

CAITLIN T. MUELLER

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MIT / Department of Architecture
Building Technology Program / 5-421
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Cambridge, MA 02139

EDUCATION

- 2014 Ph.D. in Building Technology, Department of Architecture, Massachusetts Institute of Technology
- 2014 S.M. in Computation for Design and Optimization, Center for Computational Engineering, Massachusetts Institute of Technology
- 2008 M.S. in Structural Engineering, Department of Civil and Environmental Engineering, Stanford University
- 2007 B.S.A.D. in Architectural Design, Department of Architecture, Massachusetts Institute of Technology

ACADEMIC APPOINTMENTS

- 2014 Assistant Professor, Building Technology Program, Department of Architecture, Massachusetts Institute of Technology

PUBLICATIONS

Peer-Reviewed Journal Articles

- 2015 **Mueller, C.**, “High-Dimensional Design Space Visualization for Conceptual Structural Design,” *Structural and Multidisciplinary Optimization* (in preparation).
- 2015 **Mueller, C.** and Knight, T., “Evolutionary Exploration Of A Grammar-Based Structural Design Space,” *Artificial Intelligence for Engineering Design, Analysis and Manufacturing* (in preparation).
- 2015 **Mueller, C.**, “The Structure of the Kimbell Art Museum’s Cycloid Shells,” *ICE Journal of Engineering History and Heritage* (in preparation).
- 2014 **Mueller, C.** and Ochsendorf, J., “Combining Structural Performance and Designer Preferences in Evolutionary Design Space Exploration,” *Automation in Construction* (under review).

Articles in Conference Proceedings

- 2015 **Mueller, C.** and Plunkett, W., "Thin Concrete Shells at MIT: Kresge Auditorium and the 1954 Conference," *Proceedings of the 5th International Congress on Construction History*, Chicago, IL, United States (abstract accepted).
- 2015 **Mueller, C.**, "August Komendant: Innovation in Prestressed Concrete Design and Construction," *Proceedings of the 5th International Congress on Construction History*, Chicago, IL, United States (abstract accepted).
- 2015 **Mueller, C.**, Fivet, C., and Ochsendorf, J., "Graphic Statics and Interactive Optimization for Structural Engineering Education," *Proceedings of the ASCE Structures Congress 2015*, Portland, OR, United States (abstract accepted).
- 2014 **Mueller, C.**, Irani, A., and Jenett, B., "Additive Manufacturing of Structural Prototypes for Conceptual Design," *Proceedings of the International Association for Shell and Spatial Structures (IASS) Symposium 2014*, Brasilia, Brazil.
- 2014 Rolvink, A., **Mueller, C.**, and Coenders, J., "The State of the Art of Computational Tools for Conceptual Structural Design," *Proceedings of the International Association for Shell and Spatial Structures (IASS) Symposium 2014*, Brasilia, Brazil.
- 2013 **Mueller, C.** and Ochsendorf, J. "A Novel Computational Approach for Conceptual Structural Design," *Proceedings of the International Association for Shell and Spatial Structures (IASS) Symposium 2013*, Wroclaw, Poland.
- 2013 **Mueller, C.** and Ochsendorf, J. "From Analysis to Design: New Computational Strategies for Structural Creativity," *Proceedings of the 2nd International Workshop on Design in Civil and Environmental Engineering*, Worcester, MA, United States.

Other Publications

- 2011 **Mueller, C.** and Ochsendorf, J., "An Interactive Evolutionary Framework for Structural Design," *Presented paper at 7th International Seminar of the IASS Structural Morphology Group*, London, UK.

Theses

- 2014 Mueller, C., *Computational Exploration of the Structural Design Space*, Doctoral Dissertation, Massachusetts Institute of Technology, June 2014.
- 2014 Mueller, C., *High-Dimensional Design Space Visualization for Conceptual Structural Design*, Master's Thesis, Massachusetts Institute of Technology, June 2014.

AWARDS AND HONORS

- 2013 Amar Bose Teaching Fellowship, Massachusetts Institute of Technology
- 2010 Presidential Fellowship, Massachusetts Institute of Technology
- 2007 Outstanding Undergraduate Award for Design and Academic Excellence, Massachusetts Institute of Technology, Department of Architecture
- 2007 Phi Beta Kappa Honor Society, Massachusetts Institute of Technology
- 2006 Kelly-Douglas Travel Fellowship, Massachusetts Institute of Technology

RESEARCH LEADERSHIP

- 2014 Director, Digital Structures Research Group, Massachusetts Institute of Technology
- 2014 Co-Director, Structural Design Lab, Massachusetts Institute of Technology

INVITED TALKS

- 2014 Creativity and Performance in Computational Structural Design
Ney + Partners, Brussels, Belgium, August 5, 2014
- 2014 New Computational Approaches for Optimal Structural Design (with Alessandro Beghini)
Stanford University, Structural Engineering and Geomechanics Seminar, January 8, 2014
- 2014 Computation for Creativity and Performance in Conceptual Structural Design
Skidmore, Owings, & Merrill, San Francisco, CA, January 7, 2014
- 2013 Creative Evolutionary Exploration in Conceptual Structural Design
Princeton University, Department of Civil and Environmental Engineering, December 4, 2013
- 2013 Degrees of Freedom: New Strategies for Computational Structural Design
Czech Technical University in Prague, Department of Architecture, January 9, 2013
- 2012 An Interactive Evolutionary Approach for Creative Structural Design
Skidmore, Owings, & Merrill, Chicago, IL, September 13, 2012
- 2012 Exploration + Discovery in Structural Design
University of California, Berkeley, Department of Architecture, February 15, 2012

CONFERENCE ACTIVITIES

Keynote Presentations

2013 Digital Brainstorming: An Interactive Evolutionary Framework for Creativity, Diversity, and Performance in Conceptual Structural Design, *Multi-Objective Evolutionary Computation Applied to Structural Engineering and Architecture Mini-Symposium, 12th U.S. National Congress on Computational Mechanics*, Raleigh, NC, July 22-25, 2013

Presented Papers

2015 Thin Concrete Shells at MIT: Kresge Auditorium and the 1954 Conference, *5th International Congress on Construction History*, Chicago, IL, June 3-7, 2015

2015 August Komendant: Innovation in Prestressed Concrete Design and Construction, *5th International Congress on Construction History*, Chicago, IL, June 3-7, 2015

2015 Graphic Statics and Interactive Optimization for Structural Engineering Education, *ASCE Structures Congress 2015*, Portland, OR, April 23-25, 2015

2014 Additive Manufacturing of Structural Prototypes for Conceptual Design, *International Association for Shell and Spatial Structures (IASS) Symposium 2014*, Brasilia, Brazil, September 15-19, 2014

2014 The State of the Art of Computational Tools for Conceptual Structural Design, *International Association for Shell and Spatial Structures (IASS) Symposium 2014*, Brasilia, Brazil, September 15-19, 2014

2013 A Novel Computational Approach for Conceptual Structural Design, *International Association for Shell and Spatial Structures (IASS) Symposium 2013*, Wroclaw, Poland, September 23-27, 2014

2013 From Analysis to Design: New Computational Strategies for Structural Creativity, *2nd International Workshop on Design in Civil and Environmental Engineering*, Worcester, MA, July 28-29, 2013

2011 An Interactive Evolutionary Framework for Structural Design, *7th International Seminar of the IASS Structural Morphology Group*, London, UK, September 17-18, 2011

DEPARTMENTAL AND INTERNAL TALKS

2013 Evaluating an Interactive Evolutionary Tool for Conceptual Structural Design, MIT, M.Eng. Seminar, Department of Civil and Environmental Engineering, March 8, 2013

2013 Creative Computation for Conceptual Structural Design, MIT, Computation Lecture Series, Department of Architecture, March 1, 2013

TEACHING EXPERIENCE

Department of Architecture, MIT

- 2015 Computational Structural Design and Optimization (4.s48), Spring
Instructor and Course Developer
- 2014 Building Structural Systems II (4.463), Fall
Instructor
- 2014 Building Technology Seminar (4.481), Fall
Instructor
- 2014 Forces Frozen: Structural Ice Shells Workshop (non-credit), January
Instructor and Course Developer
- 2013 Building Structural Systems I (4.440J/1.056J/4.462), Spring
Teaching Assistant
- 2012 Building Structural Systems II (4.463), Fall
Teaching Assistant
- 2012 Building Structural Systems I (4.440J/1.056J/4.462), Spring
Teaching Assistant
- 2011 Building Structural Systems II (4.463), Fall
Teaching Assistant

Department of Civil and Environmental Engineering, MIT

- 2014 Senior Civil and Environmental Engineering Design (1.013), Spring
Instructor

ADVISING EXPERIENCE

Thesis Advising, Department of Architecture, MIT

- 2014 Mali Wagner: *Structural Connections in Plywood Friction-Fit Construction*
BSA Thesis Reader

Thesis Advising, Department of Civil and Environmental Engineering, MIT

- 2015 Benjamin Jenett
SM Thesis Advisor
- 2014 Chelsea Sprague: *Building Envelope Membrane as Flexible Formwork for Concrete Panels*
M.Eng. Thesis Reader

2013 Virginie Arnaud: *Quantifying Architects' and Engineers' Use of Structural Design Software*
M.Eng. Thesis Reader

Undergraduate Research (UROP) Advising, MIT

2014 Ali Irani, Department of Architecture and Department of Civil and Environmental Engineering

2013 Andrew Sang, Department of Architecture and Department of Civil and Environmental Engineering

2013 Iovana Valdez, Department of Civil and Environmental Engineering

Other Research Advising, MIT

2014 James Coleman, SUTD Graduate Fellow, Department of Architecture

2014 Hui Li, Summer Research Assistant, Department of Architecture

2014 Grant Iwamoto, Summer Research Assistant, Department of Civil and Environmental Engineering

2014 Jonathan Mackaman: *Robotics-Based 3D Printing in Architectural Fabrication*
Research Science Institute (RSI) high school research program

2013 Jocelyn Wang: *Innovative Braced Frame Geometries for High-Rise Buildings through Structural Optimization*
Research Science Institute (RSI) high school research program

SERVICE ACTIVITIES

Service to Profession

2014 Reviewer, ASCE Journal of Architectural Engineering

Service to Department of Architecture, MIT

2014 Organizer, Building Technology Lecture Series

2014 Member, Building Technology Admissions Committee

Other Service, MIT

2014 Faculty Instructor, *Discover Course 1* Freshman Pre-Orientation Program

OUTREACH ACTIVITIES

2014 Volunteer Workshop Leader for Weston Middle School students

- 2013 Volunteer Workshop Leader for WiSE (Women in Science and Engineering) high school program
- 2013 Volunteer Workshop Leader for Weston Middle School students

PROFESSIONAL DESIGN EXPERIENCE

- 2008 Structural Engineer
Simpson Gumpertz & Heger, Waltham, MA, 2008 – 2010
- 2006 Architectural Intern
Ruffcorn Mott Hinthorne Stine, Seattle, WA, Summer 2006
- 2005 Architectural Intern
KMD Architects, San Francisco, CA, Summer 2005
- 2004 Architectural Intern
LDa Architects, Cambridge, MA, Summer 2004 and January 2005
- 2004 Architectural Intern
Vollmer Associates, New York, NY, January 2004
- 2003 Architectural Intern
Wiedemann Architects, Bethesda, MD, Summer 2003

PROFESSIONAL ORGANIZATIONS

- 2014 Member, Association for Computer Aided Design in Architecture (ACADIA)
- 2013 Member, Building Technology Educators' Society (BTES)
- 2011 Member, Structural Morphology Working Group (SMG)
- 2011 Member, International Association for Shell and Spatial Structures (IASS)
- 2008 Member, American Society of Civil Engineers (ASCE)
- 2008 Member, American Institute for Steel Construction (AISC)
- 2008 Member, American Concrete Institute (ACI)

REFERENCES

Available upon request.