

Graduate Seminar Information

“Developmental mechanisms in designing: Induction, Gene Transcription, and Commitment”

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Engineering Building, Room 2901
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Abstract

The research on developmental design focuses on investigating the inherent principles to map functions onto structures by simulating the developmental mechanisms that take place in an embryo. The developmental mechanisms, including induction, gene transcription and commitment, are used to develop design concepts from initial function specifications to structural parameters. Developmental design is a promising solution for biomimicry and autonomous design. Particularly, embryogenesis-inspired design draws on intuitively graspable epistemological foundation for conceptual design. The talk begins with a brief review of the development process of an embryo and of a developmental design framework, and then discusses embryogenesis-inspired mechanisms, the modeling of the mechanisms, and the design experiments.

About the speaker

Dr. HOU Yuemin obtained her Ph.D from Tsinghua University on June of 2005. Her research interests includes Biologically-inspired design theory and computing, Dynamical analysis and optimal design of systems, Multidisciplinary representation and modeling for design, analysis and optimization of systems, Design and neural control of intelligent systems, and Design and modeling of creativity-oriented public spaces. She has published more than 40 research papers as the first and corresponding authors, and delivered presentations at many international conferences including conferences held in France, Germany, Italy, USA, and Japan, and gave invited plenary lectures at conferences. She has completed and is conducting more than 10 research projects as principal investigator and main researcher. These projects covers the bio-inspired design and algorithm for multidisciplinary design; dynamics analysis of mechanical systems and elements including bearings, rotors, gears and small satellites; neural model for design, neural network control, the design and optimization of mechanical systems and devices, etc.. Currently, she is working on four granted projects.

Selected Journal Publications in Design

1. Hou Yuemin, Ji Linhong, **Partially Autonomous Concept Development of MFS**, *International Journal of Computer Applications in Technology*. 40(1/2), 2011:13-22.
2. Hou Yuemin, Ji Linhong, **Six-Stage Design Framework**, *Kybernetes*, 2008. V 37. Issue: 9/10. 1349-1358.
3. Hou Yuemin, Ji Linhong, **Embryogenesis-inspired design mechanisms**, *International journal of design principles and practices*, 2010, 4(3), pp.239-258.
4. Hou Yuemin, Ji Linhong, **Stimulating Design Creativity by Public Places in Academic Buildings**, *Structure and Environment*, 2011, spring issue, pp. 1-10.
5. Hou Yuemin, Ji Linhong, Jin Dwen, **Modeling Neural Pathway Using Neural Network**, *Computer Applications and Software*, 2008,11, 31-33
6. Hou Yue Min, Ji Lin Hong, Jin De Wen, the **Nature and Core of design in Terms of Science Classification**. *Science, Technology and Dialectics*, v24, n3, 2007: 23-28,110. Also in *Philosophy of Science and Technology* as reprint of important papers, B2, 8, 2007: 36-42.