

KRISTEN ("KRIS") L. DORSEY

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EDUCATION

PhD in Electrical and Computer Engineering Carnegie Mellon University, Pittsburgh, PA Dissertation title: "Dielectric Charging in CMOS MEMS"	2013
MS in Electrical and Computer Engineering Carnegie Mellon University, Pittsburgh, PA	2011
BS in Electrical and Computer Engineering Olin College of Engineering, Needham, MA	2007

ACADEMIC APPOINTMENTS

Associate Professor, Department of Electrical and Computer Engineering and Department of Physical Therapy, Movement, and Rehabilitation Sciences, Northeastern University, Boston, MA	2021–Present
Dr. Martin Luther King, Jr, Visiting Associate Professor, Media Arts and Sciences, MIT, Cambridge, MA	2021–2022
Assistant Professor of Engineering Picker Engineering Program, Smith College, Northampton, MA	2015–2021
Visiting Scholar Wyss Institute, Harvard University, Cambridge, MA	2018–2021
UC President's Postdoctoral Fellow, PRIME Systems Laboratory University of California, San Diego, San Diego, CA	2014–2015
UC Berkeley Chancellor's Postdoctoral Fellow, PRIME Systems Laboratory University of California Berkeley, Berkeley, CA	2013–2014

EXTERNAL FUNDING AWARDED

Total: \$816,972
PI Dorsey awarded: \$816,972

Mathworks, "Determining limb swelling during physical exertion from a sensing band," 05/06/2022-04/30/2023, \$25,000 , PI
Amazon Robotics, "Rapid and soft tactile sensors using conductive buckled beams," 12/21/2021, \$250,000 , PI
National Science Foundation, "CAREER: Rigidity tuned elastomer origami tessellations for fast, reconfigurable, and soft mechanoreceptors," 1846954, 02/19/2019–01/31/2024, \$500,404 , PI
Dassault Foundation, "Introducing modern simulation and modeling software alongside the Engineering Mechanics classroom," 07/01/2020–06/30/2021, \$26,568 , PI
Center for Nanoscale Systems (CNS), Harvard University, in-kind support for nanofabrication facility use (\$15,000 in-kind), 07/01/2018–05/31/2020, PI

INTERNAL FUNDING AWARDED

Total: \$9,270
PI Dorsey awarded: \$9,270

Jean Picker Faculty Fellowship, Smith College, 07/01/2020– 06/30/2021, \$8,045 , sole PI

Jean Picker Faculty Fellowship, Smith College, 07/01/2019– 06/30/2019, (teaching release)
Design Thinking Curriculum Grant, Smith College, 07/01/2017–06/30/2018, \$1,225, sole PI

FELLOWSHIPS, HONORS, AND AWARDS

Dr. Martin Luther King, Jr. Fellowship, Massachusetts Institute Technology	2021
Presidential Award for Mentoring, Smith College	2021
Jean Picker Faculty Fellowship, Smith College	2018, 2020
Center for Nanoscale Systems (CNS) Scholar, Harvard University	2018
Angel G. Jordan Award for Academic Excellence and Service to the ECE Department, Carnegie Mellon University	2014
Univ. of California President’s Postdoctoral Fellowship, UC San Diego	2014
Univ. of California Chancellor’s Postdoctoral Fellowship, UC Berkeley	2013
Neil and Jo Bushnell Fellowship in Engineering, Carnegie Mellon University	2012
GEM PhD Engineering Fellowship	2008

JOURNAL ARTICLES

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- J9 K.L. Dorsey, H. Huang*, and Y. Wen*, “Origami-patterned capacitor with programmed strain sensitivity,” *Multifunctional Materials*, vol. 5, no. 2, 2022.
- J8 K.L. Dorsey, S.F. Roberts, J. Forman, and H. Ishii, “Analysis of Defextiles: a 3D printed textile towards garments and accessories,” *J. Micromech. Microeng.*, vol. 32, no 3, 2022. (JMM Emerging Leaders special collection)
- J7 K.L. Dorsey, “Electronics-free soft robot has a nice ring to it,” *Sci. Robot.* **7**, eabg5812, 2022. (Focus article)
- J6 K.L. Dorsey and N. Lazarus, “Lifetime of liquid metal wires for stretchable platforms,” *Adv. Mat. Technol.*, no. 4, vol. 6, 2021.
- J5 O.A. Araromi, M.A. Graule, K.L. Dorsey, S. Castellanos, J.R. Foster, W.H. Hsu, J.J. Vlassak, W.H. Hsu, A.E. Passy, J.J. Vlassak, J.C. Weaver, C.J. Walsh, R.J. Wood, “Ultra-sensitive and resilient compliant strain gauges for soft machines,” *Nature*, no. 587, pp. 219–224, 2020.
- J4 K.L. Dorsey, M. Cao*, G.A. Slipher, and N. Lazarus, “Mechanical isolation and temperature compensation in soft elastomer components,” *IEEE J. Sensors*, vol. 18, no. 18, 2018.
- J3 D.A. Rolfe, K.L. Dorsey, J.C. Cheng, and A.P. Pisano, “A surface acoustic resonator with template-patterned interdigitated fingers,” *Sens. Act. A: Phys.*, vol. 248, pp. 73-77, 2016.
- J2 K.L. Dorsey and A.P. Pisano, “Stability and Control of a Metal Oxide Gas Sensor Under Air Flow,” *IEEE J. Sensors*, vol. 16, no. 3, 2016.
- J1 K.L. Dorsey, S.S. Bedair, and G.K. Fedder, “Gas chemical sensitivity of a CMOS MEMS cantilever functionalized by evaporative assembly,” *J. Micromech. Microeng.*, vol. 24, no. 7, 2014.

UNDER REVIEW

K.A. Kim, F.S. Bagci, and K.L. Dorsey, “Design Considerations for Photovoltaic Energy Harvesting in Wearable Devices,” (under review).

CONFERENCE PAPERS

(A) Full paper review
(B) 2-page abstract review
(C) Other

- C12 K.L. Dorsey, J. Forman, S. Roberts, and H. Ishii, “Mechanical sensing in 3D-printed wearable devices using under-extruded conductive filament,” Hilton Head Workshop, Hilton Head Island, USA, 2022 (to appear). (B)
- C11 N. Hanson, H. Hochshtein, A. Vaidya, J. Willick, K.L. Dorsey, T. Padir, “In-Hand Object Recognition with Innervated Fiber Optic Spectroscopy for Soft Grippers,” IEEE RoboSoft, 2022. (A)
- C10 K.L. Dorsey, “Reconfigurable Soft Capacitor with Variable Stiffness Ring,” in Proc. IEEE RoboSoft Conf., Seoul, Korea, 2019. (A)
- C9 K.L. Dorsey, M. Cao*, and N. Lazarus, “Mechanical Isolation Structures for Soft Elastomer Components,” in Proc. IEEE Sensors Conf., Glasgow, UK, 2017. (B)
- C8 N. Terasaki, K.L. Dorsey, M. Makihata, and A.P. Pisano, “Micro printing using microfluidics for printed biodegradable devices in trillion sensing,” in ECS Trans., 2017. (C)
- C7 D.A. Rolfe, K.L. Dorsey, and A.P. Pisano, “A model to guide template-based nanoparticle printing development,” in Proc. ASME Intl. Conf. on Nanochannels, Microchannels, and Minichannels, San Francisco, USA, 2015. (A)
- C6 M.M. Makihata, B.Eovino, X. Jiang, A. Toor, K.L. Dorsey, and A.P. Pisano, “Non-invasive and remote pipeline rehabilitation technology using reactive and magnetic particles,” ACSE Pipelines Conf., Baltimore, USA, 2015. (C)
- C5 K.L. Dorsey, D.A. Rolfe, G.D. Hoople, and A.P. Pisano, “Functionalized micromolded nanoparticles towards gas sensor arrays,” IEEE Sens. Conf., Valencia, Spain, 2014. (B)
- C4 K.L. Dorsey, J.R. Herr, and A.P. Pisano, “Sensor selection for outdoor air quality monitoring,” in Proc. Next-Generation Robots and Systems SPIE Sensing Technology+Applications Conf., Baltimore, USA, 2014. (C)
- C3 K.L. Dorsey and G.K. Fedder, "A test structure to inform the effects of dielectric charging on CMOS MEMS inertial sensors," in Proc. IEEE Microelectromechanical Systems Conf., Paris, France, 2012. (B)
- C2 K.L. Dorsey and G.K. Fedder, "A Frenkel-Poole model of dielectric charging in CMOS MEMS," in Proc. Solid State Sensors, Actuators, and Microsystems Conf., Beijing, China, 2011. (B)
- C1 K.L. Dorsey and G.K. Fedder, "Dielectric charging effects in electrostatically actuated CMOS MEMS resonators," in Proc. IEEE Sensors Conf., Kona, USA, 2010. (B)

CONFERENCE AND WORKSHOP PRESENTATIONS (SINCE 2018)

- “Mechanical sensing in 3D-printed wearable devices using under-extruded conductive filament,” Hilton Head Workshop, Hilton Head Island, USA 2022
- “A Tunable, 3D Printed “Textile” for Soft or Wearable Robots,” Leveraging advancements in smart materials science workshop at ICRA 2022
- “An origami-patterned, flexible pressure sensor fabricated with vacuum forming,” Materials Research Society Fall Meeting, Boston, USA 2019

“Reconfigurable soft capacitor with variable stiffness ring,” IEEE RoboSoft Conference, Seoul, Korea	2019
“Reconfigurable soft capacitor,” Southwestern Robotics Symposium, Tempe, USA	2019
“A strain isolated capacitor in a hyper-elastic substrate,” Academic and Research Leadership Network Faculty Development Symposium, Pittsburgh, USA	2018

INVITED SEMINARS AND COLLOQUIA (SINCE 2018)

“Origami for tunable soft sensors and actuators,” Robotic Materials for Advanced Machine Intelligence Symposium, Materials Research Society Spring Meeting	2022
“From Dielectric Charging to Soft Sensors,” Stanford University	2022
“Sensing and active compression challenges for monitoring persistent edema,” University of California San Diego CSE Robotics Seminar	2022
“Design and applications of tunable, soft mechanical sensors,” Cornell ECE Colloquium	2022
“The Future is Flexible,” Massachusetts Institute of Technology ICEO	2022
“Challenges and opportunities in designing tunable, soft mechanical sensors,” UMass Amherst Robotics Seminar Series	2021
“It’s a bit of a stretch,” Engineering Department Seminar, Hope College	2021
“Reconfigurable Sensing,” Expert Panelist, NSF-NIH Smart Health Principal Investigators meeting	2021
“Challenges and opportunities in designing tunable, soft mechanical sensors,” Toyota Research Institute	2021
“Challenges and opportunities in designing tunable, soft mechanical sensors”, Robotics Institute/Mechanical Engineering/Electrical and Computer Engineering joint seminar, Carnegie Mellon University	2021
“Challenges and opportunities in designing tunable, soft mechanical sensors,” Robotics Engineering Colloquium, Worcester Polytechnic Institute	2021
“Challenges and opportunities in designing tunable, soft mechanical sensors,” Electrical and Computer Engineering Seminar, Northeastern University	2021
“Soft, shape, sense,” Department of Mechanical Engineering, Johns Hopkins University	2020
“Soft, shape, sense,” Department of Mechanical and Materials Engineering, Florida International University	2020
“Soft, shape, sense,” Sung, Yang, and Kod* Labs, University of Pennsylvania	2020
“Soft, shape, sense,” Electrical and Computer Engineering department, Duke University	2020
“Soft, shape, sense,” Safer-at-home Seminar Series: Materials Science and Engineering Virtual Research and Networking, NC State University	2020
“What’s hard about soft sensors?” Electrical and Computer Engineering Colloquium, Tufts University	2019
“It's a bit of a stretch: selective, flexible mechanical sensors,” Mechanical Engineering Seminar, University of Connecticut, Storrs	2019

“It's a bit of a stretch: selective, flexible mechanical sensors,” joint ME/ECBE/CS Seminar, Union College	2019
“It's a bit of a stretch: selective, flexible mechanical sensors,” Physics Seminar, Mount Holyoke College	2019
“What’s hard about soft sensors?” MOSIS Distinguished Lecturer Seminar, University of Connecticut, Storrs	2019
“What’s hard about soft sensors?” Valve, L.L.C., Bellevue, WA	2019
“What’s hard about soft sensors?” Sigma Xi, Smith College	2018
“Strain isolation in elastomer-based capacitors,” National Institute of Standards and Technology, Gaithersburg, MD	2018

PATENTS

US 9,150,402, “MEMS Devices Utilizing a Thick Metal Layer of an Interconnect Metal Film Stack,” R. Mahameed, K.L. Dorsey, M.O. Abdelmejeed, M. Abdelmoneum, 2015

PROFESSIONAL LEADERSHIP POSITIONS

Editorial Board Member, IOP Multifunctional Materials journal	2022–Present
Boston Regional Leader, Black in Robotics	2021–Present
Early Career Researcher Board Member, IOP Multifunctional Materials journal	2021–2022
Symposium Co-organizer, “From Actuators and Energy Harvesting Storage Systems to Living Machines,” Materials Research Society Spring Meeting	2021–2022
Workshop Organizer, Undergraduate Soft Robotics Research Workshop, IEEE Robosoft	2021

TECHNICAL PROGRAM COMMITTEE SERVICE

Technical Program Sub-Committee Leader, Hilton Head Solid-State Sensors, Actuators, and Microsystems Workshop	2022
Technical Program Committee Member, Transducers Conference	2021
Technical Program Committee Member, Hilton Head Solid-State Sensors, Actuators, and Microsystems Workshop	2020

OTHER CONFERENCE AND JOURNAL REVIEW SERVICE

Ad-hoc reviewer for *Science Robotics*, *IEEE Robotics and Automation Letters*, *IEEE Sensors Journal*, *Science Advances*

Ad-hoc reviewer for IEEE RoboSoft Conference, IEEE Sensors Conference

PANEL AND GRANT PROPOSAL REVIEW SERVICE

Panel reviewer, National Science Foundation
 Study section reviewer, National Institute of Health
 Ad-hoc reviewer, National Science Foundation

PROFESSIONAL MEMBERSHIPS

Senior Member, IEEE

Member, National Society of Black Engineers

Member, Materials Research Society

INDUSTRY EXPERIENCE

Graduate Intern Technical, Intel Corporation, Hillsboro, OR 2012

Engineering Intern, Lexmark, Inc., Lexington, KY 2007

TEACHING RECORD

EGR 390: Introduction to Mechatronics, Smith College I21

EGR 324: Fundamentals of Microelectronics, Smith College F20, F17

EGR 323: Introduction to MEMS, Smith College F19, F16, S16

EGR 220/220L: Electric Circuit Theory and Lab, Smith College S21, S20,
S19, S18,
S17, F15

EGR 100: Engineering for Everyone: Bits, 'Bots, and Thoughts, Smith College F19, F17, S16

INVITED TEACHING PEDAGOGY AND INCLUSIVITY TALKS

Panelist, "Inclusion and Equity in Group Work," Teaching Arts Lecture, Smith College 2021

Guest lecturer, "A Potential Future for Robotics," Technophilia/Technoskepticism, Kahn Liberal Arts Institute, Smith College 2021

Panelist, "Identity in Academia," Inclusion in Action: Day of Learning, Smith College 2019

Panelist, "Effective Grading Practices," Teaching Arts Lecture, Smith College 2018

UNDERGRADUATE THESIS COMMITTEE SERVICE

Total: 9 students ¹ advisor
² reader

Smith College Honors Thesis (4 credits): Halle Brown², Hayley Markos¹, Yuhan Wen¹, Sara Kacmoli¹, Sara Loric², Xi Jiang²

Smith College Honors Thesis Extension (1 credit): Meng Cao², Becky Shen²

Smith College Senior Thesis: Alysha de Silva¹

UNDERGRADUATE RESEARCH SUPERVISED

Total: 23 students ^a indep study
^b summer
^c other

Musheera Khandaker^{ab}, Hamza Iqbal^a, Mealakthey Sok^b, Ash Wu^{ab} 2021–2022

Wasila Yussif^a, Kirsten Appell^a, Theo Tefera^a, Malaika Kironde^a, Piper MacDonald^a, Molly Loughney^a, Nana Ansah^a, Rachael Shannon^a, Linnea Finkle^a, Mealakthey Sok^a 2020–2021

Wasila Yussif^{ab}, Yuhan Wen^b, Jody Huang^c 2019–2020

Meng Cao^{ab}, Mariel Jones^a, Becky Shen^a, Yuhan Wen^{ab} 2018–2019

Eli Boahen ^{a b} , Meng Cao ^{a b} , Jody Huang ^a , Dan Lin ^a , Jiaao Lu ^a , Becky Shen ^{a b} , Yuhan Wen ^a	2017–2018
Sara Kacmoli ^a , Dan Lin ^a , Jiaao Lu ^a	2016–2017
Dan Lin ^a	2015–2016

PRESENTATIONS BY UNDERGRADUATE STUDENTS

- Meng Cao, “Digital signal processing with FPGAs,” Honors Thesis Extension Poster Session, Smith College, 2019
- Alysha da Silva, “Mechanical and Electrical Response to Fabricated Uniaxial Polymer,” Celebrating Collaborations Poster Session, Smith College, 2018
- Yuhan Wen and Dan Lin, “Fabrication and Testing of Liquid Metal Switches,” Celebrating Collaborations Poster Session, Smith College, 2018
- Sara Kacmoli, “Novel intrinsic quantum designs for quantum cascade superluminescent emitters,” Honors thesis presentation, Smith College, 2017
- Dan Lin, “A testbed for detecting and mimicking finger joint bending,” IEEE MIT Undergraduate Research Technology Conference, MIT, 2016

UNIVERSITY-LEVEL SERVICE

RISE Awards selection committee, MIT	2021–2022
Chair, McKinley Fellowship selection committee, Smith College	2020–2021
Committee member, McKinley Fellowship selection committee, Smith College	2019–2021
Organizer “Applying to Grad school” workshop, Smith College	2016

DEPARTMENT-LEVEL SERVICE

Robotics Faculty Representative, EXP Open Office Layout Group	2022
Faculty Search Committee, Northeastern University	2021–2022
Committee member, Assessments and Standards sub-committee, Picker Engineering Program, Smith College	2019–2021
Committee member, Equity, Diversity, and Inclusion sub-committee, Picker Engineering Program, Smith College	2019–2021
Faculty coordinator for the Fundamentals of Engineering Exam, Picker Engineering Program, Smith College	2017–2020
Committee member Honors and Awards Sub-committee, Picker Engineering Program, Smith College	2017–2019
Committee member, Program Assistant Search Committee, Picker Engineering Program, Smith College	2017
Organizer, “Applying for an engineering summer undergraduate research fellowship” workshop, Picker Engineering Program, Smith College	2017
Committee member, Brodsky Fund for Engineering Entrepreneurship Committee, Picker Engineering Program, Smith College	2016–2017
Co-organizer, Diversity and Inclusion Charrette, Picker Engineering Program, Smith College	2016

MEDIA AND PODCASTS

- “50 women you need to know about in robotics in 2021,” <https://robohub.org/50-women-in-robotics-you-need-to-know-about-2021/> 2021
- Interviewee, “Soft, Squishy Robots Could Save Lives,” Axios <https://www.axios.com/soft-robotics-engineering-save-lives-cecad1c2-860a-466b-be9d-573020831641.html> 2021
- Guest, IEEE Robotics and Automation Society (RAS) Soft Robotics Podcast, <https://soundcloud.com/ieeeras-softrobotics/kris-episode> 2020
- Guest, “Tiny Sensor Problems,” Embedded.FM Podcast, <https://embedded.fm/episodes/214> 2015

MENTORING AND OUTREACH EVENTS

- Panelist, Women of Color in Data Science, WiDS Cambridge Conference 2022
- Vanguard STEM Mentoring Workshop 2022
- “Where the rubber meets the code,” Nerd Nite, Northampton, MA 2019
- “What’s hard about soft sensors?” SciTech Café, Northampton, MA 2018
- “Tactile sensors on people and robots,” Smith College Summer Science and Engineering Program, Northampton, MA 2017
- “Skin-worn sensors: Why can’t I buy one yet?,” Celebration of American Science and Engineering, University of Maryland, College Park, MD 2017
- “What is Engineering for Everyone?,” Smith College Alumnae Club of Pittsburgh, Pittsburgh, PA 2017

BROADENING PARTICIPATION ACTIVITIES

- Virtual classroom demo to present origami metamaterials, Brattleboro Area Middle School, Brattleboro, VT 2020
- Half-day workshops for MA STEM teachers, Smith College 2016, 2017, 2017, 2020
- SCS Noonan Scholars lab tour 2018
- Organizer, Soft robotics day for Springfield Urban League STEM youth group, Smith College 2018
- Organizer, Motor design workshop for Smith Voc. High School, Smith College 2017
- Career Day Participant, Glenwood Elementary School, Springfield MA 2017