

KATHERINE W. SONG

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EDUCATION:

- **S.M., Massachusetts Institute of Technology**, Cambridge, MA, 2011-2013
Ph.D. ABD
Department of Electrical Engineering and Computer Science (EECS)
Cumulative GPA: 4.92/5.00
- **B.S.E. with Highest Honors, Princeton University**, Princeton, NJ, 2007-2011
Major: electrical engineering; Certificates (minors): materials science, applications in computing
Cumulative GPA: 3.94/4.00

WORK EXPERIENCE:

- **Display Electrical Engineer**, Apple Inc., February 2015-October 2017
Manager: Dr. Marc DeVincentis
Responsibilities:
 - Direct Responsible Individual for design, from conception to mass production, of iPhone X display [rigid] flex PCB
 - DRI for iPhone X and Watch 2 failure analysis during assembly, software bring-up, and reliability testing at factory sites
 - Prototyping and collaboration with external vendors to develop new display and module packaging technologies

RESEARCH EXPERIENCE:

- **Graduate Research Fellow**, MIT Media Lab & Charles Stark Draper Laboratory, May 2013-December 2014
Advisers: Professor Hugh Herr (MIT Media Lab), Dr. Bryan L. McLaughlin (Draper Laboratory)
Project:
 - Implantable silicone microchannel array for bi-directional prosthesis control
- **Graduate Research Fellow** (S.M. research), MIT, August 2011-May 2013
Adviser: Professor Vladimir Bulovic, Department of Electrical Engineering and Computer Science
Projects:
 - Electrophoretic deposition of core-shell quantum dots for light emitting devices (LEDs)
 - Fabrication of near-infrared LEDs using core-shell PbS-CdS quantum dots
- **Visiting Researcher**, Palo Alto Research Center, Palo Alto, CA, Summer 2010
Host: Dr. Robert A. Street, Senior Research Fellow
Project: Characterization of organic bulk heterojunction and silicon nanowire solar cells
- **Undergraduate Researcher**, Princeton University, Princeton, NJ, Jan. 2009-May 2011
Advisers: Professors Sigurd Wagner and Naveen Verma, Department of Electrical Engineering
Projects:
 - Fabrication of a top-gate staggered thin-film transistor structure using a new hybrid material as a gate dielectric
 - Mechanical flexibility studies of TFTs made with the new gate dielectric on a plastic substrate
 - Design and fabrication of an amorphous-Si-based circuit to serve an interface between large-area electronics sheets and nanoscale integrated circuit chips for a structural health monitoring application
- **Undergraduate Researcher**, Carnegie Mellon University, Pittsburgh, PA, Summer 2008
Adviser: James W. Schneider, Professor, Department of Chemical Engineering
Project: Electrophoretic sorting of carbon nanotubes by DNA-surfactant tagging

TEACHING EXPERIENCE:

- **Instructor**, Online SAT Essay Course, Fall 2018

Taught class of 30 students in Singapore how to write the SAT Essay and improve their ability to read/write argument
Led lectures and workshops on the Zoom platform

- **Teaching Assistant**, MAS.600: Human 2.0, Spring 2014
- **Laboratory Assistant**, ELE208: Fundamentals of Semiconductor Devices, Spring 2011
- **Teaching Assistant**, ELE302: Systems Design and Analysis, Spring 2011
- **Writing Center Fellow**, Princeton University Writing Program, Fall 2008-Spring 2011
One of ~50 selected undergraduate and graduate student fellows
Advised students on writing and oral presentations varying in topic and discipline
- **Peer Tutor**, Princeton University Office of the Dean of College, Fall 2009-Spring 2011
Offered assistance for 9 technical classes in engineering, math, physics, and computer science

LEADERSHIP, MENTORING, & VOLUNTEERING EXPERIENCE:

- **Technical Mentor**, FIRST Robotics Competition Team #7419, Sep. 2018 - present
Guide the robot design and program management for the first FRC team for Quarry Lane HS (Dublin, CA)
- **Volunteer**, Nepal Volunteers Council, Kathmandu, Nov 2016
Set up a computer lab for a school in Kathmandu, Nepal by repairing old donations and salvaging parts
- **Co-chair**, 2013 MIT Microsystems Technology Laboratories Annual Research Conference (MARC2013)
Led the planning and execution of a ~300-attendee, student-run annual conference
Spearheaded the introduction of new types of technical presentations and interactive fun/educational opportunities
- **Bursar, Hiking Leader, Winter School Leader, Climbing Leader**, MIT Outing Club, 2012-2014
Managed incoming finances, prepared annual budget, voted on club initiatives
Led club hiking/climbing trips to various locations in the Northeast
- **Princeton Engineering School Tour Guide and Coordinator**, Jan. 2010-May 2011
Led visitor tours of the School of Engineering and Applied Science 1-2 times per week
- **Vice-President**, Tau Beta Pi (engineering honor society) – New Jersey Delta chapter, Jan. 2010-May 2011
Served on the Committee for Financial Affairs as the chapter's voting delegate at the national TBP convention
- **Design Team Captain and Vice-President**, Int'l Assoc. for Hydrogen Energy – Princeton Chapter, 2010-2011
Led design of a solar-powered hydrogen generator for the first annual IAHE design competition – **placed 1st**
Recruited speakers for seminar series
- **Co-President, Head of Layout/Publishing**, *Princeton Science in Society* journal, 2007-2011
Led publicity efforts and organized speaker and film screening events
Trained new members with Adobe InDesign and electronic layout design
Oversaw and managed layout process for biannual issues and worked out contracts with publishing companies
- **Co-President (2010-2011) and Secretary (2009-2010)**, Princeton University Materials Research Society
Helped organize a "Making Stuff" event as part of a PBS educational series
Organized dinner talks, study breaks, tours of regional companies and laboratories, etc.
- **Undergraduate Representative**, Princeton Imaging and Analysis Center Users Committee, 2009-2011
Helped make decisions related to imaging equipment purchases and usage
- **Mentor (volunteer)**, Princeton University Society of Women Engineers, Fall 2009-Spring 2011
Assisted underclassmen women engineers with course selection, study strategies, etc.
- **Freshman Advising Interactor (volunteer)**, Princeton University School of Engineering, 2009-2010
Assisted Professor C. Friedman (computer science) with course advising for freshman engineers
- **Treasurer**, Princeton kendo club, Spring 2008-Fall 2009

Prepared and presented annual budget to the Sports Clubs committee
Collected member dues and made club purchases

JOURNAL PUBLICATIONS & CONFERENCE PAPERS:

1. "Assessment of nerve regeneration through a novel microchannel array." Benjamin Maimon, Anthony N. Zorzos, **Katherine Song**, Rhyse Bendell, Ron Riso, Hugh Herr, *International Journal of Physical Medicine & Rehabilitation*, **4**, 2 (2016).
2. "High-performance shortwave-infrared light-emitting devices using core-shell (PbS-CdS) colloidal quantum dots." Geoffrey J. Supran, **Katherine W. Song**, Gyuweon Hwang, Raoul Correa, Jennifer Scherer, Yasuhiro Shirasaki, Mounqi Bawendi, Vladimir Bulovic, *Advanced Materials* **27**, 8 (2015).
3. "QLEDs for displays and solid-state lighting." Geoffrey J. Supran, Yasuhiro Shirasaki, **Katherine W. Song**, Jean-Michel Caruge, Peter T. Kazlas, Seth Coe-Sullivan, Trisha L. Andrew, Mounqi G. Bawendi, Vladimir Bulović, *MRS Bulletin* **38**, 9 (2013).
4. "Electrophoretic deposition of CdSe/ZnS quantum dots for light emitting devices." **Katherine W. Song**, Ronny Costi, Vladimir Bulovic, *Advanced Materials* **25**, 10 (2013).
5. "High-resolution sensing sheet for structural-health monitoring via scalable interfacing of flexible electronics with high-performance ICs." Yingzhe Hu, Warren Rieutort-Louis, Josh Sanz-Robinson, **Katherine Song**, James Sturm, Sigurd Wagner, Naveen Verma, *VLSI Symp. Circuits* (2012).
6. "The homemaker's hydrogen generator: A report for IAHE student hydrogen design competition 2010" Yin Liang, **Katherine Song**, Leo Shaw, Michael Zhu, Alex Tait, Nicole Businelli, Jane Yang, Ryan Soussan, Haonan Zhou, Thomas Mbise, *International Journal of Hydrogen Energy* **36**, 13880 (2011).
7. "Photoconductivity measurements of the electronic structure of organic solar cells." Robert A. Street, **Katherine W. Song**, John Northrup, Sarah Cowan. *Physical Review B* **83**, 165207 (2011).
8. "Influence of diode series resistance on the photocurrent analysis of organic semiconductors." Robert A. Street, **Katherine W. Song**, Sarah Cowan, *Organic Electronics* **12**, 244 (2011).
9. "New insulator for thin-film transistor backplanes and for flexible passivation layers." Lin Han, **Katherine Song**, Sigurd Wagner, Prashant Mandlik. *Electrochemical Society Transactions* "Thin Film Transistors 10 (TFT 10)," **33**, 125 (2010).
10. "Amorphous silicon TFT technology for rollable OLED displays." Sigurd Wagner, Lin Han, Bahman Hekmatshoar, **Katherine Song**, Prashant Mandlik, Kunigunde H. Cherenack, James C. Sturm. *Society for Information Display Digest* **10**, 917 (2010).
11. "a-Si:H TFTs with a new hybrid dielectric highly stable under mechanical and electrical stress." Lin Han, **Katherine Song**, Prashant Mandlik, Sigurd Wagner. *Society for Information Display Digest* **10**, 238 (2010).
12. "Ultra-high flexibility of amorphous silicon transistors made with a resilient insulator." Lin Han, **Katherine Song**, Prashant Mandlik, Sigurd Wagner, *Applied Physics Letters* **96**, 042111 (2010).
13. "Effects of mechanical strain on the electrical performance of amorphous silicon thin-film transistors with a new gate dielectric." **Katherine W. Song**, Lin Han, Sigurd Wagner, Prashant Mandlik, *Proceedings of the Materials Research Society Volume 1196*, C02-02 (2010).

CONFERENCE PRESENTATIONS:

1. "Microfabricated, regeneration-based peripheral nerve interface for recording and stimulation," **Katherine W. Song**, Ronald R. Riso, Hugh M. Herr, *Neural Interfaces Conference*, Dallas TX. 23 June 2014 (poster).
2. "Electrophoretic deposition of CdSe/ZnS quantum dots for light emitting devices," **Katherine W. Song**, Ronny Costi, Vladimir Bulovic, *MRS Fall Meeting*, Boston MA. 28 Nov 2012 (poster).
3. "Localized state spectroscopy in organic solar cells," Robert Street, **Katherine Song**, Alexa Krakaris, *MRS Fall Meeting*, Boston MA. 28 Nov 2011.
4. "Large area a-Si/Si nanowire hybrid solar cells," Sourobh Raychaudhuri, Rene A. Lujan, **Katherine W. Song**, Chris Paulson, Robert A. Street, *Nanotech Conference and Expo*, Boston MA. 13-16 June 2011.

5. "Top-gate thin-film transistors with a new gate dielectric," **Katherine W. Song**, Lin Han, Prashant Mandlik, and Sigurd Wagner, *Symposium A, MRS Spring Meeting*, San Francisco CA. 29 April 2011.
6. "Geometries of amorphous silicon thin-film transistors with a hybrid gate dielectric," Sigurd Wagner, Lin Han, **Katherine W. Song**, Bhadri Visweswaran, Prashant Mandlik, Yifei Huang, Bahman Hekmatshoar, James C. Sturm, *Symposium A, MRS Spring Meeting*, San Francisco CA. 29 April 2011.
7. "Density of electronic states model for organic solar cells," Robert Street, **Katherine Song**, and John Northrup, *Symposium B, MRS Spring Meeting*, San Francisco CA. 28 April 2011.
8. "Disordered nanowire based photovoltaics," Sourobh Raychaudhuri, Rene Lujan, **Katherine Song**, Chris Paulson, Robert A. Street, *Symposium B, MRS Spring Meeting*, San Francisco CA. 26 April 2011.
9. "Performance of amorphous silicon thin-film transistors under very high tensile strain." **Katherine W. Song**, Lin Han, Sigurd Wagner, *Symposium A, MRS Spring Meeting*, San Francisco CA. 07 April 2010.
10. "A novel hybrid material for flexible OLED displays." Lin Han, **Katherine Song**, Sigurd Wagner, *9th Annual Flexible Electronics and Displays Conference*, Phoenix AZ, Feb 2010.
11. "A new material for the encapsulation of plastic foil substrates." Lin Han, **Katherine Song**, Sigurd Wagner, *Symposium C, MRS Fall Meeting*, Boston MA, 30 Nov 2009.
12. "Effects of mechanical strain on the electrical performance of amorphous silicon thin-film transistors with a new gate dielectric." **Katherine W. Song**, Lin Han, Sigurd Wagner, *Symposium C, MRS Fall Meeting*, Boston MA, 30 Nov 2009.

PATENTS:

1. "Adaptive pixel uniformity compensation for display panels." Shengkui Gao, Hung Sheng Lin, Hyunsoo Kim, Hyunwoo Nho, **Katherine W. Song**, Mohammad Hajirostam, Myung-je Cho, Rui Zhang, Sang Y. Youn, Wei H. Yao, Yafei Bi. US Patent App. 15/711,831 (2018).
2. "Near-infrared light emitting device using semiconductor nanocrystals." Geoffrey J.S. Supran, **Katherine W. Song**, Gyuweon Hwang, Raoul Emile Correa, Yasuhiro Shirasaki, Mounji G Bawendi, Vladimir Bulovic. US Patent 9,935,240 (2018).
3. "Peripheral neural interface via nerve regeneration to distal tissues." Hugh M. Herr, Ronald R. Riso, **Katherine W. Song**, Richard J. Casler Jr., Matthew J. Carty. US Patent App. 15/233,241 (2016).
4. "Deposition of semiconductor nanocrystals for light emitting devices." Vladimir Bulovic, **Katherine W. Song**, Ronny Costi. US Patent 9,472,723 (2016).

SELECTED HONORS & AWARDS:

- **National Science Foundation Graduate Research Fellowship**, 2011-2014
- **Massachusetts Institute of Technology Henry Ford II Fellowship**, 2011-2012
- **Hertz Foundation Fellowship Finalist** (1 of 50 out of pool of ~600), January 2011
- **Charles Ira Young Tablet and Medal**, May 2011
 "A memorial tablet to Charles Ira Young, class of 1883, has been placed in the Engineering Bldg. by friends of Mr. Young. The medal will be awarded each year to the student who excels in research in Electrical Engineering."
 Princeton University Department of Electrical Engineering
- **Peter Mark Prize**, May 2011
 "Awarded annually to a senior in Electrical Engineering, having an outstanding record in the area of electronic materials & devices."
 Princeton University Department of Electrical Engineering
- **Outstanding Materials Student Award**, May 2011
 "PRISM's highest undergraduate honor, the 'Outstanding Materials Student Award' recognizes the combined excellence in academics, research, and dedication to materials science."

Princeton University Program in Materials Science and Engineering

- **Tau Beta Pi Prize**, May 2011
“This award is given to a senior class member, or members, who have significantly contributed a major part of his or her time in service to the SEAS.”
Princeton University
- **Phi Beta Kappa** (inducted as top 10% of graduating class), Spring 2011
- **Sigma Xi** (scientific research honor society), Spring 2011
- **Barry M. Goldwater Scholarship**, April 2010
- **Tau Beta Pi** (inducted as top 1/8th of junior class), Fall 2009
- **Shapiro Prize for Academic Excellence**, September 2008
Princeton University
- **Manfred Pyka Memorial Physics Prize**, June 2008
Princeton University Physics Department
- **Robert C. Byrd Honors Scholarship**, 2007-2011
United States Department of Education
- **National Merit Scholarship**, 2007

ONLINE COURSEWORK:

- **PennX – ROBO1x** Robotics: Kinematics and Mathematical Foundations (Matlab)
- **PennX – ROBO2x** Robotics: Vision Intelligence and Machine Learning (Matlab)
- **PennX – ROBO3x** Robotics: Dynamics and Control (Matlab)
- **MITx – 2.008x** Fundamentals of Manufacturing Processes
- **DelftX – ROS1x** Hello (Real) World with ROS – Robot Operating System
- **Microsoft – DEV318x** Design Thinking: UX and Advanced Topics

SKILLS & HOBBIES:

- **Laboratory:** PDMS/silicone microstructure molding and assembly; integrated circuits design, fabrication, and evaluation (laser mask writing, PECVD, thermal/e-beam evaporation, sputtering, mask alignment/lithography, reactive ion etching, wet etching [including HF], parameter analyzer testing); scanning electron microscopy and focused ion beam milling; atomic force microscopy; profilometry; fluorescence and absorbance spectrophotometry; capillary electrophoresis; dynamic light scattering; mechanical testing; general metal and wood shop (mills, routers, lathes, grinders); general wet lab (pipetting, spin casting, purification, cell culture, PCR, etc.).
- **Computing:** Matlab, Python, Java/J#, C, LaTeX. Exposure to Verilog, Mathematica, assembly (IA-32 architecture; DSP5680x microprocessor), HTML, CSS.
- **Digital Design:** Mechanical/layout design software (SketchUp, L-Edit and AutoCAD), Adobe Illustrator/InDesign/Photoshop, circuit simulation and PCB layout software (Cadence, SPICE, Nanosim).
- **Foreign Languages:** Mandarin Chinese (1 yr of advanced track at Princeton) and Spanish (4 yrs before college)
- **Other Interests:** rock climbing, hiking, running, woodwork, travel