

Speculative design with urban nature: interpreting computational data

*A laboratory investigating the impact of explorative mapping
on design practices within academic context*

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English summary

This thesis situates itself at the intersection of speculative design, ecological theories, and computational technologies, interrogating how contemporary designers dealing with urban nature might reconceive their role amidst the twin pressing challenges of ecological crisis and digital transformation. Grounded in the acknowledgment of urban nature as neither fixed nor oppositional to the built environment, but rather as a fluid, hybrid construct, this work destabilizes inherited dichotomies between the natural and the artificial, the human and the non-human, the technical and the creative, the scientific and the *'designerly'*. It approaches urban nature as a dynamic assemblage shaped through reciprocal relations of culture, technology, and ecology—a notion synthesised in the concept of naturecultures.

Central to this inquiry is the proposition that urban designers and planners must cultivate a renewed epistemic and operative posture: one that mobilises computational tools not merely as neutral instruments of measurement, but as agents capable of reshaping spatial imaginaries. Specifically, the thesis advocates for a speculative design practice empowered by Geographic Information Systems, GIS, and digital mapping, wherein data is not passively consumed but actively interpreted, contested, and reassembled. In doing so, it reframes GIS beyond its conventional applications as an analytic device, asserting its potential as a catalyst for reflective, critical, and creative exploration. Mapping, here, becomes operative rather than descriptive—a practice of world-making as much as world-representing. The investigation is structured around the conviction that competence development in design is inseparable from fostering this

epistemic shift. Drawing upon posthuman ecological theories and the paradigm of the Ecocene, it positions ecological literacy, systems thinking, and speculative imagination as interwoven facets of contemporary design practice. Competence is not conceived merely as technical proficiency, but as the evolving ability to navigate complex, multi-scalar, temporally fluid, and ethically charged urban landscapes.

Through a laboratory framework embedded within architectural education, the thesis operationalises its conceptual propositions. The laboratory becomes a microcosm where the abstract tenets of naturecultures, speculative design, and digital technology are activated, observed, and iteratively refined. It reveals how the introduction of GIS into students' workflows catalyses shifts not only in the tools employed but in the modes of thinking, imagining, and critiquing that undergird their design processes. Crucially, the work underscores that these shifts are relational—competences such as systemic thinking, synthesis, multiscale, and speculative capacity do not evolve in isolation but through their entanglement within a broader network of socio-technical and ecological considerations.

Rather than presenting technology and ecology as antagonistic forces, the thesis articulates a vision of design practice where computational tools mediate more nuanced, reflective engagements with urban nature. Rejecting both technocratic determinism and uncritical ecological romanticism, it navigates a third path—one where designers become agents of negotiation between data, ecological systems, and speculative futures. This negotiation does not aim to resolve complexity but to embrace it, repurposing digital mapping as a means to open alternative imaginaries and question dominant paradigms. Ultimately, this work contributes to a reconceptualization of the designer's role in the age of the Ecocene. It envisions a professional posture grounded in data literacy, ecological awareness, and speculative agency, capable of addressing the intertwined challenges of urbanisation, climate change, and socio-technical transformation. In doing so, it does not offer a prescriptive methodology but a conceptual and operative framework for reimagining design education and practice—one critically attuned, ethically engaged, and oriented towards fostering resilient, inclusive, and imaginative urban futures.