CURRICULUM VITAE OF GIANLUCA CUSATIS

:: BIOSKETCH ::

I am a faculty member of the Civil and Environmental Engineering Department at Northwestern University that I joined in August 2011. Prior to joining Northwestern, I worked at Rensselaer Polytechnic Institute for 6 years. I obtained my "Laurea"[1] degree and my PhD degree in structural engineering from Politecnico Di Milano (Italy). My teaching experience covers several courses in structural mechanics and mechanics of materials typically offered in civil engineering curricula. My research expertise is relevant to experimental, computational and applied mechanics, with emphasis on heterogeneous and quasi-brittle infrastructure materials. My work on constitutive modeling of concrete through the adoption of the so-called Lattice Discrete Particle Model (LDPM), one of the most accurate and reliable approaches to simulate failure of materials experiencing strain-softening, is known worldwide. In addition, recent work on waterless concrete for Martian constructions has received widespread attention in the technical community and in the media. Under the sponsorship of several agencies, my current research focuses on formulating and validating multiscale and multiphysics computational frameworks for the simulation of large-scale problems dealing with a variety of different applications including, but not limited to, infrastructure aging and deterioration, structural resiliency, and response of materials and structures to natural and man-made hazards. I am a member of the American Society of Civil Engineers (ASCE) and the American Concrete Institute (ACI) and I am active in several technical committees. At Northwestern University, I have held leadership positions as MMS Program coordinator and, currently, Director of Graduate Studies. ASCE EMI (Board of Directors), ACI 446 (Chair), ACI 209 (Chair), IA-ConCreep (President), and IA-FraMCoS (Treasurer). In 2018 I was awarded the EMI Fellow membership grade and in 2025 was elected Fellow for ACI. In 2020 I founded Cusatis Computational Services (CCS) Inc to pursue translation of fundamental research into practice. From 2021 to 2024, I was on leave from my teaching and service responsibilities at Northwestern University to serve as Program Director for the CMMI ECI program at the National Science Foundation.

:: EDUCATIONAL PREPARATION ::

Politecnico di Milano – Milan, Italy
PhD degree in Structural Engineering — *March 2002*

Politecnico di Milano – Milan, Italy
"Laurea" degree in Structural Engineering — *July 1998*

:: PROFESSIONAL EXPERIENCE ::

Northwestern University – Evanston, IL

Department of Civil and Environmental Engineering — www.civil.northwestern.edu
2145 Sheridan Road; Tech A134 — sites.northwestern.edu/m2im/
Evanston, Illinois 60208-3109 — g-cusatis@northwestern.edu

Professor (CEE) — *September 2019 – Present*
Professor (ME courtesy appointment) — *September 2022 – Present*
· Leading research activities on the behavior of concrete, wood, and geomaterials
· Teaching courses of the civil engineering curriculum
· Coordinating the Mechanics, Materials, and Structures (MMS) program (until June 2025)
· Coordinating the Structural Design MS program (until June 2025)

Director of graduate studies (CEE) — *September 2020 – August 2021; September 2026 – Present*
· Coordinating CEE MS and PhD programs
· Coordinating graduate student admissions
· Curricular development and maintenance
· Managing performance review, and disciplinary matters

Associate Professor (CEE) — *August 2011 – August 2019*
· Co-director of the Center for the Sustainable Engineering of Geological and Infrastructure Materials (SEGIM)
· Leading research activities on the behavior of quasi-brittle infrastructure materials
· Teaching courses of the civil engineering curriculum
· Coordinating the Mechanics, Materials, and Structures (MMS) program

Research Associate (CEE) — *June 2004 - July 2005*

[1] In the old Italian high educational system the "Laurea" degree was a five-year degree equivalent to BS+MS degree

· Conducting research on the mesoscale modeling of concrete

Cusatis Computational Services, Inc. – Wilmette, IL

242 Vista Ct
Wilmette, Illinois 60091

www.cusatisinc.com
gcusatis@cusatisinc.com

Founder and President — *February 2020 – Present*
Research and Development Director — *June 2024–Present*

National Science Foundation – Alexandria, VA

CMMI ECI Expert — *March 2024 – February 2025*
· Supporting the activities of the CMMI ECI Program.

CMMI ECI Program Director — *September 2021 – February 2024*
· Managing research funding in infrastructure materials and structures.

Politecnico di Milano – Milan, Italy

Visiting Professor — *July 2021*
· Teaching a course on concrete additive manufacturing

Research Associate — *April 2002 - May 2004*
· Conducting research on the mesoscale modeling of concrete and steel anchors

Tokyo Institute of Technology – Tokyo, Japan

Visiting Professor — *June 2018 – July 2018*
· Teaching a course on computational modeling of concrete materials and structures

Rensselaer Polytechnic Institute – Troy, NY

Assistant Professor — *August 2005 – July 2011*
· Leading research activities on the dynamic behavior of concrete
· Teaching courses of the civil engineering curriculum

Milan, Italy

Licensed Professional Engineer — *January 1999 - October 2006*
· Design of reinforced concrete and prestressed concrete structures

:: SUMMARY OF LEADERSHIP EXPERIENCE ::

- At NU, I serve as Director of Graduate Studies. My core responsibilities include acting as the primary liaison among graduate faculty, students, and the Graduate School; promoting academic quality and integrity; overseeing student records and annual evaluations; facilitating professional development activities; advising students on academic and career resources; supporting students in distress; and coordinating MS and PhD recruitment efforts across the department.
- I have held various leadership roles in professional societies, including serving on the ASCE EMI Board of Directors; chairing ACI Committees 446 (Concrete Fracture) and 209 (Concrete Creep and Shrinkage); serving as President of IA-ConCreep; and acting as Treasurer for IA-FramCoS. In these roles, I have been a staunch advocate for closer collaboration between academia and industry and have actively supported the engagement of emerging professionals.
- At NSF, I managed the review process, selection, and awarding of research proposals focused on structural mechanics and infrastructure materials. During my tenure, I spearheaded a multidisciplinary research initiative on climate change mitigation and adaptation, emphasizing climate action through the lens of the civil infrastructure system life cycle. This initiative was supported by multiple programs within the CMMI division and led to several awards backed by significant federal investment.
- In 2020, I founded Cusatis Computational Services (CCS) Inc., a start-up dedicated to translating fundamental research in infrastructure material modeling into practical computational tools. I currently serve as President of CCS. Under my leadership, the company has secured R&D funding in collaboration with the University of Maine, Virginia Tech, and Northwestern University.

:: HONORS, AWARDS, AND LEADERSHIP IN PROFESSIONAL SOCIETIES ::

· American Concrete Institute (ACI), Fellow *2025*
· ASCE, Journal of Aerospace Engineering, 2022 Best Paper Award *2022*
· ASCE, Engineering Mechanics Institute (EMI), Fellow *2018*
· IA-ConCreep, President *2015 – 2021*
· ACI 209, Creep and Shrinkage in Concrete, Chair *2016 – 2021*
· ASCE, Engineering Mechanics Institute (EMI), Board Of Governors, Member *2017 – 2020*
· IA-FraMCoS, Treasurer *2013 – 2019*
· ACI 446, Fracture Mechanics, Chair *2010 – 2016*

:: IN THE NEWS (SELECTED ITEMS)::

· SOM and Northwestern Advance in NASA's 3D-Printed Habitat Competition, Press Release, 8/6/2018.
· Civil Engineering Challenges in the Aftermath of Hurricane Maria, America's News HQ, Fox News, 10/1/2017.
· Scientists explore ways to use Martian soil to build habitats on the red planet, ACS Central Science, 11/15, 2017.
· Team Develops Martian Concrete With Significant Implications For Terrestrial Construction, ASCE Civil Engineering Magazine, 1/19/2016.
· Materials Scientists Make Martian Concrete, MIT Technology Review, 1/5/2016.
· Why Martian Concrete Might Be The Best Building Material In The Solar System, co.design, 1/7/2016.
· Concrete for Mars Shelters Made from Martian Materials, CNET, 1/11/2016.
· Martian Concrete Made from Materials Only on the Red Planet, phys.org, 1/7/2016.
· Researchers Mix Up Batches Of Martian Concrete, Popular Science, 1/6/2016.
· How to Build a House on Mars, The Atlantic, 1/10/2016.

:: RESEARCH – PUBLICATIONS ::

Books, Monographs, and Book Chapters[2]

5. **G. Cusatis**, and M. Troemner. "Chapter 2.2: Structural Design". In *Embassy 2050 - Application of Policies and Aspirations*, Springer. 2016. ISBN 978-3-319-40124-9.

4. G. Ranzi, G. Di Luzio, M. Bocciarelli, G. Leoni, A. Dömnez, **G. Cusatis**, A. Perez, I. Gilbert. "Time-dependent behaviour of concrete" in *Time-dependent behaviour and design of composite steel-concrete structures*. International Association for Bridge and Structural Engineering, Zurich, Switzerland, 2021, pp. 196, Structural Engineering Documents (No. 18). 2021. https://doi.org/10.2749/sed.18.ch2

3. **G. Cusatis**, and C. Jin (Eds). New Frontiers in Oil and Gas Exploration, Springer. 2016. ISBN 978-3-319-40124-9.

2. W. Li, **G. Cusatis**, and C. Jin. "Integrated Experimental and Computational Characterization of Shale at Multiple Length Scales". In *New Frontiers in Oil and Gas Exploration*, Springer. 2016. ISBN 978-3-319-40124-9.

1. **G. Cusatis**. "The Lattice Discrete Particle Model (LDPM) for the Numerical Simulation of Concrete Behavior Subject to Penetration". *In Materials under extreme loadings - Application to penetration and impact.* Wiley. 2010. ISBN: 9781848211841.

Peer Reviewed Journal Articles – Published and in Press[2]

137. E. Irizarry S. Gomaa, R. Marrero-Rosa A. Ahmed, J. Burroughs, E. Kreiger, **G. Cusatis** "Influence of Surface Morphology on the Strength and Failure Behavior of 3D Printed Ultra-High-Performance Concrete". *ACI Materials Journal*. 2026.

136. S. Pal, S. Gomaa, A. Ahmed, **G. Cusatis**, and S. Keten "Molecular Investigation of Freshly-Made Cement Paste Rheology for 3D-Printing Application". *Journal of Applied Physics*. 2026.

135. M.Z. Naser, A. B. Awwad, Z. McCreery, R. Eissa, A. Naser, **G. Cusatis**, A. Metcalf, K. Madathil, J. Abdalla, V. Kodur, M. Reza Saeb. "Engineering Reasoning and Instruction (ERI) Benchmark: A Large Taxonomy-driven Dataset for Foundation Models and Agents". *Computers & Industrial Engineering*. 2026. https://doi.org/10.48550/arXiv.2603.02239

[2]Underlined names are advised students and post-docs.

134. L. Shen, W. Zhao, H. Yin, L. Gan, H. Gu, M. Zhu, G. Di Luzio, **G. Cusatis** "Discrete hygro-thermo-mechanical coupled modeling of concrete under freeze-thaw cycles: cracking pattern, mechanical degradation and external load effect", *Computer Methods in Applied Mechanics and Engineering*. 2026. https://doi.org/10.1016/j.cma.2026.119338

133. L. Yang, G. Di Luzio, **G. Cusatis**, J.-G. Dai, "Modeling of the interaction between hydration and carbonation on reaction kinetics at early age", *Carbon Capture Science & Technology*. 2026. https://doi.org/10.1016/j.ccst.2026.100675

132. Y. Lyu, F. Zheng, M. Troemner, E. Lale, K. Yu, D. Toussaint, H. Ye, **G. Cusatis**. "Polymaterial Lattice Discrete Particle Model for the Optimization of Lightweight Aggregate Concrete: Intragranular Fracture and Compression Behavior", *International Journal for Numerical and Analytical Methods in Geomechanics*. 2026. https://doi.org/10.1002/nag.70361

131. L. Yang, H. Yin, H. Su, K. Yao, M. Alnaggar, G. Di Luzio, **G. Cusatis**. "A multiscale homogenization approach for multiphysics lattice modeling of alkali-silica reaction in concrete: upscaling coupled mechanics and mass transport". *Cement and Concrete Research*. 2026. https://doi.org/10.1016/j.cemconres.2026.108230

130. J. Khoury, **G. Cusatis**, G. Pijaudier-Cabot. "Macroscale damage model calibrated from discrete mesoscale data with a consistent description of fracture". *European Journal of Mechanics / A Solids*. 2026.

129. N. Noorollahi, **G. Cusatis**, A. Fascetti. "Reduced Order Modeling of the Lattice Discrete Particle Model via Proper Orthogonal Decomposition". *International Journal for Numerical and Analytical Methods in Geomechanics*. 2026. https://doi.org/10.1002/nag.70298

128. E. Lale, J. Eliáš, K. Yu, M. Troemner, M. Stredulova, J. Khoury, T. Xue, I. Koutromanos, A. Fascetti, B. Ayhan, B. Chen, G. Di Luzio, Y. Lyu, M. Pathirage, G. Pijaudier-Cabot, L. Shen, A. Tasora, L. Yan, J. Zhong, **G. Cusatis**. "Lattice Discrete Particle Model (LDPM): Comparison of Various Time Integration Solvers and Implementations". *International Journal for Numerical and Analytical Methods in Geomechanics*. 2026. http://doi.org/10.1002/nag.70286

127. J. Khoury, **G. Cusatis**, G. Pijaudier-Cabot. "Informing a damage model for fracture of concrete from lattice discrete particle model results" *International Journal of Damage Mechanics*. 2026. https://doi.org/10.1177/10567895261421295

126. B. Chen, **G. Cusatis**, A. Fascetti, "Displacement Controlled Arc Length Method for the Lattice Discrete Particle Model". *Computer Methods in Applied Mechanics and Engineering*. 2025. https://doi.org/10.1016/j.cma.2025.118567

125. J. Eliáš and **G. Cusatis**. "Do Discrete Fine-Scale Mechanical Models with Rotational Degrees of Freedom Homogenize Into a Cosserat or a Cauchy Continuum?" *Journal of the Mechanics and Physics of Solids*. 2025. https://doi.org/10.1016/j.jmps.2025.106422

124. C. Huang, L. Shen, W. Yu, N. F. Alkayem , Y. Han, Z. Tian , H. Yin , **G. Cusatis**. "High-fidelity SPH-DEM Framework for Mesoscopic Rheological Behavior of Fresh Fiber-reinforced Concrete". *International Journal of Mechanical Sciences*. 2025. https://doi.org/10.1016/j.ijmecsci.2025.110061

123. Y. Zhou, A. Shamim, Z. Zhu, **G. Cusatis**, F. Xing. "Integrated cyclic fiber-bridging model encompassing buckling characteristics of both steel and PE fibers". *Engineering Structures*. 2025. https://doi.org/10.1016/j.engstruct.2025.119696.

122. M. Pathirage, D. Gregoire, G. Pijaudier-Cabot, **G. Cusatis**. "Transformation and regression statistics of the size-effect method for determining fracture energy and process zone size in quasi-brittle materials" *Materials and Structures*. 2025. https://doi.org/10.1617/s11527-024-02565-x

121. J. Eliáš and **G. Cusatis**. "Macroscopic stress, couple stress and flux tensors derived through energetic equivalence from microscopic continuous and discrete heterogeneous finite representative volumes", *Computer Methods for Applied Mechanics and Engineering*. 2025. https://doi.org/10.1016/j.cma.2024.117688

120. L. Yang, M. Troemner, **G. Cusatis**, H. Su. "A novel analytical model of particle size distributions in granular materials". *Engineering with Computers*. 2025. https://doi.org/10.1007/s00366-024-02042-7

119. M. Troemner, E. Lale, **G. Cusatis**. "Lattice Discrete Particle Model Simulations of Energetic Size Effect and its Implications for Shear Design Specifications of Reinforced Concrete Squat Walls". *Engineering Structures*. 2025. https://doi.org/10.1016/j.engstruct.2024.119085

118. S. Gomaa, E. M. Irizarry, A. Ahmed, R. Marrero, H. Ahmed, J. Burroughs, E. Kreiger, J. Liu, M. Troemner, **G. Cusatis**."3D Printing of Ultra-High-Performance Concrete: Shape Stability for Various Printing Systems". *Construction and Building Materials*. 2024. https://doi.org/10.1016/j.conbuildmat.2024.139039

117. R. Marrero, T. Bhibho, A. Dönmez, **G. Cusatis**, Z. P. Bažant. "The Shard Test and Nanoporomechanics Reverse Classical Paradigm of Cement Hydration Being Contractive", *PNAS*. 2024. https://doi.org/10.1073/pnas.2418448121

116. Y. Lyu, M. Troemner, E. Lale, E. Ramyar, W. K. Liu, **G. Cusatis**. 'Clustering-enhanced Lattice discrete particle modeling for quasi-brittle fracture and fragmentation analysis". *Computational Mechanics*. 2024. https://doi.org/10.1007/s00466-024-02485-1

115. L. Shen, L. Hu, G. Di Luzio, M. Cao, L. Xu, **G. Cusatis** "Mesoscale Mechanical Discrete Model for Cementitious Composites with Microfibers", *Engineering*. 2024. https://doi.org/10.1016/j.eng.2024.11.017

114. H. Yin, M. Troemner, W. Li, E. Lale, L. Yang, L. Shen, M. Alnaggar, G. Di Luzio, **G. Cusatis**. "An Interprocess Communication-based Two-way Coupling Approach for Implicit-Explicit Multiphysics Lattice Discrete Particle Model Simulations". *Engineering Fracture Mechanics*. 2024. https://doi.org/10.1016/j.engfracmech.2024.110515

113. S.-A. Brown, G. Di Luzio, **G. Cusatis**. "Microprestress Theory for the Prediction of Mechanosorptive Creep in Wood". *ASCE Journal of Engineering Mechanics*. 2024. https://doi.org/10.1061/JENMDT.EMENG-7603

112. G. Pijaudier-Cabot, D. Toussaint, M. Pathirage, **G. Cusatis**. "On the role of the horizon in modelling failure due to strain and damage localization in peridynamics". *ASCE Journal of Engineering Mechanics*. 2024. https://doi.org/10.1061/JENMDT.EMENG-7689

111. M. Mercuri, M. Pathirage, A. Gregori, and **G. Cusatis**. "Influence of self-weight on size effect of quasi-brittle materials: generalized analytical formulation and application to the failure of irregular masonry arches" *International Journal of Fracture*. 2024. https://doi.org/10.1007/s10704-023-00710-1

110. H. Yin, A. Cibelli, S.-A. Brown, L. Yang, L. Shen, M. Alnaggar, **G. Cusatis**, and G. Di Luzio. "Flow Lattice Model for the Simulation of Chemistry Dependent Transport Phenomena in Cementitious Materials". *European Journal of Environmental and Civil Engineering*. 2024. https://doi.org/10.1080/19648189.2023.2242456

109. Y. Lyu, M. Pathirage, Z. P. Bažant, **G. Cusatis**. "Dissipation Mechanisms of Crack-Parallel Stress Effects on Fracture Process Zone in Concrete". *Journal of the Mechanics and Physics of Solids*. 2023. https://doi.org/10.1016/j.jmps.2023.105439

108. Z. Zhu, W. Wang, M. Troemner, and **G. Cusatis** "Lattice discrete particle modeling of the cycling behavior of strain-hardening cementitious composites with and without fiber reinforced polymer grid reinforcement". *Composite Structures*. 2023. https://doi.org/10.1016/j.compstruct.2023.117346

107. D. Shirole, G Volpatti, A. Guerini, D. Zampini, **G. Cusatis**, A. Rotta-Loria. "Effects of electrodeposition in concrete mediated by electric currents of variable polarity". *Cement and Concrete Research*. 2023. https://doi.org/10.1016/j.cemconres.2023.107254

106. Y. Lyu, M. Pathirage, E. Ramyar, W. K. Liu, **G. Cusatis**. "Machine learning meta-models for fast parameter identification of the lattice discrete particle model". Computational Mechanics. 2023. https://doi.org/10.1007/s00466-023-02320-z

105. N. Izadinia, E. Ramyar, M. Alzayer, S. H. Carrc **G. Cusatis**, V. Dwivedi, D. Garcia, M. Hettiarachchi, T. Massion, W. Miller, and A. Wachter and **G. Cusatis**. "A Versatile Optimization Framework For Sustainable Post-Disaster Building Reconstruction. " *Optimization and Engineering*. 2023. https://doi.org/10.1007/s11081-022-09766-9

104. D. Tong, S.-A. Brown, H. Yin, D. Corr, E. Landis, G. Di Luzio, **G. Cusatis**. "Orthotropic Hygroscopic Behavior of Mass Timber: Theory, Computation, and Experimental Validation". *RILEM: Materials and Structures*. 2023. https://doi.org/10.1617/s11527-023-02196-8

103. M. Pathirage, B. Zhang; M. Alnaggar, **G. Cusatis** "Confinement and alkali-silica reaction in concrete: review and numerical investigation." *International Journal of Solids and Structures* . 2023. https://doi.org/10.1016/j.ijsolstr.2023.112341

102. L. Yang, B. Lai, R. Xu, X. Hu, H. Su, **G. Cusatis**, C. Shi. "Prediction of alkali-silica reaction expansion of concrete using artificial neural networks." Cement and Concrete Composites. 2023. https://doi.org/10.1016/j.cemconcomp.2023.105073

101. H. Yin, and **G. Cusatis**. "RingsPy: A Python package for Voronoi mesh generation of cellular solids with radial growth pattern". *Journal of Open Source Software*, 8(83), 4945. 2023. https://doi.org/10.21105/joss.04945.

100. M. Pathirage, D. Tong, F. Thierry, **G. Cusatis**, D. Gregoire, and G. Pijaudier-Cabot. "Discrete modeling of concrete failure and size-effect". *Theoretical and Applied Fracture Mechanics*. 2022. https://doi.org/10.1016/j.tafmec.2022.103738

99. Z. Zhu, M. Pathirage, W. Wang, M. Troemner, and **G. Cusatis**. "Lattice Discrete Particle Modeling of Concrete Under Cyclic Tension-Compression with Multi-Axial Confinement.". *Construction and Building Materials*. 2022.

98. J. Eliáš, H. Yin, and **G. Cusatis**. "Homogenization of discrete diffusion models by asymptotic expansion." *International Journal for Numerical and Analytical Methods in Geomechanics*. 2022.http://doi.org/10.1002/nag.3441

97. L. Shen, H. Zhang, G. Di Luzio, H. Yin, L. Yang, and **G. Cusatis**. "Mesoscopic discrete modeling of multiaxial load-induced thermal strain of concrete at high temperature." *International Journal of Mechanical Sciences*. 2022. https://doi.org/10.1016/j.ijmecsci.2022.107613

96. J. Eliáš and **G. Cusatis**. "Homogenization of discrete mesoscale model of concrete for coupled mass transport and mechanics by asymptotic expansion. " *Journal of the Mechanics and Physics of Solids*. 2022. https://doi.org/10.1016/j.jmps.2022.105010

95. H. Yin, E. Lale, and **G. Cusatis**. "Generalized formulation for the behavior of geometrically curved and twisted three-dimensional Timoshenko beams and its isogeometric analysis implementation." *ASME Journal of Applied Mechanics*. 2022. https://doi.org/10.1115/1.4054438

94. A. Cibelli, L. Ferrara, M. Pathirage, **G. Cusatis**, and G. Di Luzio. "A discrete numerical model for the effects of crack self-healing on the mechanical behaviour of ordinary plain concrete: implementation, calibration, and validation." *Engineering Fracture Mechanics*. 2022. https://doi.org/10.1016/j.engfracmech.2022.108266

93. C. Li, X. Zhou, and **G. Cusatis**. "Micro-Mechanics of Fiber-Concrete Interaction: Numerical Modeling and Experimental Validation." *ASCE Journal of Engineering Mechanics*. 2022. https://doi.org/10.1061/(ASCE)EM.1943-7889.0002097

92. E. Ramyar and **G. Cusatis**."Discrete Fresh Concrete (DFC) model for the simulation of standard, self-consolidating, and printable concrete flow." *ASCE Journal of Engineering Mechanics*. 2022. https://doi.org/10.1061/(ASCE)EM.1943-7889.0002059

91. J. Bolander, **G. Cusatis**, J. Eliáš, and K. Nagai. "Discrete mechanical models of concrete fracture". *Engineering Fracture Mechanics*. 2021. https://doi.org/10.1016/j.engfracmech.2021.108030

90. M. Angiolilli, A. Gregori, and **G. Cusatis**. "Simulating the nonlinear mechanical behavior of FRCM-strengthened irregular stone masonry walls". *International Journal of Architectural Heritage*. 2021. 10.1080/15583058.2021.2001114

89. L. Yang, M. Pathirage, H. Su, M. Alnaggar , G. Di Luzio, **G. Cusatis**."Computational modeling of expansion and deterioration due to alkali-silica reaction: the effect of size range, size distribution, and content of reactive aggregate". *International Journal of Solids and Structures* . 2021. https://doi.org/10.1016/j.ijsolstr.2021.111220

88. L. Yang, M. Pathirage, H. Su, M. Alnaggar , G. Di Luzio, **G. Cusatis** "Computational modeling of temperature and relative humidity effects on concrete expansion due to alkali-silica reaction". *Cement and Concrete Composites*. 2021. https://doi.org/10.1016/j.cemconcomp.2021.104237

87. M. Mercuri, M. Pathirage, A. Gregori, and **G. Cusatis**. "Masonry vaulted structures under spreading supports: fracturing behavior and size effect." *Journal of Building Engineering*. 2021. https://doi.org/10.1016/j.jobe.2021.103396

86. M. Mercuri, M. Pathirage, A. Gregori, and **G. Cusatis**."On the collapse of the Medici masonry tower: an integrated discrete-analytical approach." *Engineering and Structures*. 2021. https://doi.org/10.1016/j.engstruct.2021.113046

85. M. Troemner, E. Ramyar, J, Meehan, B. Johnson, N. Gouzardi, **G. Cusatis** "A 3D-printing centered approach to Mars habitat architecture and fabrication." *ASCE Journal of Aerospace Engineering*. 2021. https://doi.org/10.1061/(ASCE)AS.1943-5525.0001359

84. L. Shen, G. Di Luzio, D. Zhu, X. Yao, **G. Cusatis**, M. Cao, Y. Han, Y. Wang, and Q. Ren. "Mechanical responses of steel fiber reinforced concrete after exposure to high temperature: experiments and mesoscale discrete modeling". *ASCE Journal of Engineering Mechanics*. 2021. https://doi.org/10.1061/(ASCE)EM.1943-7889.0001991

83. R. Roozbeh, D. Scott, F. Bousikhane, R. Moser, B. Green, and **G. Cusatis**. "Influence of Steel Fiber Size, Shape, and Strength on the Quasi-Static Properties of Ultra-High Performance Concrete: Experimental Investigation and Numerical Modeling". *Construction and Building Materials*. 2021. https://doi.org/10.1016/j.conbuildmat.2021.123532

82. L. Shen, F. Lo Monte, G. Di Luzio, **G. Cusatis**, W. Li, R. Felicetti, F. Lombardi, M. Lualdi, M. Cao, and Q. Ren. "On the moisture migration of concrete subject to high temperature with different heating rates". *Cement and Concrete Research*. 2021. https://doi.org/10.1016/j.cemconres.2021.106492

81. M. Alnaggar, **G. Cusatis**, R. Wan-Wendner, Yang L., and G. Di Luzio. "Mesoscale modeling of concrete time-dependent behavior". *Beton i Zhelezobeton [Concrete and Reinforced Concrete]*. 2021. No. 2 (604), pp. 24–48. In English.

80. M. Angiolilli, M. Pathirage, A. Gregori, and **G. Cusatis**. "The Lattice Discrete Particle Model for the simulation of irregular stone masonry". *ASCE Structural Engineering Journal*. 2021. https://doi.org/10.1061/(ASCE)ST.1943-541X.0003093

79. E. Lale and **G. Cusatis**. "Symmetric High Order Microplane Model for Damage Localization and Size Effect In Quasi-Brittle Materials". *International Journal for Numerical and Analytical Methods in Geomechanics*. 2021. http://doi.org/10.1002/nag.3209

78. W. Li, Y. Qiao, J. Fenner, K. Warren, M. Salviato, Z. P. Bažant, **G. Cusatis**. "Elastic and Fracture Behavior of Three-Dimensional Ply-to-Ply Angle Interlock Woven Composites: Through-Thickness, Size Effect, and Multiaxial Tests". *Composites Part C: Open Access*. 2021. https://doi.org/10.1016/j.jcomc.2020.100098

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:: RESEARCH – PROJECTS ::

Externally Sponsored @ CCS Inc.

4. Phase II: Computational Tools for the Multiscale Simulation of Engineered Wood Products (EWP) under Dynamic Loading Conditions, US Army Engineer Research and Development Center. Contract: W912HZ23C0047; Aug 7, 2023 to Aug 8 2025.

3. Direct to Phase II: Data-Driven Multiscale and Multiphysics Cloud Framework for the Prediction of Long-Term Behavior of Mass Timber, Assistant Secretary of the Army (Acquisition, Logistics and Technology). Contract: W5170124C0030; Jan 16, 2024 to July 15, 2025.

2. SBIR/STTR Phase I Matching Program, Illinois Department of Commerce and Economic Opportunity Grant: 23-322008. Jan 1, 2023 to Dec 31, 2023.

1. Phase I: Computational Tools for the Multiscale Simulation of Engineered Wood Products (EWP) under Dynamic Loading Conditions, US Army Engineer Research and Development Center. Contract: W912HZ22P0045; Apr 29, 2022 to Jan 31, 2023.

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20. Portside 3D Printed Lightweight Concrete Foundation for Offshore Wind Turbines. 11/1/2023-10/1/2025. DOE via Orbital Composites Inc.
19. Computational Tools for the Multiscale Simulation of Engineered Wood Products under Dynamic Loading Conditions. Phase II. 9/01/2023-08/31/2025. USACE ERDC via CCS.
18. Multi-Scale Additive Manufacturing of Ultra High Performance Fiber Reinforced Concrete: Experiments and Computations. 6/24/2022-6/24/2025. USACE ERDC.
17. Multiscale Characterization of Concrete with Carbon Reinforcement at Various Length Scales. 12/2021-7/2024. ExxonMobil.
16. Rheology and Strength of Polymer-Sulfur Concrete. 6/2021-6/2023. ExxonMobil.
15. Computational Tools for the Multiscale Simulation of Engineered Wood Products under Dynamic Loading Conditions. Phase I and Phase II. 4/2022-12/2025. USACE ERDC via CCS.
14. Collaborative Research: Enabling Innovation in Sustainable Structural Building Systems Through Multiscale Modeling and Experimentation of Mass Timber. 4/1/18-3/30/22, NSF.
13. Simulation of Concrete 3D Printing, 9/17-9/19, USACE ERDC via ES3.
12. Aging Micromechanical Models for Concrete, 8/17-8/18, USACE ERDC via ES3.
11. Characterization of Aging Behavior in Cor-Tuf. 12/15-12/16, USACE ERDC via ES3.
10. Multiscale and Multiphysics Simulation of Reinforced Concrete Structures. 9/14-9/17, NSF.
9. 3D Braided Composite Structures - Experimental Characterization and Modeling of Fracturing Behavior. 9/14-9/17, NSF.
8. Service Lifetime Extension of Nuclear Power Plants: Prediction of Concrete Aging and Deterioration Through Accelerated Tests, Nondestructive Evaluation, and Stochastic Multiscale Computations. 9/14-9/17, NRC.
7. Microplane Constitutive Model for Carbon-Polymer Laminates and Prediction of Car Crashworthiness. 12/12-12/14, DOE via USCAR.
6. Ultra-High Performance Fiber Reinforced Concrete Structures - Macroscale Analysis with Mesoscale Lattice Discrete Particle Models. 8/12-7/15, NSF.
5. Microscopic Computational Simulation of Fiber-Matrix Interaction in Ultra High-Performance Cementitious Composites Under Quasi-Static and Dynamic Loadings. 8/12-8/13. USACE ERDC.
4. Numerical Simulation of the Micromechanical Behavior of Fiber/Concrete Interaction. 10/12-10/14. USACE ERDC via ES3 SBIR Phase II Project.
3. Man-made Hazard Mitigation of Reservoir Dams: Monte Carlo Simulation with Multiscale Modeling of Concrete and Accurate Fluid-Structure Interaction. 7/09-7/12. NSF. *Transferred from Rensselaer.*
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1. Constitutive Modeling and Numerical Algorithms for Concrete Behavior at High Strain Rate. 10/05-8/07. USACE ERDC via ES3.

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Graduate Courses @ Northwestern University

7. Structural Design 3 Spring 2020, Spring 2021
6. Structural Design 2 Winter 2020, Winter 2021
5. Structural Design 1 Fall 2019, Fall 2020
4. Inelastic Analysis of Structures – Fall 2017, Fall 2018, Spring 2019, Fall 2023- Present, annually.
3. Theory of Elasticity – Winter 2013-Winter 2017, annually.
2. Theory of Plates and Shells – Spring 2012, Winter 2013-Winter 2019, annually, Fall 2019, Fall 2020, Spring 2023-Present, annually.
1. Design of Prestressed Concrete – Spring 2012-Spring 2019, annually.

Undergraduate Courses @ Northwestern University

2. Engineering Analysis 2 – Spring 2026.
1. Concrete Design – Winter 2019, Winter 2020, Winter 2023 - Present, annually..

Graduate Courses @ Politecnico di Milano

1. Advances In Cementitious Material Technology And Numerical Modeling For 3D Printing Applications In Structural Engineering – Summer 2021.

Graduate Courses @ Tokyo Institute of Technology

1. Computational Modeling of Concrete Structures - The Lattice Discrete Particle Model (LDPM) – Summer 2018.

Graduate Courses @ Rensselaer Polytechnic Institute

1. Advanced Concrete Mechanics – Fall 2008, 2010.

Undergraduate Courses @ Rensselaer Polytechnic Institute

4. Strength of Materials – Fall 2010.
3. Concrete Design – Spring 2007, Spring 2009-2011, annually.
2. Advanced Structural Analysis – Spring 2006, 2008, 2010.
1. Introduction to Structural Engineering in Fall 2005-2009, annualy.

Short Courses

5. "Multi-Scale and Multi-Phase Modeling of Aging Concrete Structures", BOKU University, Vienna (Austria), July 2014 and June 2015.
4. "Microplane Models: Theory, Numerical Implementation, and Applications", Monash University, Melbourne (Australia), May 2014.
3. "Cracking of Prestressed Concrete Bridges". NYSDOT. Bridge Inspection Training Course. Birch Hill, Schodack, NY, March 2010.
2. "Design of Prestressed Concrete Bridges". NYSDOT Training Course. Rensselaer Polytechnic Institute, Troy (NY), USA, May 2007.
1. "Modeling and Analysis of the Response of Structures (MARS) Workshop: the Lattice Discrete Particle Model (LDPM)". U.S. Army Engineer Research & Development Center, Vicksburg (MS), USA, April 2007.

:: ADVISING ::

Post-Docs @ Northwestern University

10. Bahar Ayhan, June 2023 – June 2025.
9. Shady Gomaa, March 2023 – June 2025.
8. Raul Marrero, August 2022 – December 2025.
7. Madura Pathirage, September 2021 – July 2023.
6. Roozbeh Rezakhani, September 2016 – September 2017.
5. Marco Salviato, January 2014 – July 2015.
4. Erol Lale, September 2013 – August 2015; June 2023 – June 2025.
3. Congrui Jin, October 2013 – August 2015.
2. Roman Wendner, July 2012 – August 2013.
1. Xinwei Zhou, May 2012 – February 2013.

PhD Students @ Northwestern University

22. Wisdom Akpan, "Micromechanical Modeling of Wood Durability", in progress.
21. Jiaqi Liu, "A Digital Twin for Concrete 3D Printing Process Workflow", in progress.
20. Tapinawashe Bhibho, "Investigating the Effects of Nano and Micro Silica on Shrinkage and Creep Behavior of Cementitious Materials for Enhanced Durability", in progress.
19. Ke Yu, "Computational modeling of concrete fresh to hardened transition", in progress.
18. Ayesha Ahmed, "Rehological Behavior of Ultra-High Performance Concrete at Fresh State", in progress.
17. Dono Toussaint, "Computational Modeling of Size Effect in Reinforced Concrete Beams and Rocks", June 2026.
16. Elmer Irizarry, "Mechanical Behavior of Hardened 3D Printed Ultra-High Performance Concrete", April 2026.
15. Danyang Tong, "Fully Coupled Multiphysics Model of Thermo-Hydro-Mechanical Behaviors for Frozen Ground Through Discrete-Continuum Simulation", June 2025.
14. Susan-Alexis Brown, "Time Dependent Behavior of Hybrid Structures Under Coupled Hygrothermal-Mechanical Loads", November 2023.
13. Hao Yin, "Discrete Modeling of Fracture and Flow in Porous Quasi-Brittle Materials with Applications to Wood and Concrete", November 2023.
12. Yuhui Lyu, "Efficient Structural Response Prediction for Concrete Using the Lattice Discrete Particle Model and Machine Learning Techniques", April 2023.
11. Chenyang Li, "Micromechanics and multi-physics of quasi-brittle materials with application to fiber reinforced concrete and granular rocks", April 2022.
10. Elham Ramyar, "Multiple-Scale Modeling of Cementitious Material: Fresh State Flow and Aging Behavior", April 2022.
9. Matthew Troemner, "Multiscale Lattice Discrete Particle Modeling of Concrete: Micromechanics, Scaling, Dynamics", February 2022.
8. Madura Pathirage, "Experimental and Numerical Modeling of Concrete Deterioration and Aging", June 2020.
7. Faysal Bousikhane, "Experimental Investigation and Multi-Physics Computational Modeling for Assessment, Mitigation, and Prevention of Concrete Deterioration", June 2018.
6. Weixin Li, "Computational and Experimental Characterization of the Behaviors of Anisotropic Quasi-Brittle Materials: Shale and Textile Composites", February 2018.
5. Shiva Esna Ashari Esfahani, "Multiscale Modeling of Earth-like Materials", July 2016.

4. Roozbeh Rezhakani, "Mathematical Homogenization of Discrete Models for the Simulation of Quasi-Brittle Behavior", September 2016.

3. Lin Wan, "Material Characterization and Aging of Ultra-High Performance Concrete" December 2015.

2. Jovanca Smith, "Characterization of Ultra-High Performance Concrete for Impact Resistant Structures", May 2014.

1. Mohammed Al-Naggar, "Multiscale Modeling of Concrete for Failure Analysis and Aging of Concrete Structures", May 2014.

MS Students @ Northwestern University

13. Xin Zhang, "Numerical Simulation of 3D Woven Composites" , Winter 2019.

12. Tianjiao Gai, "Experimental and Computational Analysis of Reinforced Concrete Deterioration Due to Alkali Silica Reaction (ASR)", Fall 2018.

11. Boqin Zhang, "Numerical Simulations of Alkali Silica Reaction (ASR) Deterioration Under Triaxial Stress States", Fall 2018.

10. Zixian Yang, "Experimental and computational modeling of drying behavior for standard and self healing concrete", December 2017

9. Zhefei Jin, "Experimental Study of Marcellus Shale", September 2016.

8. Minhyeok Ko "Shrinkage and Creep Effect on Large Structures", May 2016.

7. Oluwatobi Fiyin, "Shrinkage and Creep Effect on Tall Building",May 2015.

6. Mengxi Du, "Experimental Investigation of Fiber Reinforced Ultra High Performance Concrete", May 2015.

5. Madura Pathirage, "Alkali Silica Deterioration of Concrete", August 2015.

4. Faysal Bousikhane, "Experimental investigation of a fungi-activated self-healing concrete", July 2014.

3. Jiannan Wang, "Computational Analysis of Concrete-Fiber Interaction", March 2014.

2. Yikai Wang, "Strength and Toughness Build-Up of Ultra-High Performance Concrete", December 2013.

1. Laure Bonfils, "Dynamic Behavior of Ultra-High Performance Concrete (UHPC) Structures Under Extreme Loading Conditions", May 2013.

Post-Docs @ Rensselaer Polytechnic Institute

2. Andrea Mencarelli, November 2010 – December 2010.

1. Edward Schauffert, September 2010 – August 2011.

PhD Students @ Rensselaer Polytechnic Institute

3. Xinwei Zhou, "Continuous/Discrete Computational Modeling for the Multiscale Simulation of Concrete Mechanical Behavior", May 2012.

2. Andrea Mencarelli, "Numerical Simulation of the Effect of Blast and Penetration on Reinforced Concrete Structures", November 2010.

1. Edward A. Schauffert, "Discrete Modeling of Quasi-Brittle Materials: Fracture, Fragmentation and Size-Effect", August 2010.

MS Students @ Rensselaer Polytechnic Institute

7. Eric Domonell, "Lattice Discrete Particle Modeling of Reinforced Concrete", December 2011.

6. Jovanca Smith, "Discrete Modeling of Ultra High-Strength, Fiber Reinforced Concrete", August 2011.

5. Eric Dhal, "Experimental Investigation of the Mechanical Behavior of Concrete under Uniaxial and Multiaxial Stress States", November 2009.

4. Daniel Horvath, "Microplane Modeling of Concrete and Other Quasi-Brittle Materials", November 2009.
3. Andrea Mencarelli "Discrete Particle Model (LDPM) for Concrete: Calibration and Validation under Quasi-Static Loading Condition", December 2007.
2. Edward Schauffert, "Size Effect and Cohesive Crack Propagation in Quasi-Brittle Materials", August 2007.
1. Miao Zhou "Spectral Particle Method (SPM) for Two-dimensional Cohesive Crack Propagation", August 2007.

:: PROFESSIONAL AND PUBLIC LECTURES ::

Plenary and Keynote Lectures

14. "Computational Modeling of Infrastructure Materials in the Era of Artificial Intelligence", Plenary lecture at EMI-IC, Naples (Italy) September 3, 2026; Invited seminar at RWTH Aachen University, Aachem (Germany), August 31, 2026. Invited seminar, Kent seminar series, Illinois Center for Transportation (ICT) at the University of Illinois Urbana-Champaign, Rantoul, IL, October 22, 2026. Invited seminar, Johns Hopkins University, Baltimore, MD, October 29, 2026.
13. "Discrete Modeling of Fracture in Quasi-Brittle Materials", CEE Department, University of Pittsburgh. Pittsburgh, PA. November 15, 2024. Also, presented at the workshop "Fracture across fields: insights from material science, biology, and geophysics", Princeton University. Princeton, NJ. May 8-10, 2024.
12. "Numerical Simulation of Flow, Setting, and Hardening of 3D Printed Concrete". ACI Fall 2024 Convention. Philadelphia, PA. November 3, 2024.
11. "Lattice Discrete Particle Modeling (LDPM) of Heterogeneous Quasi-Brittle Materials: A Reflection On Two Decades Of Accomplishments". Semi-Plenary lecture at Particles 2023 Conference. Milan, Italy. October 10, 2023.
10. "3D Printing in Costruction: Don't Forget About Materials". Plenary lecture at the YPO workshop on Revolutionizing Construction with 3D Printing. Philadelphia, PA. May 13-14 2019.
9. "Computational Modeling and Characterization of Infrastructure Materials for Terrestrial and Extraterrestrial Constructions." Plenary lecture at the SynerCrete 2018 Conference. Funchal, Madeira Island, Portugal. October 24-26, 2018.
8. "The Lattice Discrete Particle Model (LDPM) for Fracture Dynamics and Rate Effect in Concrete: Theory, Calibration and Applications" Plenary lecture at the 22th DYMAT Technical Meeting. Grenoble, France. October 19-21, 2016.
7. "A Computational Framework for the Simulation of Aging and Deterioration of Concrete Structures" Plenary Lecture at the 57th Brazilian Conference of Concrete. Bonito (MS), Brazil. October 27-30, 2015.
6. "Aging and deterioration of concrete structures. Learning from the past, assessing the present, and predicting the future: science or magic?" Plenary Lecture at the 10th International Conference on Mechanics and Physics of Creep, Shrinkage, and Durability of Concrete and Concrete Structures (CONCREEP-10). Vienna, Austria. September 21-23, 2015.
5. "Mesoscale Simulation of Alkali-Silica Reaction (ASR) Deterioration of Concrete and Interpretation of Nonlinear Ultrasound Measurements" Keynote Lecture at NEA-CSNI-IAGE CAPS Workshop: Assessment of Nuclear Structures Subject to Concrete Degradation (ASCET). Gaithersburg, MD, June 30, 2015.
4. "Multiscale computational models for the simulation of concrete materials and structures" Plenary Lecture at EURO-C 2014, 24-27 March, 2014. St. Anton, Austria.
3. "High-order Microplane Theory for Elasticity and Softening of Quasi-Brittle Materials" Keynote Lecture at The Third International Conference on Computational Modeling of Fracture and Failure of Materials and Structures (C-FRAC 2013), Prague, Czech Republic, 4-7 June 2013.
2. "Simulation of Fiber-Reinforced Ultra-High Performance Concrete Under Penetration" Keynote Lecture at the PREVI Workshop, Les Houches, France, 1-4 April, 2013.
1. "Generalized Mathematical Homogenization of The Lattice Discrete Particle Model". Keynote Lecture at the 8th International Conference on Fracture Mechanics of Concrete and Concrete Structures (FraMCos-8), 10-14 March, 2013. Toledo, Spain.

Selected Invited Lectures (15 out of 50$^+$)

15. "The Role of Mechanics, Infrastructure Materials, and Structural Design for the Decarbonization and Resilience of the Built Environment", University of Illinois Urbana-Champaign, Urbana-Champaign (IL), October 16, 2023 and University of Illinois Chicago, November 17, 2023.

14. "3D Printing of Infrastructure Materials for Terrestrial and Extraterrestrial Constructions: Experiments, Computations, and Future Outlook.", Warren Lecture, University of Minnesota, Minneapolis (MN), Nov 21, 2019.

13. "Discrete Modeling of Mesoscale Poromechanics: Formulation and Numerical Examples with Application to Shale Simulation.", Politecnico di Milano, Milan, Italy. June 6, 2017.

12. "Multiscale-Multiphysics Computational Models for Quasi-Brittle Materials: from Cementitious and Carbon Composites to Rock and martian Concrete.", Laval University, Quebec, Canada. May 10, 2017.

11. "Aging and deterioration of infrastructure materials. Learning from the past, assessing the present, and predicting the future: science or magic?" Falling Apart - America's Neglected Infrastructure, Alumni Association, Northwestern University, Evanston (IL), November 5, 2015.

10. "Multiscale Modeling of the Mechanical Behavior of Black Shale", Grand Challenges in Geological Fluid Mechaincs, Santa Fe (NM), September 4, 2015.

9. "A multiscale computational framework for the Akali Silica Reaction (ASR) deterioration of concrete structures", NIST, Gaithersburg (MD), April 7, 2015

8. "Aging and deterioration of concrete structures. Learning from the past, assessing the present, and predicting the future", University of Illinois at Urbana-Champaign, Urbana-Champaign (IL), March 16, 2014.

7. "The Lattice Discrete Particle Model (LDPM): From Concrete Micro-Structure to Structural Modeling of High Impulsive Loading Events", Tongji University (Shanghai, China), Nanjing University of Science and Technology (Nanjing, China), Tsinghua University and Beihang University (Beijing, China), October 2014.

6. "Multiscale Computational Models for the Simulation of Concrete Materials and Structures" John's Hopkins University, Baltimore (VA), April 2014 also presented at Monash University and Swinburne University (Melbourne, Australia); University of Sydney and New South Wales (Sydney, Australia), May 2014.

5. "A multiscale computational framework for the analysis of alkali-silica reaction (ASR) deterioration of concrete structures" in Lecture Series 2013-2014 on Life-Cycle and Sustainability of Civil Infrastructure and Protection Systems. BOKU, Vienna (Austria), Mar 2014.

4. "The Lattice Discrete Particle Model (LDPM): From Concrete Micro-Structure to Structural Modeling – A Journey Across Length Scales." Hilti Corporation, Schaan, Lichtenstein, June 3 2013.

3. "Multiscale Modeling of Concrete (and Other Geomaterials): Are We There Yet?". Sandia Nat Labs, Albuquerque (NM), Sep. 5 2012.

2. "Multiscale And Multiphysiscs behavior of Concrete: Predicting Infrastructure Future?" US Bureau of Reclamation, Denver (CO), July 20, 2012.

1. "Modeling the Multiscale and Multiphisycs Behavior of Concrete: From Academia to Practice", CTL Group, Skokie (IL), April 2012.

:: SERVICE ::

Service @ Northwestern University

· Northwestern McCormick Engineering Ad Hoc Promotion & Tenure Committee, Winter 2020 and Winter 2024.
· Northwestern McCormick Engineering Promotion & Tenure Committee, Spring 2021.
· CEE Director of Graduate Studies. September 2020 – August 2021. September 2026 – Present.
· Program Coordinator for the Mechanics, Materials, and Structures (MMS) program. January 2015 – June 2025.
· CEE Graduate committee, CEE Department, February 2014 – August 2021.
· CEE Space Committee, CEE Department, February 2014 - August 2014.
· Faculty Advisory Committee, CEE Department, September 2013 – August 2014.
· Coordinator for the Seminar Series on "Sustainable Engineering of Geological and Infrastructure Materials (SEGIM)", September 2014 – May 2018.
· Coordinator for the Seminar Series on "Structural Engineering and Infrastructure Materials (SEIM): Design, Mechanics, and History". August 2012 – August 2014.
· Program Coordinator for the Structural Engineering and Infrastructure Materials (SEIM) program. August 2011 – December 2014.
· ME Computational Mechanics Search Committee, Member, September 2013 – May 2014.

Service @ Rensselaer Polytechnic Institute

· Geotechnical/Environmental Engineering Search Committee, Member, January 2011 – May 2011.
· CEE Graduate Committee, Member, September 2008 – May 2011.
· 175th Anniversary Celebration Committee, Member, September 2009 – May 2010.
· Faculty Peer Support Committee, Member, Sep.tember 2008 – Sep. 2009.
· Faculty Mentorship Committee, Chair, January 2008 – September 2008.
· Departmental Undergraduate Committee, Member, January 2008 – Sept. 2008.
· Faculty advisor for the Chi-Epsilon Student Chapter, May 2010 – May 2011.
· Advisor for the RPI Concrete Canoe Team, Fall 2010 – Spring 2011.
· Advisor for the RPI Steel Bridge Team, Fall 2006 – Spring 2011.

Membership in Professional Societies

· American Society of Civil Engineering (ASCE), Member, August 2006 – Present.
· American Concrete Institute (ACI), Member, August 2005 – Present.
· International Association of Protective Structures (IAPS), September 2011 – 2014.
· RILEM, International Union of Laboratories and Experts in Construction Materials, Systems and Structures, Member, May 2010 – May 2012.
· United States Association for Computational Mechanics (USACM), Member, August 2009 – August 2010.
· The Milan Order of Engineers, Member, 1999 – 2006.

Service in Technical Committees and Technical Boards – Associations

· ACI 209, Creep and Shrinkage in Concrete, Chair, April 2016 – August 2021; Member, May 2008 – Present.
· ACI 446 Fracture Mechanics, Chair, March 2010 – March 2016; Member September 2005 – Present.
· ACI 447 Finite Element Analysis of Reinforced Concrete Structures (Joint ACI-ASCE), Member, April 2008 – Present.
· ACI Committee on Awards for Papers (CAP) – Subcommittee SC2, Wason Medal for Materials Research, Member, February 2013 – August 2021.
· ACI 564 3D Printing with Cementitious Materials, Member, March 2017 – Present.
· ASCE Engineering Mechanics Institute (EMI), Board of Governors, Member, October 2017 – October 2020.
· ASCE EMI – Computational Mechanics, Member, April 2008 – Present.
· ASCE EMI – Modeling Inelasticity and Multi-Scale Behavior, Member, May 2008 – Present.
· IA-ConCreep, Board of Directors, Secretary, October 2008 - September 2012;President, October 2015 - November 2021.
· IA-FraMCoS, Board of Directors, Treasurer, March 2013 – June 2019.

Service in Technical Committees and Technical Boards – Journals

· Editorial Advisory Board of the International Journal of Damage Mechanics. February 2014 –August 2021.
· Editorial Board of the Int. J. for Numerical and Analytical Methods in Geomechanics. October 2013 – August 2021.
· Associate Editor for the Engineering Mechanics Journal (JEM) of the ASCE. December 2012 – August 2021.
· Associate Editor for the J. of Nanomechanics and Micromechanics (JNM) of ASCE. September 2014 – September 2017.

Chairmanship at Conferences and Workshops

- Biot-Bažant 2021, A one time fusion of Concreep and the Biot conference on poromechanics, 1-3 June, 2021, Evanston (IL), USA – Delivered Remotely. Conference Co-Chair.
- EMI 2013, ASCE Engineering Mechanics Institute Conference, 4-7 August, 2013, Evanston (IL), USA. Conference Chair.
- SES 2012, Society of Engineering Science, 49th Annual Technical Meeting, 10-12 Oct, 2012, Atlanta (GA), USA. "Symposium IV.15 From Nanopores to Large Structures: A Life Time Journey Across Length Scales". In honor of Prof. Z.P. Bažant. Organizer and Session Chairman.
- EMI 2010, ASCE Engineering Mechanics Institute Conference, 8-11 August, 2010, Los Angeles (CA), USA. Mini-symposium on "Constitutive and Fracturing Behavior of Quasi-Brittle Materials Computation and Experiments" in honor of Prof. L. Cedolin. Organizer and Session Chairman.
- 7th International Conference on Fracture Mechanics of Concrete and Concrete Structures (FraMCos 7), 23-28 May, 2010, Jeju, South Korea. Two sessions on "Discrete Modeling of Concrete Materials and Structures", Session Organizer and Session Chairman.
- 10th U.S. National Congress for Computational Mechanics, Mini-symposium on Structural Response Under Extreme Loads: Modeling, Simulation, and Experiments, Columbus (OH), July 16-19, 2009, Session Organizer and Session Chairman.
- The 2009 Joint ASCE-ASME-SES Conference on Mechanics and Materials, Symposium in Honor of Z. P. Bažant, Blacksburg (VA), June 24-27, 2009, Session Chairman.
- Mini-symposium on Failure Simulation by Discrete Models, CFRAC 2007, International Conference on Computational Fracture and Failure of Materials and Structures, Nantes, France, June 11 – 13, 2007, Session Chairman.