

# Trans-Co-Design in Systemic Approach to Architectural Performance:

## The Multi-Layered Media and Agency in Creative Design and Its Processes

Dr Marie Davidová

Welsh School of Architecture, Collaborative Collective

\* Corresponding author e-mail: davidovam@cardiff.ac.uk

**Abstract:** Based on several research by design cases illustrations, the paper aims to conclude a mix of diverse media in reference to diverse generative agency in Systemic Approach to Architectural Performance design field. In this field, the design processes and design's performances in time are seen as the 'resulting design objects'. Therefore, the agency involved in both is merged and proceeds parallel within one co-performative and co-living eco-system in its fight for Post-Anthropocene in built environment. SAAP is a fusion of several process based fields and their media, involving namely: a) 'Systems Oriented Design'; b) 'Performance Oriented Architecture'; 3) 'Prototypical Urban Interventions'; d) 'Time-Based Design'; e) 'Service Design'; f) 'Co-Design, Co-Creation and DIY'. The paper separately investigates SAAP's relations to these fields and concludes with their integration and synergy.

**Keywords:** trans-co-design; systemic approach to architectural performance; eco-systemic agency; systems oriented design; time-based design; performance-oriented design; eco-systemic urban interventions; co-design; co-creation; DIY, non-anthropocentric eco-systemic services

## 1. Introduction



Figure 1: The sharp division of human built up environment and the environment covering other than human ecosystem in the city centre of Cardiff. Such distinction is still representing the prevailing tendencies of current urbanism that is in opposition with current landscape ecology. (photo: Davidová 2018)

The discussed field of Systemic Approach to Architectural Performance is focusing on landscape, social and cultural ecology in built environment for eco-systemic co-living co-performance. With Joachim's statement that looking forward to a future that shines is not a platitude but an absolute imperative that empowers designers to speculate about the near future (Joachim, 2015), this research by design is targeting on its shift from Anthropocene for biodiversity support and climate change adaptation (Davidová, 2018; Davidová, Pánek, & Pánková, 2018; Davidová & Zimová, 2018). SAAP represents holistic approach through so called '*real life co-design laboratory*', which, as opposed to the concept of regular laboratory, engages with the complexity of 'real life in real time' (Davidová et al., 2018). This concept evolved from Sevaldson's concept of '*Rich Design Research Space*' (Sevaldson, 2008) that is integrating to it real life performance of- and within- the eco-system of built environment which historically tended to be distinguished (see Figure 1) (Davidová & Raková, 2018; Davidová & Zimová, 2017, 2018; Hensel, 2019).

The direction of media mix and time-based design was suggested in reference to creative digital design techniques by Sevaldson already in 2005 (Sevaldson, 2005). However, this new approach contributes to the field by assigning the diverse media to particular biotic and abiotic agency, including trans-disciplinary human and non-human co-design participation in 'real time and life'. The biotic and abiotic generative agency is here used to express actions of living and non-living

interactors covering their agendas, which through their cross-interaction co-create evolutive performance. The media involve: a) the complexity diagramming - a manual analogue and digital tool from Systems Oriented Design (SOD) called gigamapping, which is the most designerly way to deal with systems (Sevaldson, 2013); b) digital modelling; c) its full scale prototyping and namely: d) all the integral performances and cross-interactions of all the above mentioned, generated in time. The last ones appear through i.e. airflow, relative humidity, temperature; species such as algae, lichen, butterflies or bumblebees; material properties; or through human trans-disciplinary co-designers, such as general public, landscape ecologists, coders, architects, etc. Therefore, there is a shift from what architectural profession used to be perceived. As a designer, you can only interact with the system, not designing it. Through this interaction, you can co-design and therefore re-design the (eco)system (Davidová & Zímová, 2018).

Through the properties of the active agency within the co-design are also defined its creative design tools. Therefore, the performances take multiple layers, such as synergy of natural, social and cultural environment defined in Performance Oriented Architecture by Hensel (Hensel, 2010). Here it involves creative trans-disciplinary and trans-social, biological, material, climatic, mechanical or digital performances. These are achieved through *'prototypical urban interventions'* (Doherty, 2005) established as generative urban design tool at the start of millennium by CHORA office (CHORA, 2017). Such generativeness and co-performances are grounded within its *'time-based design approach'* (Sevaldson, 2004) discussed by Sevaldson around the same time period. Within SAAP this also involves hands on studies on historical references, that were tested and developed over generations. Through the generative interventions, the projects are co-creating eco-systemic services in built environment. This is supported by another layer of generative co-designing agency whilst marking the prototypes with QR codes. The QR codes are leading to recipes for *'do it yourself'* (DIY) locally specific adaptations. The paper exemplifies these processes on several different cases of *'responsive wood'* (Hensel & Menges, 2006) projects that form and ratify the *'Systemic Approach to Architectural Performance'* (Davidová, 2017b) design field.

## 2. The Integrated Fields

Systemic Approach to Architectural Performance is integrating several process-based fields for eco-systemic real time life co-performance in living environment. The key fields in this are: a) Systems Oriented Design; b) Performance Oriented Architecture; 3) Prototypical Urban Interventions; d) Time-Based Design; e) Service Design and f) Co-Design, Co-Creation and DIY. These fields are through interventions co-providing synergetic co-performing processes of urban and cultural landscape.

### 2.1. Systems Oriented Design

Systems Oriented Design (SOD) is looking beyond object to access a *'rich picture'* (Checkland, 2000) of complexity serving as a generative design tool. It is holistically looking at vast fields of relations and patterns of interactions (Sevaldson, 2013). SOD is framed in media rich *'Rich Design Research Space'* which takes into account the physical, social, and cultural spaces, and the virtual and visual media spaces in which the research-by-design takes place (Sevaldson, 2008). In our case, this

space takes place in the building site's public space (see Figure 2) or in adjacent publically accessible refreshment spaces (see Figure 3 and Figure 4) whilst both are being accompanied by social events such as EnviroCity Festivals (Davidová & Kernová, 2016) (see Figure 5). Such spaces cover co-design with communities and diverse trans-disciplinary team members and stakeholders.



Figure 2: Rich Design Research Public Space gigamapping and conceptual modelling on building site targeting on community co-design (photo: Davidová 2018)



Figure 3: COLridor II Project Rich Design Research Space covering stakeholders' gigamapping that is engaging sketching, work with referential images and conceptual model making (photo: Gönulf 2018).

Diverse actors in the Rich Design Research Space require diverse media. For example, within human speculative co-design some disciplines or public relate better to drawing or image relations' connections, the others to physical modelling or prototyping or combinations of all (see Figure 2 and Figure 3). This needs to be at first point grounded by physical gigamapping to find the relations of the natural, social and cultural data, thoughts, collective understandings and speculations. The physical maps can be further on translated to digital maps and digital modelling simulations. This can be

afterwards printed and fabricated to meet physical interaction again (see Figure 4). Such feedback looping interaction is however, simultaneously co-designed with the other kinds of agency. The prototype's performance is co-generated by i.e. relative humidity, temperature, their material properties and organisms that appear in its adjacent environment or directly settles on prototypes. Therefore, the design processes appear to be cross- and multi-layered in relation with multiple agency and mixing digital with analogue, biotic with abiotic – living with non-living.

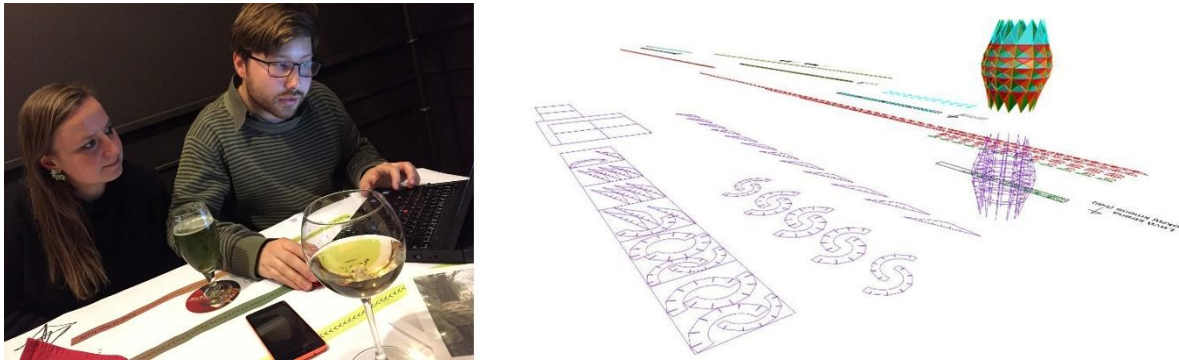


Figure 4: Combining gigamapping and computing whilst co-designing with local community and trans-disciplinary team in project COLridor I (photo: Zímová, digital model and print screen: Prokop 2017)



Figure 5: Selection of the events of EnviroCity 2017 festival (Photos: Carrithers 2017)

## 2.2. Performance Oriented Architecture

Performance Oriented Architecture is explained by Hensel as non-anthropocentric, requiring integration of core concepts in architecture and biology. This is to be approached so as to inform the integrated spatial and material organisation of architecture and its interaction with the physical environments towards the production of heterogeneous provisions that can help sustain ecosystems and biodiversity (Hensel, 2012). Within such framework, the SAAP research by design cases have been mainly developing and applying non-anthropocentric responsive solid wood concept on its full-scale prototypes in built environment. This research by design has been focusing on hygroscopic co-performance of living and non-living biological matter and abiotic agency of relative humidity and temperature (see Figure 6 and Figure 7). These prototypes take direct active agency within the natural, social and cultural environment, co-performing and co-designing its edible, habitable, transferable, exchangeable and micro-climatic eco-systemic services.

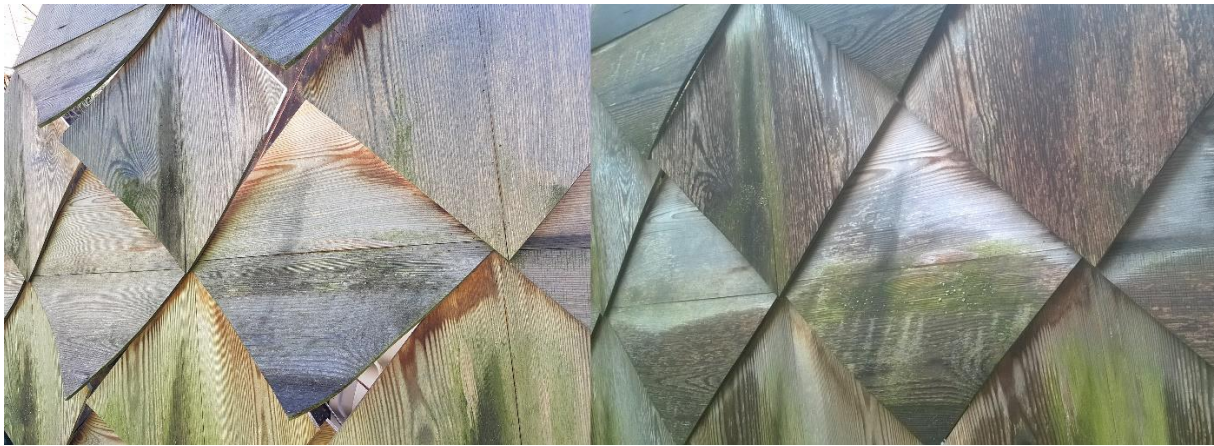


Figure 6: Ray 2\*2013 Responsive Wood Envelope Prototype a) in semi-dry June 2018 weather when the screen is open for boundary exchange between exterior and semi-interior; b) after April light rain in 2017 when the system is closed, not allowing the humid and cold air to pass through the boundary; both after five and four years respectively of being exposed to weather and biotic conditions. The prototype got inhabited by Blue Stein Fungi, Algae and Lichen. These, namely the algae, are regulating the moisture content of wood, thus co-causing its warping. Notice also the organisation of algae habitation caused by the material's fibre direction and position within the design that is affected by material performance and form. Thus it is organised through its moisture and the organism's abundance and distribution interaction (Davidová, 2017a). (photos: Davidová 2017 - 2018)



Figure 7: COLridor II project that is using hygroscopicity of wood for planting flowers for coming spring pollinators in otherwise fully build up environment. The outdoor and its indoor extensive installation generates micro biotopes of edible landscape, covering dwellings and nutrients opportunities for various species, including, but not limited to honey producing plants and local edible and sprout seeds. These eco-topes secure a transition and an exchange on a biocorridor connecting central urban with semi-urban areas of historical city of Třebíč (photos: Davidová 2018 and Zimová 2019).

### 2.3. Eco-Systemic Prototypical Urban Interventions



Figure 8: TreeHugger CY together with exhibited design gigamaps and QR code leading to Systemic Approach to Architectural Performance blog with recipe for its creation for generating its iterations. The TreeHugger prototypes serve as hotels for insect as well as fast-food restaurants for bats and birds. This one was built by the United Nations Buffer Zone – the non-human bio-corridor that is, thanks to the difficult political situation, passing through the otherwise very human oriented urbanised city centre of Nicosia. The prototype is questioning the linearity and separation of this concept, suggesting its crossing for both the non-human spread to urbanised areas as well as the human spread of community built iterations on both sides of the city. Therefore it engages with food chains; transfers and exchange of nutrients, genetic, biological, biotic as well as abiotic materials, cross-species cultural, social and political interaction; co-habitats and co-dwellings, etc. (photo: Davidová 2018)

From an urban and landscape perspective, prototypes are explained by Doherty as architectural and programmatic interventions that are open to changing political, economic, ecological and social dynamics over time and space. They present a more strategic, canny and fluid approach rather than determinate strategies like master planning. Prototypes perform with uncertainty by creating and maintaining a spatial dialogue of sorts over time (Doherty, 2005). In other words, prototypes act as generative force that is engaging its surrounding environment. Therefore, with the bottom up approach of rather small and simple input, prototypes can grow into an expansive and complex time-based outputs. Our prototypes have non-anthropocentric character and focus on engagement of overall eco-system through its systemic interactions. Therefore, they are called eco-systemic

prototypical urban interventions that engage with food chains; transfers and exchange of nutrients, genetic, biological, biotic as well as abiotic material, cross-species cultural, social and political interaction; co-habitats and co-dwellings, etc. (see Figure 7, Figure 8 and Figure 9).

## 2.4. Time-Based Design



Figure 9: TreeHugger CZ performing over time from being build in spring 2017 to winter 2019. Please, note also the inhabitation by algae after the autumn 2017. (photos: Davidová and Carrithers 2017 - 2019)



Figure 10: Café in an Open Air Museum in Aarhus, Denmark. The traditional house was most likely not meant to offer an extra dwelling layer for the family of titmice within its structure. However, as opposed to current civil engineering agendas tendency, this structure is offering such opportunistic use and has developed into cross-species co-living situation over time. (photo: Davidová 2018)

Sevaldson explains framework of development of time-based projects as a) observation; b) analyses and c) intervention. The explained observations develop there along several paths of: 1) movement in the spirit of Mareys experiments (Braun, 1992); 2) the performance of singular objects with emphasis on the relations to other objects or environments over time; 3) complex situation with



emphasis on the discovery and analyses of patterns in the interaction between entities and environments (Sevaldson, 2004). Systemic Approach to Architectural Performance is intersecting these layers and feed-back looping these stages and paths. The intervention is not seen as a final object but as a performing generative input for co-design and co-living that is to be further observed, analysed, inhabited, eaten, iterated and of course re-designed (see Figure 9).

Systemic Approach to Architectural Performance also covers analysis of historical prototypes that developed and were tested over generations. Within performance field the pioneering work in this sense is covered by Fathy with focus on abiotic performance of traditional architectures in arid climates (Fathy, 1986). The biotic performance investigation was added and developed by Hensels (Hensel & Sunguroğlu Hensel, 2015). This has however focused purely on speculative computer simulations or theory, not investigating the complexity of hands on real life experience over time such as Systemic Approach to Architectural Performance (Davidová, 2016a, 2018; Davidová & Raková, 2018; Davidová & Uygan, 2017) (see Figure 10 and Figure 17).

## 2.5. Service Design

Today environmental science talks about Anthropocene Extinction, or 6<sup>th</sup> Mass Extinction, that is defined as an ongoing current event in which a large number of living species are threatened with extinction or are going extinct because of environmentally destructive human activities (Wagler, 2017). About 80% of insects by biomass disappeared in regions around central and western Europe since the end of eighties (Vogel, 2017). Similar pattern is followed by agricultural birds in example in Czechia (Czech Ornithologists Association, 2016) but most likely other regions as well. Zeithaml et al. describe Service Design as *'a form of architecture that involves processes rather than bricks and mortar'* (Zeithaml, Parasuraman, & Berry, 1990). These processes can be neither performed nor received purely by humans as well as they cannot be designed with purely human orientation.

This research is oriented towards the shift to Post-Anthropocene of urban and cultural environment through claiming that cities and other humanised landscape have to cover not only human oriented eco-systemic services – means processes. The shift from Anthropocene however cannot emerge without human involvement unless we consider a total humanitarian catastrophe. Therefore, we cannot reach environmental justice without social justice and vice versa (Davidová & Zimová, 2018; Haase, 2017; McIntyre-Mills, 2014). The commonly used term of ecosystem services is by definition designed to bring benefits to the ones involved. However, in this notion, the involved ones are traditionally targeted to be purely humans (Pauleit, Zölch, Hansen, & Randrup, 2017). The non-anthropocentric eco-systemic services are process based to distribute benefits of: a) culture and sociality (see i.e. Figure 2, Figure 3, Figure 4, Figure 5 and Figure 11); b) heathy nutrients (see i.e. Figure 7, Figure 8, Figure 11 and Figure 12); c) healthy habitats (see i.e. Figure 6, Figure 7, Figure 8 and Figure 10) and d) safe transition and exchange paths across the eco-system and all the other above mentioned services (see Figure 13). This is also including human beneficiaries as well as human agency, amongst the other biotic and abiotic participation.



Figure 11: Experience the City Other Way Festival 2018 – Collaborative Collective’s stand with hands on teaching services on DIY bird food production services for the coming autumn. (photo: Horák Goryczka 2018)



Figure 12: This restaurant in the city centre of Cardiff, Wales serves as a refreshment station for both, for the humans as well as for the bumblebees, generating more feasible paths across the city. (photo: Davidová 2018)

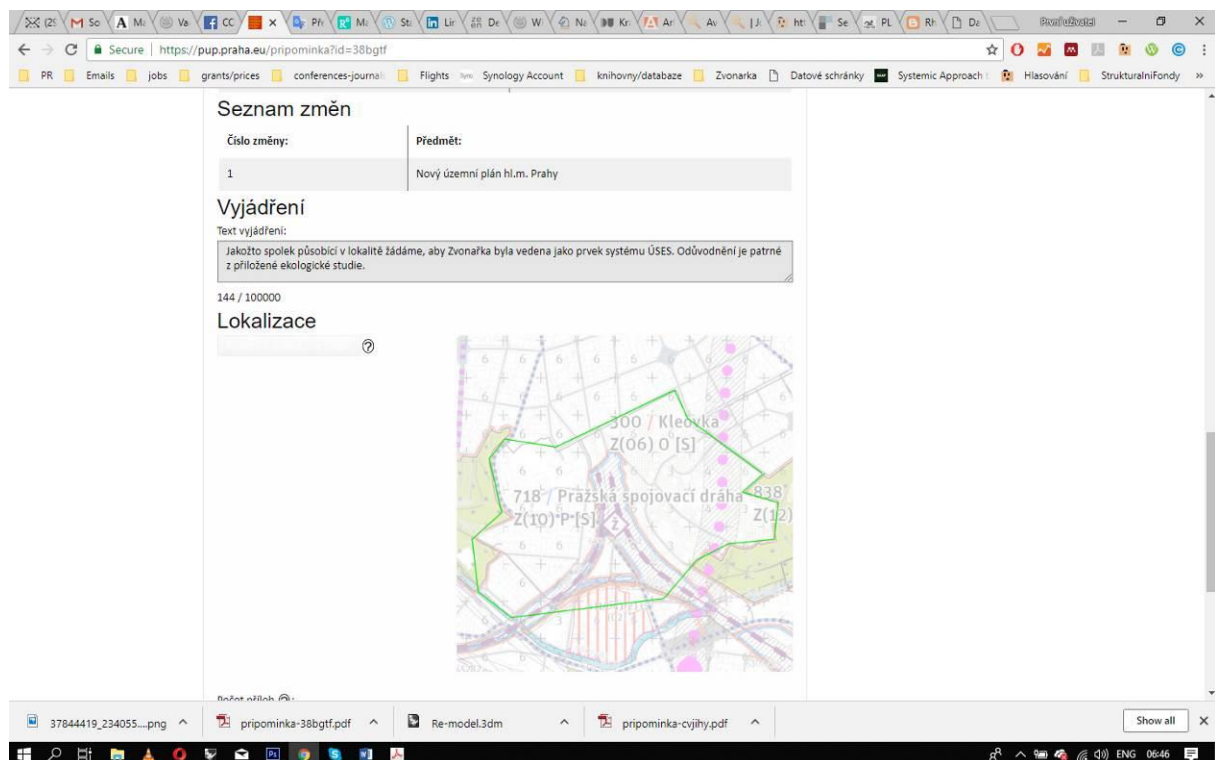


Figure 13: Questioning bio-corridorial barriers of too little planned land protection on an investigated site of COLridor I project in Metropolitan Plan proposal as remarks from Collaborative Collective NGO to the Municipality of Prague. (screenshot and marking: Davidová 2018)

## 2.6. Co-Design, Co-Creation and DIY



Figure 14: SpiralTreeHouse with self-standing flexible structure that is co-designed with wind and the tree to which it is attached. The platform on the right is being co-designed by the habitation of moss, providing comfortable flooring and mattress for humans and other species, thus extending present landscape. (photos: Zapletal 2014, Davidová 2012).



Figure 15: The construction site of Co-oCo-oNest prototype being built, used and re-designed by its users in the same time in Slavutych by Chernobyl, Ukraine. The project was to bring new futures speculations to, though by peoples' world attention abandoned, very rich developing new eco-system that is competitive to other ecological treasures of the world. The aim was to redirect the attention to the dead previously glowing past of the local community to the new opportunities of what the today's world issues bring. (photo: Davidová 2018)

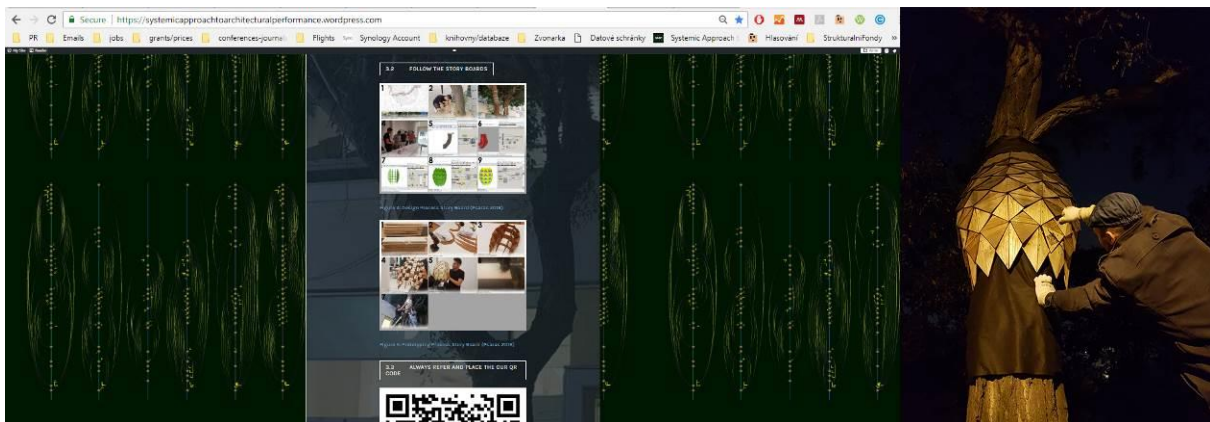


Figure 16: DIY recipe with downloadable parametric code of TreeHugger CY on SAAP blog (Davidová, 2016b) and updating of the Prague TreeHugger CZ prototype with a QR code that leads to that site (photo: Davidová 2018)

The next new thing in the changing landscape of design research has become co-designing with the users (Sanders & Stappers, 2008). There is a difference between being an activist or the facilitator, offering generative service and adaptation, rather than revolution. Interaction, through engagement of and with others and of and with food chain can for example generate large time based change across the social, cultural, economic, political and ecological systems (Govera & Evans, 2018).

This all can be achieved across multiple stakeholders and disciplines through more ways. These would be for example: a) when planning (see Figure 2); b) within the production process, on the go in real time and real life (see i.e. Figure 9, Figure 14 and Figure 15) or c) through non-commercial Creative Commons licenced DIY iterations (Creative Commons, 2017) by other communities under other local specific parameters (see Figure 8 and Figure 16). These multiple stakeholders and disciplines should cover both, the biotic and abiotic agents and agency communicated by those who cannot be represented like explained by Sevaldson for gigamapping (Sevaldson, 2018). Systemic Approach to Architectural Performance is multi-layering and cross-referencing these media and agency layers. Such multi-agency co-creative co-design process is generating the integral design's co-performance over time that in traditional terminology would be called the 'design result'

### 3. Integral Summary, Discussion and Conclusions

The illustrated projects focus on trans-disciplinary multi-layered, analogue and digital, collaborative co-design processes grounded in gigamapping for co-performance prototypes' generation. They are placed within public and natural environment complexity for its interaction. This interaction is engaging co-living and co-creation across the particular urban and/or cultural landscape eco-system and interpretation of such through multi-genre performers or agents. While doing so, the real time performance and its reflection for future project's stages is co-designed. Though the gigamap serves as a complexity and present prototype's observation generative and reflective discussion board, the prototypes serve for environmental material embodied tacit interaction, experience, observation and generation of new alterations. Being inside these design processes, this design-research represents

Sweeting's discussion on what can design research practice give to second order cybernetics (Sweeting, 2016).

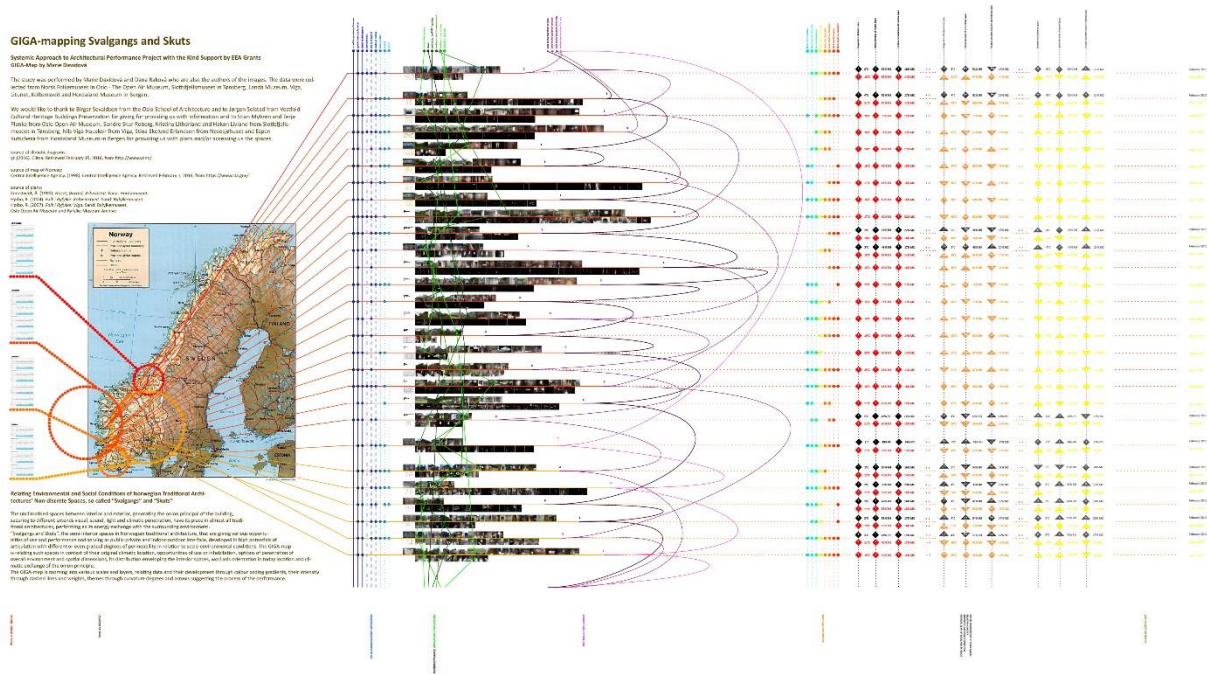


Figure 17: Traditional Architectures Observations and Registering Gigamapping: Gigamapping Svalgangs and Skuts (Davidová 2017, photos used: Davidová and Raková 2016 and 2017): The gigamap is relating such spaces in context of their original climatic location, opportunities of use or inhabitation, options of penetration of overall environment and spatial dimensions, its distribution enveloping the interior spaces, world axis orientation in today location and climatic Exchange of the onion principle. The gigamap is zooming into various scales and layers, relating data and their development through colour coding gradients, their intensity through dashed lines and weights, themes through curvature degrees and arrows suggesting the process of the performance. - the map of Norway is a public source from: Central Intelligence Agency (Central Intelligence Agency, 1998); the macro climatic diagrams (yr, 2016) are used with the courtesy of yr.no

Many of the prototyping and mapping projects focus more on detailed, other than human, environmental interaction development and its prototypical observation. This is followed by architectural application speculations and its referential studies on traditional architectures (see Figure 17). While the development of the first and very early research stage prototype is followed by gigamapping of its environmental interactions speculations supported by sampling, the prototyping research takes several feedback-looping paths that are however interconnected with the other subprojects:

- a) long term first prototype observations when exposed to environmental settings;
- b) observations of related traditional architectures;
- c) various local specific fast iterations;
- d) the new prototype development based on condemned weaknesses of the first prototype;

e) observations of related traditional architectures and both of the prototypes for planned practice application;

f) various local specific fast iterations;

....

Through the long-term prototypical observation, the development of climate-material interaction and related biotic agency is taking place in time when it is co-designed by the mentioned. In the same time, the new prototype that is trying to answer firstly observed weaknesses is built and observed again. This is within the same time confronted with related historical references of possible applications (see Figure 17) to lead to the planned use in practice. The iteration paths test different local specific applications and variations. This 'bottom up approach' of prototyping is followed by 'top down' practice applications speculations and traditional architecture references from extreme climates observations mainly in reference to *'adaptation to climate change in Czech Regions location'* (Czech Republic Ministry of the Environment & Czech Hydrometeorological Institute, 2015).



Figure 18: The TreeHugger CZ Responsive Insect Hotel Prototype after its Biotic and Abiotic Interaction over one and half year: The prototype applies Ray 2 panelling (see Figure 6) adjusted to double curved surfaces (Ray 4 (Davidová & Prokop, 2018)) and is a result of transdisciplinary co-design – the Trans-Co-Design. (photo: Davidová 2018)

The studies lead to focus on eco-systemic service design through performative eco-systemic '*prototypical urban interventions*' (Doherty, 2005). Such approach is gaining from collective trans-disciplinary and trans-agency knowledge gathered through multiple stakeholders. One of the key intervention, the responsive wood insect hotel TreeHugger (see Figure 18), is parasitting on a tree trunk in the middle of a central urban eco-top. TreeHugger is a small object. However, it is applying detailed climate moderation solution through responsive wood concept for variety of insect species' needs to create their liveable and/or preferred environment. These, in reference to the larger eco-systemic chain are to generate '*edible landscape*' (Creasy, 2004) for i.e. bats and birds, while another fast food of blossoming plants seed bombs is generated for feeding these insects. All this is integrated through i.e. the multi-genre festival EnviroCity, representing the synergy of natural, social and cultural environment with its generative agendas of recipes for DIY. Therefore, these initial projects on architectural sustainable solution have transformed to the sustainable solution for eco-systems covering and crossing multi-species and multi-non-living forces, multi-cultural, multi-political and multi-social environment agendas. They are not only bringing solutions through habitation but also through sustainable eco-system of co-living with nutrients, genetic and other material resources, societies, cultures and collaborative political agendas; the environment of '*flourishing for all*' (Ehrenfeld & Hoffman, 2013).

The full scale prototyping in reference to co-design process was largely discussed by Capjon (Capjon, 2005). However here, these processes are perceived as a 'results' that are co-designed with overall eco-system in time. This field calls for the shift from '*Cities for People*' (Gehl, 2010) towards the participation of both, biotic and abiotic agency within one co-performative eco-system, the '*Real Life Laboratory*' (Davidová et al., 2018). This is supported through using the key concept SOD tools such as '*Rich Design Research Space*', discussing the social and spatial parameters (Sevaldson, 2008) and gigamapping, that in this case, serves as a co-design communication and complexity relations mapping tool that is indivisible from prototypical co-performance and 'resulting' observations, reflections and co-design. The paper concludes with that there is a necessity of mixing and integrating living and non-living, human and non-human, analogue and digital processes based on the involved agency and its position in time and these need to be cross- and multi-layered. This can be mainly achieved through hands on reflective Research by Design, investigating the '*eco-systemic prototypical urban interventions*' (Davidová & Prokop, 2018), their related historical prototypes studies and their DIY iterations in '*real life and time – the real life co-design laboratory*'. Such 'laboratory' cannot be and should not ever attempt to be engineered (Davidová, 2017b) but intervened. Within the field of '*Systemic Approach to Architectural Performance*', the design management, the methodology, the collaborative design processes, the design's physical results and their collaborative co-performances are fused in one Time Based Eco-systemic Trans-Co-Design in real time. Therefore this research by design aims to reformulate the notion of '*Nature in Design*' (Joachim, 2016) into a '*living nature co-design*'. And whilst attempting this, such research by design's processes real time co-generate the concept of '*ecological urbanism*' that was defined by Mostafavi and Doherty (Mostafavi & Doherty, 2016).



## 4. Acknowledgement

The discussed projects were developed and built within the framework of Collaborative Collective and its collaborators.

### 4.1. Spiral TreeHouse (Cholín's adjacent forests, Czechia 2010)

- Authors: Marie Davidová, Prokop Závada
- Building Team: Prokop Závada, Marie Davidová, Barbora Peterková, Anežka Závadová, Filip Dioszegi, Michal Vedral, Jan Hradilek

### 4.2. Co-oCo-oNest – 86' Festival's Workshop (Slavutyh, Ukraine 2018)

- Workshop Tutors: Marie Davidová, Šimon Prokop
- Workshop Participants: Nataliia Neshevets, Oleksandr Rezen, Olivia Dimitrishina, Andrii Zabolotnyi, Slavutyh local community

### 4.3. COLridor II – installation for Czech National Heritage Institute Exhibition (Třebíč, Czechia 2018)

- Design and Realisation Lead: Marie Davidová, Kateřina Zímová, Ondřej Michálek, Jan Zatloukal, Kateřina Gazdová, Arif Gönulf, Jan David
- Building Team: Michal Stasiak, Tereza Čapková, Roman Čapka, Matěj Nejedlý, Vojtěch Viceník, Kamil Belán, Tomáš Novotný, Vladislav Větrovec, Tomáš Veselý, Ondřej Herzán
- Client - Exhibition Theme and Concept: Kateřina Horák Goryczka

### 4.4. TreeHugger CZ and COLridor I Project (Prague, Czechia 2017)

- Authors: Marie Davidová, Šimon Prokop, Kateřina Zímová, Ondřej Michálek, Kateřina Horák Goryczka, Krištof Hanzlík, Kamil Trgala, Eliška Oberhofnerová, the Local Biotic and Abiotic Community of Prague 2 District (Co-Design)

### 4.5. TreeHugger CY – eCAADe RIS 6 at the University of Cyprus Workshop (Nicosia, Cyprus 2018)

- Workshop Tutors: Marie Davidová, Šimon Prokop
- 6th eCAADe RIS Organisation: Odysseas Kontovourkis
- Site Analysis for Tree Pre-Selection and Permission Negotiation: Panagiota Konatzii, Michalis Psaras
- Prototyping Workshop Participants: Panagiota Konatzii, Michalis Psaras, Stefanos Kyprianou, Marko Vucic, the Local Biotic and Abiotic Community of Nicosia Centre (Co-Design)

## References

- Braun, M. (1992). *Picturing Time*. Chicago: Chicago University Press.
- Capjon, J. (2005). Engaged Collaborative Ideation supported through Material Catalysation. In *Nordes 2005 - In the Making* (pp. 1–6). Copenhagen: Royal Danish Academy of Fine Arts, School of Architecture. Retrieved from <http://nordes.org/opj/index.php/n13/article/viewFile/231/214>
- Central Intelligence Agency. (1998). Central Intelligence Agency. Retrieved February 1, 2016, from <https://www.cia.gov/>
- Checkland, P. (2000). *Systems Thinking, Systems Practice*. Chichester: John Wiley & Sons LTD.
- CHORA. (2017). CHORA – conscious city. Retrieved December 11, 2017, from <http://chora.org/>
- Creasy, R. (2004). *Edible Landscaping*. Gainesville.
- Creative Commons. (2017). Creative Commons — Attribution-NonCommercial 4.0 International — CC BY-NC 4.0. Retrieved December 9, 2017, from <https://creativecommons.org/licenses/by-nc/4.0/>
- Czech Ornithologists Association. (2016). *The Annual Report of the Czech Ornithologists Association / Výroční zpráva České společnosti ornitologické 2016 birdlife.cz*. Prague. Retrieved from [http://bigfiles.birdlife.cz/Vyrocní\\_zprava\\_CS0\\_2016.pdf](http://bigfiles.birdlife.cz/Vyrocní_zprava_CS0_2016.pdf)
- Czech Republic Ministry of the Environment, & Czech Hydrometeorological Institute. (2015). *Strategie přizpůsobení se změně klimatu v podmínkách ČR / Strategy on Adaptation to Climate Change in the Czech Republic*. (Centre for Environment at Charles University & Prague, Eds.) (1st ed.). Prague: Czech Republic Ministry of the Environment. Retrieved from [http://www.mzp.cz/C1257458002F0DC7/cz/zmena\\_klimatu\\_adaptacni\\_strategie/\\$FILE/OEOK-Adaptacni\\_strategie-20151029.pdf](http://www.mzp.cz/C1257458002F0DC7/cz/zmena_klimatu_adaptacni_strategie/$FILE/OEOK-Adaptacni_strategie-20151029.pdf)
- Davidová, M. (2016a). Socio-Environmental Relations of Non-Discrete Spaces and Architectures: Systemic Approach to Performative Wood. In P. Jones (Ed.), *Relating Systems Thinking and Design 2016 Symposium Proceedings* (pp. 1–17). Toronto: Systemic Design Research Network. Retrieved from [https://www.researchgate.net/publication/312501181\\_Socio-Environmental\\_Relations\\_of\\_Non-Discrete\\_Spaces\\_and\\_Architectures\\_Systemic\\_Approach\\_to\\_Performative\\_Wood](https://www.researchgate.net/publication/312501181_Socio-Environmental_Relations_of_Non-Discrete_Spaces_and_Architectures_Systemic_Approach_to_Performative_Wood)
- Davidová, M. (2016b). Systemic Approach to Architectural Performance. Retrieved March 29, 2016, from <https://systemicapproachtoarchitecturalperformance.wordpress.com/>
- Davidová, M. (2017a). Co-Habited, Co-Lived, Co-Designed and Co-Created Eco-Systemic Responsiveness in Systemic Approach to Architectural Performance: A Case Study on Interaction of Performative Solid Wood Envelope Ray and Algae. In M. João de Oliveira & F. Crespo Osório (Eds.), *KINE[SIS]TEM: From Nature to Architectural Matter* (pp. 36–45). Lisbon: DINÂMIA'CET-IUL ISCTE - Instituto Universitário de Lisboa. Retrieved from [https://www.researchgate.net/publication/317819704\\_Co-Habited\\_Co-Lived\\_Co-Designed\\_and\\_Co-Created\\_Eco-Systemic\\_Responsiveness\\_in\\_Systemic\\_Approach\\_to\\_Architectural\\_Performance\\_A\\_Case\\_Study\\_on\\_Interaction\\_of\\_Performative\\_Solid\\_Wood\\_Envelope\\_Ray\\_and\\_Al](https://www.researchgate.net/publication/317819704_Co-Habited_Co-Lived_Co-Designed_and_Co-Created_Eco-Systemic_Responsiveness_in_Systemic_Approach_to_Architectural_Performance_A_Case_Study_on_Interaction_of_Performative_Solid_Wood_Envelope_Ray_and_Al)

- Davidová, M. (2017b). *Wood as a Primary Medium to Eco-Systemic Performance: A Case Study in Systemic Approach to Architectural Performance*. Czech Technical University in Prague. <https://doi.org/10.13140/RG.2.2.17123.45607>
- Davidová, M. (2018). Roles, Agency and Relations of GIGA-Maps in Systemic Approach to Architectural Performance: The Special Prototypes of Post-Anthropocene. In J. Bean, S. Dickinson, & A. Ida (Eds.), *AMPS Proceedings Series 12. Critical Practice in an Age of Complexity* (pp. 114–132). Tucson: University of Arizona. Retrieved from <http://architecturemps.com/wp-content/uploads/2018/11/AMPS-Proceedings-12-Critical-Practice-in-an-Age-of-Complexity.pdf>
- Davidová, M., & Kernová, M. (2016). EnviroCity - Facebook. Retrieved April 1, 2016, from <https://www.facebook.com/envirocity/>
- Davidová, M., Pánek, K., & Pánková, M. (2018). Spiralling Slope as a Real Life Co-Design Laboratory. In J. Bean, S. Dickinson, & A. Ida (Eds.), *AMPS Proceedings Series 12. Critical Practice in an Age of Complexity* (pp. 133–142). Tucson: University of Arizona. Retrieved from <http://architecturemps.com/wp-content/uploads/2018/11/AMPS-Proceedings-12-Critical-Practice-in-an-Age-of-Complexity.pdf>
- Davidová, M., & Prokop, Š. (2018). TreeHugger: The Eco-Systemic Prototypical Urban Intervention. In O. Kontovourkis (Ed.), *6th eCAADe RIS 2018 Proceedings* (pp. 75–85). Nicosia: University of Cyprus. Retrieved from [http://papers.cumincad.org/cgi-bin/works/paper/ecaaderis2018\\_103](http://papers.cumincad.org/cgi-bin/works/paper/ecaaderis2018_103)
- Davidová, M., & Raková, D. (2018). Biodiversity and Climate Change Adaptation through Non-Discrete Architectural Spaces and Architectures: Systemic Approach to Traditions for Sustainable Futures. *FormAkademisk - Research Journal of Design and Design Education*, 11(4), 1–31. <https://doi.org/https://doi.org/10.7577/formakademisk.2287>
- Davidová, M., & Uygan, E. (2017). Living in Bio-Climatic Layers: An Investigation of Cappadocian Caves in Relation to Today's Design and Its Futures. In F. Mahbub, S. Uddin, & A. M. Khan (Eds.), *International Design Conference: DESIGN EVOLUTION [Education and Practice]* (pp. 1–12). Karachi: Indus Valley School of Art and Architecture. Retrieved from [https://www.researchgate.net/publication/313759290\\_Living\\_in\\_Bio-Climatic\\_Layers\\_An\\_Investigation\\_of\\_Cappadocian\\_Caves\\_in\\_Relation\\_to\\_Today%27s\\_Design\\_and\\_Its\\_Futures](https://www.researchgate.net/publication/313759290_Living_in_Bio-Climatic_Layers_An_Investigation_of_Cappadocian_Caves_in_Relation_to_Today%27s_Design_and_Its_Futures)
- Davidová, M., & Zímová, K. (2017). COLridor: Co-Design and Co-Living for Sustainable Futures. In B. Sevaldson (Ed.), *Relating Systems Thinking and Design 6: Environment, Economy, Democracy: Flourishing Together* (pp. 1–20). Oslo: Systemic Design Research Network. Retrieved from <https://systemic-design.net/rsd6/systemic-design-cases/#davidova>
- Davidová, M., & Zímová, K. (2018). COLridor: Co-Design and Co-Living Urban Adaptation. *FormAkademisk - Research Journal of Design and Design Education*, 11(4), 1–30. <https://doi.org/https://doi.org/10.7577/formakademisk.2647>
- Doherty, G. (2005). Prototypes in Pinkenba. In *Nordes 2005 - In the Making* (Vol. 1, pp. 1–5). Copenhagen: Royal Danish Academy of Fine Arts, School of Architecture. Retrieved from <http://www.nordes.org/opj/index.php/n13/article/view/262/245>

- Ehrenfeld, J., & Hoffman, A. J. (2013). *Flourishing : a frank conversation about sustainability* (1st ed.). Stanford: Stanford University Press. Retrieved from [https://www.researchgate.net/publication/274250501\\_Flourishing\\_A\\_Frank\\_Conversation\\_on\\_Sustainability](https://www.researchgate.net/publication/274250501_Flourishing_A_Frank_Conversation_on_Sustainability)
- Fathy, H. (1986). *Natural Energy and Vernacular Architecture: Principles and Examples with Reference to Hot Arid Climates*. Chicago and London: The University of Chicago Press. Chicago and London: The University of Chicago Press. Retrieved from <http://archive.unu.edu/unupress/unupbooks/80a01e/80A01E00.htm>
- Gehl, J. (2010). *Cities for People* (Vol. 1). Washington, Covelo, London: Island Press. <https://doi.org/10.1017/CBO9781107415324.004>
- Govera, C., & Evans, J. (2018). Thinking Edibility Otherwise. *Journal of Design and Science*, (4). Retrieved from <https://jods.mitpress.mit.edu/pub/issue4-evans-govera>
- Haase, A. (2017). The Contribution of Nature-Based Solutions to Socially Inclusive Urban Development— Some Reflections from a Social-environmental Perspective (pp. 221–236). Springer, Cham. [https://doi.org/10.1007/978-3-319-56091-5\\_13](https://doi.org/10.1007/978-3-319-56091-5_13)
- Hensel, M. (2010). Performance-oriented Architecture: Towards Biological Paradigm for Architectural Design and the Built Environment. *FORMakademisk*, 3(1), 36–56. Retrieved from <http://www.formakademisk.org/index.php/formakademisk/article/view/65>
- Hensel, M. (2012). *Performance-oriented architecture: An integrated discourse and theoretical framework for architectural design and sustainability towards non-discrete and non-anthropocentric architectures*. University of Reading. Retrieved from [https://www.researchgate.net/publication/282856733\\_Performance-oriented\\_Architecture\\_-\\_An\\_integrated\\_discourse\\_and\\_theoretical\\_framework\\_for\\_architectural\\_design\\_and\\_sustainability\\_towards\\_non-discrete\\_and\\_non-anthropocentric\\_architectures](https://www.researchgate.net/publication/282856733_Performance-oriented_Architecture_-_An_integrated_discourse_and_theoretical_framework_for_architectural_design_and_sustainability_towards_non-discrete_and_non-anthropocentric_architectures)
- Hensel, M. (2019). The rights to ground: integrating human and non-human perspectives in an inclusive approach to sustainability. *Sustainable Development*, 1–7. <https://doi.org/10.1002/sd.1883>
- Hensel, M., & Menges, A. (2006). *Morpho-Ecologies* (1st ed.). London: AA Publications.
- Hensel, M., & Sunguroğlu Hensel, D. (2015). Architectural History from a Performance Perspective – The Latent Potential of Knowledge embedded in the Built Environment. In La Scuola di Pitagora (Ed.), *Teritage and Technology: Mind, Knowledge, Experience - Le Vie dei Mercanti XIII International* (pp. 794–802). Naples: La Scuola di Pitagora. <https://doi.org/10.13140/RG.2.1.3409.7365>
- Joachim, M. (2015). A Century of Ecological Innovation. *Architectural Design*, 85(4), 68–73. <https://doi.org/10.1002/ad.1928>
- Joachim, M. (2016). Ten archetypes of nature in design. *Technoetic Arts*, 14(1), 127–130. [https://doi.org/10.1386/tear.14.1-2.127\\_1](https://doi.org/10.1386/tear.14.1-2.127_1)

- McIntyre-Mills, J. (2014). Systemic Ethics for Social and Environmental Justice. In J. McIntyre-Mills (Ed.), *Systemic Ethics and Non-Anthropocentric Stewardship* (pp. 121–153). Cham: Springer. [https://doi.org/10.1007/978-3-319-07656-0\\_6](https://doi.org/10.1007/978-3-319-07656-0_6)
- Mostafavi, M., & Doherty, G. (2016). *Ecological Urbanism*. (M. Mostafavi & G. Doherty, Eds.), *Ecological Urbanism* (revised). Cambridge: Lars Müller Publishers. Retrieved from [https://www.academia.edu/25491739/Ecological\\_Urbanism\\_Revised\\_Edition](https://www.academia.edu/25491739/Ecological_Urbanism_Revised_Edition)
- Pauleit, S., Zölch, T., Hansen, R., & Randrup, T. B. (2017). Nature-Based Solutions and Climate Change – Four Shades of Green. In N. Kabisch, H. Korn, J. Stadler, & A. Bonn (Eds.), *Nature-Based Solutions to Climate Change Adaptation in Urban Areas* (pp. 29–49). Cham: Springer. <https://doi.org/10.1007/978-3-319-56091-5>
- Sanders, E. B.-N., & Stappers, P. J. (2008). Co-creation and the new landscapes of design. *CoDesign*, 4(1), 5–18. <https://doi.org/10.1080/15710880701875068>
- Sevaldson, B. (2004). Designing Time: A Laboratory for Time Based Design. In *Future Ground* (pp. 1–13). Melbourne: Monash University. Retrieved from <http://www.futureground.monash.edu.au/>.
- Sevaldson, B. (2005). *Developing Digital Design Techniques: Investigations on Creative Design Computing* (1st ed.). Oslo: Oslo School of Architecture and Design.
- Sevaldson, B. (2008). Rich Design Research Space. *Form Akademisk*, 1(1), 28–44. Retrieved from <http://journals.hioa.no/index.php/formakademisk/article/view/119/108>
- Sevaldson, B. (2013). Systems Oriented Design: The emergence and development of a designerly approach to address complexity. In J. B. Reitan, P. Lloyd, E. Bohemia, L. M. Nielsen, I. Digranes, & E. Lutnaes (Eds.), *DRS // CUMULUS 2013* (pp. 14–17). Oslo: HIOA. [https://doi.org/ISBN 978-82-93298-00-7](https://doi.org/ISBN%20978-82-93298-00-7)
- Sevaldson, B. (2018). *Systems Oriented Design*. in preparation.
- Sweeting, B. (2016). Design research as a variety of second-order Cybernetic practice. *Constructivist Foundations*, 11(3), 572–579. Retrieved from [https://www.researchgate.net/publication/305317834\\_Design\\_Research\\_as\\_a\\_Variety\\_of\\_Second-Order\\_Cybernetic\\_Practice](https://www.researchgate.net/publication/305317834_Design_Research_as_a_Variety_of_Second-Order_Cybernetic_Practice)
- Vogel, G. (2017). Where have all the insects gone? *Science*, 5(6355), 1–4. <https://doi.org/10.1126/science.aal1160>
- Wagler, R. (2017). Anthropocene extinction. *Access Science*. <https://doi.org/10.1036/1097-8542.039350>
- yr. (2016). Clima. Retrieved February 15, 2016, from <http://www.yr.no/>
- Zeithaml, V. A., Parasuraman, A., & Berry, L. L. (1990). *Delivering quality service: Balancing customer perceptions and expectations*. New York - London: Free Press.