

# Christine Maria 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 College & University  
Biology with Honors, Summa cum laude

## Professional Experience

- May 2003-present Vice President  
Founder and Director, Engineering is Elementary  
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

## Funded Projects

*Engineering is Elementary: Engineering and Technology Lessons for Children*  
(PI, Project Director, Grant Author)

National Science Foundation Instructional Materials Development, \$2,725,620, June 2005-May 2011  
Bechtel Foundation, \$1,020,770, November 2007-December 2012  
Intel Foundation, \$410,000, August 2003-December 2005  
Cisco System Foundation, \$348,724, July 2006-December 2008  
National Institute of Standards and Technology, \$144,097, July 2005-June 2007  
Tides Foundation, \$135,000, January 2010-August 2011  
Massachusetts Pipeline Fund, \$100,000, June 2004-May 2005  
Hewlett Packard, \$50,000, October 2004-December 2005  
Millipore, \$25,000, October 2005-December 2005

*Engineering is Elementary: Alliance for Curriculum Implementation and Support*: Cargill Foundation,  
\$2,483,526, January 2009-June 2013 (Co-PI, Grant Co-Author)

*Advancing Technological Skills and Literacy (ATLAS) of Elementary Educators*: National Science Foundation  
Advanced Technological Education, \$740,649, July 2007-June 2010 (PI, Project Director, Grant Author)

*Bridging Engineering, Science, and Technology (BEST) for Elementary Educators*: National Science  
Foundation Advanced Technological Education, \$899,072, June 2010-May 2013 (PI, Project Director,  
Grant Author)

*Connecting Mathematics, Science, Engineering, Classrooms, and Museums*: Liberty Museum Foundation,  
\$1,000,000, January 2008-December 2012 (PI, Project Director, 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)

*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)

*Creating Exhibitions for Everyone—A Research Project Planning Grant*: National Science Foundation Informal Science Education, \$49,982, May 2004-January 2005 (PI, Grant Author)

*Tufts Engineering the Next Steps (TENS) Research Experience for Teachers*: National Science Foundation GK12, \$65,871, July 2003-June 2004 (PI, Grant Author)

*Tufts Engineering the Next Steps (TENS) GK12 Project*: National Science Foundation GK12, \$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, Project Director, 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 GK12, \$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

*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)

## **Evaluation**

### *Program Evaluator:*

Multi-Threaded Instruction: Forming Multi-disciplinary Research Groups to Improve Undergraduate Education, Tufts University

Tufts Computer Science, Engineering, and Mathematics Scholarship Program, Tufts University

Student Teacher Outreach and Mentorship Program, Tufts University

Engineering GK-12 Program, Tufts University

### *External Program Evaluator:*

Virtual Labs, Real Data, Including Biological Materials for Statics and Mechanics of Materials, Cornell University

GE Fund Faculty for the Future Program Support, WEPAN

National Junior Science & Humanities Symposium, Academy of Applied Sciences

MentorNet: The Electronic Industrial Mentoring Program for Women in Engineering and Science

Center for Economic and Environmental Development, Allegheny College

COSMOS Corporation

Engineering Concepts for the High School Classroom Replication Project: Partners for Engineering Problem Solving, Dartmouth College

Engineering Concepts for the High School Classroom, Dartmouth College  
French Creek Environmental Education Project, Allegheny College  
Women in Science Project, Dartmouth College

## **Honors and Awards**

Mary Margaret Scoby Award, Technology Education for Children Council, 2007  
Leaders to Watch, International Technology Educational 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 K. Belnap Prize, Yale University, 1991  
John Spangler Nichols Cup, Yale University, 1991  
Phi Beta Kappa, Yale University, Inducted 1989, President 1990-91

## **Memberships and Committees**

### *Current Advisory Committees:*

National Academy of Engineering Committee on K-12 Engineering Education Standards  
National Center for Engineering and Technology Education (NCETE), Advisory Board Chair  
Institute for P-12 Engineering Research and Learning (INSPIRE)  
Crossing Boundaries and Exploring Biodiversity Conservation Using Information Technologies  
Kids Science Challenge  
Engineering our Future New Jersey

### *Member:*

American Educational Research Association  
American Society for Engineering Education  
National Association for Research in Science Teaching  
National Science Teachers Association  
International Technology Education Association

### *Reviewer:*

Journal of Research in Science Teaching  
Science Education  
National Science Foundation  
Journal of Engineering Education

## **Curricula**

### ***Engineering is Elementary Series ([www.mos.org/eie](http://www.mos.org/eie)):***

#### Curricular Units:

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 Electrical Circuits (Electrical Engineering)  
A Work in Process: Designing and Play Dough Process (Chemical Engineering)  
A Stick in the Mud: Siting a Bridge (Geotechnical Engineering)  
The Attraction is Obvious: Designing a Maglev Vehicle (Transportation Engineering)  
Thinking Inside the Box: Designing a Plant Package (Packaging Engineering)  
A Long Way Down: Designing Parachutes (Aerospace Engineering)  
Now You're Cooking: Designing Solar Oven (Green Engineering)  
Solid as a Rock: Replicating an Artifact (Materials Engineering)  
Taking the Plunge: Designing Submersibles (Ocean Engineering)  
A Slick Soluttion: Cleaning an Oil Spill (Environmental Engineering)  
Lighten Up: Designing Lighting Systems (Optical Engineering)  
No Bones About It: Design Knee Braces (Biomedical Engineering)

Storybooks:

Yi Min's Great Wall: A Materials Engineering Story  
Saving Salila's Turtle: An Environmental Engineering Story  
Leif Catches the Wind: A Mechanical Engineering Story  
Javier Builds a Bridge: A Civil Engineering Story  
Aisha Makes Work Easier: An Industrial Engineering Story  
Mariana Becomes a Butterfly: An Agricultural Engineering Story  
Kwame's Sound: An Acoustical Engineering Story  
Juan Daniel's Fútbol Frog: A Bioengineering Story  
A Reminder for Emily: An Electrical Engineering Story  
Michelle's MVP Award: A Chemical Engineering Story  
Suman Crosses the Karnali River: A Geotechnical Engineering Story  
Hikaru's Toy Trouble: A Transportation Engineering Story  
A Gift for Fadil: A Packaging Engineering Storybook  
Paolo's Parachute Mission: An Aerospace Engineering Story  
Lerato Cooks Up a Plan: A Green Engineering Story  
Galya and Natasha's Rocky Adventure: A Materials Engineering Story  
Despina Makes a Splash: An Ocean Engineering Story  
Tehya's Pollution Soluttion: An Environmental Engineering Story  
Omar's Time to Shine: An Optical Engineering Story  
Erik's Unexpected Twist: A Biomedical Engineering Story

Video:

Industrial Engineering: Making Work Easier (In collaboration with DigiNovations)  
TELLY Award in International Competition in the Category "Educational Video Production"  
Platinum Award for General Video Production from the National Professional Videographers  
Association

***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

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

- Cunningham, C.M. & Lachapelle, C.P. (in review). Designing engineering experiences to engage all students. In J. Strobel, S. Purzer, M. Cardella (Eds.), Engineering in PreCollege Settings: Research in Practice. Rotterdam: Sense Publishers.
- Cunningham, C.M. & Lachapelle, C.P. (in review). Engineering in elementary schools. In J. Strobel, S. Purzer, M. Cardella (Eds.), Engineering in PreCollege Settings: Research in Practice. Rotterdam: Sense Publishers.
- 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). 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.
- Huttlinger C., Knight, M.T., Carlson, B., Cunningham, C.M. (2006) Engineering in the classroom: A low tech, local approach. The Technology Teacher. 66(2). 18-21.
- Bhargava, p., Antonakakis, J., Cunningham, C. M., Zehnder, A. T. (2006) Web-based virtual torsion laboratory. Computer Applications in Engineering Education 14(1). 1-8.
- Single, P. B., Muller, C. B., Cunningham, C. M., Single, R. M., and 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(2).
- Goodman, I. F, Cunningham, C.M., Lachapelle, C., Thompson, M., Bittinger, K., Brennan, R.T., and 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>
- Trautmann, N. M, Carlsen, W. S., Krasny, M. E., & Cunningham, C. M. (2000). Integrating inquiry. The Science Teacher. 67(6). 52-55.
- 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 influence 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. 483-499.
- Cunningham, C. M. (1997). Who knows?: The influence of teachers' sociological understanding of science (SUS) on knowledge, authority, and control in the classroom. Journal of Classroom Interaction. 32(2). 24-34
- Cunningham, C. M. (1995). Sample curriculum analysis. In G. J. Posner. Analyzing the Curriculum. (pp. 274-303). New York: McGraw-Hill Inc.
- Carlsen, W. S., Cunningham, C. M. & Lowmaster, N. (1995). But who will teach it? Review of Benchmarks for Science Literacy. Journal of Curriculum Studies 27. 448-451.
- 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*, 207-220.