

# CHRISTINE M. CUNNINGHAM

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## **Education**

- 1995 Ph.D. Cornell University  
Science Education, Curriculum and Instruction  
Advisors: William S. Carlsen (principal), Kenneth Strike, George Posner  
  
Dissertation: *The Effect of Teachers' Sociological Understanding of Science on Classroom Practice and Curriculum Innovation*
- 1991 B.A. & M.A. Yale University  
Biology with Honors, summa cum laude

## **Professional Experience**

- May 2003–present Founding Director, Engineering is Elementary  
Vice President, Museum of Science, Boston, MA
- September 2001–May 2006 Director of Engineering Education Research, Center for Engineering Educational Outreach, Tufts University, Medford, MA
- April 1998–December 2001 Project Director and Co-PI, Women's Experiences in College Engineering Project, Goodman Research Group, Inc., Cambridge, MA
- January 1997–January 2001 Research Associate, Science Education, Cornell University, Ithaca, NY
- August 1995–December 1997 Postdoctoral Fellow, Science Education, Cornell University, Ithaca, NY

## **Honors and Awards**

### *Christine Cunningham*

- Harold W. McGraw, Jr. Prize in Education, 2017  
IEEE Pre-University Educator Award, 2015  
American Society for Engineering Education K-12 and Pre-College Division Lifetime Achievement Award, 2015  
International Society for Design and Development in Education Prize, 2014  
American Society for Engineering Education Fellow, 2014  
Mary Margaret Scoby Award, Technology Education for Children Council, 2007  
Leaders to Watch, International Technology and Engineering Educators Association, 2007  
Epsilon Pi Tau, Exemplary Initiation, 2006  
Outstanding Leadership Award, American Society of Engineering Education K-12 Division, 2005  
College of Agriculture and Life Sciences Excellence in Extension/Outreach Award, Cornell University, 1999  
Marvin and Ruth Glock Dissertation Award, Cornell University, 1997  
American Educational Research Association Division K Dissertation Award, 1996  
National Association for Research in Science Teaching Dissertation Award, 1996  
Spencer Dissertation Fellowship, 1994–95  
NSF Graduate Research Fellowship, 1991–94  
A.D. White Fellowship, Cornell University, 1991–94  
Alpheus Henry Snow Prize, Yale University, 1991  
Yale Science and Engineering Award, Yale University, 1991  
William R. Belknap Prize, Yale University, 1991  
John Spangler Nicholas Cup, Yale University, 1991

Phi Beta Kappa, Yale University, Inducted 1989, President 1990–91

### *Engineering is Elementary*

*Every Kid Can Engineer*, NSF 2016 Video Showcase Public Choice & Presenters Choice Awards

*Engineering is Elementary*, NSF 2015 Video Showcase Public Choice & Presenters Choice Awards

2015 Best Website for Teaching & Learning Award, American Association of School Librarians

Readers' Choice Top 100 Product for 2014, District Administration magazine

Top 100 Educational Innovations from Fundación Telefónica, 2014

*Engineering is Everywhere Special Report: Ice Cream!*, TELLY Bronze Award, Education Category, 2014

*Engineering is Everywhere Special Report: Runoff!*, TELLY Bronze Award, Education Category, 2014

*Engineering is Everywhere Special Report: Insulation!*, TELLY Bronze Award, Education Category, 2014

Silicon Valley Education Fund Award, 2013

Change the Equation STEMworks Program, 2012

Change the Equation Featured Program, 2010

Bayer Best Practice in K-12 STEM Education Program, 2010

*Industrial Engineering: Making Work Easier*, Platinum Award for General Video Production from the National Professional Videographers Association, 2006

*Industrial Engineering: Making Work Easier*, TELLY Award, Educational Video Production Category, 2006

## **Curricula**

### ***Engineering is Elementary Series (eie.org):***

Curricular Units (2011):

*A Sticky Situation: Designing Walls* (Materials Engineering)

*Water, Water Everywhere: Designing Water Filters* (Environmental Engineering)

*Catching the Wind: Designing Windmills* (Mechanical Engineering)

*To Get to the Other Side: Designing Bridges* (Civil Engineering)

*Marvelous Machines: Making Work Easier* (Industrial Engineering)

*The Best of Bugs: Designing Hand Pollinators* (Agricultural Engineering)

*Sounds Like Fun: Seeing Animal Sounds* (Acoustical Engineering)

*Just Passing Through: Designing Model Membranes* (Bioengineering)

*An Alarming Idea: Designing Alarm Circuits* (Electrical Engineering)

*A Work in Process: Improving a Play Dough Process* (Chemical Engineering)

*A Stick in the Mud: Evaluating a Landscape* (Geotechnical Engineering)

*The Attraction is Obvious: Designing Maglev Systems* (Transportation Engineering)

*Thinking Inside the Box: Designing Plant Packages* (Packaging Engineering)

*A Long Way Down: Designing Parachutes* (Aerospace Engineering)

*Now You're Cooking: Designing Solar Ovens* (Green Engineering)

*Solid as a Rock: Replicating an Artifact* (Materials Engineering)

*Taking the Plunge: Designing Submersibles* (Ocean Engineering)

*A Slick Solution: Cleaning an Oil Spill* (Environmental Engineering)

*Lighten Up: Designing Lighting Systems* (Optical Engineering)

*No Bones About It: Designing Knee Braces* (Biomedical Engineering)

Storybooks:

*Yi Min's Great Wall: A Materials Engineering Story* (2005)

*Saving Salila's Turtle: An Environmental Engineering Story* (2005)

*Leif Catches the Wind: A Mechanical Engineering Story* (2005)

*Javier Builds a Bridge: A Civil Engineering Story* (2005)

*Aisha Makes Work Easier: An Industrial Engineering Story* (2005)

*Mariana Becomes a Butterfly: An Agricultural Engineering Story* (2005)

*Kwame's Sound: An Acoustical Engineering Story* (2005)

*Juan Daniel's Fútbol Frog: A Bioengineering Story* (2006)

*A Reminder for Emily: An Electrical Engineering Story* (2006)

*Michelle's MVP Award: A Chemical Engineering Story* (2006)

*Suman Crosses the Karnali River: A Geotechnical Engineering Story* (2007)  
*Hikaru's Toy Trouble: A Transportation Engineering Story* (2007)  
*A Gift from Fadil: A Packaging Engineering Storybook* (2007)  
*Paulo's Parachute Mission: An Aerospace Engineering Story* (2008)  
*Lerato Cooks Up a Plan: A Green Engineering Story* (2008)  
*Galya and Natasha's Rocky Adventure: A Materials Engineering Story* (2009)  
*Despina Makes a Splash: An Ocean Engineering Story* (2009)  
*Tehya's Pollution Soluttion: An Environmental Engineering Story* (2009)  
*Omar's Time to Shine: An Optical Engineering Story* (2010)  
*Erik's Unexpected Twist: A Biomedical Engineering Story* (2010)

Video: *Industrial Engineering: Making Work Easier* (In collaboration with DigiNovations)

Professional Development Guides (2012):

*Engineering is Elementary Professional Development Guides:*

*A Sticky Situation: Designing Walls*  
*Water, Water Everywhere: Designing Water Filters*  
*Catching the Wind: Designing Windmills*  
*To Get to the Other Side: Designing Bridges*  
*Marvelous Machines: Making Work Easier*  
*The Best of Bugs: Designing Hand Pollinators*  
*Sounds Like Fun: Seeing Animal Sounds*  
*Just Passing Through: Designing Model Membranes*  
*An Alarming Idea: Designing Alarm Circuits*  
*A Work in Process: Improving a Play Dough Process*  
*A Stick in the Mud: Evaluating a Landscape*  
*The Attraction is Obvious: Designing Maglev Systems*  
*Thinking Inside the Box: Designing Plant Packages*  
*A Long Way Down: Designing Parachutes*  
*Now You're Cooking: Designing Solar Ovens*  
*Solid as a Rock: Replicating an Artifact*  
*Taking the Plunge: Designing Submersibles*  
*A Slick Solution: Cleaning an Oil Spill*  
*Lighten Up: Designing Lighting Systems*  
*No Bones About It: Designing Knee Braces*

*Engineering in Out-of-School Time Educator Workshop Professional Development Guide* (2014)

**Engineering Adventures Series ([engineeringadventures.org](http://engineeringadventures.org)):**

*Bubble Bonanza: Engineering Bubble Wands* (2011)  
*Hop To It: Safe Removal of Invasive Species* (2012)  
*Go Green: Engineering Recycled Racers* (2012)  
*Shake Things Up: Engineering Earthquake-Resistant Buildings* (2012)  
*To the Rescue: Engineering Aid Drop Packages* (2012)  
*Liftoff: Engineering Rockets and Rovers* (2013)  
*The Sky's the Limit: Engineering Flying Technology* (2013)  
*Music to My Ears: An Acoustical Engineering Challenge* (2016)  
*A Slippery Slope: Engineering an Avalanche Protection System* (2016)  
*Light Up the Night: An Electrical Engineering Challenge* (2016)

**Engineering Everywhere Series ([eie.org/engineering-everywhere](http://eie.org/engineering-everywhere)):**

*Put a Lid on It: Engineering Safety Helmets* (2013)  
*Here Comes the Sun: Engineering Insulated Homes* (2013)  
*Don't Runoff: Engineering an Urban Landscape* (2013)  
*Food for Thought: Engineering Ice Cream* (2013)  
*Go Fish: Engineering Prosthetic Tails* (2013)

*It's About Time: Engineering Timers* (2013)  
*Plants to Plastics: Engineering Bioplastics* (2013)  
*Outbreak Alert!: Engineering a Pandemic Response* (2014)  
*Growing Up: Engineering Vertical Farms* (2014)  
*It's in the Bag: Engineering Bioinspired Gear* (2014)  
*Testing the Waters: Engineering a Water Reuse Process* (2017)  
*Worlds Apart: Engineering Remote Sensing Devices* (2017)

### **i2 Camp Curricula:**

*Global Architectural Design: A Green Engineering Challenge* (2013)  
*Redesigning the Urban Landscape: An Environmental Engineering Challenge* (2013)  
*Crash Test Engineering: A Biomedical Engineering Challenge* (2013)  
*Engineering Ice Cream: Designing Food Processes* (2013)  
*Engineering Prosthetic Devices: Biomechanical Engineering* (2013)  
*Tracking the Fourth Dimension: Engineering Timekeeping Devices* (2013)  
*Bioplastics: Chemical Engineering* (2013)  
*Outbreak Alert! Engineering a Pandemic Response: Biomedical Engineering* (2013)  
*Vertical Farming: Agricultural Engineering* (2014)  
*Bioinspired Textiles: Textile Engineering* (2014)

**Wee Engineer** (preschool/preK engineering) (*under development, expected 2018*)

**Engineering is Elementary for Kindergarten** (*under development, expected 2018 and 2019*)

### **Environmental Inquiry Series:**

Carlsen, W. S., Cunningham, C. M., Trautmann, N. M. & Krasny, M. E. (2003). *Watershed dynamics* (Student and teacher edition). Arlington, VA: National Science Teachers Association Press.

Krasny, M. E., Trautmann, N. M., Carlsen, W. S., & Cunningham, C. M. (2003). *Invasion ecology* (Student and teacher edition). Arlington, VA: National Science Teachers Association Press.

Trautmann, N. M., Krasny, M.E., Carlen, W. S., & Cunningham, C. M. (2003). *Decay and renewal* (Student and teacher edition). Arlington, VA: National Science Teachers Association Press.

Trautmann, N. M., Carlsen, W. S., Krasny, M. E., & Cunningham, C. M. (2001). *Assessing toxic risk* (Student and teacher edition). Arlington, VA: National Science Teachers Association Press.

### **Recent Invited Talks, Keynotes, Webinars, Panels**

Everyone can engineer: Why all kids should study engineering—Even before they can spell it. *Keynote Speaker, Big Bang Conference*. Odense, Denmark. April 5, 2018.

Why all kids should study engineering—Even before they can spell it. *Keynote Speaker, University of North Carolina at Greensboro STEM Teacher Leader Collaborative Leadership Lab*. Greensboro, NC. November 6, 2017.

How classroom engineering develops “habits of mind” that empower student performance. *Plenary Speaker, Thailand Institute for the Promotion of Teaching Science and Technology (IPST) Conference*. Videotalk. October 14, 2017.

The Formative Years. *Speaker and Panelist, AtlanticLIVE Cracking the Code: The Next Generation of Women in STEM*. Boston, MA. September, 29, 2017.

The practice perspective. *Panelist, National Academy of Science Stakeholder Convening on Early Science, Technology, Engineering, and Mathematics Learning and Young Dual Language Learners*. Washington DC. May 24–25, 2017.

Engineering design processes. *Invited Speaker, STEM Ecosystems Community of Practice Convening*. Tampa, FL. April 26, 2017.

- Diverse implementations of PreK-12 engineering education. *Panelist, National Academy of Engineering Educator Capacity Workshop*. Washington DC. April 19, 2017.
- Preparing girls for the digital age. *Panelist, Miss Hall's School Education Forum*. New York, NY. April 10, 2017.
- Novel innovations in engineering education. *Panelist, Engineering Deans Institute*. Tampa, FL. April 3, 2017.
- Everyone can engineer: Why all kids should study engineering—Even before they can spell it. *Invited Speaker, STEM Teacher Leader Summit, University of North Carolina, Greensboro*. Greensboro, NC. March 14, 2017.
- Engineering 3-D learning: How engineering develops “habits of mind” that empower student performance. *Invited Speaker, Alabama Science Teachers Association*. Birmingham, AL. March 8, 2017.
- Everyone can engineer: Why all kids should study engineering—Even before they can spell it. *Invited Speaker, Pub Science, Discovery Space*. State College, PA. March 2, 2017.
- Renewing and repurposing preK-16 curriculum, instruction, and assessment—NGSS challenges and opportunities. *Invited Panelist, Waterbury Lecture, Pennsylvania State University*. State College, PA. November 29, 2016.
- Everyone can engineer: Why all kids should study engineering—Even before they can spell it. *Invited Speaker, Center for Science Teaching & Learning Seminar Series in STEM Education, Northern Arizona University*. Flagstaff, AZ. May 6, 2016.
- Integrate to innovate: How classroom engineering develops “habits of mind” that empower student performance. *Mary C. McCurdy Lecture, National Science Teacher Association Conference on Science Education*. Nashville, TN. March 31, 2016.
- Engineering. *Elementary NGSS Twitter Chat*. February 4, 2016.
- Engineering EiE®: The development of an elementary engineering curriculum. *Invited Lecture, University of California, Santa Barbara School of Education*. Santa Barbara, CA. January 14, 2016.
- Engineering education for the early childhood classroom. Erikson Institute *Educare Ounce of Prevention Webinar*. January 12, 2016.
- Engineering habits of mind. *California Afterschool Network STEM Committee Webinar*. December 11, 2015.
- Early childhood engineering: Why kids should be making technologies, not just using them. *Invited Speaker, Early Education and Technology for Children Conference*. Orlando, FL. November 18, 2015.
- Everyone can engineer: Why all kids should study engineering—Even before they can spell it. *Focus Speaker, California Science Education Conference*. Sacramento, CA. October 3, 2015.
- Engineering EiE®: The development of an elementary engineering curriculum. *Keynote Lecture, International Society for Design and Development in Education*. Boulder, CO. September 22, 2015.
- Everyone can engineer: Why all kids should study engineering—Even before they can spell it. *Keynote Lecture, Spring STEM Institute, New York City Department of Education Office of Curriculum, Instruction, and Professional Learning*. New York City, NY. April 7, 2015.
- Unleashing curiosity through engineering. *Keynote Lecture, CA STEM Summit 2015*. Los Angeles, CA. March 16, 2015.
- Everyone can engineer: Why all kids should study engineering—Even before they can spell it. *Keynote Lecture, IEEE Integrated STEM Education Conference (ISEC)*. Princeton, NJ. March 7, 2015.
- What does engineering look like when done by K-12 students? *Speaker, Texas Teachers Summit*. College Station, TX. January 30, 2015.

- Engineering EiE®: The research behind an exemplary elementary engineering curriculum. *Distinguished Lecture, Institute for Engineering Education and Innovation, Texas A&M*. College Station, TX. January 29, 2015.
- Why kids should study engineering before they can spell it. *Keynote Lecture, Pennsylvania Science Teachers Association Annual Conference*. State College, PA. December 3, 2014.
- Engineering is for elementary students: Why kids should study engineering before they can spell it. *Texas Tech University Seminar*. Lubbock, TX. November 17, 2014.
- The keys to success in K-6 NGSS implementation: Well-prepared teachers, excellent programs. *California State University Webinar*. November 14, 2014.
- Little kids can engineer: Outreach to elementary-school students. *Society of Women Engineers Voices from the Field Webinar Series*. August 27, 2014.
- What does engineering look like when done by K-12 students? *Keynote Lecture, National Academy of Engineering Guiding Implementation of K-12 Engineering Education Regional Meetings*. Washington, DC, June 30, 2014; Minneapolis, MN, August 12, 2014; Los Angeles, CA, November 4, 2014.
- Are you ready for the Next Generation? How a new approach to K-12 education will develop college-ready students with engineering habits of mind. *Distinguished Lecture, American Society for Engineering Education Annual Conference*. Indianapolis, IN. June 18, 2014.
- Engineering education for the Next Generation. *Keynote Lecture, STEM in Education Conference Keynote*. Dominguez Hills, CA. June 7, 2014.
- Engineering education for the Next Generation. *Keynote Lecture, Wake County Elementary STEM Education Day*. Raleigh, NC. May 8, 2014.
- Engineering education for the Next Generation. *Keynote Lecture, National Science Education Leadership Association*. Boston, MA. April 2, 2014.
- They can't spell "engineering," but they can do it: Young learners develop 21st century "habits of mind" with hands-on engineering activities. *Keynote Lecture, Vermont Kindergarten Conference*. Burlington, VT. March 28, 2014.
- Teaching NGSS engineering design through media for elementary school teachers. *WGBH Webinar Series*. January 27, 2014.
- Visualizing K-6 engineering education. *National Science Teachers Association Webinar Series*. September 18, 25, and October 2, 2013.
- Visualizing elementary engineering. *Keynote Lecture, Triangle Coalition Conference*. Washington DC. September 12, 2013.
- Engineering is Elementary: Engineering our future. *STEM Congressional Briefing: Harnessing the power of engineering to improve STEM education in K-12 schools*. Washington DC. June 12, 2013.
- Visualizing K-8 engineering education. *National Science Teachers Association Webinar Series*. May 16, 23, and 30, 2013.
- Putting the E in STEM. *Lehigh University College of Education Distinguished Lecture Series: Leaders of Practice: Transforming STEM: From global agenda to classroom success*. Lehigh, PA. February 5, 2013.
- Engineering education for the Next Generation. *Keynote Lecture, Wisconsin Project Lead the Way Professional Development Conference*. Milwaukee, WI. December 4, 2012.
- Engineering enhanced science, inquiry, and problem solving. *Keynote Lecture, National Science Teacher Association Regional Conference, Louisville*. Louisville, KY. October 18, 2012.
- Designing engineering experiences to engage ALL students. *Keynote Lecture, Minnesota STEM Education Conference*. Minneapolis, MN. May 17, 2012.

Engineering is Elementary: Teacher education. *National Academy of Engineering Integrated STEM Committee Presentation: Approaches to integrated STEM: Teacher education*. Washington DC. January 12, 2012.

## **Media Appearances**

STEM Everyday #67: Dr. Christine Cunningham, EiE founder and director. *STEM Everyday* Podcast. June 13, 2017. <http://remarkablechatter.com/stem-everyday-67-dr-christine-cunningham-eie-founder-director/?platform=hootsuite>

Engineering is Elementary founder Christine Cunningham speaks on K-12 engineering curriculum, equal access to STEM education. *Edtechtimes* Interview. April 13, 2017. <https://edtechtimes.com/2017/04/13/engineering-is-elementary-founder-christine-cunningham-speaks-on-k-12-engineering-curriculum-equal-access-to-stem-education/>

The right way to teach science. WGBH *Innovation Hub* Radio Interview. July 25, 2014. <http://blogs.wgbh.org/innovation-hub/2014/7/25/right-way-teach-science/>

Engineering for kids. *How on Earth*, WGNU, Denver, CO Radio Interview. November 26, 2013.

Engineering for kids. Fox 25, Boston Television Interview. November 19, 2013.

## **Journal Articles, Book Chapters, Invited Papers**

Cunningham, C. M. (in press). Engineering in elementary STEM education: Curriculum design, instruction, learning, and assessment. New York, NY: Teacher College Press.

Cunningham, C. M., Lachapelle, C. P., & Davis, M. (in press). Engineering concepts, practices, and trajectories for early childhood education. In English, L. & Moore, T. (Eds.), *Early engineering learning*. New York, NY: Springer.

Robinson, A., Adelson, J. L., Kidd, K. A., & Cunningham, C. M. (2017). A talent for tinkering: Developing talents in young, low-income children through engineering curriculum. *Gifted Child Quarterly*. Advance online publication. DOI: 10.1177/0016986217738049

Davis, M. E., Cunningham, C. M., & Lachapelle, C. P. (2017). They can't spell "engineering" but they can do it: Designing an engineering curriculum for the preschool classroom. *Zero to Three Journal*. 37(5), 4–12.

Kelly, G. J., Cunningham, C. M., & Ricketts, A. (2017). Engaging in engineering practices as identity work through engineering practices in elementary classroom. *Linguistics and Education*. 39, 48-59. DOI: 10.1016/j.linged.2017.05.003

Lachapelle, C. P., Cunningham, C. M., & Davis, M. (2017). Middle childhood education: Engineering concepts, practices, and trajectories. In deVries, M. J. (Ed.), *Handbook of technology education*. New York, NY: Springer. DOI: 10.1007/978-3-319-38889-2\_23-1

Hertel, J. D., Cunningham, C. M., & Kelly, G. K. (2017). The roles of engineering notebooks in shaping elementary engineering student discourse and practice. *International Journal of Science Education*. 9, 1194-1217. DOI: 10.1080/09500693.2017.1317864

Cunningham, C. M., & Kelly, G. K. (2017). Epistemic practices of engineering in education. *Science Education*. 101, 486–505. DOI: 10.1002/sce.21271

Cunningham, C. M., & Kelly, G. K. (2017). Framing engineering practices in elementary school classrooms. *International Journal of Engineering Education*. 33(1B), 295–307.

Cunningham, C. M. (2017). Engineering practices. In Schwarz, C., Passmore, C., & Reiser, B. (Eds.), *Helping students make sense of the world using Next Generation science and engineering practices* (pp. 283–307). Arlington, VA: National Science Teachers Association Press.

Cunningham, C. M., & Carlsen, W. S. (2016). Not just a prop for teaching science. *PRISM*, 26(3), 68.

- Cunningham, C. M. (2016). Engineering education for elementary students. In deVries, M. J., Gumaelius, L., & Skogh, I. B. (Eds.). *Pre-university engineering education* (pp. 81–99). Rotterdam, Netherlands: Sense Publishers.
- Cunningham, C. M., & Lachapelle, C. P. (2016). Designing engineering experiences to engage *all* students. *Educational Designer*, 3(9). Retrieved from <http://www.educationaldesigner.org/ed/volume3/issue9/article31/index.htm>
- Cunningham, C. M. (2015). Turn school setbacks into success. *A parent's guide to STEM*. (p. 40). U.S. News & World Report.
- Cunningham, C. M., & Higgins, M. (2014). Engineering for everyone. *Educational Leadership*, 72(4), 42–47.
- Cunningham, C. M., & Berger, C. (2014). Integrating science and engineering in the elementary classroom. In Yager, R. (Ed.), *Exemplary STEM programs: Designs for success* (pp. 423–440). Arlington, VA: National Science Teachers Association Press.
- Cunningham, C. M. (2014). Engineering is Elementary: Engineering for elementary school students (grades 1–5). In C. I. Sneider (Ed.), *The go-to guide for engineering curricula, preK-5!* (pp. 19–38). Thousand Oaks, CA: Corwin Press.
- Higgins, M., & Cunningham, C. M. (2014). Engineering Adventures: Engineering for out-of-school time. In C. I. Sneider (Ed.), *The go-to guide for engineering curricula, preK-5!* (pp. 147–162). Thousand Oaks, CA: Corwin Press.
- Cunningham, C. M., & Carlsen, W. S. (2014). Precollege engineering education. In N. Lederman (Ed.), *Handbook of research on science education* (pp. 747–758). Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.
- Cunningham, C. M., & Lachapelle, C. P. (2014). Designing engineering experiences to engage *all* students. In S. Purzer, J. Strobel, & M. Cardella (Eds.), *Engineering in pre-college settings: Synthesizing research, policy, and practices* (pp. 117–142). Lafayette, IN: Purdue University Press.
- Lachapelle, C. P., & Cunningham, C. M. (2014). Engineering in elementary schools. In S. Purzer, J. Strobel, & M. Cardella (Eds.), *Engineering in pre-college settings: Synthesizing research, policy, and practices* (pp. 61–88). Lafayette, IN: Purdue University Press.
- Cunningham, C. M., & Carlsen, W. S. (2014). Teaching engineering practices. *Journal of Science Teacher Education*, 25(2), 197–210.
- Lachapelle, C. P., Sargianis, K., & Cunningham, C. M. (2013). Engineer it, learn it: Science and engineering practices in action. *Science and Children*, 51(3), 70–76.
- Sargianis, K., Lachapelle, C. P., Cunningham, C. M., Facchiano, J., Sanderson, C., & Slater, P. (2012). Limestone or wax? *Science and Children*, 50(4), 54–61.
- Morgan, E., Sargianis, K., Skophammer, R., Cunningham, C. M., Yocom de Romero, N., & Murphy-Garcia K. (2012). Engineering elementary students: Two examples of integrating science and engineering in the classroom. *Children's Technology and Engineering*, 11(2), 8–12.
- Cunningham, C. M. (2009). Engineering is Elementary. *The Bridge*, 30(3), 11–17.
- Cunningham, C. M. (2008). Technology and engineering in museums. In R. L. Custer & T. L. Erikson (Eds.), *Engineering and Technology Education. 57<sup>th</sup> Yearbook* (pp. 208-210). Woodland Hills, CA: Glencoe/McGraw-Hill.
- Cunningham, C. M. (2007, October). *Elementary teacher professional development in engineering: Lessons learned from Engineering is Elementary*. Paper presented to National Academy of Engineering K-12 Engineering Committee.
- Cunningham, C. M., Knight, M. T., Carlsen, W. S., & Kelly, G. (2007). Integrating engineering in middle and high school classrooms. *International Journal of Engineering Education*, 23(1), 3–8.



- Knight, M. T., Huttlinger, C., Carlson, B., & Cunningham, C. (2006). Engineering in the classroom: A low-tech, local approach. *Technology Teacher*, 66(2), 18–21.
- Single, P. B., Muller, C. B., Cunningham, C. M., Single, R. M., & Carlsen, W. S. (2005). MentorNet: E-Mentoring for women students in engineering and science. *Journal of Women and Minorities in Science and Engineering*, 11(3), 295–309.
- Knight, M. T., & Cunningham, C. M. (2004). Building a structure of support: An inside look at the structure of women in engineering programs. *Journal of Women and Minorities in Science and Engineering*, 10(1), 1–20.
- Goodman, I. F., Cunningham, C. M., Lachapelle, C., Thompson, M., Bittinger, K., Brennan, R. T. & Delci, M. (2002). *Final Report of the Women's Experiences in College Engineering (WECE) Project*. Goodman Research Group, Inc. Cambridge, MA <http://www.grginc.com>.
- Single, P., Muller, C. B., Cunningham, C. M., & Single, R. M. (2000). Electronic communities: A forum for supporting women professionals and students in technical and scientific fields. *Journal of Women and Minorities in Science and Engineering*, 6(2), 115–130.
- Cunningham, C. M. (1998). The effect of teachers' sociological understanding of science (SUS) on curricular innovation. *Research in Science Education*, 28(2), 243–257.
- Cunningham, C. M., & Helms, J. V. (1998). Sociology of science as a means to a more authentic, inclusive and liberatory science education. *Journal of Research in Science Teaching*, 35(5), 483–499.
- Cunningham, C. M. (1997). Who knows?: The influence of teachers' sociological understanding of science on knowledge, authority, and control in the classroom. *Journal of Classroom Interaction*, 32(2), 24–34.
- Carlsen, W. S., Kelly, G. J., & Cunningham, C. M. (1994). Teaching ChemCom: Can we use the text without being used by the text? In G. Aikenhead & J. Solomon (Eds.), *Science, technology, and society education* (pp. 84-96). New York, NY: Teachers College Press.
- Kelly, G. J., Carlsen, W. S., & Cunningham, C. M. (1993). Science education in sociocultural context: Perspectives from the sociology of science. *Science Education*, 77(2), 207–220.

## **Funded Projects**

- Engaging Elementary Students in Engineering: A Dell–EiE Collaboration*: Dell Giving, \$1,003,943, June 2017–July 2018 (PI, Grant Co-Author)
- AIR Worldwide EiE Scholarship Program III*: AIR Worldwide, \$15,000, July 2017–June 2018 (PI)
- MathWorks EiE Scholarship Program*: MathWorks, \$23,000, April 2017–December 2017 (PI, Grant Co-Author)
- Engineering is Elementary in Orlando, FL*: Oracle, \$25,000, April 2017–March 2018 (PI, Grant Author)
- AIR Worldwide EiE Scholarship Program II*: AIR Worldwide, \$15,000, July 2016–June 2017 (PI)
- Expanding Access to Elementary Engineering through Online Professional Development Resources for Teachers*: Cisco, \$125,000, April 2016–August 2017 (PI, Grant Author)
- MathWorks EiE Scholarship Program*: MathWorks, \$23,000, April 2016–December 2016 (PI, Co-Grant Author)
- Engineering is Elementary in Baltimore, MD*: amazon.com through Change the Equation, \$5,000, March 2016–September 2016 (PI)
- EMC EiE Scholarship Program*: EMC, \$10,000, April 2016–December 2016 (PI, Co-Grant Author)
- Engineering is Elementary in Orlando, FL*: Oracle, \$25,000, April 2016–March 2017 (PI, Grant Author)
- 100kin10 Teach for America EiE Scholarship*: 100kin10, \$25,000, March 2016–September 2016 (Co-PI, Grant Author)

- PLANETS (Planetary Learning that Advances the Nexus of Engineering, Technology, and Science):* NASA, \$4,923,480, January 2016–December 2020 (Co-PI, Grant Co-Author)
- AIR Worldwide EiE Scholarship Program:* AIR Worldwide, \$15,000, September 2015–June 2015 (PI, Grant Author)
- Engineering Adventures, Massachusetts Scholarships II:* SheGives, \$37,000, June 2015–December 2015 (PI, Grant Author)
- Building Pathways for Future Leaders in Engineering:* Gordon Foundation, \$5,000,000, June 2015–June 2020 (Co-PI, Grant Co-Author)
- Engineering is Elementary in Massachusetts:* Oracle, \$25,000, April 2015–March 2016 (PI, Grant Author)
- PictureSTEM:* National Science Foundation iCorps-L, \$50,000, December 2014–March 2015 (Project Mentor)
- Engineering Adventures, Massachusetts Scholarships:* SheGives, \$33,500, June 2014–December 2014 (PI, Grant Author)
- Engineering is Elementary in Silicon Valley:* Oracle, \$25,000, February 2014–October 2014 (PI, Grant Author)
- Engineering is Elementary in Silicon Valley:* Silicon Valley Education Fund, \$5,000, October 2013–August 2014 (PI, Grant Author)
- Engineering for All:* National Science Foundation Discovery Research K-12, \$633,800, September 2013–August 2016 (Co-PI, Grant Co-Author)
- Middle School Camps and OST Curriculum Development:* i2Camps, \$500,000, November 2012–January 2015 (PI, Grant Author)
- Exploring the Efficacy of Engineering is Elementary:* National Science Foundation Discovery Research K-12, \$2,999,822, September 2012–August 2016 (PI, Grant Author)
- Engineering MISSION: Engineering for Middle School Science, Inspiration, and Opportunity:* NASA, \$857,125, June 2012–June 2015 (Grant Co-Author)
- Engineering is Elementary in Saudi Arabia:* Raytheon, \$254,970, August 2012–August 2014 (PI, Grant Author)
- Engineering is Elementary Scholarships:* Raytheon, \$1,000,000, June 2011–June 2015 (PI, Grant Author)
- Engineering Adventures Pilot in Orange County:* Samueli Foundation, \$5,975; 2011–2012 (Co-PI)
- Engineering Adventures: Curriculum Development:* S.D. Bechtel Jr. Foundation, \$500,000; November 2011–January 2013 (PI, Grant Author)
- Engineering is Elementary: Supporting Implementation with Video Resources:* Cognizant, \$750,000; 2011–2014 (PI, Grant Author)
- Developing Partner Sites:* Cognizant, \$60,000; 2011–2014 (PI, Grant Author)
- The Raytheon Partnership for Engineering is Elementary Teacher Professional Development:* Raytheon, \$600,000; 2011–2016 (PI, Grant Author)
- Raytheon-EiE Teacher Scholarship Program:* Raytheon, \$1,000,000; 2011–2015 (PI, Grant Author)
- Bridging Engineering, Science, and Technology (BEST) for Elementary Educators:* National Science Foundation Advanced Technological Education; \$899,072, June 2010–May 2014 (PI, Grant Author)
- Engineering is Elementary: Resources for Classroom Implementation and Dissemination:* S. D. Bechtel, Jr. Foundation: \$310,770; 2010–2012 (PI, Grant Author)
- Engineering is Elementary (EiE) Out-of-School Time (OST) Proof of Concept Grant:* S. D. Bechtel, Jr. Foundation: \$175,142; 2010–2011 (PI, Grant Author)
- EiE in Oakland After-School Programs: An Evaluation and Planning and Pilot for EiE Afterschool Modules:* S. D. Bechtel Jr. Foundation; \$73,000, 2010 (PI, Grant Author)

- Engineering is Elementary*: Tides Foundation/Google Charitable Trust: \$135,000; 2010–2011 (PI, Grant Author)
- Engineering is Elementary: Alliance for Curriculum Implementation and Support*: Cargill Foundation, \$2,483,526; January 2009–June 2013 (Co-PI, Grant Co-Author)
- Engineering is Elementary: National Dissemination through Regional Partners*: S.D. Bechtel, Jr. Foundation: \$466,000; 2009–2010 (PI, Grant Author)
- Family Engineering for Parents & Elementary-Aged Children*: National Science Foundation Informal Science Education, \$1,697,484; May 2008–April 2011 (Co-PI, Grant Co-Author)
- Connecting Mathematics, Science, Engineering, Classrooms, and Museums*: Liberty Museum Foundation, \$1,000,000; January 2008–December 2012 (PI, Grant Author)
- Engineering is Elementary: National Research and Professional Development*: S.D. Bechtel, Jr. Foundation: \$150,000; 2007–2008 (PI, Grant Author)
- Engineering is Elementary*: Cisco Systems Foundation, \$250,000; 2008–2009 (PI, Grant Author)
- Advancing Technological Skills and Literacy (ATLAS) of Elementary Educators*: National Science Foundation Advanced Technological Education, \$740,649; July 2007–June 2010 (PI, Grant Author)
- EiE MA Dissemination*: Cisco Systems Foundation, \$52,362; 2007–2008 (PI, Grant Author)
- EiE Webspaces*: Cisco Systems Foundation, \$46,200; 2006–2007 (PI, Grant Author)
- Engineering is Elementary National Dissemination*: NIST, \$210,000; 2005–2007 (PI, Grant Author)
- Engineering is Elementary: Engineering and Technology Lessons for Children*: National Science Foundation Instructional Materials Development, \$2,725,620; June 2005–May 2011 (PI, Grant Author)
- Engineering is Elementary Educational Public Video Pilot Project*: Intel, \$38,628; 2005 (PI, Grant Author)
- Power Up! Creating Leaders for Community College & High School Technology/Engineering*: National Science Foundation Advanced Technological Education, \$772,534; July 2004–June 2008 (PI, Grant Author)
- EiE Curriculum*: Millipore, \$20,000; October 2004–December 2005 (PI, Grant Author)
- EiE Curriculum*: Hewlett Packard, \$25,000; October 2004–December 2005 (PI, Grant Author)
- K-6 Technology/Engineering Tie-In Lessons*: Massachusetts Pipeline Fund, \$100,000; June 2004–May 2005 (PI, Grant Author)
- Creating Exhibitions for Everyone—A Research Project Planning Grant*: National Science Foundation Informal Science Education, \$49,982; May 2004–January 2005 (PI, Grant Author)
- Engineering is Elementary: Engineering and Technology Lessons for Children*; Intel, \$225,889; 2004–2005 (PI, Grant Author)
- Supplemental Funding Request for K-8 Engineering Dissemination through FOSS Technology Tie-In Lessons*; Intel, \$60,000; 2003–2004 (PI, Grant Author)
- K-8 Engineering Dissemination through FOSS Technology Tie-In Lessons*; Intel, \$60,000; 2003–2004 (PI, Grant Author)
- Tufts Engineering the Next Steps (TENS) Research Experience for Teachers*: National Science Foundation GK-12, \$65,871; July 2003–June 2004 (PI, Grant Author)
- Tufts Engineering the Next Steps (TENS) GK12 Project*: National Science Foundation GK-12; \$1,547,795, June 2003–May 2006 (PI, Grant Author)
- Leveraging Experience to Accelerate Progress (LEAP): Moving Towards Gender Equity in Engineering Education*: Intel Foundation, GE, Mobil Exxon, HP, \$90,000; Sept 2002–February 2003 (PI, Grant Author)

*Pre-College Engineering for Teachers (PCET)*: National Science Foundation Teacher Enhancement, \$1,738,421; August 2002–December 2008 (PI, Grant Author)

*Tufts Computer Science, Engineering, and Mathematics Scholarship Program*: National Science Foundation Division of Undergraduate Education, \$385,000; September 2002–August 2006 (Co-Author, Evaluator)

*Cornell University Sciences Research Partnerships (CERP)*: National Science Foundation GK-12, \$1,350,000; February 2000–August 2003 (Co-PI, Grant Co-Author)

*Urban Ecosystems Modeling: Preservice and Inservice Teacher Education through Technology-Intensive Curriculum Design*: Dwight D. Eisenhower Competitive Inservice Training Grant for Science and Mathematics Education, \$116,000; 1999–2001 (PI, Grant Author)

*A Comprehensive Evaluation of Women in Engineering Programs*: National Science Foundation Research on Educational Policy and Practice, Sloan Foundation, \$1,200,000; March 1998–December 2001 (Co-PI, Project Director)

*Environmental Inquiry: Learning Science as Science is Practiced*: National Science Foundation Instructional Materials Development, \$845,000; January 1997–December 2001 (Co-PI, Grant Co-Author)

*Institute on Science and the Environment for Teachers*: National Science Foundation Teacher Enhancement 1995-2000 \$694,693; Dwight D. Eisenhower Competitive Inservice Training Grant for Science and Mathematics Education; \$67,500 (1993), \$70,875 (1994), \$42,500 (1995), \$33,000 (1996), \$33,000 (1997), \$33,000 (1998); (Project Director, Grant Co-Author)

*Invisible College for Science Education Reform*: NYNEX \$20,000; August 1996–July 1997 (Project Director, Grant Author)

## **Program Evaluation**

External Evaluator for Community-Based Engineering Design Challenges for English Learners, Utah State University (2015)

Program Evaluator for Multi-Threaded Instruction: Forming Multi-Disciplinary Research Groups to Improve Undergraduate Education, Tufts University (2003)

Program Evaluator for Tufts Computer Science, Engineering, and Mathematics Scholarship Program, Tufts University (2003)

External Evaluator for Virtual Labs, Real Data, Including Biological Materials for Statics and Mechanics of Materials, Cornell University (2002)

Program Evaluator for Student Teacher Outreach and Mentorship Program, Tufts University (2002)

Program Evaluator for GK-12 Program, Tufts University (2002)

External Evaluator for GE Fund Faculty for the Future Program Support, WEPAN (2001)

External Evaluator for the National Junior Science & Humanities Symposium, Academy of Applied Sciences (2001)

External Evaluator for MentorNet: The Electronic Industrial Mentoring Program for Women in Engineering and Science (1998)

External Evaluator for the Center for Economic and Environmental Development, Allegheny College (1997)

Program Evaluator for the COSMOS Corporation (1997)

External Evaluator for the Engineering Concepts for the High School Classroom Replication Project: Partners for Engineering Problem Solving, Dartmouth College (1997)

External Evaluator for the Engineering Concepts for the High School Classroom, Dartmouth College (1996)

External Evaluator for the French Creek Environmental Education Project, Allegheny College (1995)

External Evaluator for the Women in Science Project, Dartmouth College (1994)

## **Memberships and Committees**

*Current Advisory Committees and Service:*

National Academy of Science Committee “Supporting English Learners in STEM Subjects” (2017–present)  
Engineering in School, Danish Academy of Technical Sciences (2017–present)

Broadening Identities for Diverse Youth in STEM through Socioenvironmental Problem Solving (2017–present)  
 Power of Data; Northern Arizona University (2015–present)  
 NSF Nanosystems Engineering Research Center for Directed Multiscale Metamaterials with Nanoscale Precision (CELL-MET); Boston University (2017–present)  
 Engineering Teacher Pedagogy: Using INSPIRES to Support Integration of Engineering Design in Science and Technology Classrooms; University of Maryland Baltimore County (2015–present)  
 Head Start on Engineering: Supporting Engineering Interest Development in Early Childhood; Oregon Museum of Science and Industry (2015–present)  
 Broadening Contexts to Motivate Participation in Engineering CAREER Grant; Purdue University (2015–present)  
 National Academy of Engineering Committee “Guiding Implementation of K-12 Engineering Education in the United States” (LinkEngineering) (2014–present)  
 Notre Dame Center for STEM Education; Notre Dame (2014–present)  
 Wise Guys and Gals – Boys & Girls as WISEngineering STEM Learners; Hofstra University (2014–present)  
 EngineerGirl Advisory Board and Essay Contest Judge; National Academy of Engineering (2014–present)  
 Journal of Pre-College Engineering Education Research (J-PEER) Editorial Board (2010–present)

*Previous Advisory Committees and Service:*

Engineering for All; Hofstra University (2013–2017)  
 Carnegie Corporation of New York Instructional Materials and Next Generation Science Standards Convening (2017)  
 Early Childhood STEM Working Group; Erikson Institute and University of Chicago Center for Elementary Mathematics Education (2015–present)  
 Interdisciplinary Project-Based Learning Grade 1 Planning Grant; University of Michigan (2015–2016)  
 National Assessment of Educational Progress Technology and Engineering Literacy Group Leader for Building TEL from a Foundation of Contextual Data Event (2016)  
 White House Early STEM Learning Symposium (2016)  
 NSF – Next Generation Tools to Analyze and Revise Science Curriculum; California State University, East Bay (2015–2016)  
 ATETV presents SciTrends; Pellet Productions (2014–2016)  
 Designing Our World: A Community Envisioning Girls as Engineers; Oregon Museum of Science and Industry (2013)  
 California Science Curriculum Framework Review (2014–2015)  
 National Science Foundation iCorps-L Mentor; Purdue University (2014–2015)  
 White House – UMBC College Opportunity STEM Education Workshop (2014)  
 National Assessment of Educational Progress Technology and Engineering Literacy Achievement Levels Description Content Expert Panel; WestEd (2014)  
 An Examination of Science and Technology Teachers' Conceptual Learning through Concept-Based Engineering Professional Development (Project INFUSE); Black Hills State University (2011–13)  
 UTech Engineering: Training Secondary Teachers to Deliver Design-Based Instruction; University of Texas at Austin (2010–11)  
 Partnership to Improve Student Achievement Physical Science: Integrated STEM approaches (PISA<sup>2</sup>); Steven Institute of Technology (2010–2014)  
 Crossing Boundaries and Exploring Biodiversity Conservation Using Information Technologies; Hobart and William Smith College (2009–2013)  
 Engaging Youth in Engineering Module Study (EYE); Mobile Area Education Foundation (2009–2013)  
 An Investigation of the Impact of Strengthening the “T” and “E” Components of STEM in High School Biology and Chemistry Courses (2009–2014)  
 Assessing Women and Men in Engineering; Pennsylvania State University (2009)  
 National Academy of Engineering Committee “K-12 Engineering Education Standards” (2008–2010)  
 STEM Conference National Steering Committee (2008)  
 Engineering Equity Extension Service; National Academy of Sciences (2008–2010)

Institute for P-12 Engineering Research and Learning (INSPIRE); Purdue University (2007–2014)  
Peer Alliance for Gender Equity; Science Museum of Minnesota (PAGE) (2007–2010)  
Pulse of the Planet Kids Science Challenge; Jim Metzner Productions Inc (2007–2011)  
Commonwealth Alliance for Information Technology Education; University of Minnesota – Twin Cities  
(2007–2009)  
Chair, American Society of Engineering Education K-12 and Pre-College Division (2006–7)  
Engineering Research Center for Compact and Efficient Fluid Power; University of Massachusetts,  
Amherst (2006–2010)  
Engineering our Future New Jersey (2006–2009)  
Brookline High School 21st Century Fund (2006–2007)  
A National Symposium to Develop an Effective Model for the Professional Development of K-12  
Engineering and Technology Education Teachers; Illinois State University (2005–7)  
National Center for Engineering and Technology Education (NCETE), Advisory Board Chair; Utah State  
University (2004–2010)  
Selection Committee, Women to Watch; Mass High Tech (2004–2009)  
Massachusetts Grade 5 Science and Technology/Engineering Assessment Development Committee (2004–  
5)  
Program Chair, American Society of Engineering Education K-12 and Pre-College Division (2003–2004)  
MentorNet, A National Electronic Industrial Mentoring Network for Women in Engineering and Science;  
MentorNet (2000–2008)

*Reviewer:*

Cultural Studies of Science Education  
Journal of Engineering Education  
Journal of Research in Science Teaching  
Journal of Teacher Education  
Journal of Pre-College Engineering Education Research (Editorial Board)  
Science Education  
National Science Foundation

*Academic Degree Committees:*

Phillip Lau, Tufts University, MS in Engineering, 2002  
Matthew Johnson, Pennsylvania State University, PhD in Education, 2016  
Amanda Sullivan, Tufts University, PhD in Early Childhood Development, 2016  
Megan Lancaster, The University of North Carolina, Greensboro, PhD in Education, in progress  
Carmen Vanderhoff, Pennsylvania State University, PhD in Education, in progress