

Introduction

Posthuman Frontiers

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In the posthuman there are no essential differences or absolute demarcations between bodily existence and computer simulation, cybernetic mechanism and biological organism, robot teleology and human goals.

—N. Katherine Hayles, 1999¹

If posthumanism can be defined as the condition in which humans are understood to be intertwined and co-evolutionary with technological, medical, informatic, and economic tools and networks, and exist within a continuum with biological, ecological, and machinic entities,² then computational design is by definition a posthumanist endeavor. In contrast to design paradigms dominant since the Renaissance, contemporary computational design is not “conceived in the mind” of the designer and then represented as instructions for construction,³ but rather design emerges through informational procedures and feedbacks with one or more numerically controlled machines. Increasingly, feedback from environmental forces, other participants, and data streams becomes an active force shaping design outcomes, behaviors, and interactions.

The ACADIA 2016 Conference brings together new research and design work from practice and academia that explores the partnerships among human practices, procedural design methods, and autonomous machines. The papers presented in these proceedings identify and examine current tendencies in computational design to develop and use quasi-cognitive machines and to advance the integration of software, information, fabrication, and sensing in the generation of mechanisms capable of interfacing with the physical realm.

EMERGENT TOOL STREAMS

The conference proceedings extend architectural inquiry to incorporate fields that span material science, robotics, autonomous behavior, interaction, and data-driven approaches. The papers selected for the proceedings describe practices and techniques driven by procedural approaches and externalized knowledge that ultimately take on their own identity, instrumentality, and momentum. Design operates through complex entanglements and feedback with computational as well as physical matter. The processes and products of designers are now intertwined with an emergent tool stream that not only imbues us and our built environments with novel interfaces, senses, and sensibilities, but that also produces spontaneous material and informational excess as byproducts of its autocatalytic processes. Just one example of the manifold correlations demanded by contemporary methods of design—it is no longer a question of how to work with big data, but how to evaluate the quality of data, how to assess the politics of data, and how to consider the impact of design judgment, decision making, and aesthetics within data-driven processes.

POSTHUMAN DESIGN ECOLOGIES

Posthumanism does not entail a condition *after* the dominance of the human species or without humans, but rather emphasizes an alternative perspective on design that shifts focus away from an anthropocentric position of observation and control. Posthumanist design practices decentralize the role of human judgment and embrace the notion that creative agencies can be conferred to nonhuman entities such as objects, tools, materials, other species, and environmental forces. Externalized knowledge begins to take on identity and instrumentality, and participate in the process of generating novel design ecologies and alternative

models for architectural design. The panoramic position of the (humanist) designer as sole genius is giving way to a design ecology that operates in autonomous and semiautonomous modes. While bottom-up design techniques have been discussed in architecture extensively, a primary difference in today's conversation regards the amount of resolution that new technologies yield, the fine grain of the solutions, and the sophistication of their execution. All of these (technological as well as theoretical) aspects allow the integration of a certain level of codified information, and a level of detail that results in an architecture rich in expression and articulation. In a moment when reflective judgment, knowledge, and intent seem less and less understood as the basis of design professions, and when subjectivity and identity are increasingly augmented and fragmented, how can we consider the deep challenges posed to the future of design education, research, and professional practice?

POSTHUMAN FRONTIERS

The papers presented at the ACADIA 2016 Conference have been categorized into five sections that are intended to position the dominant conversations emerging from current work in the field.

Programmable Matter operates through the commonality between natural systems, architecture, and computational design. The papers describe methods for computation that translate the logic of biological systems into codified material behaviors, which allows formational and performative agency to be shared among designers, materials, computational procedures, and environmental forces.

Generative Robotics explores processes of design exploration that are developed through codified actions and procedures as opposed to constraints or predetermined instructions. Robotics are moving beyond instrumental tools to one that are fully immersed within the cyclical processes of design iteration. Robots and humans are becoming collaboratively engaged in the making of material and in the formation and assembly of architectural forms.

Procedural Design deploys collaborative and emergent protocols and processes to enable design exploration, ideation, form development, or the construction of physical architectural systems. Procedural designs do not result in singular solutions, but rather fields of possible outcomes emanating from protocols such as game engines, big data scanning, genetic algorithms, and self-assembling agents.

Posthuman Engagements explores awareness, interaction, and communication among humans, tools, and intelligent machines. From the use of learning algorithms that aim to achieve life-like

behavior in synthetic systems, to gesture-based drawing machines, the papers in this section experiment with material and digital languages that produce new relations and intimacies between humans, environments, and things.

Material Frontiers gathers two emerging areas of exploration: computational material agencies that extend beyond instrumentality and performance to engage aesthetics, ontology, and irregular formation, and design work with synthetic biologies, where architectural researchers deploy living matter crossbred with computational, biological, genetic, and electrochemical logics toward new species of architectural and landscape materialization.

The papers gathered in this volume represent some of the most innovative and exciting work currently occurring in the field. This conference helps to document a maturation of computational design into a discipline that embraces instrumental or formal sophistication while also expanding the potential fields of agents, matters, and environments in collaborative and co-evolutionary ways. With the increasingly effortless agility enabled by tools of computational design and digital fabrication, we see the ACADIA community not only address the synthesis of the human and the technological in the process of design, but also consider the participants of a posthuman architecture. We look forward to the conversations at the conference about the potential of such an expanded scope in theory, process, and practice, and anticipate future trajectories that build upon this work from the growing ACADIA community.

1. N. Katherine Hayles, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics* (Chicago, University of Chicago Press, 1999), 3.
2. This definition is adapted from: Carey Wolfe, *What is Posthumanism?* (Minneapolis: University of Minnesota Press, 2009), xv; Ariane Lourie Harrison, "Charting Posthuman Territory," in *Architectural Theories of the Environment: Posthuman Territory*, ed. Ariane Lourie Harrison (New York: Routledge, 2013), 3; and Bruce Mazlish, *The Fourth Discontinuity: The Co-Evolutions of Humans and Machines* (New Haven, CT: Yale University Press, 1993), 5-7.
3. Leon Battista Alberti, *De re aedificatoria*, 2.1.4., quoted in Mario Carpo, *The Alphabet and the Algorithm* (Cambridge, MA: MIT Press, 2011), 21.