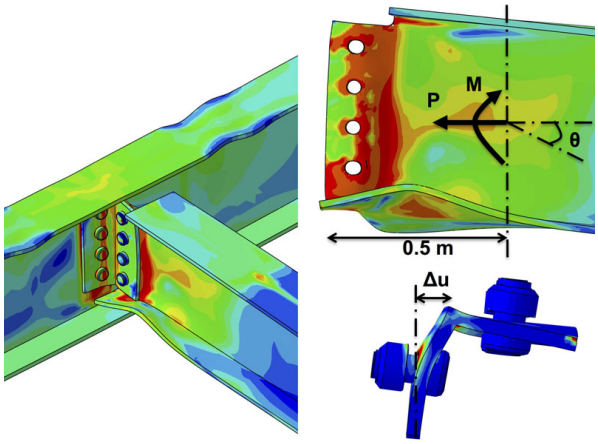
Professor Maria Garlock



See: https://garlock.princeton.edu/research/steel-connections-for-fire/

See:
https://www.princeton.edu/cee/people/display_person/?netid=mgarlock
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https://garlock.princeton.edu/professor-maria-garlock-wins-2016-t-r-higgins-lectureship-award/
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Civil and Environmental Engineering
Princeton University

Statement:
The prosperity of our nation and the well-being of its citizens greatly depend on the efficiency and safety of our civil engineering works, which give us shelter (buildings), enable transportation (roads, bridges, ports, airports), and bring us water and power (dams and reservoirs). Such works must be designed for extreme forces such as earthquakes, hurricanes, and fires. The design decisions that we make regarding these extreme forces greatly affect how many deaths, how much damage, and how long a recovery time we will have following an extreme event. Such multi-hazard resilience for structures is the underlying theme for one of my research areas. Another research thrust is related to engineering and the arts. There is more than one solution to an engineering problem and this reality opens the door to creativity and the arts in engineering. My work in this realm is inspired by the pioneering scholarship of Professor Emeritus David Billington and includes exhibitions that have been in art museums, and outdoors at popular tourist sites. My research also extends into teaching. Recently, I have transformed my approach to teaching by using research-based pedagogy that involves more student-faculty interaction. This new approach is being integrated into classes as large as 150 to those as small as 12. A recent NSF educational grant is giving me the opportunity to advance this type of research. I am grateful for the opportunities that have been afforded to me thus far through the support of Princeton University, industry, and government agencies. I am also thankful to many people, such as my hard working students and collaborating colleagues, who have worked with me to advance the knowledge, teaching, and learning of civil engineering.

Education:

Ph.D., Structural Engineering, 2003, Lehigh University, Bethlehem, PA
M.S., Civil Engineering, 1993, Cornell University, Ithaca, NY
B.S., Civil Engineering, 1991, Lehigh University, Bethlehem, PA

Honors and Awards:

- 1st place poster in category of Steel Structures, Composite Structures and Connections in the 5th International Conference for Structures in Fire, East Lansing, MI, June, 2010 (Quiel, S., Garlock, M.E.M. "Stress-based Equations for Predicting the Buckling Capacity of Steel Plates Exposed to Fire")
- Princeton University School of Engineering and Applied Science Commendation List for Outstanding Teaching (2007)
- Princeton University School of Engineering and Applied Science Commendation List for Outstanding Teaching (2006)
- Lawrence Keyes, Jr. /Emerson Electric Co. Faculty Advancement Award given by Princeton University (June 2006)
- Bronze Award for the Advancement of Arc Welded Design, Engineering and Fabrication, given by The James Lincoln Arc Welding Foundation (2003)
- Excellence in Civil Engineering Education (ExCEEd) Fellow (2003)

Research Interests:

Structural engineering; Fire-structure interaction; Earthquake engineering; Thin shell concrete roof structures; Structural art

Selected Publications:

Jonathan D. Glassman and Maria E. Moreyra Garlock, "Compression model for ultimate postbuckling shear strength at elevated temperatures", ASCE Journal of Structural Engineering, Vol. 143, No. 6, June 2017

Jonathan D. Glassman, Maria E. Moreyra Garlock, Esam M. Aziz and Venkatesh K. Kodur, "Modeling parameters for predicting the postbuckling shear strength of steel plate girders", Journal of Constructional Steel Research, Vol. 121, pp 136-143, June 2016

Jonathan D. Glassman and Maria E. Moreyra Garlock, "A compression model for ultimate postbuckling shear strength", Thin-Walled Structures, Vol. 102, pp 258-272, May 2016

Aziz, E.M., Kodur, V.K., Glassman, J.D., Garlock,M.E.M. (2015) "Behavior of steel bridge girders under fire conditions", Journal of Constructional Steel Research, Elsevier, Volume 106, March, Pages 11–22.

Glassman, J., and Garlock, M., "Elevated temperature evaluation of an existing steel web shear buckling analytical model" (2014). Journal of Constructional Steel Research, Elsevier. Volume 101, October, Pages 395–406.

Selamet, S., and Garlock, M.E.M. (2014). "Fire Resistance of Steel Shear Connections". Fire Safety Journal, Elsevier, Volume 68, August, Pages 52–60.

Alos-Moya, J., Paya-Zaforteza, I., Garlock, M., Loma de Osorio, E., Schiffner, D., Hospitaler, A., "Analysis of a bridge failure due to fire using computational fluid dynamics and finite element models" (2013). Engineering Structures, Elsevier, Vol 68, p. 96-110.

Quiel, S.E., Garlock, M.E.M., Dwaikat, M.M.S., Kodur, V.K.R. (2014). "Predicting the demand and plastic capacity of axially loaded steel beam-columns with thermal gradients" Engineering Structures, Elsevier, Vol 58, p. 49-62.

Aziz, E., Kodur, V., Glassman, J. D., Garlock, M. E. M. Experimental behavior of steel bridge girders under fire conditions. Journal of Constructional Steel Research, 2014; 106:11–22.

Elhami Khorasani, N., Garlock, M.E.M., Gardoni, P. (2013). “Fire Load: Survey Data, Recent Standards, and Probabilistic Models for Office Buildings”, Engineering Structures, Elsevier, in press: http://dx.doi.org/10.1016/j.engstruct.2013.07.042
Selamet, S., and Garlock, M.E.M. (2013). “Plate Buckling Strength of Steel Wide-Flange Sections at Elevated Temperatures”, Journal of Structural Engineering, ASCE, v 139, n 11, p 1853-65.
Pakala, P., Kodur, V., Selamet, S., and Garlock, M.E.M. (2012). “Fire behavior of shear angle connections in a restrained steel frame”, Journal of Constructional Steel Research, Elsevier, Volume 77, Pages 119–130.
Selamet, S., and Garlock, M.E.M. (2012). “Predicting the maximum compressive Beam Axial Force during Fire considering Local Buckling”, Journal of Constructional Steel Research, Elsevier, V.71, p.189-201.
Garlock, M.E.M., and Selamet, S. (2010). “Modeling and Behavior of Steel Plate Connections Subject to Various Fire Scenarios”, Journal of Structural Engineering, ASCE, v 136, n 7, p 897-906
Selamet, S., Garlock, M. (2010), Guidelines for modeling three dimensional structural connection models using finite element methods, In: Proceedings of the International Symposium on Steel Structures: Culture and Sustainability, Istambul, Turkey, pp. 351-360.