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# Nikolas Martelaro

## Education

Current **Stanford University**, Stanford, CA,
PhD Candidate in Mechanical Engineering: DesignX Group.
Advisor: Larry Leifer

March 2015 **Stanford University**, Stanford, CA,
Masters in Mechanical Engineering: Design Group.
**Coursework Includes:** ME310 Global Design Innovation, ME218abc Smart Product Design, COMM269 Computers and Interfaces, STATS110 Intro to Statistics, ME110 Design Sketching

May 2012 **Franklin W. Olin College of Engineering: Full tuition scholarship**, *Needham, MA*,
Bachelor of Science in Engineering: Design, *GPA 3.85*.
**Coursework includes:** Product Design and Development; User-Oriented Collaborative Design; Dynamics; Thermodynamics; Transport Phenomena; Signals and Systems; Principles of Engineering; Numerical Methods & Scientific Computing; Computational Statistics; Software Design; Design for Manufacturing; Circuits; Mechanical Design; Systems Design; Affordable Design & Entrepreneurship

## Experience

### Current Research

### Design Research

AY 2012-13 **Stanford University**, *Research Assistant*, Stanford, CA, In collaboration with Dr. Malte Jung (Cornell) and Dr. Pamela Hinds (Stanford).
**Human-team robot interaction during high stress activities:** Working to design and develop a "Wizard-of-Oz" experimental study to explore how robots can interact and influence team activity during high stress activities. Developing robot hardware using Arduino and designing human-robot interaction.

AY 2012-13 **Stanford University**, *Research Assistant*, Stanford, CA, In collaboration with Dr. Malte Jung (Cornell) and Dr. Clifford Nass (Stanford).
**Participatory Prototyping Materials:** Designed and developed an interactive prototpying system using Arduino. Ran a 2x2 factorial study with 65 high school student exploring the efficacy of prototyping materials that interact with the user. Analyzed data and collaborated on paper submission to DIS 2014 (“Participatory Materials: Having a Reflective Conversation with an Artifact in the Making”).

AY 2012-13 **Stanford University**, *Research Assistant*, Stanford, CA, In collaboration with Dr. Malte Jung (Cornell) and Dr. Martin Steinert (Stanford).
**The Personal Trait Myth - A comparative analysis of the innovation impact of design thinking tools and personal traits**: Research aiming to untangle influence of dispositional factors versus situation factors in individual’s creative capacity. Helped design experimental study and analyzed data. Co-authored a book chapter for “Design Thinking” book series for Springer.

Summer 2012 **MITRE**, *Technical Intern*, Bedford, MA, In collaboration with Dr. Ozgur Eris (TU Delft) and Tina Crotty (MITRE).
Development of support environments for distributed engineering activity. Collaborating on case study for submission (Working title: “Development of a Survey Instrument for Assessing Collaboration Outcomes in Facilitated Design Meetings”)

Spring 2012 **Franklin W. Olin College**, *Researcher*, Needham, MA, In collaboration with Dr. Lawrence Neeley.
Research on individual product designer product realization stories and processes within the Kickstarter community. Focusing on using research insights to develop tools and processes to aid individual product designers.

Spring 2012 **Franklin W. Olin College**, *Researcher*, Needham, MA, In collaboration with Dr. Ozgur Eris (TU Delft).
Continuing micro-behavioral analysis of designers using a distributed sketching system. Co-authoring paper for submission to Design Studies. Working title: "A Comparative Analysis of Multimodal Communication During Design Sketching in Co-located and Distributed Environments."

Summer 2011 **MITRE**, *Technical Intern*, Bedford, MA.
Conducted industry research characterizing distributed engineering design at MITRE. Helped develop and run experimental observations, analyzed data, and co-identified new factors in distributed collaboration.

Summer 2010 **Franklin W. Olin College of Engineering**, *Researcher*, Needham, MA.
Redesigned, built, and tested a distributed sketching system for geographically separated designers. Co-developed research tasks and analysis methods. Prepared and analyzed data for publication with custom analysis code.

Eris, O., Martelaro, N. "A Comparative Analysis of Collaborative Sketching Interactions of Designers in Co-located and Distributed Environments," Proceedings of Design Thinking Research Symposium – DTRS8, Sydney, Australia, 2010, pp. 149-162

Summer 2009 **Franklin W. Olin College of Engineering**, *Miller Fellowship Researcher*, Needham, MA.
Prototyped hardware and software for a distributed sketching system for use by geographically separated designers. Developed custom Python software to interface with a test system consisting of two USB cameras and high resolution displays. Awarded $7500 Miller Fellowship for summer undergraduate research.

## Course Projects

Spring 2014 **World Cup: Mechatronic RC Hovercraft Design and Development**, *ME218c: Smart Product Design Practice*.
4 week long group project focused on the design and development of an RC hovercraft. Design and development of hovercraft and controller using FreescaleMX and PIC microprocessors and off the shelf electronics components. Team designed mechanical, electrical, and software sub-systems. Focus on serial UART communication, wireless XBee comuunication, communication protocols, and multiprocessor systems.

Winter 2014 **Joustball: Mechatronic Robot Design and Development**, *ME218b: Smart Product Design Applications*.
3 week long group project focused on the design and development of a robotic, autonomous jousing robot. Design and development using FreescaleMX microprocessors and off the shelf electronics components. Team designed mechanical, electrical, and software sub-systems. Focus on SPI communication, motor and servo actuation, microprocessor peripherals, hierarchical state machines, and autonomous systems.

Fall 2013 **Marathon Beekeeping: Mechatronic Game Design and Development**, *ME218a: Intro to Smart Products*.
3 week long group project focused on the design and implementation of an interactive, 2-player arcade-style game. Design and development using FreescaleMX microprocessors and off the shelf electronics components. Team designed mechanical, electrical, and software sub-systems. Focus on analog circuit design, state machines, and interactive systems.

AY 2012-13 **CRUISE: Car data acquisition for informing would-be EV drivers**, *ME310 Global Design Innovation*.
Year-long product development project from concept to pre-production. Worked with a global team from Norway to realize a consumer electronic device to collect data on driver behavior and provide simulated EV performance via a mobile application.

Fall 2011 **Affordable Cassava Grater for use in rural Ghana**, *Affordable Design and Entrepreneurship*.
Continued design and development of a consumer-class cassava grater for rural communities to use in an income generating business. Worked to specify electromechanical components for production ready product. Traveled to Ghana to conduct on site community engagement and system development.

Fall 2011 **Steam Engine Design and Fabrication**, *Mechanical Design*.
Designed, analyzed, and fabricated a small scale steam engine with a team of 4.

Spring 2011 **Research Submarine Fin Drive System Redesign**, *Design for Manufacturing*.
Redesigned the fin actuation system of an unmanned, research submarine for lower cost, easier assembly, and improved functionality. Team of 3 presented work to industry partner for integration into their submarine.

Fall 2010 **Low Flow Shower Appliance**, *Product Design and Development*.
Designed and prototyped a low flow, misting shower head providing a pleasurable showering experience with water savings of 25%. Interdisciplinary team with business and industrial design students.

Spring 2010 **Inner City High School Teacher User Design Project**, *User Oriented Collaborative Design*.
Studied inner city high school teachers in user focused product design process. Team of four conducted on site user research, developed personas, and created an conceptual prototype of a resource sharing system.

Fall 2009 **Autonomous Robot Development**, *Principles of Engineering*.
Developed an autonomous robot able to sense and map its environment, communicating wirelessly with a remote computer. Worked with a team of two other students to design and build all electromechanical elements. Developed both embedded and scripted algorithms.

## Teaching Experience

Winter 2014 **Stanford University**, *Course Assistant for Prototyping and Rapid Experiment Lab*.
Assisting design teaching team in studio based course on using prototyping and rapid experiments during the design process. Tasks include design process coaching during and outside of class and lecturing on prototpying tools and methods.

Spring 2012 **Franklin W. Olin College of Engineering**, *Course Assistant for User Oriented Collaborative Design*.
Assisting design teaching team in studio based, second year User Oriented Collaborative Design course. Tasks included providing design process coaching during and outside of class time and performing logistical tasks for course operation.

## Awards

2013 **NSF Graduate Research Fellowship Program**, *Stanford University*.
Awarded 3 year NSF GRFP fellowship for proposal of research on improving STEM education through participatory prototpying materials.

Summer 2009 **Miller Research Fellowship**, *Franklin W. Olin College of Engineering*.
Awarded $7500 Miller Fellowship for summer undergraduate research.

## Invited Talks

October 2013 **Prototyping Tool and Methods**, *SUGAR: Global Stanford ME310 Network Kickoff*, Radicand Labs, Redwood City, CA.

## Leadership and Activities

Fall 2009 - Spring 2012 **Olin Mini Baja Drivetrain Team**.
Design Manager 2011-2012, directing 30 student engineers. Lead overall design process and system integration of four subteams: drive train, body, suspension, and electrical. Tasks include: project management, design process planning, subsystem integration and communication

## Skills

Design User research, need identification, persona creation, rapid prototype creation, user testing, product design, interaction design

Engineering Mechanical design & analysis, scientific programming, embedded systems development (Arduino, PIC, & FreescaleMX), electrical circuit design, PCB layout, 3D printing, Laser cutting, woodworking, rapid paper prototpying

Software SolidWorks Design & Simulation, Python, MATLAB, SPSS, Embedded C, Adobe Creative Suite, LaTeX