

Call for Applications

Spring University

“CAx: Dimensions of Computer-Aid in Architecture, Biological Sciences, Design and Medicine”

2-7 April, 2017

Cluster of Excellence »Image Knowledge Gestaltung. An Interdisciplinary Laboratory«

Humboldt-Universität zu Berlin

Sophienstr. 22a

D-10178 Berlin

Computer-aided design, computer-assisted surgery or computer-aided manufacturing: the advent of conception, simulation and intervention through digital means has already wrought a permanent change to the ways of thinking and acting in the areas of architecture, design, biomaterial science and medicine. Recently, the deployment of advanced robotics, tracking systems and real-time imaging promises to not only close and ‘seamlessly’ link but to establish permanent feedback loops that mutually transform digital processes and physical materialities. For example, designing a construction in architecture by means of computer-aided design software, automatically transferring the data to 3D-printing devices, and controlling the process by augmented-reality technologies to detect deviations between planning and materialization points to the fundamental role of computer-aided techniques. Besides constructive computer-aided techniques, interventional practices that are enabled by computational processes as in computer-assisted surgery pose literally vital questions of how computing ‘aids’ certain practices and actors and point to ethical, legal and socio-economic issues.

If computer-aided methods can no longer be thought of primarily as design or conceptual tools residing in the computer’s black box, how can they be understood in their transformative potential that crosses the ontological threshold to the environment, bodies and materials? What kind of specific aid or assistance do computational methods provide in architecture, biological sciences, design and medicine, and how can one analyze the overlay and merging of digital and physical layers of CAx from an interdisciplinary perspective?

To discuss these questions the spring university will focus on five core areas:

- **Histories and Contexts of CAx:** As a way of placing current techniques in their historic context, there will be a particular focus on the development of computer-aided design software in architecture and design.
- **Simulation and Visualisation:** Simulation methods with their basic mathematical models as well as visualisation strategies provide tools to evaluate outcomes of planned constructions and interventions as well as to communicate among actors.

- **Robotics and Automation:** Robotic systems such as in computer-assisted surgery are transforming the workflows from surgical handicraft to remote controlled and automated modes of intervention. Besides practical challenges such as the search for appropriate control and interaction modalities as well as visualisation methods, the transformation of surgical knowledge, cooperative practices and the shift in responsibilities and work routines are key issues when analyzing the application of robotic systems.

- **Material Resistances:** The question of how digital design can be transferred into material construction or »digital materiality« also evoked the search for »smart« and responsive materials. This focus will examine the processual gaps between code and matter and the resistance of materiality in CAx applications, in particular in architecture and design.

- **Hands-on CAx and Fieldtrips:** Visits to exemplary contexts of application as well as a workshop will provide participants with practice-based insights on CAx methods. Whilst fieldtrips will show certain applications in situ, a workshop will give participants the opportunity to experience a computer-aided design process first-hand (e.g. constructing a 3D-printable object).

Confirmed Faculty

Gabriele Gramelsberger, Chair of Philosophy of Digital Media, Witten/Herdecke University

Daniel Cardoso Llach, School of Architecture, Carnegie Mellon University

Sven Pfeiffer, Department for Digital Architectural Production, Technical University Berlin

Friedrich Schmidgall, Interaction Design, Interdisciplinary Laboratory Image Knowledge Gestaltung, Humboldt-Universität zu Berlin

Richard Weinkamer, Department of Biomaterials, Max Planck Institute of Colloids and Interfaces Potsdam

Who should apply

The spring university invites Master's and doctoral students from the fields of Architecture, Biological and Biomaterial Sciences, Design, Media Studies, Medicine, Philosophy of Science, History of Science, Science and Technology Studies and related fields. Both on-going theoretical as well as practice-based investigations into technologies, practices and contexts of CAx in different fields of application are welcome. During the spring university you will have the opportunity to discuss your project with the other participants and the faculty. The working language will be English.

How to apply

Please submit your CV (1 page) along with a 300-word abstract of your current research project until February 19th, 2017. Please also note in your application: full name, affiliation, address and dietary restrictions.

Please email applications as one PDF-document to: bwg.cax@hu-berlin.de

All accepted applicants will be notified by February 22nd, 2017. Participants are expected to present their projects in the format of their choice (e.g. 20 min. presentation; poster; demonstration) in the course of the spring university. Please indicate in your application how you would like to present your research.

Venue, Accommodation and Travel Arrangements

The spring university mainly takes place at the Cluster of Excellence »Image Knowledge Gestaltung. An Interdisciplinary Laboratory«, Sophienstr. 22a, D-10178 Berlin-Mitte. Fieldtrips will be arranged by the organizers.

There is no participation fee.

Accommodation for all participants will be arranged by the organizers at the Humboldt Universität's guesthouse (Ziegelstr. 13a, D- 10117 Berlin).

Participants are asked to organize travel arrangements on their own. Travel costs will be financed and reimbursed shortly after the spring university concludes by the Cluster of Excellence »Image Knowledge Gestaltung. An Interdisciplinary Laboratory«.

Please direct any questions to: bwg.cax@hu-berlin.de

The spring university is part of the Cluster of Excellence »Image Knowledge Gestaltung. An Interdisciplinary Laboratory« funded by the German Research Foundation (DFG) (<https://www.interdisciplinary-laboratory.hu-berlin.de/en/bwg/>)

Organization: Dr. des. Kathrin Friedrich, Sarah Scheidmantel, Puo-An Wu