

# KRISTEN ("KRIS") L. DORSEY

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## EDUCATION

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

## ACADEMIC APPOINTMENTS

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

## EXTERNAL FUNDING AWARDED

Total: \$791,972  
PI Dorsey awarded: \$791,972

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

## INTERNAL FUNDING AWARDED

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

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| Jean Picker Faculty Fellowship, Smith College, 07/01/2020– 06/30/2021, <b>\$8,045</b> , 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, <b>\$1,225</b> , 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

\*ugrad author

- 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.

## CONFERENCE PAPERS

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

- C12 S. Roberts, J. Forman, H. Ishii, and K.L. Dorsey, “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. Hochsztein, 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)

- “An origami-patterned, flexible pressure sensor fabricated with vacuum forming,” 2019 Materials Research Society Fall Meeting, Boston, USA
- “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)

“Design and applications of tunable, soft mechanical sensors,” Cornell ECE Colluquium 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 SERVICE

Reviewer, IEEE Sensors Conference 2019  
Ad-hoc reviewer, IEEE RoboSoft Conference 2019  
Ad-hoc reviewer, IEEE Sensors Conference 2018

## OTHER JOURNAL REVIEW SERVICE

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

## 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,<br>S19, S18,<br>S17, F15 |
| EGR 100: Engineering for Everyone: Bits, ‘Bots, and Thoughts, Smith College | F19, F17, S16                      |

## TEACHING PEDAGOGY TALKS AND PANEL SERVICE

|  |      |
|--|------|
| Panelist, “Inclusion and Equity in Group Work,” Teaching Arts Lecture, Smith College [invited]   | 2021 |
| Guest lecturer, “A Potential Future for Robotics,” Technophilia/Technoskepticism, Kahn Liberal Arts Institute, Smith College [invited] | 2021 |
| Panelist, “Identity in Academia,” Inclusion in Action: Day of Learning, Smith College [invited]  | 2019 |
| Panelist, “Effective Grading Practices,” Teaching Arts Lecture, Smith College [invited]  | 2018 |
| Host, “Mentoring undergrad research projects,” Teaching Circle, Smith College  | 2017 |

## UNDERGRADUATE THESIS COMMITTEE SERVICE

Total: 9 students <sup>1</sup> advisor  
<sup>2</sup> reader

Honors Thesis (4 credits): Halle Brown<sup>2</sup>, Hayley Markos<sup>1</sup>, Yuhan Wen<sup>1</sup>, Sara Kacmoli<sup>1</sup>, Sara Loric<sup>2</sup>, Xi Jiang<sup>2</sup>

Honors Thesis Extension (1 credit): Meng Cao<sup>2</sup>, Becky Shen<sup>2</sup>

Senior Thesis: Alysha de Silva<sup>1</sup>

## UNDERGRADUATE RESEARCH SUPERVISED

Total: 20 students <sup>a</sup> indep study  
<sup>b</sup> summer  
<sup>c</sup> other

|   |           |
|---|-----------|
| Musheera Khandaker <sup>a</sup>   | 2022      |
| Wasila Yussif <sup>a</sup> , Kirsten Appell <sup>a</sup> , Theo Tefera <sup>a</sup> , Malaika Kironde <sup>a</sup> , Piper MacDonald <sup>a</sup> , Molly Loughney <sup>a</sup> , Nana Ansah <sup>a</sup> , Rachael Shannon <sup>a</sup> , Linnea Finkle <sup>a</sup> , Mealakthey Sok <sup>a</sup> | 2020–2021 |
| Wasila Yussif <sup>a b</sup> , Yuhan Wen <sup>b</sup> , Jody Huang <sup>c</sup>   | 2019–2020 |
| Meng Cao <sup>a b</sup> , Mariel Jones <sup>a</sup> , Becky Shen <sup>a</sup> , Yuhan Wen <sup>a b</sup>  | 2018–2019 |

|  |           |
|--|-----------|
| Eli Boahen <sup>a,b</sup> , Meng Cao <sup>a,b</sup> , Jody Huang <sup>a</sup> , Dan Lin <sup>a</sup> , Jiaao Lu <sup>a</sup> , Becky Shen <sup>a,b</sup> ,<br>Yuhan Wen <sup>a</sup> | 2017–2018 |
| Sara Kacmoli <sup>a</sup> , Dan Lin <sup>a</sup> , Jiaao Lu <sup>a</sup>   | 2016–2017 |
| Dan Lin <sup>a</sup>   | 2015–2016 |

#### PRESENTATIONS BY 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              |  |

#### COLLEGE-LEVEL SERVICE

|  |           |
|--|-----------|
| 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

|   |           |
|---|-----------|
| 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

|   |      |
|---|------|
| Interviewee, “Soft, Squishy Robots Could Save Lives,” Axios | 2021 |
|---|------|

<https://www.axios.com/soft-robotics-engineering-save-lives-cecad1c2-860a-466b-be9d-573020831641.html>

Guest, IEEE Robotics and Automation Society (RAS) Soft Robotics Podcast, 2020  
<https://soundcloud.com/ieeeras-softrobotics/kris-episode>

Guest, "Tiny Sensor Problems," Embedded.FM Podcast, 2015  
<https://embedded.fm/episodes/214>

#### GENERAL AUDIENCE AND OUTREACH TALKS

"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