5th SIG Design Theory Tutorial (27-28-29 jan 2020, Paris, France)

Tutorial Faculty

Professorial College		
Name	**Institution**	**Country, city**
Hatchuel Armand	MINES ParisTech	France, Paris
Gaetano Cascini	Politecnico di Milano	Milano, Italy
Kroll Ehud	ORT Braude College	Israel, Karmiel
Le Masson Pascal	MINES ParisTech	France, Paris
Reich Yoram	Tel Aviv University	Israel, Tel Aviv
Subrahmanian Eswaran	Carnegie Mellon University	USA, Pittsburg
Weil Benoit	MINES ParisTech	France, Paris

Organizer: Maxime Thomas

Speakers:

Speakers		
Name	**Institution**	**Country, city**
Boudier Justine	MINES ParisTech	France, Paris
Brown Christopher	Worcester polytechnic institute	USA, Worcester
Gaetano Cascini	Politecnico di Milano	Milano, Italy
Fritzsche Albrecht	Ulm University	Germany, Ulm
Gericke Killian	Rostock University	Rostock, Germany
Hatchuel Armand	MINES ParisTech	France, Paris
Kroll Ehud	ORT Braude College	Israel, Karmiel
Le Masson Pascal	MINES ParisTech	France, Paris
Nagel Jacquelyn K.S.	James Madison University	USA, Harrisonburg
Reich Yoram	Tel Aviv University	Israel, Tel Aviv
Smulders Frido	TU Delft	Deflt, Netherlands
Subrahmanian Eswaran	Carnegie Mellon University	USA, Pittsburg
Weil Benoit	MINES ParisTech	France, Paris

Scientific background and goals

The community of the Design Theory SIG of the Design Society, was created in 2007, to strengthen and unify the field of design theory. Since, thanks to active and fruitful research, important achievements have been reached through: a) historical and comparative work on design theories (Hatchuel et al. 2011; Le Masson, Dorst, and Subrahmanian 2013) b) establishing theoretical foundations with a high level of generality that consolidate Design ontology and paradigm (Hatchuel et al. 2018). Design Theory now offers a firm scientific body and ground for integrated and holistic engineering design (Vajna 2020). It has a growing impact on different disciplines in both natural and social sciences. Today, Design Theory is a vibrant research field that offers consistent models, tools and methodologies that PhD students may want to use to pursue their own research questions.

Therefore, the goal of this tutorial is two-folded. First, helping the students from different disciplines to master the literature, tools and methods of Design Theory for their own doctoral research. Second, presenting open questions and recent advances in Design Theory for PhD students willing to contribute to the field.

The tutorial attracts students from fields where Design Theory has now a rich literature:

- *Engineering Design,*
- *Decision and rationality theory*
- *Psychology of Creativity*
- *Innovation Management,*
- *Knowledge and Science Management,*
- *Public Management and Policy making processes*

It also welcomes students from Humanities, Philosophy and Art that are willing to investigate the implications of Design Theory in their fields.

To reach these goals, the tutorial provides the following contents:

- *Basic courses: several modules, made by professors of the Professorial college, on basic notions of design theory*
- *Work with faculty members: interactive work sessions with the tutorial faculty members for students to identify what design theory can bring to their research*
- *Advanced Topic: short presentation made by an expert on an advanced topic in design theory – typically: 30 minutes, based on a paper, presented by a professor + 15 minutes for questions.*
- *Publishing in design theory: presentation of the Research in Engineering Design journal*

Bibliography:

Hatchuel, Armand, Pascal Le Masson, Yoram Reich, and Eswaran Subrahmanian. 2018. 'Design Theory: A Foundation of a New Paradigm for Design Science and Engineering'. *Research in Engineering Design* 29 (1): 5–21.

Hatchuel, Armand, Pascal Le Masson, Yoram Reich, and Benoit Weil. 2011. 'A Systematic Approach of Design Theories Using Generativeness and Robustness', 12.

Le Masson, Pascal, Kees Dorst, and Eswaran Subrahmanian. 2013. 'Design Theory: History, State of the Art and Advancements'. *Research in Engineering Design* 24 (2): 97–103.

Vajna, S. 2020. *Integrated Design Engineering: Interdisciplinary and Holistic Product Development*.

Day 1 – Zoom link : https://zoom.us/j/97081738801?pwd=UWwzRlFERVNPQ2RiaGhsYUlYeHV3Zz09

Basic Course	Advanced Topic / Paper Discussion	Breakout Groups

Day 1 – 27 Jan 2021			
Timetable	**Type of Course**	**Title Course**	**Speakers**
9:00 - 10:00	**Workshop program + presentation of participants + Paper discussion**	Design theory: a foundation of a new paradigm for design science and engineering	Pascal Le Masson, Eswaran Subrahmanian Maxime Thomas
10:00 - 11:00	**Basic course:** Classical School	An overview on the Design Methodology by Gerhard Pahl and Wolfgang Beitz	Killian Gericke
11:00 - 11:30	**Break**		
11:30 - 12:30	**Breakout groups (1/5)**	Exploring your thesis with Design Theory	Professorial College
12:30 - 14:00	**Lunch**		
14:00 - 15:00	**Basic course:** Classical School	The simonian tradition in design (Economics, info, learning, decision, problem solving)	Eswaran Subrahmanian
15:00 - 16:00	**Basic course:** Contemporary Formal Models I	Introduction to CK Design Theory	Pascal Le Masson & Benoit Weil
16:00 - 16:30	**Break**		
16:30 - 17:30	**Advanced topic / Paper discussion (1)**	The Dreamliner's bumpy road to takeoff. Overlooked Design & Innovation Theory as root cause?	Frido Smulders
17:30 - 18:30	**Advanced topic / Paper discussion (2)**	Design theory and the art tradition	Armand Hatchuel

Day 2

https://zoom.us/j/97081738801?pwd=UWwzRlFERVNPQ2RiaGhsYUlYeHV3Zz09

Day 2 - 28 Jan 2021			
Timetable	**Type of Course**	**Title Course**	**Speakers**
9:00 - 10:00	**Breakout groups (2/5)**	Exploring your thesis with Design Theory	Professorial College
10:00 - 11:00	**Breakout groups (3/5)**	Exploring your thesis with Design Theory	Professorial College
11:00 - 11:30	**Break**		
11:30 - 12:30	**Basic course:** Contemporary Formal Models II	Enhanced parameter analysis method	Ehud Kroll
12:30 - 14:00	**Lunch**		
14:00 – 15:00	**Basic course:** Contemporary Formal Models III	Knowledge structure in design (n-dim, , matroïd, sp splitting condition) + PSI	Eswaran Subrahmanian + Yoram Reich
15:00 – 16:00	**Advanced topic / Paper discussion (3)**	Biomimetics with design theory (Vendôme classroom, visioconf)	Jacquelyn K.S. Nagel
16:00 - 16:30	**Break**		
16:30 - 17:30	**Advanced topic / Paper discussion (4)**	Axiomatic Design for Creativity, Sustainability, and Industry 4.0	Christopher Brown
17:30 – 19:30	**Cocktail**		

Day 3

https://zoom.us/j/97081738801?pwd=UWwzRlFERVNPQ2RiaGhsYUlYeHV3Zz09

Day 3 – 29 Jan 2021			
Timetable	**Type of Course**	**Title Course**	**Speakers**
9:00 - 9:45	**Advanced topic / Paper discussion (5)**	Demonstration of fixation effect during generation of creative ideas from fundamental experimentation approach to applied experimentations.	Justitne Boudier
9:45 - 10:30	**Advanced topic / Paper discussion (6)**	Design, Creativity and design Theory	Gaetano Cascini
10:30 - 11:00	**Break**		
11:00 – 11:45	**Breakout groups (4/5)**	Exploring your thesis with Design Theory	Professorial College
11:45 - 12:30	**Breakout groups (5/5)**	Exploring your thesis with Design Theory	Professorial College
12:30 - 14:00	**Lunch**		
14:00 – 15:00	**Advanced topic / Paper discussion (7)**	Conjunctions of Design and Automated Search in Digital Innovation	Albrecht Fritzsche
15:00 – 16:00	**Publishing in design theory**	Room V115	Yoram Reich (RED)