

SUJITHRA RAVISELVAM, PhD

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Doctor of Philosophy- Engineering Product Development (2016-2021)

Singapore University of Technology and Design

Master of Science- Biomedical Engineering (2012-2013)

Nanyang Technological University (NTU)

Bachelor of Science- Biomedical Engineering (2007-2011)

SRM Institute of Science and Technology

Singapore

India

PhD Research- Engineering Product Development (September 2016- August 2021)

Singapore University of Technology and Design (SUTD)

- Developed a **design framework** that systematically applies a set of extreme-user experiences for design creativity and user-centric design.
- Tested the effectiveness of **extreme-user experiences in identifying latent needs** in multiple domains like healthcare, education, cybersecurity, and assistive technology.

Research Fellow, Design Innovation Team- DesignZ, SUTD (October 2021-Present)

- Facilitating Design Innovation workshops and engage with external partners to embed, catalyse, and grow design in their organizations.

Graduate Researcher, SUTD-MIT International Design Centre (September 2016-2021)

Lead: Prof Kristin L. Wood, Professor, Senior Assoc. Dean, University of Colorado Denver

- Worked with the Design Innovation (DI) to understand **Critical and Creative Thinking** in the Singapore General Education system and formulated recommendations to nurture them effectively.
- Developing a **board game** that aims to **empower kids with creativity and innovation** by applying an empathic design process. Built with a primary focus to deliver design education for kids in refugee camps and rural areas.
- **Facilitated Design Innovation workshops** that address the design opportunities within different Government and private organizations in Singapore.

Research Experience & Project Highlights

Visiting Scholar, Ideation Lab, Massachusetts Institute of Technology (July 2019- Jan 2020)

Lead: Prof. Maria C. Yang, Professor Mechanical Engineering, D-Lab Faculty Academic Director

- Studied the role of extreme-user experiences in **medical device design** and their role in **reducing cognitive load**.
- **Co-instructed** labs for 2.00 Introduction to Design Module.
- **Lead an IAP** titled User-Centred Design Workshop: Extreme-users and Rapid Ideation.
- Helped **judge the projects at MakeMIT2020**, a world premier hardware hackathon.

Research Engineer, SUTD-MIT International Design Centre (Aug 2015- Aug 2016)

- Worked as a Design Innovation team and executed empathic design studies that captured the latent user needs necessary to **redesign a series of medical centres** in Singapore.
- Led an **experiential learning simulation** project as a **Principal Investigator** to analyse the effectiveness of a series of simulated scenario-based workshops on designer empathy and creativity. This included simulations on **poverty, age, visual impairment, and hearing impairment**.
- Worked with a multinational company to design and manufacture modular work kits that eased the **workspace transformation** of 326 employees. Worked as a three-member team and completed the project within a short span of 2 months by applying the **Rapid Response Process** for design innovation.

Research Assistant, Singapore University of Technology and Design (Dec 2013- July 2015)

Lead: Prof Katja Hölttä-Otto, Associate Professor, Engineering Product Development, SUTD

- Applied a 'lead-user' approach to creating **universal design solutions**. The elderly users were involved as lead-users to design products used by the general population.
- Prepared a successful grant proposal for a project that aimed at error reduction in the work environment. This focused mainly on **preventing interaction errors in medical instruments** by catering for the design needs of end-users.

KEY RESEARCH TERMINOLOGY

Extreme-user: Users who experience needs that are latent among the general population and have the potential to inspire design professionals.

HONORS/AWARDS

- SUTD President's Graduate Fellowship: Sept 2016- Sept 2021
- Journal of Mechanical Design Editors' Choice Award: ASME 2020
- Teaching Assistant Excellence Award: SUTD EPD 2019
- Best Paper: ASME IDETC 2019
- Best Poster: ICDC 2016
- Finalist: Red Dot Design Awards 2015
- Student Delegate: USLS2018
- Performance-Based Scholarship: Feb 2010

Publications

- Raviselvam Sujithra, Katja Hölttä-Otto, Kristin L. Wood, Karupppasamy Subburaj (2022) "Systematic Application of Extreme-User Experiences: Impact on the Outcomes of an Undergraduate Medical Device Design Module," Biomedical Engineering Education (Under review: Minor revisions).
- Raviselvam, Sujithra, Shiroq Al-Megren, Kyle Keane, Katja Hölttä-Otto, Kristin L. Wood, and Maria C. Yang. (2021) "Simulation Tools for Inclusive Design Solutions." In Universal Design 2021: From Special to Mainstream Solutions, pp. 210-218. IOS Press.
- Raviselvam, Sujithra, Hwang Dongwook, Bradley Camburn, Karen Sng, Katja Hölttä-Otto, and Kristin L. Wood. (2021) "Extreme-user Conditions to Enhance Design Creativity and Empathy- Application Using Visual Impairment." International Journal of Design Creativity and Innovation.
- Camburn, Bradley, Ryan Arlitt, David Anderson, Roozbeh Sanaei, Sujithra Raviselam, Daniel Jensen, and Kristin L. Wood. (2020) "**Computer-aided mind map generation via crowdsourcing and machine learning.**" Research in Engineering Design 31: 383-409.
- Alqadi, Reem, Maryam Alhowaiti, Fatimah Almohaimed, Mawaddah Alsabban, and Sujithra Raviselvam. (2020) "**Crowdsourcing Accessibility: A Review of Platforms, Mobile Applications and Tools.**" In International Conference on Human-Computer Interaction, pp. 10-17. Springer, Cham.
- Camburn, Bradley, Yuejun He, Sujithra Raviselvam, Jianxi Luo, and Kristin Wood.(2020) "**Machine learning-based design concept evaluation.**" Journal of Mechanical Design 142, no. 3 [Received Editors' Choice Award].
- Bradley Camburn, Yuejun He, Raviselvam Sujithra, Jianxi Luo, Kristin L. Wood. (2019) "**Evaluating Crowdsourced Design Concepts with Machine Learning**" ASME 2019 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. American Society of Mechanical Engineers[Received Best Paper Award].
- Raviselvam Sujithra, Katja Hölttä-Otto, Kristin L. Wood, Karupppasamy Subburaj. (2019) "**An Extreme User Approach to Identify Latent Needs: Adaptation and Application in Medical Device Design.**" ASME 2019 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. American Society of Mechanical Engineers.
- Raviselvam Sujithra, David Anderson, Katja Hölttä-Otto. (2018) "**Systematic Framework to Apply Extraordinary User Perspective to Capture Latent Needs Among Ordinary Users.**" ASME 2018 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. American Society of Mechanical Engineers.
- Sng Hui En Karen, Sujithra Raviselvam, Lucienne T. Blessing, Kristin L. Wood. (2017) "**A design case study: Transferring design processes and prototyping principles into industry for rapid response and user impact.**" ICED17 21st International Conference on Engineering Design".
- Raviselvam Sujithra, Sanaei Roozbeh, Lucienne T. Blessing, Katja Hölttä-Otto, and Kristin L. Wood. (2017) "**Demographic Factors and Their Influence on Designer Creativity and Empathy Evoked through User Extreme Conditions.**" ASME 2017 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. American Society of Mechanical Engineers.

RESEARCH INTERESTS

- Latent user-needs for design innovation
- Extreme-user experiences and cognitive load
- Design methods
- Inclusive design

SKILLS

- Solid Works
- MATLAB
- LabVIEW
- Design Methods

LANGUAGES

- English
- Tamil
- Hindi
- Japanese (Learning)
- Chinese (Learning)
- French (Learning)

INTERESTS

- Art
- Language
- Books
- Martial arts
- Dance

- Raviselvam, Sujithra, Katja Hölttä-Otto, and Kristin L. Wood. (2016) "**User Extreme Conditions to Enhance Designer Empathy and Creativity: Applications Using Visual Impairment.**" ASME 2016 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. American Society of Mechanical Engineers.
- Hölttä-Otto, Katja, and Sujithra Raviselvam. (2016) "**Guidelines for Finding Lead User Like Behavior for Latent Need Discovery.**" DS 85-2: Proceedings of NordDesign 2016, Volume 2, Trondheim, Norway, 10th-12th August 2016.
- Poster Presentation: Raviselvam, Sujithra, Karen Sng, and Kristin Wood. (2016) "**Design Knowledge and Impact on Simulation Induced Creativity and Empathy.**" DS86: Proceedings of The Fourth International Conference on Design Creativity, Georgia Institute of Technology, Atlanta, GA, USA. [Received Best poster award]
- Raviselvam, Sujithra, Kristin L. Wood, Katja Hölttä-Otto, V. Tam, and Kamy Nagarajan. (2016) "**A Lead User Approach to Universal Design-Involving Older Adults in the Design Process.**" Studies in health technology and informatics 229: 131. DOI 10.3233/978-1-61499-684-2-131.
- Raviselvam, S., Noonan, M., & Hölttä-Otto, K. (2014). "**Using elderly as lead users for universal engineering design.**" Universal Design, 366-375. DOI 10.3233/978-1-61499-403-9-366.

References:

- **Prof Katja Hölttä-Otto**, Professor of Engineering Design, University of Melbourne, Australia.
- **Prof Kristin L. Wood**, Professor, Senior Assoc. Dean, University of Colorado Denver.