

JENNIFER L. CROSS

Center for Engineering Education and Outreach
Tufts University
200 Boston Ave
Suite G810
Medford, Massachusetts 02155
jlcross@cmu.edu
jenncross.com

RESEARCH INTERESTS

- Human-robot interaction with a focus on educational applications of robotics
- Development of novel robotics platforms and programming interfaces for K-12 and undergraduate education
- Diversity and accessibility in robotics, engineering, and computer science education
- Teacher and student empowerment, technological fluency, and computational thinking
- Mixed-methods evaluation of educational robotics interventions

EDUCATION

- Ph.D. in Robotics** 2017
Carnegie Mellon University, Pittsburgh, PA
Dissertation: Creative Robotic Systems for Talent-Based Learning
Advisor: Illah Nourbakhsh
Committee: Mitchel Resnick, Jack Mostow, and Aaron Steinfeld
- M.S. in Robotics** 2013
Carnegie Mellon University, Pittsburgh, PA
Advisor: Illah Nourbakhsh
- B.S. in Electrical and Computer Engineering** 2010
Franklin W. Olin College of Engineering, Needham, MA
Member of Olin College's fifth graduating class

AWARDS & HONORS

- Honorable Mention Award** 2017
ACM CHI Conference on Human Factors in Computing Systems
- Program for Interdisciplinary Education Research Fellow** 2011 – 2017
Institute of Education Sciences – Department of Education
- Graduate Research Fellowship Program Fellow** 2011 – 2014
National Science Foundation
- Best Paper Award** 2013
IEEE Integrated STEM Education Conference
- Olin College Full Merit Scholarship** 2006 – 2010
Franklin W. Olin College of Engineering

PROFESSIONAL EXPERIENCES

Tufts University, Medford, MA

Postdoctoral Research Associate

2018

Mechanical Engineering Department – Center for Engineering Education and Outreach

Lab Director: Chris Rogers

Carnegie Mellon University, Pittsburgh, PA

Postdoctoral Fellow

2017 – 2018

Graduate Research Assistant

2010 – 2017

Robotics Institute – CREATE Lab (Community Robotics Education and Technology Empowerment Lab)

Lab Director: Illah Nourbakhsh

The Pennsylvania State University, State College, PA

National Science Foundation EREU Undergraduate Scholar

Summer 2009

Electrical Engineering Department – Radar Space Sciences Lab

Lab Director: John Mathews

General Electric Transportation, Erie, PA

Legacy Locomotive and Reliability Engineering Intern

Summer 2008

Locomotive Reliability Group

F. W. Olin College of Engineering, Needham, MA

Undergraduate Research Assistant

Advanced Computing Lab – Self-Directed Exploded Field-Programmable Gate Array Project

2008 – 2010

Lab Director: Mark Chang

Olin Biomimetic Robotics Lab – Self-Directed Robotic Shark Project

2007 – 2008

Lab Director: Gill Pratt

Charles Stark Draper Laboratory, Cambridge, MA

Undergraduate Intern

Summer 2007

Mechanical Systems Division and Robotic Systems Division

GRANT ACTIVITY

Co-authored proposals, neither PI nor co-PI:

STTR Phase II: A Low Cost Robotics kit for Elementary Education (NSF 1831177)

PI: Tom Lauwers

STTR Phase I: A Low Cost Robotics kit for Elementary Education (NSF 1648747)

PI: Tom Lauwers

Creative Robotics: an inclusive program for fostering diverse STEM talent in middle school (NSF 1321227)

PI: Illah Nourbakhsh

TEACHING

Engineering and Science for Middle and High School Educators I (ENE 150)

2018

Course Instructor, Tufts University

Audience: 25 Middle and High School Educators

Taught through Canvas for online Engineering Education Certificate program

Course covers fundamentals of robotic systems, feedback, and PID control through LEGO MINDSTORMS

Human-Machine System Design (ENP 162)	2018
<i>Assistant Instructor with Prof. Intriligator, Tufts University</i>	
Audience: 33 senior and M.S. students in engineering psychology, human factors, or mechanical engineering	
Mobile Robotics Project Course (Summer Academy for Math and Science)	2014
<i>Course Instructor, Carnegie Mellon University</i>	
Audience: High school seniors from underrepresented minorities in STEM in summer pre-college program	
Systems Engineering (16-650)	2012
<i>Teaching Assistant for Prof. Bergerman, Carnegie Mellon University</i>	
Audience: Masters students in a 2-year professional robotic system design degree program	

GUEST LECTURES

Principles of Human Robot Interaction (16-867)	2015 & 2017
<i>Guest Lecturer, Carnegie Mellon University</i>	
Topic: Robotics & Education	
New Literacies for Educational Leadership (EDL 730)	2017
<i>Guest Lecturer, Miami University, Oxford, OH</i>	
Topic: Integrating Instructional Technology	
Human Robot Interaction (16-467)	2016
<i>Guest Lecturer, Carnegie Mellon University</i>	
Topic: Experimental Design in Human Robot Interaction	
Methods & Materials for Elementary Teachers (EDUC 460)	2015
<i>Guest Lecturer, West Liberty University, West Liberty, WV</i>	
Topic: Transdisciplinary Integration of Creative Robotics	
Educational Robotics for the Classroom (16-651)	2011
<i>Guest Lecturer, Carnegie Mellon University</i>	
Topic: Robot Programming with the CREATE Lab Visual Programmer	

OUTREACH & SERVICE

Introduction to Robotics for Classrooms	2011 – 2017
<i>Lead Workshop Instructor, Various locations including: Pittsburgh, PA; Marshall, WV; Bristol, UK; and others</i>	
Audience: K-12 Educators	
Over 200 teachers have participated in my one- and two-day professional development programs	
CONTEXT: Tech and Data Fluency for Teaching and Learning Conference	2015 & 2017
<i>Session Leader, Pittsburgh, PA</i>	
Topic: Recognizing Student Engineering and Computational Thinking Talents in Transdisciplinary Projects	
Audience: School Administrators and K-12 Educators	
Integrating the E in STEM Workshop Series	2016
<i>Workshop Leader, Erie, PA</i>	
Topic: Transdisciplinary Integration of Creative Robotics for Identification of Student STEM Affinities	
Audience: K-12 Educators	

OurCS: Opportunities for Undergraduate Research in Computer Science	2013 & 2015
<i>Graduate Organizer, Carnegie Mellon University</i>	
Audience: Women in Undergraduate Computer Science Programs	
Robotics Institute Ph.D. Admissions Committee	2012 – 2014
<i>Committee Member</i>	
Women@SCS Creative Technology Nights	2012 – 2014
<i>Workshop Leader, Carnegie Mellon University</i>	
Topic: Robot Programming with Scratch	
Audience: Girls, 11 to 14 years old	
Women@SCS Computer Science Roadshows	2011 – 2013
<i>Graduate Student Presenter, Carnegie Mellon University</i>	
Audience: K-12 Students and Educators	
Peer Review	
– <i>Review Panelist, National Science Foundation</i>	
– <i>Reviewer, Journal of Engineering Education (JEE)</i>	
– <i>Reviewer, IEEE Robotics and Automation Letters (RA-L)</i>	
– <i>Reviewer, IEEE Frontiers in Education Conference (FIE)</i>	
– <i>Reviewer, IEEE Robotics and Automation Magazine (RA-M)</i>	

MENTORING

Master's Thesis Committee	
<i>Xunjie Zhang, Carnegie Mellon University</i>	2017
<i>Matthew Bernstein, Carnegie Mellon University</i>	2012
Ph.D. Qualifiers Committee	
<i>Yen-Chia Hsu, Carnegie Mellon University</i>	2015
<i>Eleanor Avrunin, Carnegie Mellon University</i>	2014

PROFESSIONAL ACTIVITIES & MEMBERSHIPS

American Society for Engineering Education	2013 – 2018
IEEE	2012 – 2018
Society of Women Engineers	2007 – 2018
Future Faculty Program	2011 – 2018
<i>Eberly Center for Teaching Excellence and Educational Innovation, Carnegie Mellon University</i>	
Women@SCS	2010 – 2017
<i>School of Computer Science, Carnegie Mellon University</i>	
Society of Automotive Engineers	2006 – 2010
<i>Baja SAE Competition, Olin College Co-Team Lead</i>	2007 – 2009

PUBLICATIONS

JOURNALS

- Hsu, Y.-C., **Cross, J.**, Dille, P., Tasota, M., Dias, B., Sargent, R., and Nourbakhsh, I. (2019). Smell Pittsburgh: A Crowdsourced Mobile Application for Reporting and Visualizing Pollution Odor. *ACM Transactions on Computer-Human Interaction (TOCHI)*. (in review)
- Mathews, J. D., Briczinski, S. J., Malhotra, A., and **Cross, J.** (2010). Extensive Meteoroid Fragmentation in V/UHF Radar Meteor Observations at Arecibo Observatory. *Geophysical Research Letters*, 37(4).

CONFERENCE PROCEEDINGS AND OTHER PUBLICATIONS

- Hsu, Y.-C., **Cross, J.**, Dille, P., Nourbakhsh, I., Leiter, L., and Grode, R. (2018). Visualization Tool for Environmental Sensing and Public Health Data. In *Proceedings of the 2018 ACM Conference Companion Publication on Designing Interactive Systems (DIS '18 Companion)*, Hong Kong.
- Cross, J.**, Hamner, E., Zito, L., and Nourbakhsh, I. (2017). Student Outcomes from the Evaluation of a Transdisciplinary Middle School Robotics Program. In *Proceedings of 2017 IEEE Frontiers in Education Conference (FIE)*, Indianapolis, Indiana.
- Hamner, E., Zito, L., **Cross, J.**, Tasota, M., Dille, P., Fulton, S., Johnson, M., Nourbakhsh, I., and Schapiro, J. (2017). Development and Results from User Testing of a Novel Robotics Kit Supporting Systems Engineering for Elementary-Aged Students. In *Proceedings of 2017 IEEE Frontiers in Education Conference (FIE)*, Indianapolis, Indiana.
- Hsu, Y.-C., Dille, P., **Cross, J.**, Dias, B., Sargent, R., and Nourbakhsh, I. (2017). Community-Empowered Air Quality Monitoring System. In *Proceedings of 2017 ACM CHI Conference on Human Factors in Computing Systems*, Denver, Colorado. (Honorable Mention Award)
- Cross, J.**, Hamner, E., Zito, L., Nourbakhsh, I., and Bernstein, D. (2016). Development of an Assessment for Measuring Middle School Student Attitudes towards Robotics Activities. In *Proceedings of 2016 IEEE Frontiers in Education Conference (FIE)*, Erie, Pennsylvania.
- Cross, J.**, Hamner, E., Zito, L., and Nourbakhsh, I. (2016). Engineering and Computational Thinking Talent in Middle School Students: a Framework for Defining and Recognizing Student Affinities. In *Proceedings of 2016 IEEE Frontiers in Education Conference (FIE)*, Erie, Pennsylvania.
- Hamner, E., Zito, L., **Cross, J.**, Slezak, B., Mellon, S., Harapko, H., and Welter, M. (2016). Utilizing Engineering to Teach Non-Technical Disciplines: Case Studies of Robotics within Middle School English and Health Classes. In *Proceedings of 2016 IEEE Frontiers in Education Conference (FIE)*, Erie, Pennsylvania.
- Hamner, E., **Cross, J.**, Zito, L., Bernstein, D., and Mutch-Jones, K. (2016). Training Teachers to Integrate Engineering into Non- Technical Middle School Curriculum. In *Proceedings of 2016 IEEE Frontiers in Education Conference (FIE)*, Erie, Pennsylvania.
- Bernstein, D., Mutch-Jones, K., Hamner, E., and **Cross, J.** (2015). Robots and Romeo and Juliet: Studying Teacher Integration of Robotics into Middle School Curricula. Paper presented at the 2016 Annual Meeting of the American Educational Research Association (AERA), Washington, DC.
- Cross, J.**, Hamner, E., Bartley, C., and Nourbakhsh, I. (2015). Arts & Bots: Application and Outcomes of a Secondary School Robotics Program. In *Proceedings of 2015 IEEE Frontiers in Education Conference (FIE)*, El Paso, Texas.
- Cross, J.** and Hamner, E. (2014). Identifying and Cultivating Diverse STEM Talent through Creative Robotics. In *Proceedings of 2014 American Society for Engineering Education (ASEE) Annual Conference and Exposition*, Indianapolis, Indiana.

Cross, J., Bartley, C., Hamner, E., and Nourbakhsh, I. (2013). A Visual Robot-Programming Environment for Multidisciplinary Education. *In Proceedings of 2013 IEEE International Conference on Robotics and Automation (ICRA)*, Karlsruhe, Germany.

Hamner, E. and **Cross, J.** (2013). Arts & Bots: Techniques for distributing a STEAM robotics program through K-12 classrooms. *In Proceedings of the 2013 IEEE Integrated STEM Education Conference (ISEC)*, Princeton, NJ. (Best Paper Award)

Brown, H. B., Nourbakhsh, I., Bartley, C., **Cross, J.**, Dille, P., Schapiro, J., and Styler, A. (2012). ChargeCar Community Conversions: Practical, Electric Commuter Vehicles Now! *In Proceedings of the 2012 IEEE International Electric Vehicle Conference (IEVC)*, Greenville, SC.