

JINJUAN SHE

Interdisciplinary Research in Sustainable Design Lab, Department of Mechanical Engineering,
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RESEARCH INTERESTS

User-centered design methodologies; socio-technical systems; design for behavior change; consumer decision-making; human factors; cognitive learning in engineering class

EDUCATION

Ph.D., Mechanical Engineering, with Minor in Statistics, Iowa State University, 2013

Dissertation: "Designing Features that Influence Decisions about Sustainable Products"

Advisor: Erin MacDonald, Assistant Professor of Mechanical Engineering and Art & Design

M.S., Mechanical Engineering, Wuhan University, China, 2009

B.S., Mechanical Engineering, Wuhan University, China, 2007

HONORS & AWARDS

Teaching Excellence Award, Iowa State Univ., Fall 2013

Certificate on Bounded Rationality Summer School, Max Planck Institute for Human Development, Berlin, 2013

Seward, Ratcliffe, and Galloway Foundation Mechanical Engineering Fellow, Iowa State Univ., 2009-2010

First-level Scholarship for Outstanding Graduate Student, Wuhan Univ., 2008

Outstanding Graduate Student Organization Leader, Wuhan Univ., 2008

"Top Ten" Excellent Students, School of Power & Mechanical Engineering, Wuhan Univ., 2006

First-level National Scholarship Recipient, China, 2005

Social Activity Award, Wuhan Univ., 2005

RESEARCH

Dissertation: Well-designed sustainable features are sometimes hidden from customers, which will be wasted if customers do not value or know them. I hypothesized and tested that this challenge can be addressed through design. I created a design method that helps product designers communicate sustainability via specifically-designed product features, and in turn, helps customers to think about sustainability during purchase decisions.

- **Step 1: Create design method to enhance designers' abilities to communicate the sustainability of products to customers**

Using the concept of priming from psychology, created and tested a sensory-focused method to create product features that communicate sustainability to the customer; judged effectiveness of the generated design with design experts in a lab environment and customers online (using Amazon Mechanical Turk).

- **Step 2: Influence decision context for sustainable thinking with communication features**

Built physical prototypes of some features generated in Step 1 and tested their effectiveness influencing thoughts of sustainability. Used quantitative and qualitative preference-elicitation methods from marketing to demonstrate that exposure to these communication features increases thoughts of purchase criteria related to sustainability.

- **Step 3: Affect decision-making process and decisions with communication features**

Simulated complex purchase scenarios with overwhelming product information, and demonstrated that sustainability communication features cause customers to search for other “hidden” product attributes related to sustainability, such as energy usage and shipping method. The features increased these hidden attributes' importances in their decision-making, and positively affected purchase decisions towards sustainability. User research methods used included: choice, willingness to pay, information search, eye tracking, rating, and interviews.

Ongoing project: Investigate customer sensory perceptions to inform product design

Judgments and decisions about products are not always consistent. We are developing a new user research method to capture customer consistent and inconsistent sensory perceptions on sustainability, functionality, and their willingness to purchase products. The results will help designers to get insights about which sensory associations should be avoided or advocated while designing a sustainable product.

PUBLICATIONS

Journal Publications

1. She, J., and MacDonald, E., 2014, “[Priming Designers to Communicate Sustainability](#),” Journal of Mechanical Design, 136(1), 011001.
2. MacDonald, E., and She, J., “[Seven Cognitive Concepts for Successful Sustainable Design](#),” Journal of Cleaner Production (Under review).

Peer-Reviewed Conference Proceedings

3. She, J., and MacDonald, E., 2013, “[Trigger Features on Prototypes Increase Preference for Sustainability](#),” ASME International Design Engineering Technical Conference/ Design Theory and Methodology, Portland, Oregon, Aug. 4-7.
4. She, J. and MacDonald, E., 2012, “[Priming Designers to Communicate Sustainability](#),” ASME International Design Engineering Technical Conference/ Design Theory and Methodology, Chicago, Aug. 12-15.
5. MacDonald, E., and She, J., 2012, “[Seven Cognitive Concepts for Successful Sustainable Design](#),” ASME International Design Engineering Technical Conference/ Design Theory and Methodology, Chicago, Aug. 12-15.
6. Wu, S., Li, Q., Zhu, E., She, J., and Qing, M., 2008, “[A Hybrid Intelligent System for Pipeline Robot Navigation in Unknown Environment](#),” International Conference on Intelligent Robotics and Application, Wuhan, China, Oct. 15-17.

WORKING PAPERS

1. She, J., and MacDonald, E., "Design Features Influence Decisions about Sustainable Products," Journal of Mechanical Design (In preparation).
2. She, J., MacDonald, E., Conner Seepersad, C., and Hölttä-Otto, K., "Priming Improves Product Design," Journal of Experimental Psychology: Applied (In preparation).

TEACHING & MENTORING EXPERIENCE

Teaching Assistant, Department of Mechanical Engineering, Iowa State University

- **Introduction to Mechanical Engineering Design**, Fall 2012, Spring 2013

Advised 14 teams (5 to 6 students per team) in product design for developing countries by using Design for Six Sigma method, with 30% of the teams entering the final competition for products created in the class; graded

assignments and provided support in customer needs identification, conceptualization, documentation, prototype fabrication, validation, data analysis, and business plan proposal.

- **Creativity and Imagination in Engineering Design**, Fall 2011 (Volunteer teaching assistant)
Helped the instructor to coordinate class activities (26 undergrads and 5 graduate students); lectured on multicultural learning experiences and creativity; assisted students with their design projects.
- **Engineering Measurement and Instrumentation**, Fall 2009, Spring 2010
Led three lab sections in each semester (12 students per section); guided students to the new theories and concepts such as instrument uncertainty, precision error, propagation error; helped students understand and get hands-on experience of various measurement systems and techniques, such as first/second order system, data acquisition/sampling, strain gauge, and pendulum vision system.

Undergraduate Research Advisor, Interdisciplinary Research in Sustainable Design Lab, Iowa State University, Feb. 2013- present

Supervised two undergraduate students to complete research projects regarding a novel method for studying user sensory perceptions regarding sustainability, functionality, and consumer preferences.

PROFESSIONAL EXPERIENCE

Participant, The 12th Summer Institute on Bounded Rationality, Max Planck Institute for Human Development, Berlin, Germany, Jun. 18-25, 2013.

Chosen to be one of 35 participants internationally and issued a certificate for successful completion of the summer institute on bounded rationality; attended 14 talks, worked on team projects in five workshops, made two poster presentations, interacted with faculty and peers from over 10 different fields regarding heuristic process and heuristic modeling.

PRESENTATIONS

1. Delivered the three peer-reviewed conference presentations cited in Publications section above (#3,4,6).
2. She, J., and MacDonald, E., 2013, "Priming Communication of Sustainability in Design," Presented at Mechanical Engineering Graduate Student Seminar, Ames, IA, Nov. 4.
3. She, J., and MacDonald, E., 2013, "Sustainable Design Cues Affect Customer Preference Constructions," Presented at Max Planck Summer Institute on Bounded Rationality, Berlin, Germany, Jun. 18-25.
4. She, J., and MacDonald, E., 2013, "Trigger Features on Prototypes Increase Preference for Sustainability," Presented at 4th Annual Symposium on Sustainability, Ames, IA, Feb. 25.
5. She, J., and MacDonald, E., 2012, "Communicate Sustainability in Design," Presented at 4th Annual Graduate Research Symposium, Ames, IA, Mar. 29.
6. She, J., and MacDonald, E., 2012, "Communicate Sustainability in Design," Presented at Sustainapalooza, IA, Feb. 28.
7. She, J., and MacDonald, E., 2011, "Creation of Design Methods that Facilitate Customer Decision-Making on Sustainable Products," Presented at INFORMS Conference, Charlotte, NC, Nov. 13-17.
8. She, J., and MacDonald, E., 2011, "Creation of Design Methods that Facilitate Customer Decision-Making on Sustainable Products," Presented at 3rd Annual Symposium on Sustainability, Ames, IA, Feb. 21.

JOURNAL REVIEWER

Journal of Cleaner Production

ACTIVITIES & SERVICE POSITIONS

Judge, The State Science and Technology Fair of Iowa, Ames, IA, Mar. 30, 2012

Reviewer, ISU Second Year Undergraduate Architecture Design Project Review, Ames, IA, Feb.3, 2012

Judge Assistant, Iowa FIRST LEGO League (FLL) State Championship, Jan. 14, 2012

President, Graduate Class of Mechanical Engineering, Wuhan Univ., China, 2007-2009

Graduate Administrative Assistant, Graduate College, Wuhan Univ., China, 2007-2008

Committee member, Student Union in School of Power & Mechanical Engineering, China, 2005-2006

MEMBERSHIPS

American Society of Mechanical Engineering

Human Factors and Ergonomics Society

INFORMS

Honor Society