



9th International Workshop on **DESIGN THEORY**

Special Interest Group
of the Design Society

1st-2nd February 2016
MINES ParisTech



Organized by the Chair of Design Theory and Methods for Innovation | CGS – MINES ParisTech

Contact: akin.kazakci@mines-paristech.fr - stephanie.brunet@mines-paristech.fr

Monday February 1st*Chaired by Akin Kazakci***8:00-8:45: Welcome****8:45-9:00: Introduction and opening**, Pascal Le Masson (MINES ParisTech), Eswaran Subrahmanian (CMU), Akin Kazakci (MINES ParisTech)**SESSION: EVOLUTION OF DESIGN THEORY****9:00-9:30: Theory of technical systems, Basis for a Systematic Engineering Design Process.** W. Ernst Eder, *Honorary fellow of the design society* (Royal Military College of Canada)**9:45-10:15: The evolution of design theory and design methodology at Technische Universität Ilmenau.** Christian Weber, *Design Society Fellow* (Technische Universität Ilmenau)**10:30-11:00: The evolution of teaching of design theory in engineering schools,** Armand Hatchuel, *Design Society Fellow* (MINES ParisTech)**COFFEE BREAK****11:30-12:30: Invited Presentation: Creative adaptation by artificial evolution,** Jean-Baptiste Mouret (INRIA)*Chaired by Yoram Reich***SESSION: DESIGN THEORY AND KNOWLEDGE STRUCTURES**

- 13:30-14:00 : **How innovative design can contribute to chemical and process engineering?** Olivier Potier (LRGP-CNRS) Juliette Brun, Pascal Le Masson, Benoit Weil (MINES ParisTech)
- 14:15-14:45 — **Mathematics for Multi-faceted Design**, Spencer Breiner (NIST), Al Jones(NIST) and Eswaran Subrahmanian (CMU)

COFFEE BREAK**SESSION: DESIGN THEORY AND SCIENTIFIC PROCESS**

- 15:30-16:00 : **Design challenges in scientific communities: generating design options for the LHCb collaboration at CERN**, Vladimir Gligorov (CERN)
- 16:15-16:45 : **Understanding data scientists' design process: a data science observatory** : Akin Kazakci (MINES ParisTech) Balazs Kégl (CNRS)
- 17:00-18:30 : **DISCUSSION SESSIONS**

Tuesday February 2nd**9:00- 12:00 PARALLEL SESSIONS**

- **Session 1: Design Theory and Approaches**

(Chaired by Benoit Weil)

- **Session 2: Design Theory and Models**

(Chaired by Eswaran Subrahmanian)

- **Session 3 : Design Theory and Managerial Implications**

(Chaired by Bernard Yannou)

- **Session 4 : Design Theory and Identity of Objects**

*(Chaired by Annie Gentes)**Chaired by Armand Hatchuel***SESSION: DESIGN THEORY - DEALING WITH RISK AND UNCERTAINTY**

- 13:30-14:00: **Categorical risk perception for design to combine expertise and analysis**, David Broniatowski (GWU)
- 14:00-14:30: **Radical Innovation Design**, Bernard Yannou (Ecole Centrale)
- 14:30-15:00: **Mindful Deviation through combining and causation and effectuation: A design theory based study of technology entrepreneurship**, Marine Agogu  (HEC Montr al), Mat Lundqvist, Karen Williams Middleton (Chalmers University)

COFFEE BREAK**SESSION: DESIGN THEORY AND EVOLUTION OF DESIGNS**

- 15:30-16:00: **Product evolution using crowdsourcing and Affordance based design**, Ivan Mata and Georges Fadel (Clemson University)
- 16:00-16:30: **Design Theory and Technological Evolution**, Andy Dong (Warren Centre for Engineering Innovation)
- 16:30-17:30 : **FUTURE PROGRAM**

Parallel sessions 1: Design Theory and Methods (20mn each presentation) *Chaired by Benoit Weil*

- **Design theory and innovation in workspace design: Lessons learned from a design project**, Maria Ianeva (GRePS, Université Lyon 2), Patrick Chotel (Colliers International)
- **Using design theory to generate new applications for industry 4.0: Beyond traditional measures of industrial performance**: Yohann Sitruk, Akin Kazakci (MINES ParisTech)
- **Models in engineering design: Claudia Eckert (Open University)**, Rafaela Hillerbrand (ITAS-KIT)
- **"Thinking out of the box - who moved my box" – An implicit PSI analysis**: Yoram Reich (University of Tel Aviv)

BREAK

- **Design oriented manufacturing: the case of failure mode and effect analysis in semiconductor industry**: Benjamin Cabanes, Stéphane Hubac (ST MicroElectronics), Pascal Le Masson, Benoit Weil (MINES ParisTech)
- **Casting innovative aerospace design case studies in parameter analysis framework to uncover design processes of experts**: Ehud Kroll, Ido Farbman (ORT Braude College)
- **Design driven methods for creating conceptual IP cartography**: Olga Kokshagina, Pascal Le Masson, Benoit Weil, (MINES ParisTech)
- **How smart products with built-in flexibility empower users to self-design their uses ? A theoretical framework for use generation** : Morgane Benade, Frank Piller (Aachen University), Juliette Brun, Pascal Le Masson, Benoit Weil (MINES ParisTech), Ingi Brown (Agendize)

Parallel sessions 2: Design Theory and Models (20mn each presentation) *Chaired by Eswaran Subrahmanian*

- **Archeology of Non standard Design philosophy: An experimental text**: Muriel Mambrini-Doudet (INRA), Ira Monarch (CMU), Anne-Francoise Schmid (chaire TMCI) , Eswaran Subrahmanian (CMU)
- **Confronting the CPM/PDD approach with the C-K theory**: Christian Weber (Technische Universität Ilmenau)
- **Demarcation problem of a general design theory**: Damien Motte, Robert Bjarnemo (Lund University)
- **Reasoning and making sense of data in the absence of goals**, Mary Lou Maher (UNCCharlotte), Kathryn Merrick, Bing Wang (UNSW)

BREAK

- **Why do we think that synthesis is creative and analysis is rational?** Lauri Koskela (University of Huddersfield)
- **Shannon entropy as a measure of design potential**: John Gero, Jeff Kan (UNC Charlotte)
- **Surprise and reformulation as meta-cognitive processes in creative design**: Kalzon Grace, Mary Lou Maher (UNCCharlotte)
- **Design theory and machine generativity**: Mehdi Cherti, Balazs Kégl (CNRS), Akin Kazakci, (MINES ParisTech)

Parallel sessions 3: Design Theory and Managerial Implications (20mn each presentation) *Chaired by Bernard Yannou*

- **On the art of science and the science of art in remarkable atemporal design innovation frames of reference:** Patrick Corsi (IKBM), Dominique Morin (Snecma)
- **Cognitive processes undergirding the design logic in business model innovation:** Dirk Schneckenberg (ESC Rennes School of Business), Vivek Velamuri, Christian Comberg (HHL Leipzig Graduate School of Management)
- **System architecture, risk perception, and design worldviews:** David Broniatowski (GWU)

BREAK

- **Can design chance the financial industry? A case study of a bank of England project:** Marta Gasparin (University of Leicester), Christiana Parisi (Copenhagen Business School), Hermann Rapp (Anglia Ruskin University)
- **Designing Innovation ecosystems: NASAs shift towards designing a low-earth orbit economic zone:** Douglas Robinson, Mariana Mazzucato (University of Sussex)
- **The Debut of the Design Studio in Psychology Clinical Training Programs:** Susan Imholz
- **Implicit comparisons brings out different features:** Allison Faye, Barbara Tversky (Stanford University)

Parallel sessions 4: Design Theory and Identity of Objects (20mn each presentation) *Chaired by Annie Gentes*

- **Smartphones to explore movement: science and design collaboration:** Joel Chevrier (CIME Nanotech & CRI Paris)
- **Discourses on the methods:** Tiphaine Kazitani, Frédéric Valentin (Codesign Lab, Télécom ParisTech)
- **Disputing ergonomics. Deconstructing users. A queer perspective on design:** Emeline Brulé, Tiphaine Kazitani (Codesign Lab, Télécom ParisTech)
- **The Cognitive Effect of Leadership Instructions on Creative Ideation: A Novelty-based approach of “Goal-Settings”:** Hicham Ezzat, Pascal Le Masson, Benoit Weil (MINES ParisTech)

BREAK

- **Design and creativity, the architectural design process:** Rossella Stufano, Stefano Borgo, Dino Borri, Domenico Camarda (Dicatech)
- **Design and time: movement –object and time-object: Cross reflexions beteen C-K theory and Deleuze’s theory of cinema and Creation:** Christophe Abrassart (Université de Montréal)
- **Drafting and testing design reasoning models: the case of codesign:** Louis-Etienne Dubois, Pascal Le Masson, Benoit Weil (MINES ParisTech)

Session 1: From design theory to industrial applications... and back.

Chaired by Armand Hatchuel (MINES ParisTech)

This discussion session will consider the complex and contrasted relationships between theory-driven field interventions and theory-building through such interventions. The following two presentations will launch the debate.

- **Design theory for innovation at the plant level. Guillaume Bulin. Airbus.**
- **Innovation in value networks. Hans Bjorkman**

Session 2: Theory of technical systems.

Chaired by Pascal Le Masson (MINES ParisTech)

This session will consider additional issues related to TTS and its relationship with other frameworks some of which are (non exclusive): Pahl & Beitz, VDI 2221 / 2222, Koller, and Ullman, as well as of IPD (Olsson, Ehrlenspiel) and Dynamic Product Development (Ottosson), in a comparison matrix with the following criteria: Basic concepts; integration capabilities; process model; adaptability and flexibility; predictability; portability.

Session 3: Design and science: « close encounters of the third type ».

Chaired by Annie Gentès (Télécom ParisTech)

Analyzing the dialog between Sciences & Design through the activity of symbolization can place them on a common field of investigation. Designers and scientists, combining their creative process, contribute to an objectification of the activity of symbolization and thus operate at a higher level of innovation. The workshop will present and test with the participants some hybrid objects created by designers based on collaborations with quantum physicists. Participants will be given some of these objects and asked to interpret them, evaluate them, and if possible, propose some possible scenarios of use.