contact with the body. From immobile surfaces, such as the planes of buildings, pavements, and chairs, to kinetic, interactive, and wearable surfaces.

Critical Vertigo

Critical vertigo is an artistic tactic that engineers moments of sensory or cognitive disequilibrium so that audiences can feel, and therefore critically examine, the contingent structures—spatial, social, ideological—within which they normally find their balance. The loss of bearings here is considered as a productive critical state rather than a mere thrill. Instead of guiding the audience toward stable meaning, deliberate disorientation makes viewers aware of how their sense of reality is constructed and, therefore, open to question.

During vertiginous experiences, the sense of gravity as well as the body is heightened, prompting the "owner" to refamiliarise with his or her body, to become more aware of its physical reality and attachment to gravity. In such a gravitational breakdown, as phenomenologist Maurice Merleau-Ponty would say, "the body collapses and becomes once more an object"[123], open for analytic dissection and critical self probing.

Because everyone who enters a vertiginous artwork is equally unmoored, the experience can foster an unusual affective commons. Viewers find themselves negotiating space together, asking strangers for balance, trading tips on orientation. Shared uncertainty levels hierarchies that ordinarily structure venue/gallery behaviour, and models a micro-solidarity useful far beyond the exhibition. At the same time, the deliberate cultivation of instability trains epistemic humility: to stay upright, one must accept provisional footholds rather than absolute ground. Critical vertigo can be thought of as an epistemological engine because it does not simply represent knowledge, but manufactures the very conditions under which knowledge becomes possible. In other words, the moment of perceptual free-fall that vertiginous artworks induce is more than an affective jolt; it is a generator of questions, categories, and relations that did not exist a moment earlier.[124]

In a media landscape saturated with seamless interfaces and instant certainties, deploying critical vertigo may turn disorientation into a tool for attentiveness. By scrambling a viewer's bodily

bearings—through unstable horizons, revolving surroundings, or extreme *g*-forces—critical vertigo interrupts the autopilot of perception that late-capitalist environments cultivate. The resulting dizziness is not mere spectacle; it is a forced pause in which the scaffolding of "common sense" becomes visible. In that moment of estrangement, everyday infrastructures of power—the usually unnoticed technical, spatial, and social arrangements that choreograph how we move, what we see, whom we meet, and even what we think is possible—surface as constructed rather than natural, inviting reflection instead of passive consumption.

Finally, critical vertigo flips the logic of commercial thrill architectures—theme parks, sky decks, mall VR rides—by exposing the market's promise of safe excitement as contingent and ideological. When the same sensory triggers are mobilised for critique, audiences discover that exhilaration can carry a counter-spectacular charge, awakening them to the forces that normally choreograph their pleasures. In short, to use vertigo critically today is to transform disorientation from a selling point into a vantage point: by losing balance we gain insight into the systems that keep us upright.

Gravitational Readymade

At the early stage of my research on gravitational aesthetics (roughly between 2007~2017), I coined and have been employing the term "highbrow fairground" in seeking to deliver the intellectual depth of a museum/gallery with the bodily exhilaration of the funfair. Thus, a highbrow fairground might be considered an artistic strategy that grafts the visceral thrills, mechanics, and social rituals of the amusement park onto the discursive space of contemporary art. It treats rides as raw material for conceptual exploration, thus collapsing the old "high/low" divide.

One of the tactics that came out of such thinking was "gravitational readymade", a re-contextualised apparatus lifting a ride out of the midway and placing it in a gallery, a plaza, or a biennial pavilion, turning fun-fair hardware into a sort of sculptural readymade that viewers literally enter or climb aboard.

In such an art-making tactic, the force of gravity itself—or a physical situation generated solely by gravity—is framed as a found "object". The artist's role is to choose, isolate, or minimally stage a gravitational

event and declare it art. With *Airtime*, for example, I pulled the phenomenon of airtime from the amusement park industry and vocabulary, and catapulted it into a gallery, a space open for unconstrained bodily and reflective exploration. Meanwhile, *Hypergravitational Piano* or *Oneiric Hotel* appropriated the technologies—human centrifuge and sleep lab equipment—usually found in scientific facilities, turning them into an extraterrestrial soundstage and critical gravitational dream playground respectively.

Gravitational readymade boasts an embodied spectatorship: instead of being a detached wall-label reader, the visitor becomes a rider, tester, or "lab rat", submitting themselves to the experiment of reflection and imagination under altered *g*-forces. Also, as amusement parks have always been spaces where all social classes mix, this format provides increased democratisation of access, courting a broader, less intimidated public. My *Cerebral Spinner*, a centrifuge-lecture-theatre, is emblematic here.

Gravitational Relativism

Gravitational relativism is the conviction that "gravity" is never an absolute, universal yard-stick, but instead a local condition that structures bodies, meanings, and politics only in relation to a particular planetary, orbital, or technological context.

It provincialises Earth's physics the way cultural relativism provincialises Western norms. 1 *g* is not the norm—just Earth's parochial default. Move the frame of reference, and every certainty about weight, effort, "up", and "down" re-computes. The equivalence principle already tells us that what you feel as gravity may just be acceleration; the "force" is frame-dependent. Different bodies (pregnancy, osteoporosis, wheelchair use) experience 1 *g* very differently; gravity's "normalcy" is already multiple even on Earth. Gravitational relativism invites us to treat every gravitational environment—Earth's included—as just another situated "somewhere". Once no gravity is normative, weight, balance, fairness[125], even the metaphors of "downfall" or "uplift" become questions of perspective, ripe for redesign, critique, and creative play.

Exodisciplinary Art

Having been interested in art under extreme gravitational conditions, my attention naturally shifted towards outer space, and I started to ponder the question: What happens to a discipline that leaves Earth? When it crosses the Karman Line, the boundary at an altitude of about 100 km above sea level that separates the Earth's atmosphere and outer space?

Whatever that discipline is, it becomes disoriented. After all, all disciplines originated and grew on Earth, in an earthly ecosystem and with human supervision.

Some disciplines, such as biology, medicine, engineering, and anthropology, are already slowly adapting to the astroanthropocene, but the artistic disciplines are still stuck to the earth. Several projects and initiatives could be considered examples of space art, from the architecture and interior design of space stations, Paul Van Hoeydonck's sculpture on the moon, the astro-psychogeographic activities of the Association of Autonomous Astronauts, to the weightlessness dance projects of Kitsou Dubois and the International Space Orchestra (ISO) by Nelly Ben Hayoun. However, all of these projects were created under Earth's gravity, in the terrestrial ecosystem, and supported by human supervision.

What could an artistic discipline—or, more precisely, an exo-disciplinary art beyond Earth—look and sound like, how would it manifest itself?

First of all, we have to decide whether we still consider the earthly human an integral part of art. If so, then we have to appreciate that any extraterrestrial environment known to us is lethal. There is no air to breathe, no food to eat, no safe shelter in space. So, in principle, to settle outside the Earth's atmosphere would be to create an entirely new ecosystem. It would undoubtedly lead to a radically different environment—sensory, psychological, social, cultural, political, economic, technological, etc. The mere fact that the ecosystem would be artificial would mean that it would be highly vulnerable and, at the same time, extremely collectively responsible. Even something as seemingly insignificant on Earth as cutting hair would become a highly complex and responsible activity. Hair easily pollutes air systems and contains heavy metals. Thus, we would encounter a unique inter-

section between bioethics and aesthetics, which would undoubtedly influence the development of the discipline of art.

What role would art play in such an artificial astroecosystem? Perhaps unique interspecies communications? A means of maintaining the balance of this new "nature"? Or an evolutionary factor for a new species? Perhaps the concept of art would disappear altogether and something would emerge that our imagination cannot even conceive of or comprehend? Imagine art formed in a completely different spatiotemporal context. Where the duration of time is measured in picoseconds or billions of years. On a sub-quantum or galactic scale. For humans and technology, such "art" would be too fast, too slow, too small, or too big to be tangible. Perhaps it would be taken up and revised by aliens, for whom the past, present, and future are the same stuff.

As much as we try to imagine such cosmic realities, looking upwards—a product of absolutely earthly gravity—inevitably forces us to lower our eyes and look back to Earth. What does it look like from the perspective of another world?

Expanded Field of Sci-fi

Borrowing the phrase "expanded field" from Rosalind Krauss's famous 1979 essay on sculpture—where a practice once bounded by galleries was suddenly mapped across the larger terrain between architecture and landscape—critics now speak of an expanded field of science fiction to describe the way SF spills far beyond pulp magazines and bestselling novels into multiple media, disciplines, and social uses.

At its simplest, the term points to sciencefictionality as a method rather than a single genre: a toolbox of worldbuilding, speculative extrapolation, estrangement, and future scenario testing that can be picked up by artists, designers, planners, activists, marketers, and researchers—or by traditional storytellers working in new, hybrid ways.

Having spent five years conducting PhD research on the topic of gravitational aesthetics under the supervision of Anthony Dunne, the godfather of critical design, at the Royal College of Art, I was highly influenced by the field's speculative mindset, more specifically, by the subgenre of design fiction.

Design fiction is a practice that uses speculative scenarios, stories, and prototypes to imagine and explore how emerging technologies and societal trends might evolve in the future. It often blends elements of storytelling, science fiction, futurism, and design to prompt reflection and discussion about possibilities, consequences, and ethical dilemmas. Rather than simply predicting what might happen, design fiction aims to open up conversations about how the future could (or should) unfold and to probe the implications of various technological and cultural shifts.

In my practice, design fiction is usually based on existing and feasible technological, scientific, engineering, and medical foundation, but belongs to an unrealistic or distorted psychological and social reality. Thus, it is mostly social design fiction.

The term "social science fiction" (SSF) was coined by Isaac Asimov to describe a new science fiction trend in the 1940s, "which is concerned with the impact of scientific advance upon human beings," and places creative and investigative emphasis on the social, or, more broadly, upon the human condition, rather than on technological, material, or scientific reality.[126] Such fiction might be seen as a "morality tale, warning of possible futures, playing through the means necessary for them to be avoided or rectified."[127] By presenting alternative realities, which reflect the social trends and preoccupations of the time, social science fiction functions as a forum for diagnosing the present—probing and bringing to the discursive foreground the technological and scientific effects on humans—and for visualising the possible futures that might come out of them. Thus, it is an effective technique not just for speculating on the future, but also for shaping it, and for empowering decision making. Asimov argues that SSF offers a mode of thought to question and imagine change. "We've got to think about the future now. For the first time in history, the future cannot be left to take care of itself; it must be thought about."[128]

But the impact of SF literature on reality and the future has inexorable limits, basically those of the written word, as Bruce Sterling, the father of the term "design fiction", once said.[129] Introducing this specific design approach, he calls for the designers to help liberate words from their constraints, to free themselves from paper, the pub-

lishing infrastructure, the demands of the shelf. What literature really lacks, in my opinion, is the richness of experience, the realness and sensual texture of the encounter, and an interactive contact with the complexity of materiality. As fiction serves as a series of textual or theatrical props that fuel the reader's or the viewer's imagination to produce all sorts of emotional or physical states[130], in a way, fiction design (I prefer this term to design fiction because it has less to do with literature) might extend this effect by serving as a unique kind of reality simulator, where alternative realities could be encountered, lived, tested, and discussed.

In fact, some forms of these design strategies could date back to the 1930s. For example, they could have been partially initiated by the Futurama ultra-modern city model at the New York World's Fair in 1939, and more recently, from the 60s onward, by the utopian architectural experiments of groups such as Superstudio, Archizoom, Ant Farm, Haus-Rucker-Co, and Coop Himmelblau.[131] Although[132] architecture once seemed to dominate the stage, today this kind of scenario-building is permeating more disciplines and has become increasingly valued in providing a platform to not only recognise, consider, and reflect uncertainties in a complex industrial or technological setting[133], but also to address fuzzy design problems characterised by complex networks of trade-off and interdependency.[134] Most recently, this type of design practice is proliferating and is usually associated with speculative design, critical design, and especially value fiction.[135]

As an example from my practice, *Euthanasia Coaster* as a social fiction design is an incomplete story, as it is actually a functional design proposal for a killer coaster: just an engineered falling trajectory. It does not say anything itself about the timescale settings (historical moment in time, geographic location), ethics, institutionalising, legal issues, etc. Presenting itself in such a minimalistic way, it reveals itself as a script proposal (of the usage) or as a McGuffin[136] object for your own story. Thus it aims to be less didactic, more suggestive and open for multiple interpretation, generating possible trajectories of the usages or failures—the other realities—in the "user's" imagination. Thus, such design is capable of existing in several realities at once, or, in the words of Michel Foucault, heterotopias that, unlike utopias, are neither "here" nor "there", but are simultaneously

material and mental, such as the space of a phone call or the moment when you see yourself in the mirror.[137] In the case of the coaster, it has even more "existences", it is *polyreal*. It is simultaneously present in physical reality, such as the tangible one experienced here-and-now during a direct encounter in a gallery, and in scientific realities like the "world" of engineering, medicine, and entertainment, but also in the imaginary ones rendered by the open-to-interpretation nature of the project. This insight was partially validated by the huge attention from the media and other people with very diverse cultural, professional, and personal backgrounds. Some people accepted the coaster as an alternative euthanasia machine or an execution device, others as the most extreme thrill ride hacked with anti-g equipment, a beautiful sculptural structure, or just an SF horror story. One American offered and even begged to be the 1st guinea pig, should the project be brought to life.

Be it an engineering proposal, a sculpture, or a story, the project demonstrates fiction design's polymorphic power of operating within several domains—both professional and nonexpert—and with several purposes at once, but also functioning as a creative zone of exceptional freedom, where even the most radical and ambitious ideas could be tested by their authors, such as designers or engineers, safely and economically, and most importantly, voted on and evaluated democratically by wide audiences, both the potential users and just curious ones, with the help of the public forum a fiction design provides, such as online commenting or word of mouth. Thus, the shaping of the future could be made accessible to almost everyone. If it fails, you, the fiction designer, can always say it was just a fiction, or even comedy or black humour.[138] There is nothing wrong about that as long as it stays in a feigned realm, where horror or comedy movies also operate in a somewhat similar fashion.

136 McGuffin is a plot device used for setting a story into motion. Usually employed in mystery films, thrillers, film noir, this cinematic tool can be something that all the characters are trying to get their hands on, or can also be someone or something that is lost and being sought.

Beaver, F.E., 2006. *Dictionary of film terms: The Aesthetic companion to film art.* Peter Lang, p. 153.

138 From my experience, occasionally, I was finding the non-expert public interpreting *Euthanasia Coaster* as a joke, black humour, but I think it is completely acceptable, even might be desirable, because, first of all, humour is a powerful tool to talk about painful topics, to challenge preconceptions, but also to make the contact with the public more intimate, design becomes less didactic and less elitist yet open to more serious contemplation to those who are willing to do so.

VI.

OUTRO.
CONCLUSIONS.

Over the past several decades, the word *gravity* has been pervading and permeating my entire being: thoughts, activities, daydreams, and even dreams (mostly lucid!). Whether in a conversation with my physicist friend on gravitational pluralism, a brief chat with my neutral buoyancy coach, or a badinage by a glass of moonshine, I would often if not always find myself in stretching the topics to their connection with gravity. It did not take long before I was nicknamed Dr. Gravity by my closest friends.

Together with its spark lurking in my life-long affair with amusement parks, the obsession with the subject of gravity has developed my increasing awareness of the phenomenon's ubiquity and complexity. To grasp gravity, I felt, I needed not just to think, read, write, and create about it, but also to live it, breath it, and dance it. Therefore, this thesis has been taking a multitude of forms, both tangible and imaginary, theoretical and practical, spanning the domains of everyday life to hardcore academicism. Letting myself be "kidnapped" by the hypercomplexity[139] of gravity's effects on us and their relevance to contemporary artistic and design issues, I became aware of gravity's universal impact on the things we create and their effect back on us. In other words, what I have discovered and explored is gravity's tangible manifestation, gravitational artefacts, things that shape our relationship with gravity, such as roller coasters, wearable vehicles, parabolic flights, hi-tec conjuring arts machinery, and motion-sickness medications, which possess unique choreographic and locomotive aesthetic qualities with a potential for new artistic approach.

139 This expression is borrowed and appropriated from the German philosopher Peter Sloterdijk's belief "that contemporary philosophers have to think dangerously and let themselves be "kidnapped" by contemporary "hypercomplexities".

I hope this research project has demonstrated that gravity is not a mute background constant, but a malleable aesthetic register. Through practice-led experiments, auto-ethnographic accounts, and postphenomenological analysis, I proposed gravitational aesthetics as an approach that designs, stages, and studies modulations of g-conditions—and their cues—to choreograph perception, action, and social space. The inquiry addressed two guiding questions: (1) what happens to art when it is made and experienced under altered gravity (hyper-, micro-, or fluctuating g); and (2) what new gravities can art itself propose? Consicely, the anwers may be structured as three key contributions:

A field definition. "Gravitational aesthetics" reframes art and design around the experiential modulation of g-fields, extending art legacies into the somatic, cerebral, and existential registers of weight, fall, and levitation, arguing that the sensations we typically bracket as "background physics" can be composed with the same intentionality as colour or sound.

A hybrid methodology. Practice-led experiments—centrifuge concerts, weighted costumes, dream hotels—are analysed through variational phenomenology to reveal "multistabilities" in every device, while speculative art and design techniques keep those findings public, provocative, and iterable.

A speculative horizon. Concepts like exodisciplinarity insist that no aesthetic or ethical framework remains stable once it leaves Earth's gravity (literally or imaginatively), urging future practitioners to prototype culture for extraterrestrial environments, rotating habitats, or even post-human timescales.

Method and evidence. The work assembled a criteria-based corpus of gravity-related artefacts and texts; analysed how they mediate embodiment (orientation, balance, motility, intersubjectivity); and then made and tested a set of artworks, installations, and performances that actively modulate g-conditions or their proxies (rotation, loading, suspension, airflow, free-fall simulation, dream induction). Evidence came from field work (from diving to riding amusement rides), participant interviews, reflective and experimental writing. Across cases, two recurrent experiential states

emerged: kinaesthetic lightness—a hard-won proprioceptive grace achieved through adaptation; and mental lightness—transient derealisation resembling out-of-body experience. The thesis also documents how altered gravity re-choreographs social space: without stable floors or with heightened loads, spectatorship becomes radial, queuing dissolves, and touch becomes a negotiation between moving bodies and moving worlds.

Toolkit and concepts. Disciplines like choreography, vehicle engineering, science fiction, speculative design, cinematography, scenography, fashion, amusement ride psychology, and gravitational medicine are brought together to probe potential takes on and tools for gravitational aesthetics, but also to diversify the usage of existing things and find new niches for arts. The outcome of the research is a set of strategies and ideas that build up gravitational aesthetics. The strategies contain a number of different approaches, two of which are given extensive attention: design choreography and vehicular poetics that, by the way, are my terms. Design choreography blends art, design, and architecture with dance, and aims at designing and composing human movements through things and environments. It shifts attention from how things look to how things move bodies—scores, postures, rhythms, and safety envelopes become primary materials. Vehicular poetics treats vehicles and environments (from coasters to wind tunnels to speculative vehicles) as instruments that script agency, risk, and imagination, producing journeys that are as epistemic as they are affective. These sit alongside a glossary of working concepts (gravitational readymade, gravitational relativism, exodisciplinarity, etc.), offering a shared vocabulary for replication and critique.

Iterability. Each work is documented as a sort of parameterised situation—with exposure parameters (e.g. radius/RPM, load, airflow), choreographic scores (e.g. timings, cues), and more implicitly risk analysis (e.g. constraints, countermeasures) and production budget—so other researchers and curators can re-stage, tune, and extend the experiments across bodies and contexts. This operationalises the variational method: the same idea can be explored under different loads, durations, and postures to map its phenomenological envelope.

Outcomes and next steps. The project yields a portfolio of realised and proposal-ready works[140], now positioned for hybrid art festivals, research programmes, shows, and residencies. For example, a few experimental fairground ideas, of which *Cerebral Spinner* is a significant example, are currently being considered for building a "highbrow" park near Venice in Italy. Another, perhaps the most complex and longest project—a robotic movement platform for performing arts—has been at the core of my artistic research since 2013. It has been a multidisciplinary research platform that provoked a whole conference around it and brought together more than sixty professionals, including engineers, dance critics, music researchers, sound artists, choreographers, aviation physiologists, amusement psychologists, artificial intelligence programmers, entrepreneurs etc. Although the project is still in the prototyping and testing phase, it has already received recognition from international festivals (e.g. NewNow in Germany, Romaeuropa in Italy, Noor Riyadh in Saudi Arabia etc.), and most likely will be realised in the upcoming several years.

Limitations and implications. This is not a comprehensive art-historical genealogy; scope and word limits required depth in practice and method over breadth of historiography. Access to specialised infrastructure (e.g., parabolic flight, large-radius centrifuges) constrained trial frequency and sort of sample sizes; ethics and safety requirements bounded the extremity of exposures. These are productive limits: they delineate a tractable research programme for collaborators in such hybrid arts. It will serve as a rudimentary basis for my future investigations and artistic research, but also an inspirational material open to wider creative employment and interpretation or further development for art, design, and architecture professionals. Questioning and challenging the boundaries and status quo of art/design/architecture/arts, the research project also broadens the understanding of the creative fields, bringing together approaches hitherto seen as incongruous, and encouraging creators to take a "risk" and break away from designing a fancy chair for a performative magic levitation device, from the sexy lines of a car towards an imagination-fuelled vehicle, from an eye-appealing facade towards building dancer-friendly architectural surfaces, from earthly-gallery-oriented art towards an artistic interface between human innards and the cosmos.

Treating gravity as a medium has consequences beyond spectacle. It demands new design briefs (for g-fields rather than objects), new evaluative criteria (kinaesthetic/mental lightness, social re-choreography, ethical risk), and new institutional infrastructures (from training protocols to insurance frameworks). It also invites public imaginaries that are technically literate and ethically alert, where speculative proposals act as research devices—mobilising debate, funding, and further experiments.

In sum, *Gravitational Aesthetics* is both cartography and provocation: a map of how weight, fall, and flight already infiltrate art practices, and a call to cultivate new gravities, on Earth and far beyond.

140 Such hybrid methodology is epitomised by a number of my projects: *Airtime, The Bárány Chair, Cerebral Spinner, Cumspin, Euthanasia Coaster, Honey, Moon!, Hypergravitational Piano, Nonfiction of Levitation, Lawn Centrifuge, Oneiric Hotel, Planet of People, Thought Gym, Walking on the Wall.*

Julijonas Urbonas, *Robotic Egomotion Simulator*, 2021, custom electrohydraulics, electronics and software. A view of a prototype being tested with the choreographer Erika Vizbaraitė. Photo by Karolis Milaševičius.

REGOS (Robotic Egomotion Simulator)—equal parts robotic amusement ride, choreographic prop, aircraft simulator, and spatial disorientation device—will incorporate a wide range of gut-oriented sensations originating in dance, sports, acrobatics, piloting, and other gravitational activities. In a REGOS-led performance, the audience will sit on specially designed interactive robotic platforms, whose motion will be composed and synchronised in accordance with the live dancer's movement and the soundtrack, so that the choreography, the music, and the bodily experiences will all form a hybrid multisensory aesthetic whole. Vehicular poetics at its finest.

Endnotes

1 In phenomenology, the way in which one moves is considered to influence one's adaptation to the environment, other individuals, and experience of the self. Our movement affects our interaction with people and things, and the way in which people and things move affects our perception of others as well as our sense of self in the environment and in our interactions.

Merleau-Ponty, M., 2002. *Phenomenology of perception*. Translated from French by C. Smith. London: Routledge, pp. 112-171.

Gibson, J.J., 1986. *The ecological approach to visual perception*. Hillsdale, N.J.: Lawrence Erlbaum Associates.

2 I familiarised myself with the genealogy of ocularcentrism (the privileging of vision in Western thought and culture) via extensive writings by Jonathan Crary, Martin Jay and David Michael Levin, but the most relevant ones were Richard Shusterman and Andy Clark. Shusterman points out that much of modern aesthetics assumes an "armchair" model of detached looking, while his somaesthetic approach insists on the embodied, multisensory, and performative dimensions of art and life. Meanwhile, Clark contrasts the idea of a self bounded by the skin (what he calls the "skinbag" conception of the self) with his own extended mind view, where the body and identity stretch into tools, technologies, and environments.

3 Virilio, P. & Armitage, J., 2001. *Virilio live: selected interviews*. SAGE, p. 62.

4 In 1999, The Arts Catalyst initiated a long-term collaboration between Dr Dubois and the Biodynamics research group at Imperial College to investigate the control of the bodies in altered states of gravity, including weightlessness. The team participated in 7 parabolic "zero gravity" flights with the European Space Agency in Bordeaux, France, and the Gagarin Cosmonaut Training Centre, Russia. Outputs included a series of video installations, performances and demonstrations, as well as masterclasses and a scientific paper.

5 Virilio, P. & Armitage, J., 2001. *Virilio live: selected interviews*. SAGE, p. 52.
Virilio, P., 2003. *Discussion on gravitational aesthetics*. (Personal communication, 20 November 2008).

6 James, C., 2004. *Gravity and fantasy: The art and culture of weight*. Ph. D. London Consortium.

7 Naukkarinen, O., & Haapala, A., eds, 2005. Aesthetics and mobility. *Contemporary Aesthetics* [e-journal] Special Volume 1. Available at: <http://www.contempaesthetics.org/newvolume/pages/journal.php?volume=13> [Accessed 22 June 2009].

8 Sheller, M., 2015. Vital methodologies: Live methods, mobile art, and research creation. In: P. Vannini, ed. *Non-representational methodologies*. London: Routledge, pp.130–145.

9 Actually, I am not alone here, as Virilio's work has been judged by some philosophers to be overly negative or pessimistic with regard to technological development. Some of the instances could be found in Virilio's discussions on technology and politics with Philippe Petit.

Virilio, P., 1999. *The Politics of the very worst*. New York: Semiotext(e), p. 47.

As to Heidegger, a nice survey of what I mean by romantic inclination or what Don Ihde calls "techno-romanticism" could be found in his book *Heidegger's technologies: Postphenomenological perspectives* (2010).

10 In fact, later I found that the majority of thinkers considered philosophers of technology are phenomenologists.

Ihde, D., 2009. *Postphenomenology and technoscience : the Peking University lectures*. Albany: SUNY Press, p. 37.

11 For a more detailed introduction, please check Don Ihde's book *Postphenomenology and technoscience* (2009).

12 Ihde, D., 1986. *Experimental phenomenology*. SUNY Press, p. 14.

13 Goodman, R.B., 2005. *Pragmatism: critical concepts in philosophy*. Taylor & Francis, p. 23.

14 Dewey, J., 2005. *Art as Experience*. Perigee Trade, 46.

15 Riis, S., 2010. Two dogmas of phenomenology. In: *Annual Meeting of the Society for Social Studies of Science (4S)*.Tokyo: University of Tokyo.

16 Ihde, Don. *Experimental phenomenology: An Introduction*. SUNY Press, 1986.

17 Virilio, P., 1995. *The art of the motor*. Minneapolis:

University of Minnesota.

Virilio, P., 1999. *Polar inertia*, London: Sage.

Virilio, P., 2005. *Negative horizon: an essay in dromoscopy*. London: Continuum.

18 Ingold, T., 2004. Culture on the ground: the world perceived through the feet. *Journal of Material Culture*, 9(3), pp. 315-340.

Ingold, T. 2007. *Lines: a brief history*. Routledge, 2007, pp. 72-104.

19 Ihde, D., 2001. *Bodies in technology*. Minneapolis: University of Minnesota.

20 Ihde, D., 2009. *Postphenomenology and technoscience* . Albany: SUNY Press, p. 42.

21 Ibid, pp. 63-81.

22 Urbonas, J. 2010. "The Barany chair and *g*-design." In *ARC* 14, edited by Charmian Griffin. London: Royal College of Art, p. 44-47.

23 Calvino, I., 1993. *Six memos for the next millennium*. Vintage, p. 8.

24 Straus, E.W.,1980. *Phenomenological psychology*. New York: Garland, p. 141.

25 Clément, G. & Reschke, M.F., 2008. *Neuroscience in space*. Berlin: Springer, p. 14.

26 Stoczkowski, W., 2002. *Explaining human origins: Myth, imagination and conjecture*. Cambridge: Cambridge University Press, p. 73.

27 Stanford, B. C., 2003. *Upright: The evolutionary key to becoming human*. Boston: Houghton Mifflin
Ingold, T., 2004. 'Culture on the ground: The world perceived through the feet'. *Journal of material culture* 9, no. 3, p. 317.

28 Straus, E.W.,1980. Op. cit., p.141.

29 Wills, D., 2008. *Dorsality: Thinking back through technology and politics*. Minneapolis: University of Minnesota Press, p. 8.

30 Ibid.

31 Crucial to Leroi-Gourhan's understanding of human evolution is the notion that the transition to bipedality freed the hands for grasping and the face for gesturing and speaking, and thus that the development of the cortex, technology, and language all follow from the adoption of an upright stance.

Stiegler, B.,1998) *Technics and time*. Stanford: Stanford University Press, p. 112.

32 Bachelard, G., Farell, E. and Farell, F.,1988. *Air and dreams: An essay on the imagination of movement*. Dallas: Dallas Institute of Humanities and Culture, p. 35.

33 McLuhan, M. & Lapham, L.H.,1994. *Understanding media: The extensions of man*. Cambridge, MA: MIT Press, p. 181.

34 Virilio, P., 1995. *The art of the motor*. Minneapolis: University of Minnesota Press, p. 124.

35 G-force is a way of expressing acceleration in terms of the acceleration due to Earth's gravity. One "g" is equivalent to the acceleration caused by gravity at Earth's surface, which is about 9.8 meters per second squared (m/s^2). When you hear someone mention "2 *g*'s" or "3 *g*'s", they mean an acceleration that is two or three times 9.8 m/s^2, respectively.

36 The Coriolis effect is a force that is found in a rotating object. Gaspard Gustave de Coriolis first described the Coriolis effect in 1835 using mathematics. The Coriolis effect can best be seen in hurricanes. In the Northern Hemisphere, they spin counter-clockwise (because the Earth spins counter-clockwise), and in the Southern Hemisphere they spin clockwise.

37 Clément, G. & Reschke, M.F., 2008. *Neuroscience in space*, Springer, p. 21.

38 Hall, T.W., 2005. The Gravity of architecture – the architecture of gravity. In: A. Ferré et al., eds. *Conditioning : the design of new atmospheres, effects and experiences*. Barcelona: Actar, p. 144.

39 Ibid, p. 146.

40 Hall, T.W., 1993. The architecture of artificial gravity: archetypes and transformations of terrestrial design. In: *Space manufacturing 10: pathways to the high frontier – accession, development and utilization*. 11th SSI-Princeton Conference. Princeton, New Jersey, USA: Washington, DC, USA: American Institute of Aeronautics and Astronautics, pp. 198-209.

41 Human centrifuges are training devices for acceleration aspects of complex flight missions, and a tool that aeromedical scientists use to study effects of g-forces on human body and equipment.

42 Urbonas, Julijonas, ed. *Cosmos as a Journal*. * As a Journal 2, 2021. Vilnius: Lithuanian Culture Institute.

43 Weighted clothing are garments that have heavy materials incorporated into them, to add weight to various parts of the body, usually as part of resistance training. The effect is achieved through attaching weighted pieces to the body (or to other garments) which leave the hands free to grasp objects. Unlike withheld weights or machines, weighted clothing can leave users more able to do a variety of movements and manual labour. In some cases, certain weighted clothing can be worn under normal clothing, to disguise its use to allow exercise in casual environments.

The use of weighted clothing is a form of resistance training, generally a kind of weight training. In addition to the greater effect of gravity on a person, it also adds resistance during ballistic movements, due to more force needed to overcome the inertia of heavier masses, as well as a greater momentum that needs deceleration at the end of the movement to avoid injury. The method may increase muscle mass or lose weight; however, there have been concerns about the safety of some uses of weights, such as wrist and ankle weights.

It is normally done in the form of small weights, attached to increase endurance when performed in long repetitive events, such as running, swimming, punching, kicking or jumping. Heavier weighted clothing can also be used for slow, controlled movements, and as a way to add resistance to body-weight exercises.

44 In the phenomenological tradition—especially in thinkers like Maurice Merleau-Ponty—the "body schema" is understood as the pre-reflective, dynamic organization of one's bodily capacities. It is not merely an intellectual or visual representation of the body. Rather, it is the lived sense of one's body as a center of action in the world.

45 Robert Morris, Letter to Michael Compton, 19 January, 1971, quoted in:
Bird, J., 1999. Minding the body. In: M. Newman and J. Bird, eds. *Rewriting conceptual art*. Reaktion, p. 97.

46 In postmodern urban culture, gyms and fitness centres proliferate, largely replacing the church and the museum as the preferred site of self-meliorative instruction, where one is obliged to visit on one's leisure or as a duty to oneself, even if it involves inconvenience and discomfort.

Shusterman, R., 2000. *Performing live : aesthetic alternatives for the ends of art*. Cornell University Press, p. 137.

47 The most common contemporary theory links this pain to so-called micro-trauma, aka micro-tears to the muscles being trained that are caused by weight training. These micro-tears in the muscle contribute to the soreness felt after exercise, called delayed onset muscle soreness. It is the repair to these micro-trauma that result in muscle growth. Normally, this soreness becomes most apparent a day or two after a workout. However, as muscles become adapted to the exercises, soreness tends to decrease.
MacDougall, J.D. et al., 1980. "Effects of strength training and immobilization on human muscle fibres", in: *European Journal of Applied Physiology and Occupational Physiology*, 43(1), pp. 25-34.

48 Weight training aims to build muscle by prompting two different types of hypertrophy, sarcoplasmic hypertrophy and myofibrillar hypertrophy. Sarcoplasmic hypertrophy leads to larger muscles so is favored by bodybuilders more than myofibrillar hypertrophy which builds athletic strength. Sarcoplasmic hypertrophy is triggered by increasing repetitions, whereas myofibrillar hypertrophy is triggered by lifting heavier weights.

49 It was not until the late 1870s that fatigue was inaugurated as a medical term, basically referring to a modern disorder.

Rabinbach, A., 1992. *The human motor: energy, fatigue, and the origins of modernity*. University of California Press, p. 38.

50 Peña, C.T. de la, 2005. *The body electric: how strange machines built the modern American*. NYU Press, p. 84.

51 Ibid., p. 85.

52 Ibid., p. 86.

53 Ibid., p. 78.

54 The imagination should not be misunderstood as solely a visual practice or as having a single eye-led perceptual dimension, as the term itself is misleading since it comes from the word "image". In fact, all our sensorial qualities can be engaged to the realm of the imagination. There are aural, olfactory, gustatory, tactile,

and motor modes of the imagination.

55 Silbernagel, M.S., Short, S.E. & Ross-Stewart, L.C., 2007. "Athletes' use of exercise imagery during weight training", in: *Journal of Strength and Conditioning Research*, 21(4), pp.1077-1081.

56 For example, Ranganathan and colleagues found strength gains of 35% in a test group that imagined doing little finger abduction and 13.5% strength gains in a group imaging elbow flexion. In contrast, a group that actually performed physical training at finger abduction gained 53% strength.

Ranganathan, V.K. et al., 2004. "From mental power to muscle power--gaining strength by using the mind", in: *Neuropsychologia*, 42(7), pp.944-956.

57 More on this: Goldman, A.I., 2006. *Simulating minds: the philosophy, psychology, and neuroscience of mindreading*. Oxford: Oxford University Press, pp. 157-160.

58 Bachelard, G. & Haltman, K., 2002. *Earth and reveries of will: an essay on the imagination of matter.* Dallas Institute of Humanities and Culture, p. 274.

59 Goldman, A.I., 2006. *Simulating minds: the philosophy, psychology, and neuroscience of mindreading*. Oxford: Oxford University Press, p. 284.

60 Francis Godwin's *The Man in the moone,* which appears to be the first description of the idea of weightlessness in space; Jules Verne's *Earth to the Moon* in which Verne attempted to do some rough calculations as to the requirements for space-travel; hovering on some sort of magic carpet or winged horses in Antoine Galland's *Thousand and One Nights*.

61 For example, Kurt Vonnegut's *Slapstick or Lonesome No More!* (1976), a sci-fi novel, depicts erection inducing gravity tides, which on some days prompt people to crawl, and on others they could toss hubcaps miles distant. Or, as another example, a city crawling on rails in order to stay ahead of a crushing, slowly moving gravity field that has transformed life on Earth in Christopher Priest's *Inverted World* (1974).

62 Brainhood is a concept that highlights how contemporary Western culture has increasingly come to see a person's identity, selfhood, and agency as stemming primarily—if not exclusively—from the brain. In other words, it's the idea that "we are our brains."

63 Mockstitution, n. (neologism) similar to the concept of Artificial Institution (see Marina Naprushkina), or para-fictional institution (C. Lambert-Betty, C. Bishop), a mock institution or "Mockstitution" is an informally structured art agency that overtly mimics the name and to some degree the function of larger, more established organizational entities including schools, bureaus, offices, laboratories, leagues, centers, departments, societies, clubs, bogus corporations and institutions.

64 Construction of imagined spaces and experiences through words, names, and narrative structures.

65 Lukas, S.A., 2008. *Theme park.* Reaktion Books - Objekt, p. 115.

66 Soden, G., 2005. *Defying gravity: land divers, roller coasters, gravity bums, and the human obsession with falling*. New York: W.W. Norton, p. 106.

67 This insight has been modified and borrowed from: Soden, G., 2005. *Defying gravity: land divers, roller coasters, gravity bums, and the human obsession with falling*, New York: W.W. Norton, p. 103.

68 Mitrasinovic, M., 2006. *Total landscape, theme parks, public space*. Ashgate Publishing, pp. 181.

69 Nye, Russel B., 1981. "Eight Ways of Looking at an Amusement Park", in: *Journal of Popular Culture* 15.1 (1981), p. 71.

70 The project has been featured in dozens of media entries, blogs and hundreds of online discussions and forums that vary quite radically in content, perspectives and audience. Since its first presentation to the public in the HUMAN+ exhibition in the Science Gallery, Dublin in April 2011, the coaster has drawn more than 6M visitors who have accessed the project's website, 600K watched the video on Vimeo, and more than 2M read the Wiki article.

71 A short movie was shot in 2015 and presented various film festivals. *H Positive* (London, 2015, dir. Glenn Patton)

72 Onosko, T., 1978. *Funland*. New York: Arno Press, p. 59.

73 Anne Hart, D., 2011. Sucide by roller coaster. *Discovery.com* [online] 22 September, Available at: <http://news.discovery.com/tech/euthanasia-sucicide-rollercoaster-ride-110919.html#view-comments> [Accessed 23 October 2013].

74 Davis, C., 2014. Mindhole blowers: 20 Facts about Jaws that might make you want to scream, 'Shaaark!'. *Pajiba.com* [online] Available at: <http://www.pajiba.com/seriously_random_lists/mindhole-blowers-20-facts-about-jaws-that-might-make-you-want-to-scream-shaaark.php> [Accessed 3 Aug. 2014].

75 Rebello, S., 2013. *Alfred Hitchcock and the making of psycho*. Media tie-in edition, ed. Berkeley, CA: Soft Skull Press, p 114.

76 Shinkman, P., 2011. 'Roller coaster of certain death' not as pleasant as it sounds. *WTOP.com* [online] Available at: <http://www.wtop.com/267/2558228/Roller-Coaster-of-Certain-Death-not-as-pleasant-as-it-sounds> [Accessed 3 Aug. 2014].

77 Damasio, A.R., 2014. Euthanasia Coaster (Julijonas Urbonas). *MoMA: Design and Violence* [online] . Available at: <http://designandviolence.moma.org/euthanasia-coaster-julijonas-urbonas/> [Accessed 3 Aug. 2014].

78 Applied Brilliance Conference 2011, Thriving in the age of transparency. Emergence, resurgence, convergence, transcendence. October 11-14. Jackson Hole, USA.

79 Blissett, L., 2011. *Euthanasia roller coaster*. [email] (Personal communication, 28 July 2011).

The name of the author is changed.

80 By "naked" I mean the unconstrained sensation of lightness or an embodied condition of such an experience. For example, after practising cycling for a long time, the bicycle pulls out of the conscious foreground and is incorporated into the cyclist's body, becoming as "silent" as her lungs and heart. In this way, cycling becomes a "naked" experience. This kind of "nakedness" is similar to what post-phenomenologist Don Ihde refers to as a "ratio' between the objectness of the technology and its transparency in use.

Ihde, D., 1990. *Technology and the lifeworld: From garden to earth.* Bloomington: Indiana University Press. pp. 82-94.

81 Carol Lee:, 2002. *Ballet in western culture. A history of Its origins and evolution*. London: Routledge, p. 189.

82 Nicholls, J. 2010. *The Floor of the forest* [video online] In: *Vimeo*. Available at: <https://vimeo.com/15924833> [Accessed 1 July 2013].

83 Kourlas, G., 2011. Elizabeth Streb [online] In: *Timeout*. Available at: <http://www.timeout.com/newyork/art/elizabeth-streb?pageNumber=2> [Accessed 20 November 2012].

84 Salter, C., 2010. *Entangled: Technology and the transformation of performance*. MIT Press, p. 245.

85 The initial version of the *Reduced Gravity Walking Simulator* was located inside a hangar at NASA's Langley Research Center. Later a larger version would be located at the Lunar Landing Facility. The purpose of this simulator was to study the subject while walking, jumping, or running. Researchers conducted studies of various factors such as fatigue limit, energy expenditure, and speed of locomotion. Francis B. Smith wrote in his paper *Simulators For Manned Space Research*, "I would like to conclude this talk with a discussion of a device for simulating lunar gravity which is very effective and yet which is so simple that its cost is in the order of a few thousand dollars at most, rather than hundreds of thousands.

With a little ingenuity, one could almost build this type simulator in his backyard for children to play on. The principle is ...if a test subject is suspended in a sling so that his body axis makes an angle of 9 1/2 degrees with the horizontal and if he then "stands" on a platform perpendicular to his body axis, the component of the Earth'' gravity forcing him toward the platform is one times the sine of 9 1/2 degrees or approximately 1/6 of the Earth's normal gravity field. That is, a 90 kg astronaut "standing" on the platform would exert a force of only 15 kg—the same as if he were standing upright on the lunar surface."

Hansen, J.R., 1995. *Spaceflight revolution: NASA Langley Research Center from Sputnik to Apollo*. NASA SP-4308. Washington, D.C.: National Aeronautics and Space Administration.

Smith, F. B., 1966. "Simu-

lators For Manned Space Research," in: 1966 IEEE International Convention, New York, NY.

86 See Glossary.

87 See Glossary.

88 Suspension.org, n.d. Suspension.org. [online] Available at: http://www.suspension.org [Accessed 8 October 2023].

89 Irwin, H.J., 1985. *Flight of mind: A psychological study of the out-of-body experience*. Maryland: Scarecrow Press. p. 149.

90 Stelarc, 2001. Suspended bodies: Uncertain, Anxious and obsolete. In: Kostic, A. (ed.) *I levitate, what's next...* Maribor, Slovenia: Kibla, p. 166.

91 Originally designed by neuropsychiatrist Dr John C. Lilly in 1954, an isolation tank was used for testing the effects of sensory deprivation. It is usually a lightless, soundproof tank in which subjects float in salted water at skin temperature.

Floatation Tanks (n.d.). [online] *History of the flotation tank*. Available at: http://www.flotation-tanks.co.uk/history_of_the_flotation_tank.html [Accessed 25 October 2009].

92 In fact, this problem might be prevented by a ring heating system which is used around the outer walls of more advanced tanks to warm the water so that it rises up the outside edges of the pool, travels towards the center, and then sinks under the tank user. This very slow water convection flow helps to keep the user centered in the middle of the pool, stopping them from floating to the side and bumping into the walls of the small tank during long float sessions.

93 Due to its similarity to weightless space, neutral buoyancy allows the person to simulate some space activities such as spacewalking or EVAs (Extravehicular Activities). It's for this reason that astronauts or cosmonauts have to complete a part of their training in a space station immersed in a large pool.

94 The record belongs to Stephane Mifsud who mastered it on the 8th of June in 2009. The record of 240 hours belongs to Cem Karabay.

O'Neill, S., 2010. Maxed out: How long could you hold your breath?. [online] *New Scientist*, 25 April. Available at: http://www.newscientist.com/article/mg20627562.600-maxed-out-how-long-could-you-hold-your-breath.html [Accessed 12 May 2010], [online] *10 days and nights under the water*. Available at: http://www.10gun10gece.com/en/hakkimda.html [Accessed 12 May 2010].

95 The terminal velocity of a falling body occurs during free fall when a falling body experiences zero acceleration because of the retarding force of air resistance. Air resistance exists because air molecules collide into a falling body creating an upward force opposite to the force of gravity. This upward force will eventually balance the falling body's weight and the body will continue to fall at constant velocity known as terminal velocity.

Elert, G., 2007. Speed of a skydiver (Terminal Velocity). [online] *The Physics factbook*. Available at: http://hypertextbook.com/facts/JianHuang.shtml [Accessed 12 May 2010].

96 Auster, P., 2006. *Mr Vertigo*. London: Faber and Faber. p. 58.

97
Dubois, K.,1994. Dance and weightlessness: Dancers, Ttaining and adaptation problems in microgravity. *Leonardo*, 27(1), p. 59.

98 Homes, A.M., 2010. Elizabeth Streb. *BOMB* [online], 1 July. Available at: https://bombmagazine.org/articles/2010/07/01/elizabeth-streb/ [Accessed 8 October 2022].

99 For example, one set of new-born quails couldn't adapt to life aboard Russia's Mir space station and died after just a few days.

European Space Agency, 2004. Human spaceflight and exploration: Learning to live with the laws of motion. [online] Available at: http://www.esa.int/esaHS/ESABYU-0VMOC_astronauts_0.html [Accessed 11 March 2010].

100 Kerrod, R.,1989. *Illustrated history of man in space*. New York: Bdd Promotional Book Co, p. 13.

101 In fact, meteorism is a double problem: it does not only tend to stay in one place, but this intestinal phenomenon is quite persistent as digestive gas cannot "rise" toward the mouth and is more likely to pass through the other end of the digestive tract––in the words of the Skylab crewman-doctor Joe Kerwin––"very effectively with great volume and frequency." Happily, this problem is weakened by another trouble: a degraded sense of smell.

Oberg, J.E. & Oberg, A.R., 1986. *Pioneering space: Living on the next frontier*. New York: McGraw-Hill, p. 86.

102 The astronaut's relaxed body tends to curl into a foetus-like posture—the arms are floating in front of the face and the legs in a semi-curled position, in which the push and pull between the different muscles are evenly balanced.

103 The speed at which the eyeball moves for discerning an object is not the same in the weightless condition as on the earth.

104 Due to its negative effects on health, astronauts usually stay only a few months, though the longest stay in space was 438 days, by Russian cosmonaut Valeri Polyakov.

105 Quoted in: Latour, B., 2008. A Cautious Prometheus? A Few steps Ttward a philosophy of design (with special attention to Peter Sloterdijk). *Networks of Design: Proceedings of the 2008 Annual International Conference of the Design History Society*. Falmouth: University College Falmouth, p. 8.

106 Coined in 1960. NASA consultants Manfred E. Clynes (a physiologist) and Nathan S. Kline (a psychiatrist) introduced the term in their article "Cyborgs and space" in the *Astronautics* magazine (September 1960). They fused cybernetic + organism to describe a self-regulating human-machine system designed to "adapt it to new environments", specifically the rigours of spaceflight.

Clynes, M.E. and Kline, N.S., 1960. Cyborgs and space. *Astronautics*, September, pp.26–27, 74–75.

107 Schönhammer, R., 2000. *On flying and falling: The phenomenology of typical dreams*. Paper presented at the 17th Annual Conference of the International Association for the Study of Dreams, Washington, D.C. (Accessed: 24 January 2025).

108 Merleau-Ponty, M., 1962. *Phenomenology of perception,* 150. Translated by C. Smith. London: Routledge & Kegan Paul.

109 Schönhammer, R., 2005. *Flying (human) bodies in the fine arts — dreams and daydreams of flying.* Paper presented at the 16th Congress of the International Association of Empirical Aesthetics, New York.

110 I am rephrasing the French poet Paul Valéry who once wrote: 'Il faut être léger comme l'oiseau, et non comme la plume' (translated as 'one should be light like a bird, and not like a feather'). Calvino, I., 1993. *Six memos for the next millennium*. New York: Vintage Books, p. 16.

111 For a more extensive bibliography on the phenomenology of mobility, see:

Sheller, M., 2011. Mobility. *sociopedia.isa*. [online] Available at: http://www.sagepub.net/isa/resources/pdf/Mobility.pdf [Accessed 21 April 2013].

Peters, P.F., 2006. *Time, innovation and mobilities: travel in technological cultures*. Routledge.

112 Virilio, P., 2008. *Open sky*. Verso, p. 110.

113 Ingold, T., 2007. *Lines: a brief history*. Routledge, p. 78, 102.

114 In his book "Codex Seraphinianus", the Italian artist, architect, and industrial designer Luigi Serafini depicts an entire visual encyclopedia of an unknown world, written in its unique language, so far undeciphered by anybody else. The Codex is divided into eleven chapters, partitioned into two sections. The first section appears to describe the natural world, dealing with flora, fauna, and physics. The second deals with the humanities, the various aspects of human life: clothing, history, cuisine, architecture, and so on.

One of my favourite machines in the chapter on machinery and vehicles is what could be called "Rainbow Painter," which looks like a bizzare hybrid of a helicopter, boat, and tractor with some sort of crawler tread, the bodywork made from a cloud, dangling some elemental particles, which perhaps can be used to paint rainbows into the sky or ride the rainbow itself.

Serafini, L. & Calvino, I., 1993. *Codex seraphinianus*. Franco Mario Ricci.

115 Goldman, A.I., 2006. *Simulating minds: the philosophy, psychology, and neuroscience of mindreading*. Oxford: Oxford University Press, p. 284.

116 Urbonas, J., 2011. „The invention of the pedestrian". In: K. Jakaite, ed. *Lithuanian Design.*Vilnius: Acta Academiae Artium Vilnensis.

Urbonas, J., 2013. “Gravitational aesthetics: Vehicular poetics. Part 1. Storytelling”, In: Eun-Ju Han, ed., *Space*, no 553, pp. 110-117.

Urbonas, J., 2013. “Gravitational aesthetics: Vehicular poetics. Part 2. Imaginary travelling“, In: Eun-Ju Han, ed., *Space*, no 554, pp. 110-117.

117 Proprioception, especially when connected with movement, is sometimes called kinaesthesia, and this latter term also emphasises muscle memory and hand-eye coordination. Closely connected with these two systems is the vestibular system, a remarkable sensory organ near the auditory sensory complex that carries out a wide range of coordinated activities. It is connected to the eyes and ears, whose neurons respond to vestibular stimulation; it receives important input from the hands and fingers as well as the soles of the feet; it activates facial and jaw muscles; and it affects heart rates and blood pressure, muscle tone, the positioning of our limbs, respiration, and even immune responses. All of this is done to allow us to stand vertically and move through space with a rhythmic sense of balance.

Mallgrave, H.F., 2011. *The Architect’s brain: Neuroscience, creativity, and architecture*. Wiley-Blackwell, p. 201.

118 Miller, J., 1989. *Steps and stairs*. United Technologies Corporation, p. 8.

119 Goethe, J.W.V., 1795. “Palladio architecture”, in: J. Gage, ed., 1980. *Goethe on art*. University of California Press, p. 197.

120 Çelik, Z., 2006. “Kinaesthesia”, in: A. C. Jones, ed. *Sensorium: embodied experience, technology, and contemporary art*. Cambridge: The MIT Press, p 159.

121 Forsythe, W., 2008. “Choreographic objects” in: Weisbeck, M. (ed.) *William Forsythe: Suspense* (exhibition catalogue). Zürich: JRP | Ringier / Ursula Blickle Stiftung, pp. 5–8.

122 Urbonas, J., 2013. Gravitational aesthetics: Design choreography. Part 1. Still surfaces“. In: Eun-Ju Han, ed., *Space*, no 548, pp. 104-115.

Urbonas, J., 2013. “Gravitational aesthetics: Design choreography. Part 2. Kinetic surfaces“. In: Eun-Ju Han, ed., *Space*, no 549, pp. 106-113.

Urbonas, J., 2013. “Gravitational aesthetics: Design choreography. Part 3. Suspended surfaces“. In: Eun-Ju Han, ed., *Space*, no 550, pp. 110-117.

Urbonas, J., 2013. “Gravitational aesthetics: Design choreography. Part 4. Wearable surfaces“. In: Eun-Ju Han, ed., *Space*, no 551, pp. 110-118.

123 Merleau-Ponty, 2002, *Phenomenology of perception*. London: Routledge, p. 296.

124 More on this could be found in:

Urbonas, J., 2010. “The Barany chair and *g*-design.”In *ARC* 14, edited by Charmian Griffin. London: Royal College of Art, p. 44-47.

125 By *fairness* I mean it in the broad, justice-oriented sense of how burdens, advantages, rules, and rewards are allocated among different bodies and groups.

126 Miller, M.M., 1977. “The Social science fiction of Isaac Asimov”, in: J. D. Olander & M. H. Greenberg, eds. *Isaac Asimov*. New York: Taplinger Publishing Co., p. 14.

127 Smith, W., 2004. *Science fiction and organization*. Routledge, p. 5.

128 Asimov, I., 1971. Social science fiction. In: D. Allen, ed. *Science fiction: the future*. Harcourt Brace Jovanovich, pp. 263-291.

129 Sterling, B., 2009. Design Fiction. *interactions*, 16, pp. 20–24.

130 Goldman, A.I., 2006. *Simulating minds: the philosophy, psychology, and neuroscience of mindreading*, Oxford: Oxford University Press, p. 284.

131 Midal, A., 2008. *Tomorrow now: when design meets science fiction*, Luxembourg: MUDAM Luxembourg, p. 7.

132 Midal, A., 2010. Design and science fiction: all that glitters is not gold. In: Swiss Design Network, *6th Swiss Design Network Conference – Negotiating futures - design fictio*n. Basel: Swiss Design Network, p. 29.

133 Varum, C.A. & Melo, C., 2010. Directions in scenario planning literature – A review of the past decades. *Futures*, 42(4), pp.355-369.

134 Peldszus, R., Dalke, H. & Welch, C., 2010. Science Fiction Film as Design Scenario Exercise for Psychological Habitability: Production Designs 1955-2009. In: AIAA (American Institute of Aeronautics and Astronautics), *40th International Conference on Environmental Systems (ICES)*. Barcelona, 2010, Reston, Virginia, USA: American Institute of Aeronautics and Astronautics, p. 3.

135 Dunne, A. & Gaver, W.W., 1997. The pillow: artist-designers in the digital age. In: ACM (Association for Computing), *Conference on Human Factors in Computer Systems (CHI ‘97)*. Atlanta, 1997, New York, USA: ACM, pp. 361–362.

136 McGuffin is a plot device used for setting a story into motion. Usually employed in mystery films, thrillers, film noir, this cinematic tool can be something that all the characters are trying to get their hands on, or can also be someone or something that is lost and being sought.

Beaver, F.E., 2006. *Dictionary of film terms: The Aesthetic companion to film art*. Peter Lang, p. 153.

137 Foucault, M. & Miskowiec, J., 1986. *Of other spaces*. Diacritics, 16(1), pp. 22-27.

138 From my experience, occasionally, I was finding the non-expert public interpreting *Euthanasia Coaster* as a joke, black humour, but I think it is completely acceptable, even might be desirable, because, first of all, humour is a powerful tool to talk about painful topics, to challenge preconceptions, but also to make the contact with the public more intimate, design becomes less didactic and less elitist yet open to more serious contemplation to those who are willing to do so.

139 This expression is borrowed and appropriated from the German philosopher Peter Sloterdijk’s belief “that contemporary philosophers have to think dangerously and let themselves be “kidnapped” by contemporary “hypercomplexities”.

Sloterdijk, P., Heinrichs, H.J. and Corcoran, S., 2010. *Neither sun nor death*. London: Semiotext(e).

140 Such hybrid methodology is epitomised by a number of my projects: *Airtime, The Bárány Chair, Cerebral Spinner, Cumspin, Euthanasia Coaster, Honey, Moon!, Hypergravitational Piano, Nonfiction of Levitation, Lawn Centrifuge, Oneiric Hotel, Planet of People, Thought Gym, Walking on the Wall.*

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DISSEMINATION
(selected shows, publications, talks, awards)

Solo shows

2014 - “Standing, Falling, Levitating”, gallery “Vartai”, Vilnius.
2016 - Lithuanian Pavillion “Airtime”, Milano Triennale, Italy.
- “Prototypes for Alternative Realities”, KKKC, Klaipėda, Lithuania.
- “Cumspin”, gallery “Vartai”, Vilnius, Lithuania.
2018 - “Planet of People”, gallery “Vartai”, Vilnius, Lithuania.
2020 - “Planet of People”, Collective, Edinburgh, UK.
2021 - “Lithuanian Space Agency: Planet of People”, the 17th International Architecture Exhibition, La Biennale di Venezia, Italy.
2023 - “Lithuanian Space Agency: Planet of People”, National Museum of Art, Vilnius, Lithuania.
- “Moonshineology”, Vilnius University Observatory, Vilnius.

Group shows

2010 - St Etienne Design Biennale 2010, St. Etienne, France.
- “Research RCA: New Knowledge”, Royal College of Art, London, UK.
- Prix Ars Electronica CyberArts Exhibition, Linz, Austria.
2011 - “Human+”, Science Gallery, Dublin, Ireland.
- Japan Media Arts Festival 2010, The National Art Center, Tokyo, Japan.
- “Sound Art. Sound as Medium of Art,” ZKM, Karlsruhe, Germany.
2012 - “homeMADE, Constructing Substitute Worlds,” Centre for Contemporary Art Laznia, Gdansk, Poland.
- Update_4/NTAA Exhibition, Zebrastraat, Ghent, Belgium.
2013 - “Design and Violence,” MoMA, New York, USA.
- Design Shanghai 2013, Power Station of Art, Shanghai, China.
- Lisbon Architecture Triennale, Lisbon, Portugal.
- “Merry Melancholy,” Eskilstuna Art Museum, Eskilstuna, Sweden.
- “Urban Sounds,” House of Electronic Arts, Basel, Switzerland.
2014 - “A Show as/on (Artistic) Research,” Gallery Malonioji, Vilnius, Lithuania.
- “COMING SOON: real imaginary futures,” Bureau Floor, Maastricht, Netherlands.
- “Revolving Starsand Shaky Grounds: Constellations of Precarious Knowledge,” Hochschule für Bildende Künste, Dresden, Germany.
2015 - „Thing Nothing“, Van Abbemuseum, Eindhoven, Netherlands.
- “Human+: The future of our species”, CCCB, Barcelona, Spain.
- Kaunas Biennal, Kaunas Central Post Office, Kaunas, Lithuania.
- “Levitation”, quarter21, Vienna, Austria.
2016 - „The Life Fair“, Het Nieuwe Instituut, Rotterdam, Netherlands.
- „Žilvitis“ (Willow), galerija „Vartai“, Vilnius.
2017 - “Human+”, ArtScience Museum, Singapore.
- “Sound and Matter in Design”, Holon Design Museum, Israel.
- “City Nature”, National Gallery of Art, Vilnius, Lithuania.
- “To Die Out Laughing”, 23rd Humor and Satire Art Biennial, Gabrov, Bulgaria.
- ”Mastering Death: Artistic Perspectives”, Josephinium, Vienna, Austria.
2018 - “Mind Temple”, MOCA, Shanghai, China.
- “Waiting for Another Coming“, Ujazdowski Castle CCA, Warsaw, Poland.
- “Life at the Edges”, Science Gallery, Dublin, Ireland.
- “Stories of Things”, National Gallery of Art, Vilnius, Lithuania.
- “Honey, Moon!”, an experimental opera, New Opera Action Festival, Contemporary Art Centre, Vilnius, Lithuania.
- “Coming to Terms with Sociotechnical Discrepancies”, 12 Star Gallery, London, UK.
- Riga Biennial, Riga, Latvia.
- “Human+”, Palazzo Esposizioni, Rome, Italy.

2020 - “Driving the Human”, ZKM, Karlsruhe, Germany.
- “(Re)Design Death”, Cube Design Museum, Kerkrade, Netherlands.
2021 - “New Now”, Zollverein, Essen, Germany.
- Art Encounters Biennial, Timișoara, Romania.
2022 - “Swarm”, Melbourne Science Gallery, Australia.
- Milano Triennale, Milano, Italy.
2023 - “Dark Matters”, Melbourne Science Gallery, Australia.
2024 - “Try to make it real. But compared to what?”, MOCAK, Krokow, Poland.
- “UFNA: Unpredictable Futures. Water”, International Triennial of Art and Science, Klaipėda Culture Communication Center.
- “Swarm”, Tropez Tropez, Berlin, Germany.
- “Wild Bits”, Maajaam, Estonia.
2025 - “Media Art is Here”, Karlsruhe, Germany.
- “Spectral Drift”, Kaunas Picture Gallery, Kaunas, Lithuania.

Edited books and journals

2010 -“Talking doors”. Vilnius: Hotel of Things.
2016 -“Gravitational Aesthetics”. In: Artnews.lt ” [digital journal].
2021 -“The LSA Annual Report No.1”, Six chairs, Rupert, Vartų galerija.
-“Cosmos as a Journal”, 2, Vilnius: Lithuanian Culture Institute.

Texts (articles, essays, conference papers)

2007 - “Įtarpinto humoro dizainas: ribų ritualas ir ideo-terapija interaktyvioje terpėje” (Mediated humor design: boundary ritual and ideo-therapy in interactive me dia) In: V. Michelkevičius, ed., *Media studies*, Vilnius: Acta Academiae Artium Vilnensis, pp. 79-95.
- “Wind orchestra”. In: V. Michelkevičius et al, eds. *Migrating realities.* Cologne: KHM, pp. 50-52.
- “Objects for arithmomaniacs”. In: V. Michelkevičius, ed., *Media culture voices*. Vilnius: Mene, pp. 164-172.
- “Gravitational aesthetics”. In: University of Ulster, *ISEA09, The 15th International symposium on electronic art, Belfast,* UK, 23 August – 1 September 2009.
- “The barany chair and g-design”. In: C. Griffin, ed., *ARC magazine*. London: Royal College of Art, pp. 44-47.
- “Gravitational aesthetics”. In: P. Galle and H. Hove, eds., *Copenhagen working papers on design*. Copenhagen: The Danish School Press, pp.175- 179.
2011 - “The invention of the pedestrian”. In: K. Jakaite, ed. Lithuanian Design. Vilnius: Acta Academiae Artium Vilnensis.
2012 - “Designing Death”. In: M. Margetts, ed. *Edge of Thinking.* London: Royal College of Art.
2013 - “Gravitational Aesthetics: Design Choreography Part 1. Still Surfaces”. In: Eun-Ju Han, ed., Space, no 548, pp. 104-115.
- “Gravitational Aesthetics: Design Choreography Part 2. Kinetic Surfaces”. In: Eun-Ju Han, ed., Space, no 549, pp. 106-113.
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- “Gravitational Aesthetics: Design Choreography Part 4. Wearable Surfaces”. In: Eun-Ju Han, ed., Space, no 551, pp. 110-118.
- “Gravitational Aesthetics: Vehicular Poetics Part 1. Storytelling”. In: Eun-Ju Han, ed., Space, no 553, pp. 110-117.
- “Gravitational Aesthetics: Vehicular Poetics Part 2. Imaginary Travelling”. In: Eun-Ju Han, ed., Space, no 554, pp. 110-117.
- “Gravitational Design”. In: D. Paul & A. Sick, eds., Rauchwolken und Luftschloesser. Hamburg: Textem-Verlag, pp. 117-128.

2014 - “The First Ride”. In: Rebecca La Marre, ed., Another vixtory Over the Sun. http://anothervictory.net
2015 - “Stovint, krentant, levituojant”. In: V. Michelkevičius, ed., *Meninis tyrimas*, Vilnius: Acta Academiae Artium Vilnensis, pp. 11-126.
2016 - “Great Science for Great Arts & Great Arts for Great Science: A brief diary of an artist residency at CERN”. In: *Mustekala.info*, t. 65, Art + technology (+sci ence + philosophy), sud. Jenna Jauhiainen ir Kari Yli-Annala, 2016.
2017 - “Will I Survive the Trip? Or a flash intro into Gravitational Design, Gravitational Design” In N WIND 13, sud. Ignas Survila, p 7-10.
2018 - “Egzodisciplininis menas”, In: *Postdisciplininis leksikonas*, sud. Vytautas Michelkevicius.
- “A Planet of People”. In: *Imagining Lithuania: 100 years, 100 visions, 1918-2018*, ed. Marija Drėmaitė et al.
2020 - “Lietuvos erdvės agentūra. Planeta iš žmonių kūnų”, Goethe.lt internet journal.
2021 - “Lithuanian Space Agency”, In: Damn magazine #39.
2023 - The Lithuanian Space Agency: Cosmic Imagination and Architectural Fiction. In: Liene Jākobsone rt al (ed), (BUILDING) NEW PERSPECTIVES through Practice-led Research in Art, Design and Architecture. Art Academy of Latvia, Institute of Contemporary Art, Design and Architecture, 88-95;
- “Lietuvos erdvės agentūra”, Lietuvos nacionalinio dailės muziejaus metraštis, 25. Vilnius: Lietuvos nacionalinio dailės muziejus, pp. 337-342.
2025 - “The Lithuanian Space Agency: Cosmic Imagination and Architectural Fiction”, Seeing, 3, Zurich: Zurich University of the Arts.

AWARDS

2007 - The Royal College of Art Bursary, London, UK.
- Main Award Grand Prix Nordica, Prix Mobius Nordica 2007, mediaculture competition, Helsinki, Finland.
2008 - The Westerly Trust Grant, London, UK.
2009 - The Royal College of Art Bursary, London, UK.
2010 - Jury Recommended Work, 14th Japan Media Arts Festival, Tokyo, Japan.
- Young Artist Award, the Ministry of Culture of the Republic of Lithuania.
- Honorary mention in Participative Media, Live 2011 Grand Prix, Turku, Finland.
- Award of Distinction in Interactive Art, Prix Ars Electronica 2010, Linz, Austria.
- The Royal College of Art Grant, London, UK.
2012 - Public Prize, New Technological Art 2012, Liedts-Meesen Foundation, Belgium.
2016 - Accelerate@CERN residency.
- M.K. Čiurlionis Cup 2016, Lithuania.
2024 - Lithuanian Government’s Culture and Arts Prize 2024.

ABOUT JULIJONAS URBONAS

Julijonas Urbonas is an artist, designer, researcher, engineer, founder of Lithuanian Space Agency, associate professor at Vilnius Academy of Arts, former CEO of Klaipėda city's amusement park. Currently lives and works in Vilnius.

Julijonas' artistic research revolves around gravitational aesthetics, extraterrestrial arts, critical design, amusement park engineering, performative architecture, scenography and (post)kinetic arts. He has represented Lithuania in several triennials and biennials such as the 17th Venice Biennale of Architecture, and received international acclaim, including being awarded the prestigious Award of Distinction in Interactive Art at the Prix Ars Electronica 2010 and the Lithuanian Government's Culture and Arts Prize 2024. His projects can be found in private and museum collections such as the Lithuanian Art Museum, the X Museum Beijing, the Centre for Art and Media Karlsruhe (ZKM).

Education

1999-2003	- BA in Visual Design,Vilnius Academy of Arts, Vilnius, Lithuania.
2005-2007	- PhD in Art Research, Vilnius Academy of Arts, Vilnius, Lithuania.
	- MA in Visual Design (Honours degree with Distinction), Vilnius Academy of Arts, Vilnius, Lithuania.
2007-2018	- PhD, Design Interactions, Royal College of Art, London, UK.

Gravitacinė estetika
Julijonas Urbonas

SANTRAUKA

Šis meninio tyrimo projektas traktuoja gravitaciją kaip meninę priemonę, kuriant ir bandant įrenginius bei situacijas, kurios moduliuoja skirtingas gravitacines sąlygas (hiper-, mikro-, svyruojančias), siekiant sukurti naujas estetines patirtis ir kritinę socialinę erdvę. Meninės kūrybos, lauko eksperimentų ir postfenomenologinės analizės pagalba formuojama gravitacinės estetikos paradigma – naujų kūrybinių priemonių rinkinys, pavyzdžiui, transporto poetika (angl. vehicular poetics), choreografinis dizainas (angl. design choreography), kritinis svaigulys (angl. critical vertigo) – ir apibrėžia egzodisciplininį požiūrį į ateities meną. Apibendrinant, gravitacinė estetika yra ir kartografija, ir provokacija: žemėlapis, pažymintis, kaip svoris, krytis ir skrydis jau įsiskverbė į meno praktikas, ir raginimas puoselėti naujas gravitacijas Žemėje ir toli už jos ribų.

Pagrindiniai teiginiai

- **Artefaktai ir įrenginiai, kurie moduliuoja gravitaciją, pertvarko įkūnijimą.**

  Gravitaciniai artefaktai, tokie kaip linksmieji kalneliai, sporto svarsmenys, vėjo tuneliai ir raumenų nuovargio slopintuvai, keičia hiper-, mikro- ar svyruojančias g-sąlygas, organizuodami kūno orientaciją ervėje, veikdami pusiausvyrą, judrumą ir socialinius santykius – t. y. jie keičia tai, kaip kūnai jaučia, mąsto, įsivaizduoja ir gyvena erdvėje.

- **Gravitacinė estetika yra reliacinė ir praktika grindžiama, o ne objekto savybė.**

  Tokia estetika nėra „gravitacinių artefaktų“ vidinė savybė ar ypatybė, bet sritis, kuri projektuoja, inscenizuoja ir analizuoja sąlygas, leidžiančias suvokti gravitaciją kitaip, naudojant praktika grindžiamus eksperimentus, dizaino fikciją ir postfenomenologiją, taip kad būtų įtrauktas visas kūnas ir vaizduotė.

- **Kaip kūrybinis įrankių rinkinys, gravitacinė estetika kuruoja judesį ir veikseną – ir tiria jų poveikį.**

  Pasitelkiant transporto priemonių poetiką ir choreografinį dizainą, ši estetika traktuoja transporto priemones/aplinką (tikrą ir įsivaizduojamą) kaip instrumentus, kurie kuria judesio ir veiksenos scenarijus bei vertina jų sensorines, psichologines ir socialines pasekmes.

Metodologijos apžvalga

Siekiant suformuoti gravitacinės estetikos sampratą, šis projektas:

- Apžvelgia, renka ir kuruoja su gravitacija specifiškai susijusių kūrinių, technologijų ir tekstų kolekciją, taikant aiškius įtraukimo/atrinkimo kriterijus, taip apibrėžiant gravitacinės estetikos apimtis.

- Atlieka postfenomenologinę/variacinę komparatyvinę analizę, tiriant šių gravitacinių artefaktų poveikį kūniškumui (orientacijai erdvėje, judrumui, jutimiškumui, socialinei choreografijai).

- Kuria-bando–vertina prototipus ir meno kūrinius, kurie moduliuoja gravitacines sąlygas; renka duomenis apie jų poveikį pojūčiams ir socialinei dinamikai; vertina pagal estetinius/etinius kriterijus; apibendrina ir sintetina rezultatus į kūrybinių įrankių rinkinį (koncepcijas, metodus, žodyną).

Struktūrinė disertacijos schema

1. Įvadas

Mano vaikystė sovietiniame pramogų parke tampa atspirties tašku pagrindiniam klausimui: kas atsitinka menui – ir jį suvokiančiam kūnui – kai jis patiria pakeistą gravitaciją (hiper-, mikro-, svyruojančią)? Ištyręs judesio meno spragas – iš kurių pagrindinė yra ta, kad žiūrovai dažnai yra statiški – ir technologijos filosofiją, savo atsakymą artikuliuoju per meninio tyrimo, kuris apjungia kritinį dizainą,

atrakcionų inžineriją, judesio meną, postfenomenologiją ir kosmoso mokslą, prieigą. Šiame skyriuje suformuojami keturi tikslai:

Konceptualus – įsteigti terminą „gravitacinė estetika“ ir nubrėžti jo intelektualinę genealogiją;

Metodologinis – sukurti unikalius kūrybinius įrankius, pvz., choreografinį dizainą ar transporto poetiką;

Praktinis – sukurti arba pagaminti eksperimentinius įrenginius/erdves, pradedant fortepijono centrifugomis ir baigiant sapnų viešbučiais, taip įkūnijant gravitacinę estetiką;

Ekstrapoliacinis – spekuliuoti apie gravitacijos pojūčius alternatyviose realybėse ir mene virš žemiškos atmosferos.

2. Stovint

„Stovint“ tiria svorį kaip prigimtinį žmogaus santykį su gravitacija ir dinamišką sąveiką tarp fizinės ir psichosocialinės realybės, įkūnytą sąmoningumą ir žmogaus siekį persvarstyti apribojimus kaip derlingą dirvą meninėms ir patirtinėms galimybėms.

Diskusiją sudaro trys patirtiniai blokai:

- Ekvivalentumo principas – hipergravitacija, sukelta besisukančių mašinų, tokių kaip mano „Cerebral Spinner“ arba „Hyper-gravitational Piano“, paverčia galerijas epistemologiniais teatrais, kuriuose žiūrovai priverčiami persvarstyti erdvės, pusiausvyros ir krypties ir net muzikalumo sampratas.

- Dėvima masė – 35 kg smėliu užpildytas kostiumas ir mechanizuotos „masažo“ sporto salės atskleidžia, kaip pasunkinta ar imituota apkrova keičia propriocepciją, socialinę erdvę ir kūno įvaizdį, o mentalinės treniruotės suformuoja „įsivaizduojamo svorio“ idėją.

- Kylimo psichologija – istorinės ir šiuolaikinės „energizuojančios mašinos“ apsvarstomos per sporto psichologiją, siekiant parodyti, kad lengvumas ir sunkumas gali būti sukeliami vien tik sugestija.

3. Krentant

„Krentant“ centre – Euthanasia Coaster, fiktyvus atrakcionas-eutanazijos mašina, iliustruojanti transporto priemonių poetiką ir jos principus. Trakduodamas atrakciono bėgelį kaip skulptūrą ir „siaubiako“ siužetą, parodau, kaip tarpdisciplininis įtikinamumas (kalnelių fizika, kosminė medicina, bioetika) leidžia maketui migruoti iš galerijų į bulvarinius leidinius, akademines konferencijas, muzikinius albumus ir tatuiruočių salonus, taip suformuojant kvazirealią atrakciono egzistenciją, kurioje „jau milijonai juo važinėja“.

Projektas iliustruoja:

- Rizikos fikciją – „nerizikingą riziką“, išplėstą iki kraštutinumo;
- Fikcijos dizainą – objektus, kurie veikia kaip realus techninis pasiūlymas, moralinė pasaka ir internetinis folkloras;
- Kritinį galvasvaigį/pilvasvaigį – metodą, kuris pasitelkia įcentrinę arba laisvo kritimo jėgą, kad paskatintų persvarstyti etines ir estetines prielaidas.

4. Levituojant

Ilgiausiame empiriniame skyriuje aprašomos šešios levitacinės technologijos – kūnų kabinimas kabliais, neutralaus plūdrumo įtaisai, aerodinaminis pakibimas, parabolinis skrydis, orbitinis laisvasis kritimas ir sapninga levitacija. Kiekviena technologija veikia kaip zondas, atskleidžiantis specifines galimybes (angl. affordances) – ritmiškas laiko kilpas, tūrinę empatiją, atsakomąją lytą– kurias „žemiškas„ menas nepajėgus įžvelgti. Šiame skyriuje siūloma žvelgti į gravitacinės estetikos praktiką ne kaip objektų, o g-laukų – choreografinių sąlygų, kuriose kūnai bendrai kuria erdvę – kūrybą. Vienas iš esminių skyriaus teiginių – kinestetinis lengvumas iš tiesų yra sunkus darbas, reikalaujantis daug pastangų, aukšto technologijų raštingumo, o be to yra laikinas reiškinys. Tokioje stadijoje vertikalumo samprata suglumsta, pusiausvyros pojūčio signalai susimaišo, o teritorijos, judėjimo ir socialinės erdvės konvencijos pakrinka.

Čia išskiriamos dvi fenomenologinės, estetinės analizės trajektorijos:

- Kinestetinis lengvumas – grakštus flirtavimas su svoriu po sunkios adaptacijos prie naujų gravitacinių aplinkybių;
- Mentalinis lengvumas – virškūniškas lengvumo jausmas, primenantis išėjimo iš kūno būseną.

5. Žodynėlis

Šiame skyriuje išplečiami tyrime suformuoti ar įsteigti neologizmai:

- Choreografinis dizainas (angl. design choreography) – „šokdinantis“ kūnus dizainas;
- Gravitacinis readymade’as – gravitacinių artefaktų ir reiškinių perkėlimas iš ne meno lauko į galeriją;
- Gravitacinis reliatyvizmas – 1 g traktavimas kaip reliatyvi, sutartinė sąlyga;
- Egzodisciplininis menas – meno migracijos už planetos ribų metodologinė prieiga.

Šie terminai sudaro įrankių rinkinį, kuris gravitacinę estetiką išplečianuo reginio iki niuansuotos ekologijos, apimančios įkūnijamus derybų su svoriu arba be jo aspektus.

Kontekstas, tikslai, uždaviniai, metodika, struktūra

Nors didžiąją dalį savo gyvenimo praleidau atrakcionų parke, tik neseniai supratau, kad turiu nedidelę profesinę nelaimę: niekada nemėgau važinėtis atrakcionais, bet mieliau stebiu šiuos keistus reiškinius. Vengimas suptis galbūt kyla iš to, kad man greitai pasidaro bloga, ir kad užaugau su sovietiniais atrakcionais, kurie veikė kaip komunistinės propagandos varikliai, raminantys ir atpalaiduojantys darbo jėgą nuo fizinio ir protinio išsekimo. Mano tėvas vadovavo pramogų parkui, kuris man buvo tarsi darželis. Jo darbuotojai – atrakcionų operatoriai, renginių vadybininkai, technikai, kasininkai, administratoriai – buvo mano auklės, kurios

mane mokė subtilių būdų, kaip susukti publikos vidurius ir nervus. Taigi, buvau glaudžiai susijęs su pramogų parku, bet taip pat išlaikiau kritišką atstumą. Nepaisant to (arba dėl to), jaučiau, kad parke slypi kažkoks neišvystytas, bet galingas – dažnai skrandį veriantis – grožis. Netrukus supratau, kad tai yra unikali (jei ne vienintelė) hibridinė meno forma, kuri įtraukia publiką, judindama jų kūnus erdvėje. Tokios įžvalgos paskatino mane eksperimentuoti su atrakcionais, o kai perėmiau tėvo pareigas, nusprendžiau šį reiškinį pakelti iki meno lygio ir pavadinau šį projektą „Gravitacinė estetika“. Parką paverčiau savo studija ir pradėjau du doktorantūros projektus: vieną Vilniaus dailės akademijoje, o kitą Karališkajame meno koledže. Tuo tarpu parke eksperimentavau su atrakcionų judesių repertuaru – daugiausia dirbau prie sulėtinimo bei užsakinėjau eksperimentinius garso takelius atrakcionams (iš dalies tai paskatino kita mano veikla: tuo metu vadovavau pogrindiniam muzikos klubui). Taigi, tam tikra prasme mano meninis tyrimas prasidėjo nuo meno įtraukimo į atrakcionų parko veiklą, kitaip tariant, meno perkėlimo į kitokias gravitacines sąlygas. Čia ir iškilo vienas iš pagrindinių gravitacinės estetikos klausimų:

Kas nutinka meno sričiai kintant gravitacinėms sąlygoms, pavyzdžiui, nesvarumui, hipergravitacijai, svyruojančiai gravitacijai ir pan.? Ir atvirkščiai – kokias gravitacijos sąlygas gali sukurti menas?

Prieš išplėsdamas klausimus, norėčiau pateikti drąsią įžvalgą apie gana pasyvų judesio vaidmenį mene. Iš žiūros (angl. spectatorship) perspektyvos bet kurioje judesiu orientuoto meno srityje, ar tai būtų kinas, (post)kinetinis menas, ar šokis, juda atlikėjas (žmogus ar ne žmogus), o ne žiūrovas. Išskyrus linksmuosius kalnelius, apžvalgos ratus, karuseles ir pan. Tačiau pramogų parko įrenginiai kaip meno forma yra gana primityvūs, pernelyg orientuoti į malonumą, konceptualiai skurdūs ir apriboti menku judesio žodynu.

O jei sujungtume judesio meno estetiką su atrakcionų aktyvia choreografine galia?

Įsivaizduoti eksperimentinį, konceptualų atrakcioną yra viena, o jį sukurti – visai kas kita. Žmonių judinimo įrangos kūrimas, projektavimas ir gamyba yra labai lėtas, sudėtingas ir brangus procesas. Įgyvendinamumas eksponentiškai mažėja didėjant dinamikos mastui ir atrakciono choreografijos repertuaro sudėtingumui. Artimai susipažinęs su šiais apribojimais, aš pradėjau laikyti meno sritį savotiška saugumo zona, kurioje saugumo samprata laisvesnė, įvairesnė, be griežtų inžinerinių reikalavimų.

Zona, kurioje galėjau stumtelėti kūną ir vaizduotę į naujus paribius, kurti kvazirealius atrakcionus ir sujungti realybę su fikcija. Vienas iš pirmųjų pavyzdžių, iliustruojančių tokį mąstymo poslinkį, yra „Euthanasia Coaster“ – hipotetinė eutanazijos mašina-atrakcionas, sukurtas remiantis realiais moksliniais, technologiniais, inžineriniais ir medicininiais tyrimais. Projektas, kurį sudaro maketas, techniniai brėžiniai ir vaizdo įrašai, buvo pristatytas labai įvairiose srityse – mene, dizaino, architektūros, mokslinės fantastikos, inžinerijos, fizikos, fiziologijos, bioetikos ir kt. – ir labai plačiai auditorijai. Projekte taikomų kūrybinių technikų derinys daugiau nei pasiteisino – „mirties kalneliai“ sulaukė didžiulio tarptautinio žiniasklaidos ir visuomenės dėmesio, dėl kurio man teko susidurti su serverio, kuriame patalpinta mano internetinė svetainė, gedimu dėl per didelio lankytojų srauto ir kelerius metus be pertraukos keliauti į parodas, konferencijas, radijo ir televizijos laidas, kino projektus ir pan. Toks dėmesys atspindėjo ne tik žmonių norą įsitraukti į tokią fikciją, bet ir lėmė plačią ir labai įvairią – nuo techninės, ekspertinės, mokslinės iki meninės ir absurdiškos – reakcijos. Tai išplėtė projektą iš fikcijos sferos į publikos vaizduotės, ekspertų debatų, mokslinio populiarinimo, interneto folkloro, išplėstinės mokslinės fantastikos sferas. Nepaisant to, kad projekto forma tiesiogine žodžio prasme telpa į ant standartinio krovinių padėklo, galėčiau teigti, kad šie kalneliai yra įtaigesni nei būtų pastatyti; milijonai žmonių jau „važinėja“ juo, kiekvienas savo būdu: muzikantai dedikuoja dainas, filmų kūrėjai kuria filmus apie jį, akademikai rengia parodas ir konferencijas apie šiuos kalnelius, interneto entuziastai kuria virtualias kopijas, vieni darosi tatuiruotes, kiti buriasi į eutanaziją remiančias aktyvistų grupes ir pan.

Kalnelių projekto sėkmę iš dalies galima priskirti fikcijos įtvirtinimui tarpdisciplininiu pagrindu. Toks fikcinis dizainas yra svarbus gravitacinės estetikos tyrimo metodas, išplėtotas įvairiomis formomis – nuo akademinių, eksperimentinių tekstų, filmų scenarijų, mikro romanų iki prototipų, scenografijos ir hibridinių medijų, tačiau jis yra tik vienas iš daugelio kitų šio tyrimo metu taikomų prieigų.

Pasitelkiant choreografija, (post)kinetiniu menu, atrakcionų psichologija, kosminės medicinos, transporto priemonių inžinerijos, postfenomenologijos ir gravitacijos biologijos žiniomis, tyrimas integruoja eksperimentines tekstines, dizaino, skulptūrines, choreografines ir patirtines tyrimų proceso formas. Kartu su tradiciniais metodais, tokiais kaip literatūros apžvalga ir

konsultacijos su ekspertais, patyriminių ir autoetnografinių metodų derinys suteikia svarbų impulsą visam projektui.
Pastarasis apima, bet neapsiriboja, dalyvavimą ir patyrimą veiklose, kurios yra „judesio vedamos“ arba atviros aktyviam kūno įsitraukimui, pavyzdžiui, atrakcionai, dalyvaujamojo šokio pasirodymai, medicininiai aparatai, naudojami erdvės dezorientacijai ir didelėms pagreičio jėgoms sukelti, tirti ir treniruoti; choreografinė euristika – performatyvūs eksperimentai, kuriuose kūnas naudojamas kaip pr iemonė idėjoms eskizuoti ir išbandyti, pavyzdžiui, bodystorming'as. Iš šių eksperimentų gauta patirtis buvo panaudota tiek kaip tyrimo medžiaga ir tyrimo metodas, tiek kaip įkvėpimo šaltinis. Pavyzdžiui, bodystorming sesijoms aš sukūriau „gyvos marionetės“ diržų sistemą, kuri buvo dėvima aplink kūną ir leido pakabinti ir judinti mane ore įvairiose pozose. Šį choreografinį įrankį naudojau įvairioms gravitacijos patirtims imituoti bei kaip pedagoginę priemonę, skaitant performatyvias paskaitas, siekdamas iliustruoti tam tikras įžvalgas apie nulinės gravitacijos kūno patirties subtilybes.

Iš tiesų, šis doktorantūros projektas yra kupinas tokių unikalių metodų, kurių daugumą suformavau per daugiau nei dešimtmetį trukusį tyrimą. Skėtiniu terminu „Gravitacinė estetika“ aš apjungiu choreografinį dizainą, transporto poetiką, kritinį svaigulį, išplėstą mokslinės fantastikos lauką, egzodisciplininį meną, gravitacinius readymade'us, gravitacinį reliatyvizmą– metodikas ir požiūrius, nagrinėjančius gravitacijos, estetikos, technologijų ir filosofijos tarpusavio sąveiką, siekiant sukurti visą kūną ir vaizduotę įtraukiančias ir praturtinančias patirtis. Kūno(-ų) choreografija per daiktus, alternatyvių gravitacijų įsivaizdavimas ir sukrėstų vidurių išprovokuotas mąstymas yra keletas gravitacinės estetikos pavyzdžių.

Choreografinis dizainas ir transporto priemonių poetika sulaukė didžiausio mano dėmesio ir buvo plačiai naudojamos mano meniniuose tyrimuose teksto formoje ir įvairiuose meniniuose projektuose.

Choreografinis dizainas sutelkia dėmesį į unikalią choreografinę daiktų ir aplinkos galią. Nukreipdamas kūrybinį dėmesį nuo tradicinių dizaino ir architektūros tikslų, tokių kaip funkciškumas, išvaizda, semantika, ekonomika, ekologija ir saugumas, link choreografinių sąlygų ir poveikio, siūlau alternatyvų ir šokėjišką

dizaino požiūrį. Tokio dizaino esminis matmuo – daiktų kinestetinės ir visą kūną įtraukiančios savybės. Choreografinis dizainas skatina judinti kūną(-us), o ne stumti vaizdą ar žodį.

Transporto priemonių poetika susijusi su žmogaus technologizuoto egojudėjimo (savo pačio kūno poslinkio erdvėje patirties) poetišku potencialu, kuris pasireiškia per tokias judinančias technologijas, kaip automobiliai, atrakcionai, parašiutai ir pan. Ši prieiga nėra nei transporto priemonių dizainas, nei poezija apie transportą. Čia kūrybinis dėmesys nukreipiamas nuo judėjimo efektyvumo – dizaino rodiklių, susijusių su judėjimu iš taško A į tašką B – į pačios kelionės patirtinę poetiką. Kitaip tariant, transporto poetika sutelkia dėmesį į kelionės estetinį, vaizduotę žadinantį pobūdį. Vis dėlto pagal savo funkciją dizaino objektas čia yra transporto priemonė, techninė priemonė, skirta žmonėms (ar kitiems gyvūnams) vežti, bet taip pat pasakojimo priemonė, vėžinanti keleivį į poetinę erdvę, nesvarbu, ar ji būtų fizinė ar įsivaizduojama.

Gravitacinė estetika sutelkia dėmesį į judančio kūno patirtis, o kūno sąvoka apima juslinius, psichologinius, socialinius ir vaizduotės aspektus. Čia svarbiausią vaidmenį vaidina gravitacija – tai atskaitos taškas, nuo kurio judėjimas erdvėje įgyja prasmę. Pakeitus santykį su gravitacija, atitinkamai pasikeičia ir visos įkūnytos patirties dimensijos. Pavyzdžiui, pagalvokite apie gyvenimą orbitoje, kurioje nėra gravitacijos, arba, kalbant techniškai, svorio pojūčio. Tai radikaliai keičia astronauto erdvės ir judėjimo suvokimą, nes nėra skirtumo tarp „aukštyn“ ir „žemyn“, taip pat tarp rankų ir kojų, kurios netenka žemiškosios „kūno transportavimo“ funkcijos. Be to, yra daug kitų suvokimo pokyčių, pavyzdžiui, dėl kitokio kūno skysčių pasiskirstymo susilpnėję skonio pojūčiai arba sutrikusi veido mimika, o dėl to – ir tarpasmeninė komunikacija. Tačiau gravitacija tampa dar labiau pastebima – astronautai turi itin aktyviai mankštintis, kad kompensuotų raumenų ir kaulų tankio praradimą, o tam, kad neprarastų orientacijos erdvėje pojūtį, jie turi įsivaizduoti Žemės matmenis, t.y. tam tikrą kosminės stoties plokštumą laikydami „vertikalia“ arba „horizontalia“.

Gravitacinės estetikos tyrime laikomasi nuostatos, kad žemiška gravitacija yra tik viena iš aibės įvairiausių gravitacinių laukų ir nėra vienintelė, esminė ašis, aplink kurią būtų galima aptarti kūniškumą, percepciją, mąstymą ir vaizduotę. Todėl tyrimo pobūdis yra eksperimentinis, dinamiškas, siekiantis destabilizuoti tiek kūną, tiek jo įpročius, nuolat ieškant naujų kūno matmenų. Čia stabili

lieka tik gravitacijos, kuri pati yra suvokiama tik per nestabilumą, kultivuotą kūno pusiausvyros praradimą. Šis požiūris tiesiogiai atspindi kūno, kaip dinamiško, šokančio ir nuolat besiformuojančio subjekto, kuris įgalina gyvenimą ir patirtį, sampratą. Tačiau šios kūno savybės yra retai aptariamos šiandienos dizaino pasaulyje, kuris yra apnikęs paviršutiniška ir siaura kūno samprata – tai, ką Andy Clarkas vadina „odamaišiu“ (angl. skin-bag) – kūno redukcijos į tiesiog išvaizdą arba tekstines reikšmes. Gravitacinė estetika reaguoja į šią problematiką, tačiau neapsiriboja išplėstine kūno samprata – šis kūrybinis požiūris skatina ieškoti naujų apibrėžčių per specialiai inscenizuotas choreografines instaliacijas, provokuojančias permąstyti savo ir kitų kūniškumą.

Tokio požiūrio pavyzdžiu galima laikyti prancūzų filosofo ir architekto Paulo Virilio įžambiąją architektūrą (angl. oblique architecture) – gyvenamąją erdvę su nuožulniomis grindimis ir sienomis, verčiančioms gyventojus nuolat vesti derybas su gravitacija. Tokia kūrybinė strategija traktuoja gyventoją ne kaip statišką Vitruvijaus žmogų, o kaip gyvą, plastišką, šokantį kūną. Gyvenimas tokioje architektūroje, pasak Virilio, sustiprino kūno sąmoningumą, todėl erdvė buvo suvokiama ne vizualiai, o per visą kūną, o pasyvaus ir aktyvaus gyvenimo kategorijos, poilsis ir šokis susiliejo.

Iš tiesų, gravitacinės estetikos požiūris nėra naujas – yra nemažai atskirų meno, dizaino, architektūros ir inžinerijos pavyzdžių, kuriuos galima priskirti prie šios sferos. Kita vertus, nėra nė vieno asmens, kuris būtų vykdęs išsamius ir sistemingus tyrimus šioje srityje. Šis tyrimas, įskaitant mano publikacijas, iš dalies siekia užpildyti šią spragą. Apžvelgdamas pavyzdžius ir kurdamas naujus, juos apjungiu ir susintetizuoju į vieną kūrybinį požiūrį ir suteikiu jam poetinę orientaciją, kurią kūrėjai gali pritaikyti savo meninėje ar dizaino praktikoje.

Kalbant apie panašios meninės ar dizaino praktikos pavyzdžius, yra nedaug kūrėjų, tačiau produktyviausi iš jų yra choreografijos, architektūros, atrakcionų inžinerijos ir transporto priemonių dizaino srityse. Pavyzdžiui, jau minėtas Paul Virilio ir Claude Parent dirbo prie naujų architektūrinių idėjų, sąmoningai keisdami žmogaus sąsajas su gravitacija. Menininkas Carsten Holler perkėlė atrakcionus iš parkų į galerijas, taip suteikdamas pramoginiams įrenginiams konceptualų ir poetinį sluoksnį. Belgų menininkas Panamarenko kruopščiai ir poetiškai kūrė įvairiausias fikcines transporto priemones, kurios kviečia fantastiškoms kelionėms, provokuojančioms

permąstyti, kas yra gravitacija ir kaip ją galima įveikti ar panaudoti. Meno organizacijos „Art Catalyst“ kuruojami projektai ir juose dalyvaujantys menininkai kūrybiškai tyrinėjo nesvarumo ir pakeistos gravitacijos temas, tačiau jie buvo sporadiški, o dauguma projektų veiktų ir Žemės gravitacijos sąlygomis be didelių skirtumų. Vienintelė išimtis yra Kitsou Dubois choreografiniai tyrimai, suformuoti ir vykdyti specialiai nesvarumo aplinkoje, įsteigę naujos šokio estetikos leksiką bei palengvinę astronautų adaptaciją prie nežemiškos architektūros ir savo ateiviško kūno. Yra ir keletas kitų choreografų, kurie sąmoningai tyrinėjo gravitacinius reiškinius, daugiausia naudodami specialius – pritaikytus, individualizuotus ar išrastus – prietaisus. Štai keli tokie choreografai, kurių pavardės nuolat cirkuliavo tyrime: Trisha Brown, William Forsythe ir Elizabeth Streb.

Kalbant apie išsamiausius teorinius darbus šioje srityje, bene svarbiausi yra Paul Virilio tekstai. Analizuodamas, kaip technologijos keičia mūsų orientaciją erdvėje, judėjimą ir, kas jam svarbiausia, greitį, jis parodo, kad šie pokyčiai daro įtaką mūsų suvokimui, kūniškumui, elgesiui ir mąstymui. Nors jis gana retai aiškiai mini, kokį vaidmenį jo mąstyme vaidina gravitacija, tačiau iššifravus jo kartais sunkiai suprantamą kalbą ir tiesiogiai paklausus jo apie šiuos dalykus, tampa aišku, kad jis nėra abejingas šiai jėgai ir mano, kad „svoris ir gravitacija yra pagrindiniai suvokimo organizavimo elementai“. Tačiau jo filosofija ilgainiui tampa mažiau aktuali šiai disertacijai, nes yra pernelyg fragmentiška – retai grindžiama „tikrais“ empiriniais stebėjimais, jau nekalbant apie išsamius ir griežtus konkrečių technologijų, situacijų ar patirčių tyrimus. Be to, jis linkęs pernelyg universalizuoti technologijas ir beveik visada jas kritikuoja nerimą keliančiu tonu. Nepaisant to, Virilio idėjos ir citatos buvo įkvepiančios ir palengvino tyrimą, todėl jis kartais – tiesiogiai ir ne – pasirodo visoje disertacijoje.

Kiti rašytojai, tokie kaip Italo Calvino ir Gaston Bachelard, taip pat yra rašę apie gravitacijos poetiką ir galėtų papildyti gravitacinės estetikos mąstytojų sąrašą, tačiau jų darbai daugiausia apsiriboja literatūros menais. Todėl jie taip pat prisideda prie disertacijos tik keliomis citatomis ir vaizdingais kai kurių idėjų paaiškinimais. 2004 m., dr. Catherine James apgynė daktaro disertaciją Londono konsorciume (Tate, ICA ir AA), kurioje daugiausia dėmesio skyrė gravitacijos temai mene, ypač tapyboje, grafikos mene ir skulptūroje. Apskritai, darbas susijęs su vizualine kultūra, tiksliau, vaizdų hermeneutika, ir turi labai mažai bendro su

fenomenologinėmis įžvalgomis, kurioms skirta mano disertacija. Dėl pastarosios priežasties jos tyrimas buvo naudingas labiau kaip unikalių gravitacijos artefaktų duomenų bazė. 2005 m. internetinis mokslinis žurnalas „Contemporary Aesthetics“ išleido specialų numerį su 10 straipsnių, nagrinėjančių „estetikos klausimus mobilumo kontekste, t. y. susijusius su eismu, mobiliosiomis informacinėmis technologijomis, turizmu, sportu, menais, susijusiais su judėjimu ar jį tematizuojančiais, ir kitais mobilumo reiškiniais, kurių daugelis vaidina svarbų vaidmenį šiuolaikiniame pasaulyje“. Dar būtų galima įtraukti įvairias hibridines meno praktikas, įgalintas naujų lokacinių ir judėjimo technologijų, tokių kaip akustiniais pasivaikščiojimai, psichogeografinės kelionės, skaitmeniniai grafičiai, bendradarbiavimo kartografija, mobilieji žaidimai, nuotolinis stebėjimas/lauko tyrimai, eksperimentinis teatras ant dviračių ir „mišrios realybės“ eksperimentai. Tokia praktika inspiruoja ir suteikia empirinių duomenų apie technologizuotą žmogaus judėjimą, tačiau labai nedaugelis iš šių projektų turi tiesioginį ryšį su gravitacinės estetikos tema.

Kuratorinė praktika taip pat laikoma svarbia prieiga tyrimui. Todėl daugelis mano tyrime panaudotų pavyzdžių yra paimti iš parodų, kurias aš pats aplankiau arba kurių katalogus analizavau. Viena įtakingiausių parodų buvo „Move. Choreographing You: Art and Dance Since the 1960s“ (2011 m., Hayward Gallery, Londonas, Jungtinė Karalystė), kurioje buvo pristatyta meno kūrinių kolekcija, iliustruojanti įvairius istorinius ir dabartinius vizualiojo meno ir šokio sąryšius. Tai buvo ne tik išsamus bibliografinis šaltinis, padėjęs man sukurti choreografinio dizaino metodą, bet ir bandymų vieta mano specialiam pasunkintam kostiumui, kurį dėvėdamas jaučiausi dvigubai sunkesnis (daugiau apie tai skyriuje „Wearable mass“). Kitos, mažiau įtakinga paroda buvo „Gravity Art“ (2008 m., Telic Arts Exchange, kuratorius Rene Daalder). Joje buvo pristatyti 31 konceptualūs filmai, kuriuose gravitacija atliko tam tikra svarbų vaidmenį. Aptikau keletą įdomių kūrinių, pavyzdžiui, olandų menininko Bas Jan Ader filmų studijas apie kritimą, tačiau negalėjau rasti, kur šiuos kūrinius įtraukti į savo disertaciją. Tačiau kartu su dideliems ekranams skirtais filmais, tokiais kaip Stanley Kubricko „2001: Kosminė odisėja“ (1968) ar Christopherio Nolano „Pradžia“ (2010), jie paskatino mane pasvarstyti, kaip gravitacinė estetika galėtų veikti tokioje fiktyvioje sferoje, bet taip pat pasitarnauti kaip unikalus būdas kurti ir perduoti kūniškas patirtis nuotoliniu būdu ir išskirtinai vizualiai. Kita vertus, paroda padėjo apibrėžti mano tyrimo apimtį ir išskirti gravitacijos artefaktus tolesnei analizei. Kadangi eksponuojami kūriniai buvo apriboti viena (kinematografine)

medija, įžvalgos buvo apribotos tik vizualine kalba; be to, tai buvo dar toliau nuo mano tyrimo projekto tikslų, nes temos buvo susijusios su simbolika, konceptualizacija ir gravitacijos metaforų interpretacija. Gana panašios temos buvo nagrinėjamos ir kitose parodose, pavyzdžiui, „Defying Gravity: Contemporary Art and Flight“ (2003 m.), surengtoje Šiaurės Karolinos meno muziejuje, JAV, kurioje buvo eksponuojami meno kūriniai, šlovinantys aviaciją ir vaizduotę per meną, sukurtą per pastaruosius dvidešimt penkerius metus; arba „SpacePlace: Art in the Age of Orbitization“, internetinėje parodoje, kurią kuravo ZKM (2006 m.); o 2011 m., paroda „The Art of Flying“, kurią kuratoriai Thomas Hauschild ir Britta Heinrich surengė Pasaulio kultūrų namuose Berlyne, Vokietijoje, tyrinėjo, kaip skrydžio svajonė turėjo lemiamą įtaką kai kuriems iš mūsų didžiausių pasiekimų.

Tam tikra prasme šis tyrimas gali būti vykdomas ir Lietuvos eksperimentinio meno, kuris yra tiek vietinis, tiek tarptautinis, tradicijos kontekste. Pavyzdžiui, Lietuvos emigranto Jono Mačiūno inicijuotas Fluxus judėjimas yra svarbus precedentas: jo „įvykių partitūros“ traktavo įprastus kūno veiksmus – kritimą, balansavimą, klupimą – kaip estetinę medžiagą. Tokios praktikos siejasi su mano choreografiniu dizainu, kur gravitacija nėra fonas, o terpė. Tačiau išplėstinė tokių pavyzdžių apžvalga nukryptų nuo mano empirinio-technologizuoto tyrimo branduolio į istoriografinę interpretaciją, o ne į įkūnytą eksperimentavimą. Artimesnis laiko atžvilgiu pavyzdys – choreografė Erika Vizbaraitė savo darbe „Apnea“ (2020) plėtoja performatyvia praktika grindžiamą kvėpavimo sulaikymo keturiose būsenose – ant žemės, vandenyje, miego metu ir mirties akimirką – tyrimą, derindama choreografinius eksperimentus su fiziologiniais savikontrolės bandymais. „Apnea“ kontroliuojamas deguonies trūkumas ir plūduriavimas yra vietinis, šiuolaikinis analogas mano pačio kūniškiems eksperimentams: abu metodai manipuliuoja pagrindiniais gyvybės palaikymo kintamaisiais (oras, slėgis, tempas), kad pertvarkytų propriocepciją, gravitacijos pojūtį ir socialinę erdvę. Šio projekto svarbiausias indėlis mano tyrimams apie levitaciją. Nuo 2021 m., kartu su Erika bendradarbiaujame projekte, kuris apjungia robotizuotą atrakcioną su gyvu šokio pasirodymu.

Ieškodamas tinkamos rašymo prieigos, stiliaus ir asmeninio „balso“, rašiau tiek tradiciniais akademiniais būdais, tiek eksperimentinėmis technikomis, apimančiomis fikcijos, dienoraščio, techninio raporto, autobiografijos ir kt. formas arba jų hibridines formas. Norėjau atspindėti eklektišką ir tarpdisciplininį projekto kontekstą, bet taip

pat kuo gyviau perteikti tiriamuosius reiškinius, unikalias patirtis. Parašęs keliolika esė pobūdžio tekstų, eksperimentuodamas stiliais ir apimtimi, supratau, kad autobiografinė-fenomenologinė analizė, suderinta su spekuliatyvia fikcija, geriausiai tinka pagal aktualumą disertacijai, rašymo efektyvumą ir unikalumą. Tekstas daugiausia sukasi apie introspektyvius empirinius duomenis, bet kai pasiekiu asmenines patirties, žinių ribas, pereinu prie ekstrospekcijos ir netgi tam tikros spekuliatyvios fenomenologijos. Šį individualizuotą rašymo metodą apjungiu su savotiška patirtinės kelionės idėja, rašant taip, kad skaitytojas galėtų jutimiškai susipažinti su tekstuose analizuojamais gravitaciniais objektais ir reiškiniais, jų jutimine, psichologine, socialine tekstūra. Taip parašyti tekstai gali būti laikomi savotišku patirtiniu gravitacinės estetikos žodynu.

Tyrimo kelionė buvo gana kupina pertvarkymų, nukrypimų, atradimų ir nesėkmių, tačiau disertacija yra suskirstyta į penkis skyrius: „Įvadas“, „Stovint“, „Krentant“, „Levituojant“ ir „Žodynėlis“.

Pirmoje dalyje pristatomi pagrindiniai tyrimo komponentai: klausimai, tikslai, reikšmė ir metodologija, pradedant įvadiniu esė, kuriame trumpai pristatomas gravitacijos poveikis žmogaus evoliucijai ir technologijų pažangai ir nustatomas tonas trims tolesnėms dalims, kuriose aptariami pagrindiniai sąveikos su gravitacija būdai: pasipriešinimas (stovėjimas), pasidavimas (kritimas) ir ištrūkimas (levitacija). Tyrime atliekamas meninis ir (post)fenomenologinis įvairių technologijų, kurios tarpininkauja mūsų santykiuose su gravitacija, patirtinių ypatumų tyrimas. Įtraukti į tyrimą mano projektai įgalina visą gravitacinės estetikos projektą ir formuoja patirtinį žodyną, skirtą įvairių unikalių metodų kūrimui. Atrinkti metodai pateikti sutrumpinta forma skyriuje „Žodynėlis“. Ketvirtas, paskutinis skyrius užbaigia disertaciją, apibendrinant pagrindinius argumentus, išvadas, privalumus ir trūkumus, pateikiant pasiūlymus ateities praktikams.

Šis meninio tyrimo projektas nesiekia tapti išsamiu gravitacinės estetikos paradigmos vadovėliu; ji yra labiau užuomazga šios temos ateities plėtrai, bet taip inspiracinė medžiaga, atvira meno, dizaino ir architektūros profesionalų platesniam kūrybiniam pritaikymui ir interpretacijai.

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