Ange-Therese Akono
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EDUCATIONAL PREPARATION

Sep 2013	**Ph.D. in Civil and Environmental Engineering**, Massachusetts Institute of Technology, Cambridge, MA., USA. Ph.D. Thesis: "Assessment of Fracture Properties and Rate Effects on Fracture of Materials by Micro Scratching: Application to Gas Shale." Supervisor: Dr. Franz-Josef Ulm
Feb. 2011	**M. Sc. in Civil and Environmental Engineering**, Massachusetts Institute of Technology, Cambridge, MA., USA. Master Thesis: "Scratch Tests: A New Way of Evaluating the Fracture Toughness of Materials." Supervisor: Dr. Franz-Josef Ulm
May 2011	**Diplôme d'Ingénieur Polytechnicien**, *Ecole Polytechnique*, Palaiseau, France
May 2009	**M. Sc. In Materials Design and Mechanics of Materials**, Ecole Polytechnique, Palaiseau, France

PROFESSIONAL EXPERIENCE

Aug. 2023 – Present	**Associate Professor**, Department of Civil, Construction, and Environmental Engineering, *North Carolina State University*, NC., USA
Sept. 2017 – Aug 2023	**Assistant Professor**, Department of Civil and Environmental Engineering, *Northwestern University*, IL., USA
July 2016 – June 2017	**Faculty Fellow**, National Center for Supercomputing Applications, *University of Illinois at Urbana-Champaign*, IL., USA
Aug. 2015 – Aug. 2017	**Affiliate Faculty**, Department of Mechanical Science and Engineering, *University of Illinois at Urbana-Champaign*, IL., USA
Aug. 2014 – Aug. 2017	**Assistant Professor**, Department of Civil and Environmental Engineering, *University of Illinois at Urbana-Champaign*, IL., USA
Dec. 2013 – May 2014	**Visiting Assistant Professor**, Department of Civil and Environmental Engineering, *University of Illinois at Urbana-Champaign*, IL., USA

SIGNIFICANT SERVICE

Sept. 2021 – Present	**Associate Editor**, *Journal of Engineering Mechanics*, American Society of Civil Engineering, USA.
Oct 2023-Present	**Chair**, Properties of Materials Technical Committee, Engineering Mechanics Institute, American Society of Civil Engineering, USA.

AWARDS AND RECOGNITION

INTERNATIONAL

Aug 2024, 2023, 2022,2021	**Stanford/Elsevier Top 2% Scientists List** Listed among the World Top 2% Scientist List released by Stanford Elsevier in 2024, 2023, 2022, and 2021.
July 2023	**Gordon Research Conference Invited Speaker** for the workshop on Science of Adhesion- Deterministic Control of Adhesion Across Length Scales: Fundamentals to Applications - Frontiers of Science, USA.
Feb 2023	**US-Africa Frontiers Fellowship**, US National Academies, USA
Oct 2022	**US-Africa Frontiers of Science, Engineering, and Medicine Symposium Invited Speaker**, US National Academies, USA.
Aug 2022	**Gordon Research Conference Invited Speaker** for the workshop on Solid State Studies in Ceramics- Coupled Phenomena Across Length Scales, Gordon Research Conferences- Frontiers of Science, USA.
June 2022	**Women in STEM2D Scholar**, Johnson & Johnson, USA.
Sept. 2021, Oct. 2020	**Royal Society Workshop Invited Participant** to Present at the Celebration of 100 years of Fracture Mechanics, The Royal Society, UK
April 2021	**Leonardo da Vinci Award**, American Society of Civil Engineers, Engineering Mechanics Institute, USA. For "*discovering novel methods to probe the fracture toughness at the nanoscale, for outstanding discoveries at the intersection of Fracture Mechanics and Nanotechnology, and for inspiring a new generation of nanoscientists and Fracture Mechanics experts*."
Aug. 2019	**Royal Society International Exchange Scheme Award,** The Royal Society (UK's National Academy of Sciences), UK

NATIONAL

Sept. 2021	**"Stories from the NNI" Podcast**, National Nanotechnology Initiative, USA – Top 5 2021 most downloaded NNI podcast.
Sept. 2021	**NSF Discovery Files on "Smart Cement,"** National Science Foundation, USA

June 2020	**NIH Diversity Supplement**, National Institute of Clinical and Translational Sciences
Feb. 2016	**New Faces of Civil Engineering- Professionals Honoree**, American Society of Civil Engineers, USA. For "*Outstanding contributions and personal achievements that represent the bold and humanitarian future of civil engineering."*

LOCAL

Sept. 2020	**Building Up Scholar**, National Institute for General Medical Sciences, USA
Aug. 2019	**Searle Faculty Fellowship,** Northwestern University, USA
April 2016	**NCSA Faculty Fellowship,** National Center for Supercomputing Applications, University of Illinois at Urbana-Champaign, USA
May 2016	**BRIDGE Seed Fund Fellow**, BiRmingham Illinois Partnership for Illinois Partnership for Discovery enGagement, and Education, University of Illinois at Urbana-Champaign, USA
May 2015	**Collins Scholar Award 2014–2015**, College of Engineering—Academy for Excellence in Engineering Education, University of Illinois at Urbana-Champaign, USA
Aug. 2013	**Certificate of Appreciation,** Department of Civil and Environmental University, Howard University, USA

UNDERGRADUATE and GRADUATE AWARDS

April 2009	**Total-MIT Energy Initiative Fellowship**, Massachusetts Institute of Technology, USA
April 2009	**EGIDE Excellence Scholarship**, Egide, France
April 2007	**Fondation de l'Ecole Polytechnique Excellence Fellowship**, Ecole Polytechnique, France
Nov. 2004	**President's Award for Educational Excellence**, Ministry of National Education, Cameroon

STUDENTS'AWARDS

Nathanial Buettner	**Gordon Research Conference Invited Participant**, Gordon Research Conference Series, 2023
	Gordon Research Seminar Invited Participant, Gordon Research Conference Series, 2023
Yunzhi Xu	**Gordon Research Seminar Discussion Leader**, Gordon Research Conference Series, 2023

	Best Poster Trustee Award, Engineering Ceramics Division, American Ceramic Society, 2022
	Gordon Research Seminar Invited Participant, Gordon Research Conference Series, 2022
	NAMRC 49/MSEC 2022 NSF Student Support, National Science Foundation, 2022
	PS&ED Cluster Fellowship, Northwestern University, 2021
	USNC/TAM Early Career Attendee Fellowship, USNCTAM, 2021
	NAMRC 49/MSEC 2021 NSF Student Support, National Science Foundation, 2021
Junior Ndayikenkurugiye	**GEM Fellowship**, National GEM Consortium, 2022
Raymonde Council	**DAAD RISE German Internship**, 2021
Jiaxin Chen	**USNC/TAM Early Career Attendee Fellowship**, USNCTAM, 2021
	ASCE EMI Travel Grant, University of Illinois at Urbana-Champaign, 2016
Pooyan Kabir	**ASCE EMI Travel Grant,** University of Illinois at Urbana-Champaign, 2016

RESEARCH INTERESTS

- Nanomechanics: bottom-up modeling, elasticity and strength upscaling, statistical nanoindentation, scratch testing, and machine learning
- Smart materials: inorganic polymers, nanostructured ceramics, geopolymers, and green concrete
- Subsurface energy systems: unconventional resources, organic-rich shale, CO_2 geological storage, and microinduced seismicity
- Biomaterials: cortical bone, hard biomineralized tissues, and bone scaffolds

INVENTIONS

P1 **Ange-Therese Akono,** Jiaxin Chen, carbon-fiber reinforced geopolymer composites, patent application, NU Attorney Docket Number: 00100-0235-PV, Jan. 2021

P2 **Ange-Therese Akono**, Jiaxin Chen, Method to Synthesize Cement Reinforced with High Concentrations of Multiwalled Carbon Nanotubes and Carbon Nanofibers, Patent Application, NU Attorney Docket Number: 00100-0254-PV, July 2021

P3 Ping Guo, **Ange-Therese Akono**, Yunzhi Xu, Multifunctional Enhanced-Toughness Hierarchical Organic-Inorganic Composites using Spatially-Resolved Electrospinning Methods, Patent Application, NU Attorney Docket Number 00100-0263-NP, Sept. 2021

P4 **Ange-Therese Akono,** Method to Synthesize Cement Reinforced with Graphene Nanoplatelets at High Concentration Levels, Patent Application, Disc-ID-20-09-18-001, Feb. 2021

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RESEARCH PUBLICATIONS

Student's names are underlined. The asterix indicates corresponding author or co-corresponding author status.

Link to full bibliography:
https://www.ncbi.nlm.nih.gov/myncbi/1t7voXI39nbwne/bibliography/public/

Peer-Reviewed Journal Articles Published (N = 53)

J53. N. Buettner, G. Iyacu, G. Dal Poggetto, **A.-T. Akono***, Influence of Carbon Nanofibers on the Microstructure, Chemistry, and Pore Structure of Recycled Aggregate Concrete, *Nanomaterials*, Accepted and In Press, (2025).

J52. R. Matadi Boubimba, **A.-T. Akono**, A. Y. E. Kouassi, K. Wang, Effect of reinforcements and crosslink density on Poly (methyl methacrylate) based nano-rubbers: friction, toughness and impact resistance, *Journal of Polymer Research*, Vol. 32 (1), p. 22, (2025).

J51. E. Kamseu, M. Biesuz, **A.-T. Akono**, J. N Nouping Fokoua, E. De Bona, N. Buettner, H. Lee, C. Leonelli, S. Rossignol, V. M Sglavo, Cold-sintered laterite-based geopolymers: Densification, microstructure and micromechanics, *Journal of the European Ceramic Society*, Vol. 44, p. 116798, (2024).

J50. S. J Fuchs, D. Crandall, J. E Moore, M. Sivaguru, B. W Fouke, D N. Espinoza**, A.-T. Akono**, C. J Werth, Impacts of irregularly-distributed acidified brine flow on geo-chemo-mechanical alteration in an artificial shale fracture under differential stress, *International Journal of Greenhouse Gas Control*, Vol. 135, p. 104127, (2024).

J49. N. Buettner, G. Iyacu, **A.-T. Akono***, Colloidal nanosilica promotes high-density calcium-silicate-hydrates in fine recycled concrete aggregate mortar, *Cement and Concrete Composites*, Vol. 180, p. 107498, (2024).

J.48. Y. Xu, H. Lee, N. Buettner, **A.-T. Akono***, Multiwalled carbon nanotubes as hard templates to yield advanced geopolymer-based self-assembled nanostructured ceramics, *Mechanics Research Communications*, Vol. 134, p. 104216, (2023).

J47. M. Bagga, I. Justo-Reinoso, C. Hamley-Bennett, G. Merces, S. Luli, **A.-T. Akono**, E. Masoero, K. Paine, S. Gebhard, I. D. Ofiţeru, Assessing the potential application of bacteria-

based self-healing cementitious materials for enhancing durability of wastewater treatment infrastructure. *Cement and Concrete Composites*, Vol. 143, p.105259, (2023).

J46. Y. Xu, N. Buettner, **A.-T. Akono***, P. Guo, Fabrication of fiber-reinforced composites via immersed electrohydrodynamic direct writing in polymer gels. *MRS Communications*, pp.1-8, (2023).

J45. N. Buettner, G. Kitchen, M. Omar, B. Sun, H. Lee, S. H. Kang, **A.-T. Akono**, Nanoscale characterizations of mineralized piezoelectric scaffolds. *MRS Advances*, pp.1-8, (2023).

J44. G. L. Manjunath, **Ange-Therese Akono**, Birendra Jha, Role of CO2 in geomechanical alteration of Morrow Sandstone across micro-meso scales, *International Journal of Rock Mechanics and Mining Sciences*, Vol. 163, pp. 105311, (2023).

J43. **Ange-Therese Akono**, Influence of Martian Soil Simulant on Microstructural Heterogeneity and Mechanical Response of Martian concretes, *Mechanics Research Communincations*, Vol. 127, pp. 104013, (2023).

J42 Yunzhi Xu, Ping Guo, **Ange-Therese Akono***, Novel Wet Electrospinning Inside a Reactive Pre-ceramic Gel to Yield Advanced Nanofiber-Reinforced Geopolymer Composites, *Polymers*, Vol. 14, pp. 3943, (2022).

J41 Elie Kamseu*, **Ange-Therese Akono**, Roberto Rosa, Alberto Mariani, Cristina Leonelli. "Valorization of marble powder wastes using rice husk ash to yield enhanced-performance inorganic polymer cements: Phase evolution, microstructure, and micromechanics analyses." *Cleaner Engineering and Technology*, vol. 8, pp. 100461, (2022).

J40. Yunzhi Xu, Junior Ndayikengurukiye, **Ange-Therese Akono***, Ping Guo, Fabrication of fiber-reinforced polymer ceramic composites by wet electrospinning, *Manufacturing Letters*, https://doi.org/10.1016/j.mfglet.2021.07.017, (2022).

J39 Jiaxin Chen, **Ange-Therese Akono***, Influence of multi-walled carbon nanotubes on the fresh and hardened properties of metakaolin-based potassium geopolymers at the microscopic lengthscale, *Journal of Materials Science*, https://doi.org/10.1007/s10853-021-06547-0, (2021).

J38 Samantha J. Fuchs, Dustin Crandall, Jonathan E. Moore, Mayandi Sivaguru, Bruce W. Fouke, D. Nicolas Espinoza, **Ange-Therese Akono**, Charles J. Werth, Geochemically induced shear slip in artificially fractured dolomite- and clay-cemented sandstone, *International Journal of Greenhouse Gas Control*, Vol. 111, pp. 103448, (2021).

J37 Elie Kamseu, **Ange-Therese Akono***, Achile Nana, Rodrigue C. Kaze, Cristina Leonelli, Performance of geopolymer composites made with feldpsathic solutions: micromechanics and microstructure, *Cement and Concrete Composites*, Vol. 124, pp. 104241, (2021).

J36 Achille Nana, Jean Ngouné, Jean Noel Yankwa Djobo, Hervé Kouamo Tchakouté, Maria Chiara Bognozzi, Cristina Leonelli, **Ange-Therese Akono**, Elie Kamseu, Particles size and distribution on the improvement of the mechanical performance of high strength solid solution based inorganic polymer composites: A microstructural approach, *Materials Chemistry and Physics*, Vol. 267, pp. 124602, (2021).

J35 **Ange-Therese Akono*,** Fracture Toughness of one dimensional and two-dimensional-nanoreinforced Cement via Scratch Testing, *Philosophical Transactions of The Royal Society*, https://doi.org/10.1098/rsta.2020.0288. (2021) Invited contribution.

J34 **Ange-Therese Akono***, Charles Werth, Zhuofan Shi, Kristian Jessen, Theodore T Tsotsis, CO_2-Induced Alterations of the Cohesive-Frictional Behavior of Mt. Simon Sandstone: A Poromechanical Model, *Minerals*, Vol. 11, p. 38, (2021). Invited contribution.

J33 Lin Han, Madura Pathirage, **Ange-Therese Akono**, Gianluca Cusatis, Lattice Discrete Particle Modeling of Size Effect in Slab Scratch Tests, *Journal of Applied Mechanics*, pp. 1–32, 2020.

J32 **Ange-Therese Akono***, Gabriela Dávila, Jennifer Druhan, Zhuofan Shi, Kristian Jessen, Theodore Tsotsis, Influence of Geochemical Reactions on Long-Term Mechanical Response of Mt. Simon Sandstone, *International Journal of Greenhouse Gas Control*, Vol. 103, pp. 103183, (2020).

J31 **Ange-Therese Akono*,** Jiaxin Chen, Mimi Zhan, Surendra P. Shah, Basic Creep and Fracture Response of Fine Recycled Aggregate Concrete, *Journal of Construction and Building Materials*, In-Press, (2021).

J30 **Ange-Therese Akono*,** Mimi Zhan, Jiaxin Chen, Surendra P Shah, Nanostructure of Calcium-Silicate-Hydrates in Fine Recycled Concrete Aggregate Mortars, *Cement and Concrete Composites*, Vol. 115, pp. 103827–103841, (2021).

J29 **Ange-Therese Akono*,** Nanostructure and Fracture Behavior of Carbon Nanofiber-Reinforced Cement Using Nanoscale Depth-Sensing Methods, *Materials*, Vol. 13, pp. 3837–3855, (2020).

J28 Jiaxin Chen, **Ange-Therese Akono***, Influence of Multi-Walled Carbon Nanotubes on the Hydration Products of Ordinary Portland Cement Paste, *Cement and Concrete Research*, Vol. 137, pp. 106197–106209, (2020).

J27 **Ange-Therese Akono*,** Fracture Behavior of Metakaolin-based Geopolymer Reinforced with Carbon Nanofibers, *International Journal of Ceramic Engineering and Science*, Vol. 2, pp. 234–242, (2020).

J26 **Ange-Therese Akono***, Effect of nano-TiO_2 on C–S–H phase distribution within Portland cement paste, *Journal of Materials Science*, Vol. 55, pp. 11106–11119, (2020).

J25 **Ange-Therese Akono***, Seid Koric, Waltraud M. Kriven, Influence of Pore Structure on the Strength Behavior of Geopolymer Composites, *Cement and Concrete Composites*, Vol. 104, pp. 103361, (2019).

J24 Samantha J. Fuchs, D. Nicholas Espinoza, Christina L. Lopano, **Ange-Therese Akono,** and Charles J. Werth, Geochemical and geomechanical alteration of Mount Simon reservoir rock by CO_2-saturated brine following carbon sequestration, *International Journal of Greenhouse Gas Control*, Vol. 88, pp. 251–260, (2019).

J23 **Ange-Therese Akono***, Jennifer L. Druhan, Gabriela Dávila, Theodore Tsotsis, Kristian Jessen, Samantha Fuchs, Dustin Crandall, Zhuofan Shi, Laura Dalton, Mary K. Tkach,

Angela L. Goodman, Scott Frailey, Charles J. Werth, A Review of Geo-Chemical-Mechanical Impacts in Geological Carbon Storage Reservoirs, *Greenhouse Gases: Science and Technology*, DOI: 10.1002/ghg.1870, (2019).

J22 **Ange-Therese Akono***, Pooyan Kabir, Zhuofan Shi, Samantha Fuchs, Theodore Tsotsis, Kristian Jessen, Charles J Werth, Modeling CO_2-Induced Alterations in Mt. Simon Sandstone via Nanomechanics, *Rock Mechanics and Rock Engineering*, DOI: https://doi.org/10.1007/s00603-018-1655-2, (2018).

J21 **Ange-Therese Akono***, Pooyan Kabir, Influence of Geochemistry on Toughening Behavior of Organic-Rich Shale, *Acta Geotecnica*, https://doi.org/10.1007/s11440-018-0715-9, (2018).

J20 **Ange-Therese Akono*,** Jiaxin Chen, S. Kaewunruen, Friction and Fracture Characteristics of Engineered Crumb-Rubber Concrete at Microscopic Lengthscale, *Journal of Construction and Building* Materials, Vol. 30, pp. 735–745, (2018).

J19 **Ange-Therese Akono***, Yue Cui, Amrita Kataruka, Kevin Anderson, Pooyan Kabir, Intrinsic Mechanical Properties of Calcium Aluminate Crystals via the Linear Comparison Composite Method Coupled With Nano-Indentation, *Mechanics of Materials*, Vol. 118, pp. 74–84, (2018).

J18 Kevin Anderson, **Ange-Therese Akono***, Microstructure-Toughness Relationships in Calcium Aluminate Cement/Polymer Composites using Instrumented Scratch Testing, *Journal of Materials Science*, Vol. 52, pp. 13120–13132, (2017).

J17 Kavya Mendu, Amrita Kataruka, Jasmine Puthuvelil, **Ange-Therese Akono***, Fragility Assessment of Bovine Cortical Bone Using Scratch Tests, *Journal of Visualized Experiments*, DOI: 10.3791/56488, (2017*). Invited Contribution.*

J16 Pooyan Kabir, Franz-Josef Ulm, **Ange-Therese Akono***, Rate-Independent Fracture Toughness of Gray and Black Kerogen-Rich Shales, *Acta Geotecnica*, Vol. 12, pp. 1207–1227, (2017).

J15 **Ange-Therese Akono***, Franz-Josef Ulm, Microscopic Toughness of Viscous Solids via Scratching: From Amorphous Polymers to Gas Shale, *Journal of Nanomechanics and Micromechanics*, DOI: https://doi.org/10.1061/(ASCE)NM.2153-5477.0000131,(2017).

J14 **Ange-Therese Akono***, Letter to the Editor Reply to "Discussion on the Fracture mechanics interpretation of the scratch test by Akono *et al.*", *Engineering Fracture Mechanics*, Vol. 178, pp. 14–21, (2017).

J13 Caroline V. Johnson, Jiaxin Chen, Nicole P. Hasparyk, Paulo J. M. Monteiro, **Ange-Therese Akono***, Fracture properties of the alkali silicate gel using microscopic scratch testing, *Cement and Concrete Composites*, Vol. 79, pp. 71–75, (2017).

J12 Amrita Kataruka, Kavya Mendu, Orieka Okeoghene, Jasmine Puthuvelil, **Ange-Therese Akono***, Microscopic assessment of bone toughness using scratch tests, *Bone Reports*, Vol. 6, pp. 17–25, (2017).

J11 **Ange-Therese Akono***, Gregory Bouche, Shallow and Deep Scratch Tests as Powerful Alternatives to Assess the Fracture Properties of Quasi-Brittle Materials, *Engineering Fracture Mechanics*, Vol. 158, pp. 23–38, (2016).

J10 **Ange-Therese Akono***, Pooyan Kabir, Microscopic Fracture Characterization of Gas Shale via Scratch Testing, *Mechanics Research Communications*, (2016), Vol. 78, part B, pp. 86–92. *Invited contribution.*

J9 **Ange-Therese Akono***, Energetic Size Effect Law at the Microscopic Scale: Application to Progressive-load Scratch Testing, *ASCE's Journal of Nanomechanics and Micromechanics*, (2016), DOI: 10.1061/(ASCE)NM.2153-5477.0000105.

J8 Gregory A. Bouche, **Ange-Therese Akono***, Micromechanics-based Lower Bounds on the Macroscopic Fracture Toughness of Micro-Particulate Composites, *Engineering Fracture Mechanics*, Vol. 148, pp. 243–257 (2015).

J7 Konrad J. Krakowiak, Jeffrey J. Thomas, Simone Musso, Simon James, **Ange-Therese Akono**, Franz-Josef Ulm, Nano-chemo-mechanical Signature of Conventional Oil-well Cement Systems: Effects of Elevated Temperature and Curing Time, *Cement Concrete Research*, Vol. 67, pp. 103–121, (2015).

J6 **Ange-Therese Akono**, Franz-Josef Ulm, Zdenek P. Bazant, Discussion: Strength-to-fracture scaling in scratching, *Engineering Fracture Mechanics*, Vol. 119, pp. 21–28, (2014).

J5 **Ange-Therese Akono**, Franz-Josef Ulm, An improved technique for characterizing the fracture toughness via scratch test experiments, *Wear*, Vol. 313, pp. 117–124, (2014).

J4 **Ange-Therese Akono**, Franz-Josef Ulm, Fracture scaling relations of axisymmetric shape, *Journal of the Mechanics and Physics of Solid*s, Vol. 60, pp. 379–390, (2012).

J3 **Ange-Therese Akono**, Nicholas X. Randall, Franz-Josef Ulm, Experimental determination of the fracture toughness via micro scratch tests: application to polymers, ceramics and metals, *Journal of Materials Research*, Vol. 27, pp. 485–493, (2012).

J2 **Ange-Therese Akono**, Pedro Miguel Reis and Franz-Josef Ulm, Scratching as a Fracture Process: From Butter to Steel, *Physical Review Letters*, Vol. 106, pp. 204302–104305, (2011).

J1 **Ange-Therese Akono**, Franz-Josef Ulm, Scratch test model for the determination of fracture toughness, *Engineering Fracture Mechanics*, Vol. 78, pp. 334–342, (2011).

Book Chapters

BC3 Sakdirat Kaewunruen, **Ange-Therese Akono**, Alex M. Remennikov, Attenuation Effect of Material Damping on Impact Vibration Responses of Railway Concrete Sleepers, *Sustainable Solutions for Railways and Transportation Engineering: Proceedings of the 2nd GeoMEast International Congress and Exhibition on Sustainable Civil Infrastructures.* El-Badawy, S., & Valentin, J. (Eds.). Springer, Cham, pp. 98–107, (2018).

BC2 Pooyan Kabir, **Ange-Therese Akono***, Nano-Scale Characterization of Organic-Rich

Shale via Indentation Methods, New frontiers in Oil and Gas Exploration, edited by Congrui Jin, and Gianluca Cusatis, (Springer), (2016).

BC1 Franz-Josef Ulm, **Ange-Therese Akono**, Rolland J.-M. Pellenq, Fracture Toughness Bottom-Up: Experiments and Simulations, in Mechanics and Physics of Porous Solids: A tribute to Pr. Olivier Coussy, Symposium on Mechanics and Physics of Porous Solids, Edited by the organizing committee, ISBN: 978-2-7208-2593-4, (2011).

Conference Proceedings (N = 62)

C62 Elucidating the Enhancement Mechanisms of Carbon Nanomaterials in Fine Recycled Concrete Aggregate Mortars ASCE Engineering Mechanics Institute Annual Meeting, May 28th -31st, Chicago, 2023.

C61 Fatigue Response of Aluminosilicate Composites, 47th International Conference and Expo on Advanced Ceramics and Composites, Jan. 22–27th, 2023, Daytona Beach, FL.

C60 Biocompatibility of Geopolymers for Bone Tissue Regenerative Engineering, NIH Diversity Supplement Professional Development and Networking Workshop, August 30th -31st, 2022.

C59 Fabrication of Fiber-Reinforced Polymer Ceramic Composites By Wet Electrospinning, Gordon Research Seminar – Solid State Studies in Ceramics, August 6th – 8th, Mt Holyoke College, 2022.

C58 Advanced Manufacturing of Fiber-Reinforced Polymer Ceramic Composites By Wet Electrospinning, Manufacturing Science and Engineering Conference 2022, June 27th -July 1st, Purdue University, 2022.

C57 Fracture Toughness of Electrospun Nanofiber-reinforced Geopolymer Composites Using Scratch Tests, ASCE Engineering Mechanics Institute Annual Meeting, May 31st – June 3rd, Johns Hopkins University, 2022.

C56 Advanced In-Situ Fabrication of Nanofibers via a Modified Wet Electrospinning Method to Yield Advanced Polymer-Ceramic Nanocomposites, ASCE Engineering Mechanics Institute Annual Meeting, May 31st – June 3rd, Johns Hopkins University, 2022.

C55 Determination of the Cohesive Fracture Energy of Biofilms Using Scratch Tests, ASCE Engineering Mechanics Institute Annual Meeting, May 31st – June 3rd, Johns Hopkins University, 2022.

C54 Biocompatibility of Geopolymer Scaffolds for Bone Tissue Regenerative Engineering, ASCE Engineering Mechanics Institute Annual Meeting, May 31st – June 3rd, Johns Hopkins University, 2022.

C53 Fatigue Response of Metakaolin-Based Geopolymer, ASCE Engineering Mechanics Institute Annual Meeting, May 31st – June 3rd, Johns Hopkins University, 2022.

C52 Using Scratch Tests to Investigate the Rate-Dependence of the Fracture Response of Carbon Nanofiber-Reinforced Cement, ASCE Engineering Mechanics Institute Annual Meeting, May 31st – June 3rd, Johns Hopkins University, 2022

C51 Biocompatibility of Geopolymer for Bone Tissue Regenerative Engineering, 46th International Conference and Expo on Advanced Ceramics and Composites, Virtual Meeting, Jan 23-28, 2022.

C50 Fatigue Response of Metakaolin-Based Geopolymer, 46th International Conference and Expo on Advanced Ceramics and Composites, Virtual Meeting, Jan 23-28, 2022

C49 Fabrication of fiber-reinforced polymer ceramic composites by wet electrospinning, 46th International Conference and Expo on Advanced Ceramics and Composites, Virtual Meeting, Jan 23-28, 2022.

C48 Quantitative analysis of MWCNTs effects on the microstructure and mechanical properties of the potassium-based metakaolin geopolymers using grid nanoindentation, The American Ceramic Society 11th Advances in Cement-Based Materials Conference, June 23–25, 2021.

C47 Impact of Graphene Oxide Nanoplatelets on the Microstructure and Mechanical Characteristics of Inorganic Polysialates, 45th International Conference and Expo on Advanced Ceramics and Composites, Virtual Meeting, Feb. 8–12, 2021.

C46 Influence of Carbon Nanofibers and Multi-walled Carbon Nanotubes on the Elastic and Creep Properties of Metakaolin-Based Gepolymers, 45th International Conference and Expo on Advanced Ceramics and Composites, Virtual Meeting, Feb. 8–12, 2021.

C45 Fracture Toughness of Martian Concrete using Scratch Testing, Society of Engineering Sciences, Virtual Meeting, September 29 – October 1, 2020.

C44 Influence of Residual Cement on Performance of Recycled Aggregate Concrete, Society of Engineering Sciences Virtual Meeting, September 29 – October 1, 2020.

C43 Influence of Microparticles and Nanoparticles on the Mechanical Response of Nanostructured Inorganic Polymers, Society of Engineering Sciences, Virtual Meeting, September 29 – October 1, 2020.

C42 Fracture Behavior Analysis of Multi-walled Carbon Nanotubes Reinforced Potassium-Geopolymer Composites at Microscopic Scale, Society of Engineering Sciences, Virtual Meeting, September 29 – October 1, 2020.

C41 Porosity Determination of Cement Nanocomposites Reinforced with Multiwalled Carbon Nanotubes, Society of Engineering Sciences, Virtual Meeting, Sept. 29 – October 1, 2020.

C40 Fracture Behavior of Metakaolin-based Geopolymers Reinforced with Carbon Nanofibers, 44th International Conference & Expo on Advanced Ceramics and Composites, Daytona Beach, FL., Jan. 2020.

C39 Alteration of the Fracture Behavior in Host Rock During CO_2 Geological Sequestration, 10th International Conference on Fracture Mechanics of Concrete and Concrete Structures, FraMCos-X, Bayonne, France, June 2019. DOI: 10.21012/FC10.235480

C38 Influence of Pore Structure on Failure Behavior of Geopolymer Composites, 56th Annual Technical Meeting of the Society of Engineering Science, Washington University, Oct. 13–15, 2019.

C37 Influence of Structural Disorder on Strength Response of Polysialate Composites, 56th Annual Technical Meeting of the Society of Engineering Science, Washington University, Oct. 13–15, 2019.

C36 Fracture Assessment of Cortical Bone at Microscopic Length-scale, ASCE Engineering Mechanics Institute Technical Meeting, California Institute of Technology, June 18–21, 2019.

C35 Size Effect Law for Microscopic Scratch Testing, ASCE Engineering Mechanics Institute Technical Meeting, California Institute of Technology, June 18–21, 2019.

C34 Fluid-Rock Reactions in Mt. Simon Sandstone at Microscopic Length-Scale, ARMA 18–219, American Rock Mechanics Association, 52nd meeting, Seattle, WA, June 2018.

C33 Computational studies on the ductile-to-brittle transition during scratch testing, ASCE Engineering Mechanics Institute Technical Meeting, Massachusetts Institute of Technology, May 29 – June 1, 2018.

C32 Influence of Nanoporosity on Strength of Inorganic Polysialates: A Molecular Dynamics Study, 42nd International Conference & Expo on Advanced Ceramics and Composites, Daytona Beach, FL., Jan. 21–26, 2018.

C31 Strength Properties of Geopolymer Composites Using a Theoretical and Numerical Approach, 42nd International Conference & Expo on Advanced Ceramics and Composites, Daytona Beach, FL., Jan. 2018.

C30 Characteristics of sustainable concrete using crumb rubber integrated with carbon nanotubes. In: 15th East-Asia Pacific Conference on Structural Engineering and Construction. Tongji University, 15th East-Asia Pacific Conference on Structural Engineering and Construction, Xi'an, China, 11/10/17.

C29 Representative Elementary Volume Modeling of Geopolymer Composites, 14th US National Congress on Computational Mechanics, Montreal, Canada, July 17–20, 2017.

C28 Fluid-Rock Reactions in Mt Simon Sandstone via Scratch Testing, 54th Annual Technical Meeting of the Society of Engineering Sciences, Northeastern University, July 25–28, 2017.

C27 Ductile-to-Brittle Transition in Scratch Testing via the Energetic Size Effect Law: Macroscopic and Microscopic Length Scales, 54th Annual Technical Meeting of the Society of Engineering Sciences, Northeastern University, July 25–28, 2017.

C26 Fracture Behavior of Geopolymer Concretes at the Microscopic Length-scale, 41st International Conference & Expo on Advanced Ceramics and Composites, Daytona Beach, FL., Jan. 22–27, 2017.

C25 Investigation of the Mechanical Properties of Geopolymer Binders, ASCE Engineering Mechanics Institute, Omni, San Diego, June 4–7, 2017.

C24 Rate-Independent Fracture Toughness of Organic-Rich Shale, ASCE Engineering Mechanics Institute, Omni, San Diego, June 4–7, 2017.

C23. Strength Properties of Particulate Potassium-Based Geopolymer Composites: A

Computational Study, ASCE Engineering Mechanics Institute, Omni, San Diego, June 4–7, 2017.

C22 Molecular dynamics study on the mechanical and fracture properties of geopolymer binders, 8th Advances in Cement-Based Materials, Georgia Institute of Technology, June 26–28, 2017.

C21 Analytical and computational analysis of strength properties of geopolymer composites, 8th Advances in Cement-Based Materials, Georgia Institute of Technology, June 26–28, 2017.

C20 Wear and strength characteristics of nano-engineered crumbed rubber concrete, 8th Advances in Cement-Based Materials, Georgia Institute of Technology, June 26–28, 2017.

C19 Creep and Durability of Calcium Aluminate Cement – Polyvinyl Alcohol Composites Using the Transformation Field Analysis Method, ASCE EMI International, Metz, France, Oct. 25–27, 2016.

C18 Investigation of Bone Fragility at Microscopic Length Scales, ASCE Engineering Mechanics Institute Conference, Vanderbilt University, May 22–25, 2016.

C17 Fracture Investigation of Organic-Rich Shale: Microscopic to Macroscopic Scale, ASCE Engineering Mechanics Institute Conference, Vanderbilt University, May 22–25, 2016.

C16 Fracture Mechanisms of Micro-particulate Composites via Microscopic Scratch Tests, ASCE Engineering Mechanics Institute Conference, Vanderbilt University, May 22–25, 2016.

C15 Fracture mechanisms of microparticulate composites via macroscopic scratch testing, Fifteen Pan-American Congress of Applied Mechanics, University of Illinois at Urbana-Champaign, May 18–21, 2015.

C14 Micromechanical Bounds on the Fracture Toughness of Silica-Reinforced Polymer Micro-Composites, ASCE Engineering Mechanics Institute Meeting, Stanford University, June 16–19, 2015.

C13. Rate-Dependent Toughness in Soft Materials via Microscopic Scratch Testing, Applied Mechanics and Materials Conference, Seattle, WA, June 29 – July 1, 2015.

C12 Fracture Resistance of Biological Tissues: A Theoretical and Experimental Study, 2nd HealthCare Engineering Systems Symposium, University of Illinois at Urbana-Champaign, September 14, 2015.

C11 Multiscale characterization of organo-cements using microscopic scratch tests and statistical nanoindentation, 6th Advances in Cement-Based Materials, Kansas State University, July 20–22, 2015.

C10 Rate-Dependent Toughness in Soft Materials via Microscopic Scratch Testing, Society of Engineering Sciences 51st Annual Technical Meeting, Purdue University, Oct. 1–3, 2014.

C9 From Butter to Bone Tissues: Assessing the Fracture Resistance via Scratch Testing, Society of Engineering Sciences 51st Annual Technical Meeting, Purdue University, Oct. 1–3, 2014.

C8 Scratching to Predict the Rate-Dependent Fracture of Creeping Materials, 17th U. S. National Congress on Theoretical and Applied Mechanics, Michigan State University, June 15–20, 2014.

C7 Fracture toughness prediction at the microscopic scale, Conference of the ASCE Engineering Mechanics Institute, Northwestern University, Evanston, IL., Aug. 4–7, 2013.

C6 Decoupling Creep and Fracture By Scratching, Conference of the ASCE Engineering Mechanics Institute, Northwestern University, Evanston, IL., Aug. 4–7, 2013.

C5 Fundamental Investigation of the Chemical and Mechanical Properties of High-Temperature Cured Oil-Well Cements, Offshore Technology Conference, 30 April–3 May, Houston, TX., USA, (2012).

C4 Scratch test as a fracture process: from soft to hard materials, American Physical Society, APS March Meeting 2012 Proceedings, February 27 – March 2, 2012.

C3 Gas Shale as a Tool for Sustainability, Materials Research Society 2012 Fall Meeting, Boston, MA., Nov. 25–30, 2012.

C2 Scratch Tests: A New Way of Evaluating The Fracture Toughness of Materials, ASCE EMI Conference, University of Notre Dame, June 17–20, 2012.

C1 Scratch Tests as a Fracture Process: From Soft to Hard Materials, ASCE Engineering Mechanics Institute Conference, University of Notre Dame, June 17–20, 2012.

SPONSORED RESEARCH PROJECTS

Awarded Research Projects ($2.5M awarded in extramural-sponsored research funds)

NCATS RO3 Sept. 2023 – Sept. 2025	**Biomineralization potential of inorganic polymer for bone tissue regenerative engineering**. PI: Ange-Therese Akono, $140,000 ($140,000 awarded to Dr. Akono).
Johnson & Johnson WiSTEM2D Scholar Award July 2022 – June 2025	**Designing the Architecture of Novel Nanostructured and Mesoporous Geopolymer Scaffolds for Bone Tissue Regenerative Engineering**. PI: Ange-Therese Akono, $150,000 ($150,000 awarded to Dr. Akono).
General Motors Apr 2022 – Mar 2023	**RESS Design Enabled by Novel Manufacturing Processes**. PI: Ange-Therese Akono, $100,119 ($100,119 awarded to Dr. Akono).

NSF DMR Sept. 2021 – Aug. 2022	**MRI: Acquisition of a NanoRaman Atomic Force Microscopy (AFM) System for Multi-Property Measurements in Electronic and Other Materials**. Senior Personnel: Ange-Therese Akono, (PI Oluwaseyi Balogun), $455,000
BIAM-NU Center for Advanced Materials Manufacturing Sept. 2020 – Aug. 2021	**Multifunctional Enhanced-Toughness Hierarchical Organic-Inorganic Composites using Spatially-Resolved Electrospinning Methods**. PI: Ange-Therese Akono, Co-PI: Ping Guo, $100,000 ($50,000 awarded to Dr. Akono)
National Institutes of Health NCATS July 2020 – June 2023	**Novel Geopolymer-based Bone Scaffolds for Bone Regeneration: bridging the Gap between Mesoporosity, High Mechanical Characteristics, and Enhanced Biocompatibility**. PI: Ange-Therese Akono, $416,854
Center for Hierarchical Design of Materials (CHiMaD) Sept. 2020 – Aug. 2023	**Nanomechanical Investigation of Polymer Cellulose Nanocrystal Composites**. Senior Personnel: Ange-Therese Akono, $159,176 ($159,176 awarded to Dr. Akono)
UK Royal Society International Exchange Scheme Sept. 2019 – Sept. 2022	**Novel Inorganic Corrosion-Resistant Coatings for Improved Durability of Steel Rebars**. PI: Samir Dirar, Co-PI: Ange-Therese Akono, $14,000 ($7,000 awarded to Dr. Akono)
NSF DMR July 2019 – June 2023	**GOALI: Investigation of Cyclic Failure in Aluminosilicate Nanocomposites**. PI: Ange-Therese Akono, $401,712 ($401,712 awarded to Dr. Akono). Ceramics, Division of Materials Research, National Science Foundation.
NSF CMMI Aug. 2017 – July 2022	**Strong and Multifunctional Inorganic Polysialate Composites: A Multiscale Study**. PI: Ange-Therese Akono, $358,525 ($358,525 awarded to Dr. Akono). Mechanics of Materials, Division of Civil

	Mechanical and Manufacturing Innovation, National Science Foundation
DOE BES Aug. 2016 – July 2019	**Geological Sequestration of CO_2 center**. Lead PI: Scott Frailey. Senior Personnel: Ange-Therese Akono, $200,000 ($200,000 awarded to Dr. Akono). Office of Basic Energy Sciences, US Department of Energy
NCSA July 2016 – June 2017	**Multiscale and Multi-Physics Modeling of Na-PS Geopolymer Cement Composites.** PI: Ange-Therese Akono, $25,000 ($25,000 awarded to Dr. Akono), Co-PIs: Erman Guleryuz and Waltraud M. Kriven. National Center for Supercomputing Applications, University of Illinois at Urbana-Champaign
BRIDGE May 2016 – Dec. 2016	**Dynamic scratch resistance of micro- and nano-engineered concrete for sustainable and environmental-friendly applications in railway and other civil construction**. PI: Sakdirat Kaewunruen, Co-PI: Ange-Therese Akono, $8,000 ($8,000 awarded to Dr. Akono). BiRmingham Illinois partnership for Illinois partnership for Discovery enGagement, and Education Seed Fund

TEACHING

Northwestern University (Evanston, IL., USA)

Mechanics of Porous Media	CIV 495	Spring 2022
Statics and Dynamics—EA II	GEN-ENG 205-3	Winter 2018; Winter 2020
Introduction to Elasticity	CIV 415	Spring 2018; Fall 2018
SPREE Seminar Series	CIV 512	Spring 2019; Fall 2019

University of Illinois at Urbana-Champaign (Urbana, IL., USA)

Behavior of Materials	CEE 300	Spring 2014; Spring 2015
Structural Analysis	CEE 360	Spring 2016, Fall 2016; Spring 2017
Fatigue and Fracture	CEE 575	Fall 2015
Structural Engineering Seminar Series	CEE 595S	Spring 2015 – Spring 2017

The Massachusetts Institute of Technology (Cambridge, MA., USA)

Engineering Mechanics I (Teaching Assistant)	1.050	Fall 2011

SCIENCE OUTREACH

Northwestern University

Sept. 2022, Oct 2022	Structures and Wonder High School Lab Outreach, Northwestern University, Evanston, IL
Oct. 2019	STEM Kids Story Time, OneBook, Northwestern University, Evanston, IL.
June 2018	Nanoscience, Waves, and Fun. In collaboration with Chicago Bulls College Prep, Chicago, IL., May 2018

University of Illinois at Urbana-Champaign

Aug. 2017	Nanomechanics and Fun! In collaboration with the Illinois STEM Initiative and Urbana High School, Urbana, IL.
Feb. 2017	Discover Engineering Girl Day
Feb. 2016	10^{th} Grade Structural Mechanics Workshop. In collaboration with Intrinsic Schools, Chicago, IL.
Dec. 2015	Mechanics of materials webinar. In collaboration with Intrinsic Schools, Chicago, IL.
Dec. 2015	Strength of materials science lesson. In collaboration with Judah Christian School, Champaign, IL.
July 2014	Sustainability in construction materials. In collaboration with Urbana High School Tigers, Urbana, IL.

STUDENT ADVISING (1 Postdoc, 4 Ph.D students and 6 M. Sc. students graduated; 18 undergraduate students advised)

Postdoctoral Associates

1. Giovanni dal Poggetto, Apr 2024-Present, North Carolina State University, Novel Scaffolds for Bone Tissue Regenerative Engineering.

Ph.D. Students

1. Pooyan Kabir, Ph. D. 2018, University of Illinois at Urbana-Champaign, Geo-Chemo-Mechanical Modeling of Sedimentary Rocks: Application to Unconventional Reservoirs and Geological CO_2 sequestration, Currently Senior Engineer at San Diego Gas & Electric.
2. Jiaxin Chen, Ph. D. 2021, Northwestern University, Nanomechanical studies of geopolymer materials, Currently Research Scientist for Apple Shanghai R&D.
3. Yunzhi Xu, Ph. D. 2023, Northwestern University, Electrospinning of tough and nature-inspired inorganic polymer composites (Co-advised). Placement at General Motors.
4. Nathaniel Buettner, Ph. D., 2024, Northwestern University, Nanoscale characterization of cement nanocomposites.

MS Students

University of Illinois at Urbana-Champaign

6. Radhika Pavghi, M. Sc. 2017, Synthesis of potassium-based geopolymer materials, Currently Structural Engineer at Baldridge & Associates Structural Engineering.
5. Jiaxin Chen, M. Sc. 2017, Rubber-reinforced concrete for railway applications.
4. Caroline Johnson, M. Sc. 2017, Multiscale characterization of alkali silicate gel for improved cement Durability, Currently Structural Engineer at Strand Associates.
3. Okeoghene Orieka, M. Sc. 2016, Characterization of compact bone toughness via statistical nanoindentation, Currently Project Manager at DUDLEY.
2. Kevin Anderson, M. Sc. 2016, Nanoscale characterization of the behavior of calcium aluminate cements–polyvinyl alcohol composites, Currently Structural Engineer at Primera Engineers.
1. Gregory A. Bouche, M. Sc. 2015, Investigation of the fracture toughness of sphere-reinforced polymer composites via scratch testing, Currently Supervisor at CITGO Petroleum.

Undergraduate Students

Northwestern University

18 Frida Hernandez (Class of 2024). Nanomechanical testing of cementitious materials. 2022.
17 Nadiah Zamri (Class of 2024). Nanomechanical testing of cementitious materials. 2022.
16 Gass Lyacu (Class of 2024). Nanomechanical testing of cementitious materials. 2022.
15. Junior Ndayikengurukiye (Class of 2022). 3D printing of a robotic arm/Electrospinning of inorganic polymer composites. 2020–2021.
14. Mairi Glynn (Class of 2024). 3D printing of a robotic arm. 2020–Present.
13. Raymonde Council (Class of 2024). 3D printing of a robotic arm. 2020–2021.
12. Elyse Hebert (SROP scholar). Synthesis of soft hydrogels. Summer 2018.
11. Devon Avery Dulan (Class of 2021). CO_2-induced alterations in the mechanical properties of host rocks for geological carbon sequestration. Summer 2018.

University of Illinois at Urbana-Champaign

10. Anleen Cao (Class of 2018). Nanomechanical Studies of Mt Simon Sandstone for CO2 subsurface sequestration. Spring 2017.
9. Matthew Figus (Class of 2017). Synthesis of Potassium-Based Geopolymer. Spring 2017.
8. Yihui Dong (Class of 2018). Characterization of Wear and Abrasion Properties of Recycled Rubber-reinforced concrete. Fall 2016.
7. Luis Wally Chavez Quiroz (Class of 2017). FEM modeling of granite-reinforced geopolymer using OOF2. Summer 2016.
6. Jasmine Puthuvelil (Class of 2017). Nanoscale Characterization of Cortical Bone. Spring 2016, Fall 2016, and Spring 2017.
5. Kate Hawkins (Class of 2016). Polishing procedures for the mechanical characterization of gas shale materials. Summer 2015.
4. Suo Zhang (Class of 2016). Manufacturing of organo-cements. Summer 2015.
3. Ye Liu (Class of 2015). Three-dimensional Schematic Representation of the Macroscopic Scratch Test Equipment. Summer 2014.
2. Wenjing Li (Class of 2016). Assessment of the fracture resistance of cortical bone specimens via scratch testing. Summer 2014.
1. James C Myers (Class of 2014). Fracture Properties of particle-reinforced paraffin wax specimens via Macroscopic Scratch Testing. Summer 2014.

SERVICE AND LEADERSHIP

Conferences Organized/Co-Organized or Chaired/Co-Chaired

June 2025	ASCE Engineering Mechanics Institute International Meeting, Mini-symposium co-organizer, Advances in Computation, Theoretical and Experimental Fracture Mechanics, UC Irvine, Irvine, USA
June 2023	ASCE Engineering Mechanics Institute International Meeting, Mechanics, Physics, and Chemistry for Sustainable and Resilient Civil, Energy, and Bio-related Infrastructures and Materials - In honor of the NAE Recognition of Prof. Franz Josef Ulm, Georgia Institute of Technology, Atlanta, USA
June 2022	ASCE Engineering Mechanics Institute International Meeting, Mini-symposium co-organizer, Advances in Computation, Theoretical and Experimental Fracture Mechanics, Johns Hopkins University, Baltimore, USA
June 2022	ARMA 56th US Rock Mechanics/Geomechanics Symposium, Meta-Reviewer and Session Co-Chair, Fracture, Faults, and Fragmentation, Santa Fe, New Mexico, USA

June 2021	ASCE Engineering Mechanics Institute International Meeting, Mini-symposium co-organizer, Advances in Computation, Theoretical and Experimental Fracture Mechanics, Virtual Conference
Jan 2020	44th International Conference and Expo on Advanced Ceramics and Composites, Session Chair, Geopolymers, Inorganic Polymers and Sustainable Materials, Daytona Beach, FL, USA
June 2019	ASCE Engineering Mechanics Institute International Meeting, Mini-symposium co-organizer, Advances in Computation, Theoretical and Experimental Fracture Mechanics, Caltech University, Pasadena, USA
Oct. 2018	Society of Engineering Sciences 55th Meeting, Mechanics of Biological Tissues and Biomaterials, Madrid, Spain
June 2018	18th National Congress on Theoretical and Applied Mechanics, Mini-symposium co-organizer, Mechanics and Physics of Multi-Scale Porous Media, Northwestern University, Evanston, IL, USA
June 2018	ASCE Engineering Mechanics Institute International Meeting, Mini-symposium co-organizer, Advances in Computation, Theoretical and Experimental Fracture Mechanics, Cambridge, MA, USA
Jan. 2018	42nd International Conference and Expo on Advanced Ceramics and Composites, Session Chair, Mechanical Properties, Infrastructure, and Sustainable Materials, Daytona Beach, FL, USA
June 2017	ASCE Engineering Mechanics Institute International Meeting, Mini-symposium co-organizer, Advances in Computation, Theoretical and Experimental Fracture Mechanics, San Diego, CA, USA
Oct. 2016	ASCE Engineering Mechanics Institute International Meeting, Mini-symposium co-organizer, Advances in Creep and Relaxation Mechanics, Metz, France
Oct. 2016	Society of Engineering Science 53rd Meeting, Mini-symposium lead organizer, Mechanics of Inelastic Deformation and Failure in Biological Materials, Lafayette, IN, USA.
May 2016	ASCE Engineering Mechanics Institute 2016 Annual Meeting, Mini-symposium lead organizer, Advances in Experimental, Theoretical and Computational Fracture Mechanics, Vanderbilt, TN, USA.
Oct. 2014	Society of Engineering Science 51st Meeting, Mini-symposium co-organizer, Fracture Processes in Biomineralized Tissues, Lafayette, IN, USA.

Membership in Professional Societies

2016 – Present American Ceramic Society

2012 – Present American Society of Civil Engineers, Associate Member

Service in Technical Societies
American Society of Civil Engineers Rock Mechanics Committee Member

American Ceramic Society
June 2021: Poster Competition, ACerS Cement 2021, Judge
American Society of Civil Engineering Mechanics Institute

- Architected Materials Committee Member,
- Biomechanics Committee Member,
- Modeling Inelasticity & Multiscale Behavior Committee Member,
- Nanomechanics and Micromechanics Committee, Vice-Chair, 2021-Present
- June 2021: Panelist, EMI-NSF Diversity Panel

Reviewer for Scientific Journals (N = 67)
Journal of Rock Mechanics and Rock Engineering (8), ASCE *Journal of Engineering Mechanics* (10), Engineering *Fracture Mechanics* (6), *Construction and Building Materials* (6), *Cement and Concrete Research* (4), *ASCE Journal of Nanomechanics and Micromechanics* (4), *Surface and Coatings Technology* (3), *Society of Petroleum Engineers Journal (*2), *Geotechnical Testing Journal* (2), *Mechanics Research Communications* (2), *Damage Mechanics* (2), *ASCE Journal of Materials in Civil Engineering* (2), *Composites Structures* (2), *Mechanics of Materials* (1), *International Journal of Rock Mechanics and Mining Sciences* (1), *Scientific Reports* (1), *International Journal of Solids and Structures* (1), *Wear* (1), *Wear of Materials* (1), *Energies* (1), *Energy Exploration and Exploitation* (1), *Journal of Biomedical Materials Research Part A* (1), *Journal of the Mechanics and Physics of Solids (*1), *Polymer Testing* (1), *Sustainable and Resilient Infrastructure* (1), *Langmuir* (1), *Journal of Material Science and Engineering* (1)

Reviewer for Grant Agencies (N = 18)
National Science Foundation MOMS (4), National Science Foundation GEOMM (1), National Science Foundation CER (2), National Science Foundation EPSCoR, National Science Foundation SAEM (2), National Science Foundation FMRG (1), American Chemical Society Petroleum Research Fund (3), German Research Foundation (1), NIH TE (1), NIH NIDCR (2)

Service at Northwestern University (Evanston, IL.)

Winter 2018	NU CEE Mechanics Materials and Structures Admission Committee Member
Winter 2018	Theoretical and Applied Mechanics Admission Committee Member
Winter 2018 – Present	Diversity Fellowship Committee Member
Winter 2018 – Present	NU Central Laboratory for Materials Mechanical Properties Faculty Committee Member

Spring 2019	Undergraduate Research Expo, Judge
Summer 2020	Responsible Conduct of Research, Faculty Panel Member
Fall 2019 – Present	SPREE Seminar Series Co-Organizer
Fall 2020 – Present	NU CEE GRE/Graduate Admission Committee, Secretary
Fall 2022	LSAC Advisory Committee, Member

Service at the University of Illinois at Urbana-Champaign (Urbana, IL.)

Jan. 2015 – Jan. 2017	Faculty Adviser for the ASCE Engineer Without Borders student chapter
Spring 2014 – 2017	Structures Group Qualifying Exam Committee, CEE Department
Spring 2015	Structures Group Admission Committee, CEE Department
May 2015 – May 2016	Women Exploring Graduate Opportunities in CEE, Organizing Committee Member

LECTURE INVITATIONS (N = 51)

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51. Influence of Graphene Nanoplatelets on Properties of Potassium Geopolymer, 49th International Conference and Expo on Advanced Ceramics and Composites, Daytona Beach, FL., Jan. 2025

50. Carbon-Based Nanomaterials as Reactive Interfaces in Ceramic-Based Composites, Gordon Research Conference: Science of Adhesion, Mt Holyoke College, July 23rd-28th, 2023.

49. Advanced Micromechanics-Based Models to Elucidate Materials Degradation Processes During CO2 Geologic Storage, Schlumberger-Doll Research Institute, May 2023.

48. Promoting Sustainable and Clean Energy via Nanomechanics: Uncovering Materials Toughening Mechanisms under Coupled Extreme Environments, Stanford University, Apr 2023.

47. Novel Sustainable Construction Materials Via Nanoscale Materials Design, North Carolina State University, March 2023.

46. Influence of Carbon-Based Nanomaterials on Durability and Mechanical Performance of Portland Cement, University of California Berkeley, March 2023.

45. Fueling a Clean and Sustainable Future and Promoting a High Quality of Life Using Nanomechanics and Nanoscale Materials Science, Cornell University, March 2023

44. Discovering Novel Nanomechanics-Based Solutions to Promote Sustainable and Clean Energy, Calgary University, Feb 2023.

43. Influence of Nanomaterials on the Structure and Performance of Metakaolin-Based Geopolymers: State-of-the-art and Lessons Learned, 47th International Conference and Expo on Advanced Ceramics and Composites, Daytona Beach, FL., Jan. 2023

42. Advanced Hierarchical Scaffolds to Enhance Bone Regeneration, Illinois Institute of Technology, Chicago, October 28th, 2022.

41. Using Nanotechnology to Discover Advanced Sustainable Construction Materials to Promote Urban Development, US -Africa Frontiers in Science, Engineering, and Medicine Symposium, Nairobi, Kenya, Oct 11th-14th, 2022.

40. Using Carbon-based Nanomaterials to Engineer Novel Construction Materials, NSF Workshop on Architected Metamaterials for Civil Infrastructure, Umass Amherst, May 23-25, 2022.

39. Influence of Carbon-Based Nanomaterials on Physical and Mechanical Properties of Geopolymers, 4th Tel Aviv University – Northwestern University Workshop, June 18-24th, 2022.

38. Influence of Carbon-based Nanofillers on the Structure and Mechanical Properties of Metakaolin-Based Geopolymers, 46th International Conference and Expo on Advanced Ceramics and Composites, Daytona Beach, FL., Jan. 2022.

37. Leveraging Nanomaterials and Nanotechnology to Make Cement Greener and Tougher, Princeton Institute of Materials, Princeton University, Princeton, NJ., Sept. 2021

36. Toughening Portland Cement with Carbon-Based Nanomaterials, A cracking approach to inventing tough new materials: fracture stranger than friction, The Royal Society, London, UK, Sept. 20–21, 2021

35. Geopolymer Composites: From Green Concrete Alternatives to Biomaterials for Bone Repair, Department of Civil Engineering and Engineering Mechanics, Columbia University, New York, NY., Jan. 2021

34. How can you make cement smarter and tougher?, Black Alumni/ae of MIT Research Slam, March 2021.

33. Metakaolin Geopolymer: Lessons Learned, 45th International Conference and Expo on Advanced Ceramics and Composites, Virtual Meeting, Jan. 2021

32. Fracture at the Microscopic Lengthscale, Midwest Materials Surface Characterization Workshop, October 14, Evanston, IL., 2020

31. Novel Strategies to Recycle Concrete using Nanotechnology and Data Science, Drexel University Department of Civil and Environmental Engineering, November 13, Philadelphia, PA., 2020

30. Fracture Toughness of 1D/2D-nanoreinforced Cement via Scratch Testing, A cracking approach to inventing tough new materials: fracture stranger than friction, The Royal Society, London, UK, October 19, 2020

29. Effect of porosity on the mechanical response of geopolymer composites, 44th International Conference and Expo on Advanced Ceramics and Composites, Daytona Beach, FL., Jan. 2020

28. The future of Engineering Education: Practitioners and Academics, Plenary Session, 2018 Structures Congress, Panel Speaker, Fort Worth, TX., April 2018

27. Understanding Fracture at the Nanoscale: From Butter to CO_2 Geological Sequestration, Department of Civil and Environmental Engineering, University of Houston, Houston, TX., April 2018

26. Nanomechanics Study of Fluid-Rock Reactions in Mt. Simon Sandstone, US DOE Energy Frontiers Research Centers Blue Team Meeting, Urbana, IL, USA, Jan. 2018

25. Nanoscale Study of CO2-induced Geo-chemo-mechanical Alterations for Geological Carbon Sequestration: Case Study of the Illinois Basin Decatur Project, Department of Civil and Environmental Engineering, Stanford University, Palo Alto, CA., Jan. 2018

24. Influence of Nanoporosity on the Strength of Inorganic Polysialates: A Molecular Dynamics Study, 42nd International Conference and Expo on Advanced Ceramics and Composites, Daytona Beach, FL., Jan. 2018

23. Strength Properties of Geopolymer Composites Using a Theoretical and Numerical Approach, 41st International Conference and Expo on Advanced Ceramics and Composites, Daytona Beach, FL., Jan 2018

22. Measuring the fragility of Cortical Bone via Microscopic Scratch Testing, Department of Biomedical Engineering, Northwestern University, Evanston, IL., Nov. 2017

21. Graduate School - Pathway to Success and Empowerment, Introduction to Graduate Education at Northwestern University, Oct. 2017

20. Upscaling the Strength Characteristics of Geopolymer Composites via Atomistic Simulations and Micromechanics Modeling, National Center for Supercomputing Applications, Urbana, IL., April 2017

19. Fluid-Rock Reactions in Mt Simon Sandstone via Scratch Testing, $GSCO_2$ Annual Review Meeting, Urbana, IL., March 2017

18. Fracture Behavior of Geopolymer Concretes at the Microscopic Length-scale, 42nd International Conference and Exposition on Advanced Ceramics and Composites, Daytona Beach, FL., Jan. 2017

17. Hierarchically Structured Porous Materials, Department of Civil and Environmental Engineering, Johns Hopkins University, Baltimore, MD., December 2016

16. Scratch resistance of nano-engineered crumbed rubber concrete for sustainable applications in civil construction, School of Engineering, University of Birmingham, (Birmingham, UK), July 2016

15. Multi-Physics Characterization of Reservoir rock: Microscopic to Macroscopic Scale, Illinois Prairie Institute, May 2016

14. Nanomechanics of Hierarchically Structured Porous Materials: From Cortical Bone to Geopolymer Composites, Department of Civil and Environmental Engineering, Northwestern University, Evanston, IL., April 2016

13. Exploration des Propriétés Mécaniques des Géo-matériaux à l'Echelle moléculaire, Laboratoire Navier, Ecole des Ponts- ParisTech (Paris, France), Nov. 2015

12. Elucidating the Mechanical Resistance of Advanced Geo-composites at the Molecular Length-scale, Laboratoire de la Mecanique des Solides, Ecole Polytechnique (Palaiseau, France), Nov. 2015

11. Elucidating the Mechanical Resistance of Advanced Geo-composites at the Molecular Length-scale, Department of Civil and Environmental Engineering, University of California, Los Angeles, Oct. 2015

10. Multiscale characterization of organo-cements using microscopic scratch tests and statistical nano-indentation, Department of Materials Science and Engineering, University of Illinois at Urbana-Champaign, Sept. 2015

9. Multiscale modeling of nano-degradation and self-healing in biological and geological materials, US Army Corps of Engineers Engineer Research & Development Center Construction Engineering Research Laboratory (CERL), IL., USA, May 2015

8. A Multi-scale Investigation of the Fracture Properties of Organic-inorganic Nanocomposites, Department of Civil and Environmental Engineering, Northwestern University, Evanston IL., USA, April 2015

7. As Tough as Iron: Gaining a Multiscale Understanding of Materials Fracture Resistance, Department of Civil and Environmental Engineering, Massachusetts Institute of Technology, Cambridge, MA., USA, Oct. 2014

6. Multiscale Toughness: Cracking the Shell of Materials Risk to Fracture, Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, Urbana, IL., USA, Sept. 2014

5. Scratch Test: A New Approach for Multiscale Characterization of Fracture Properties, Department of Civil and Environmental Engineering, Howard University, Washington, DC, Oct. 2013

4. Scratch Test: A New Approach for Multiscale Characterization of Fracture Properties, Department of Civil and Environmental Engineering, University of Illinois at Urbana-Champaign, Urbana, IL., Dec. 2012

3. Scratch Test: A New Approach for Multiscale Characterization of Fracture Properties, Department of Mechanical and Civil Engineering, California Institute of Technology, Pasadena, CA., Nov. 2012

2. Scratch Test: A New Approach for Multiscale Characterization of Fracture Properties, Department of Civil Engineering and Engineering Mechanics, Columbia University, New York, NY., Oct. 2012

1. Scratch Test: A New Approach for Multiscale Characterization of Fracture Properties, Department of Civil and Environmental Engineering, Stanford University, Palo Alto, CA., Feb. 2012