Matthew Daly

Assistant Professor
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Education

Ph.D. Materials Science and Engineering — Sept. 2012 - Jun. 2017
University of Toronto — Advisors: Chandra Veer Singh and Glenn Hibbard

M.A.Sc. Mechanical Engineering — Sept. 2009 - Apr. 2012
University of Waterloo — Advisor: Norman Zhou
Degree notes: Governor General of Canada Gold Medal

B.A.Sc. Honours Mechanical Engineering Co-op — Sept. 2004 - Aug. 2009
University of Waterloo
Degree notes: Graduation with distinction; Minor in German; International Studies in Engineering Option

Research Appointments

University of Illinois Chicago — Aug. 2018 - Present
Assistant Professor, Department of Civil, Materials, and Environmental Eng.

Northwestern University — Apr. 2017 - June 2018
Postdoctoral Fellow, Department of Mechanical Engineering — Advisor: Horacio Espinosa

Journal Publications

26. N. Rasooli, W. Chen and M. Daly (2024) "Deformation Mechanisms in High Entropy Alloys: A Minireview of Short-Range Order Effects", *Nanoscale*, **16**, 1650. doi:10.1039/D3NR05251F
25. C. Xu, Y. Lu, M. Daly and D. Ozevin (2023) "Nondestructive characterization of multiscale defects in an aluminum alloy after cold spray repair", *Journal of Nondestructive Evaluation*, **42**, 75. doi:10.1007/s10921-023-00986-2
24. G. Wang, H. Hou, Y. Yan, R. Jagatramka, A. Shirsalimian, Y. Wang, B. Li, M. Daly, and C. Cao (2023) "Recent advances in the mechanics of 2D materials", *International Journal of Extreme Manufacturing* **5**, 032002. doi:10.1088/2631-7990/accda2
23. R. Jagatramka, J. Ahmed, and M. Daly (2023) "The evolution of deformation twinning microstructures in random face-centered cubic solid solutions", *Journal of Applied Physics*, **133** 055107. doi:10.1063/5.0135538
22. R. Jagatramka, C. Wang, and M. Daly (2022) "An analytical method to quantify the statistics of energy landscapes in random solid solutions", *Computational Materials Science*, **214** 111763. doi:10.1016/j.commatsci.2022.111763
21. R. Jagatramka and M. Daly (2022) "The Competition Between Deformation Twinning and Dislocation Slip in Deformed Face-Centered Cubic Metals", *JOM*, **74** 3799-3810. doi:10.1007/s11837-022-05437-3
20. J. Ahmed, T. Zhang, D. Ozevin, and M. Daly (2021) "A multiscale indentation-based technique to correlate acoustic emission with deformation mechanisms in complex alloys", *Materials*

Characterization, **182** 111575. doi:10.1016/j.matchar.2021.111575

19. A. Jaradat, C. Zhang, S. K. Singh, J. Ahmed, A. Ahmadiparidari, L. Majidi, S. Rastegar, Z. Hemmat, S. Wang, A. T. Ngo, L. A. Curtiss, M. Daly, A. Subramanian and A. Salehi-Khojin (2021) "High performance air breathing flexible lithium-air battery", *Small*, 2102072. doi:10.1002/smll.202102072

18. J. Ahmed and M. Daly (2021) "Yield strength insensitivity in a dual-phase high entropy alloy after prolonged high temperature annealing", *Materials Science and Engineering: A*, **820** 141586. doi:10.1016/j.msea.2021.141586

17. M. Daly, A. Kumar, C. V. Singh, and G. D. Hibbard (2020) "On the competition between nucleation and thickening in deformation twinning of face-centered cubic metals", *International Journal of Plasticity*, **130** 102702. doi:10.1016/j.ijplas.2020.102702

16. M. Daly, S. Haldar, V. K. Rajendran, J. McCrea, G. D. Hibbard and C. V. Singh (2020) "Size effects in strengthening of NiCo multilayers with modulated microstructures", *Materials Science and Engineering: A*, **771** 138581. doi:10.1016/j.msea.2019.138581

15. H. D. Espinosa, A. Zaheri, H. Nguyen, D. Restrepo, M. Daly, M. Frank, and J. McKittrick (2019) "In situ wear study reveals role of microstructure on self-sharpening mechanism in sea urchin teeth", *Matter*, **1** 1246-1261. doi:10.1016/j.matt.2019.08.015

14. X. Zhang, H. Nguyen, M. Daly, S. T. Nguyen, and H. D. Espinosa (2019) "Nanoscale toughening of ultrathin GO-polymer composites: mechanochemical insights into hydrogen-bonding/van der Waals interactions, polymer chain alignment, and steric parameters", *Nanoscale*, **11** 12305-12316. doi:10.1039/c9nr01453e

13. A. Zaheri, J. Fenner, B. Russell, D. Restrepo, M. Daly, D. Wang, C. Hayashi, M. A. Meyers, P. D. Zavattieri, and H. D. Espinosa* (2018) "Revealing the mechanics of helicoidal composites through additive manufacturing and beetle developmental stage analysis", *Advanced Functional Materials*, 1803073. doi:10.1002/adfm.201803073

12. M. J. Chon, M. Daly, B. Wang, X. Xiao, A. Zaheri, M. A. Meyers, and H. D. Espinosa (2017) "Lamellae spatial distribution modulates fracture behavior and toughness of african pangolin scales", *Journal of the Mechanical Behavior of Biomedical Materials*, **76** 30-37. doi:10.1016/j.jmbbm.2017.06.009

11. A. Gao, S. Mukherjee, I. Srivastava, M. Daly, and C. V. Singh (2017) "Atomistic origins of ductility enhancement in metal oxide coated silicon nanowires for Li-ion battery anodes", *Advanced Materials Interfaces*, 1700920. doi:10.1002/admi.201700920

10. H. Sun, S. Mukherjee, M. Daly, A. Krishnan, M. H. Karigerasi, and C. V. Singh (2016) "New insights into the structure-nonlinear mechanical property relations for graphene allotropes", *Carbon*, **110** 443-457. doi:10.1016/j.carbon.2016.09.018

9. M. Daly, C. Cao, H. Sun, Y. Sun, T. Filleter, and C. V. Singh (2016) "Interfacial shear strength of multilayer graphene oxide films", *ACS Nano*, **10** 1939-1947. doi:10.1021/acsnano.5b05771

8. C. Cao, M. Daly, B. Chen, J. Y. Howe, C. V. Singh, T. Filleter, and Y. Sun (2015) "Strengthening in graphene oxide nanosheets: Bridging the gap between interplanar and intraplanar fracture", *Nano Letters*, **15** 6528-6534. doi:10.1021/acs.nanolett.5b02173

7. M. Daly, J. L. McCrea, B. A. Bouwhuis, C. V. Singh, and G. D. Hibbard (2015) "Deformation behavior of a NiCo multilayer with a modulated grain size distribution", *Materials Science and Engineering: A*, **641** 305-314. doi:10.1016/j.msea.2015.06.049

6. M. Daly, M. Reeve, and C. V. Singh (2015) "Effects of topological point reconstructions on the

fracture strength and deformation mechanisms of graphene", *Computational Materials Science*, **97** 172-180. doi:10.1016/j.commatsci.2014.10.034

5. C. Cao, M. Daly, C. V. Singh, Y. Sun, and T. Filleter (2015) "High strength measurement of monolayer graphene oxide", *Carbon*, **81** 497-504. doi:10.1016/j.carbon.2014.09.082
4. M. Daly and C. V. Singh (2014) "A kinematic study of energy barriers for crack formation in graphene tilt boundaries", *Journal of Applied Physics*, **115** 223513. doi:10.1063/1.4883190
3. M. Daly, A. Pequegnat, Y. N. Zhou, and M. I. Khan (2013) "Fabrication of a novel laser processed NiTi shape memory microgripper with enhanced thermomechanical functionality", *Journal of Intelligent Material Systems and Structures*, **28** 984-990. doi:10.1177/1045389X12444492
2. A. Pequegnat, M. Daly, J. Wang, M. I. Khan, and Y. Zhou (2012) "Dynamic actuation of a novel laser processed NiTi linear actuator", *Smart Materials and Structures*, **21** 094004. doi:10.1088/0964-1726/21/9/094004
1. M. Daly, A. Pequegnat, Y. Zhou, and M. I. Khan (2012) "Enhanced thermomechanical functionality of a laser processed hybrid NiTi-NiTiCu shape memory alloy", *Smart Materials and Structures*, **21** 045018. doi:10.1088/0964-1726/21/4/045018

Refereed Conference Proceedings

7. C. Xu, M. Daly, A. Heifetz, D. Kultgen, and D. Ozevin "Computational modeling of high-temperature MEMS sensor array for ultrasonics and acoustic emission in structural health monitoring of high temperature advanced reactor pipes", 14th International Workshop on Structural Health Monitoring (IWSHM), Stanford University, CA, USA, September 12-14, 2023.
6. T. M. Khan, J. Sabino, C. Xu, J. Obregon, J. W. Adkins, M. Daly, A. Heifetz, D. Kultgen, and D. Ozevin"Dual Mode pMUT for Structural Health Monitoring of Piping Systems in Advanced Reactors", IEEE International Ultrasonics Symposium (IUS 2023), Montreal, Quebec, Canada, September 3-8, 2023.
5. B. Panton, A. Michael, A. Pequegnat, M. Daly, Y. Zhou, and M. I. Khan (2013) "An innovative laser-processed NiTi self-biasing linear actuator", Proceedings of the ASME 2013 Conference on Smart Materials, Adaptive Structures and Intelligent Systems (SMASIS), Snowbird, UT, USA, September 16 - 18, 2013. doi:10.1115/SMASIS2013-3152
4. M. Daly, A. Pequegnat, M. I. Khan, and Y. Zhou (2011) "Fabrication of a novel monolithic NiTi based shape memory microgripper via Multiple Memory Material processing", Proceedings of the ASME 2011 Conference on Smart Materials, Adaptive Structures and Intelligent Systems (SMASIS), Scottsdale, AZ, USA, September 18 - 21, 2011. doi:10.1115/SMASIS2011-4903
3. A. Pequegnat, M. Vlascov, M. Daly, M. I. Khan, and Y. Zhou (2011) "Dynamic actuation of a Multiple Memory Material processed Nitinol linear actuator", Proceedings of the ASME 2011 Conference on Smart Materials, Adaptive Structures and Intelligent Systems (SMASIS), Scottsdale, AZ, USA, September 18 - 21, 2011. doi:10.1115/SMASIS2011-4994
2. M. Daly, A. Salehian, and A. Doosthoseini (2010) "Thermal robustness assessment of a rigidized space inflatable boom via experimental modal analysis and finite element modeling", Proceedings of the ASME 2010 Conference on Smart Materials, Adaptive Structures and Intelligent Systems (SMASIS), Philadelphia, USA, September 28 - October 1, 2010. doi:10.1115/SMASIS2010-3677
1. A. Doosthoseini, A. Salehian, and M. Daly (2010) "Analysis of wrinkled membranes bounded with Macro-fiber Composite (MFC) actuators", Proceedings of the ASME 2010 Conference on Smart Materials, Adaptive Structures and Intelligent Systems (SMASIS), Philadelphia, USA, September

28 - October 1, 2010. doi:10.1115/SMASIS2010-3782

Conference Presentations

28. C. Xu, M. Daly, J. Obregon, A. Heifetz, D. Kultgen, M. Gonzalez, E. Lowenhar, and D. Ozevin "The Implementation of Acoustic Emission for Monitoring Creep Damage of Stainless Steel for Advanced Nuclear Piping System", Acoustic Emission Working Group (AEWG-64), Princeton NJ, USA, September 26-28, 2023. Oral presentation.
27. C. Xu, M. Daly, A. Heifetz, D. Kultgen, and D. Ozevin "Damage Assessment of Advanced High Temperature Fluid Reactor Piping System with Guided Wave Ultrasonics", 2023 American Nuclear Society (ANS) Annual Meeting, Indianapolis IN, USA, June 11 - 14, 2023. Oral presentation with extended abstract.
26. Y. Lu, J. Ahmed, and M. Daly "Measurement of Transformation Stress in Metastable HEAs by Nanoindentation", Annual Meeting and Exhibition of The Minerals, Metals and Materials Society (TMS), San Diego CA, USA, March 19 - 23, 2023. Oral presentation.
25. A. Shirsalimian, R. Jagatramka, J. Ahmed, and M. Daly "Effects of Potential Energy Statistics on Deformation Behavior in Concentrated Solid Solutions", Annual Meeting and Exhibition of The Minerals, Metals and Materials Society (TMS), San Diego CA, USA, March 19 - 23, 2023. Poster presentation.
24. M. Daly "Deformation Mechanisms in Fluctuating Energy Landscapes", *Invited Talk*, The 2022 Society of Engineering Science Annual Technical Meeting, College Station TX, USA, Oct. 16 - 19, 2022. Oral presentation.
23. M. Daly "Deformation mechanisms in concentrated solid solutions", *Invited Talk*, The 33rd Canadian Materials Science Conference, Toronto ON, Canada, June 22 - 24, 2022. Oral presentation.
22. R. Jagatramka and M. Daly "The evolution of deformation twinning in a heterogeneous planar fault energy landscape", The 151st Annual Meeting and Exhibition of The Minerals, Metals and Materials Society (TMS), Anaheim CA, USA, February 27 - March 3, 2022. Oral presentation.
21. J. Ahmed and M. Daly "Size effects in a dual phase high entropy alloy", The 151st Annual Meeting and Exhibition of The Minerals, Metals and Materials Society (TMS), Anaheim CA, USA, February 27 - March 3, 2022. Oral presentation.
20. R. Jagatramka, C. Wang and M. Daly "A Method to Predict Fluctuations in the Fault Energy Landscape of FCC Solid Solutions", The 151st Annual Meeting and Exhibition of The Minerals, Metals and Materials Society (TMS), Anaheim CA, USA, February 27 - March 3, 2022. Oral presentation.
19. M. Daly and R. Jagatramka "Disorder-driven biasing of deformation tendencies in concentrated FCC solid solutions", 2nd World Congress on High Entropy Alloys (HEA 2021), Charlotte NC, USA, December 5-8, 2021. Oral presentation.
18. M. Daly, R. Jagatramka and C. Wang "Fluctuations in the generalized planar fault energy landscape in concentrated FCC solid solutions", Materials Science and Technology 2021 (MS&T), Columbus OH, USA, October 17-20, 2021. Oral presentation.
17. J. Ahmed, T. Zhang, D. Ozevin and M. Daly "Microstructural evolution and acoustic monitoring of deformation sources in a metastable high entropy alloy", 2021 Midwest SAMPE Student Research Symposium, May 20, 2021. Oral presentation, Virtual. ***First place from SAMPE Midwest chapter and third place in national SAMPE graduate student competition.***

16. M. Daly, R. Jagatramka, J. Ahmed "A First Principles Criterion for Microstructure Evolution in Deformation Twinned FCC Materials", The 150th Annual Meeting and Exhibition of The Minerals, Metals and Materials Society (TMS), March 15 - 18, 2021. Oral presentation, Virtual.
15. M. Daly "A First-Principles Criterion for the Evolution of Deformation Twinning in FCC Materials", *Invited Talk*, The 57th Society of Engineering Science Technical Meeting, September 29 - October 1, 2020. Oral presentation, Virtual.
14. M. Daly, Z. Lin, and H. D. Espinosa "Strain rate effects on the plasticity mechanisms and work hardening of metallic micropillars", *Invited Talk*, The 148th Annual Meeting and Exhibition of The Minerals, Metals and Materials Society (TMS), San Antonio, TX, USA, March 10 - 14, 2019. Oral presentation.
13. M. Daly, A. Kumar, G. D. Hibbard, and C. V. Singh "The competition between deformation twin nucleation and thickening in nanostructured FCC materials", The 148th Annual Meeting and Exhibition of The Minerals, Metals and Materials Society (TMS), San Antonio, TX, USA, March 10 - 14, 2019. Oral presentation.
12. D. Restrepo, M. Daly, A. Zaheri, and H. D. Espinosa "Revealing the self-sharpening mechanisms of sea urchin teeth: in situ testing and modeling", The 148th Annual Meeting and Exhibition of The Minerals, Metals and Materials Society (TMS), San Antonio, TX, USA, March 10 - 14, 2019. Oral presentation.
11. F. F. Ahmed, M. Daly, and G. D. Hibbard "Defining the micro-mechanistic energy landscape in nanocrystalline and coarse-grained multilayered Ni-30%Co structures", Canadian Materials Science Conference (CMSC), Edmonton, AB, Canada, June 19 - 22, 2018. Poster presentation.
10. H. D. Espinosa, A. Zaheri, M. Daly, D. Restrepo, W. Gao, R. Yang, and B. Myers "A mechanics perspective on helicoidal structures: from nature to additive manufacturing", 18th U.S. National Congress for Theoretical and Applied Mechanics (USNCTAM), Chicago, IL, USA, June 4 - 9, 2018. Oral presentation.
9. M. Daly, G. D. Hibbard, and C. V. Singh "Anomalous strengthening in a NiCo multilayer with a modulated microstructure", Canadian Materials Science Conference (CMSC), Hamilton, ON, Canada, June 8 - 10, 2016. Oral presentation.
8. C. Cao, M. Daly, B. Chen, C. V. Singh, Y. Sun, and T. Filleter "Strength and fracture of graphene oxide nanosheets", American Vacuum Society (AVS) 62nd International Symposium and Exhibition, San Jose, CA, USA, October 18 - 23, 2015. Oral presentation.
7. M. Daly, G. D. Hibbard, and C. V. Singh "Atomistic investigation of dislocation activity along interfaces in multilayers with modulated microstructures", Conference of Metallurgists (COM), Toronto, ON, Canada, August 23 - 26, 2015. Oral presentation.
6. C. V. Singh and M. Daly "Effect of thermal activation on the strength of polycrystalline graphene sheets", Conference of Metallurgists (COM), Vancouver, BC, Canada, September 28 - October 1, 2014. Oral presentation.
5. M. Daly, J. L. McCrea, B. A. Bouwhuis, G. D. Hibbard, and C. V. Singh "Mechanical characterization of electrodeposited CoNi multilayers with a bimodal grain size distribution", The 143rd Annual Meeting and Exhibition of The Minerals, Metals and Materials Society (TMS), San Diego, CA, USA, February 16 - 20, 2014. Oral presentation.
4. M. Daly, G. D. Hibbard, and C. V. Singh "Tensile properties of electroplated CoNi nanoscale multilayers with bimodal grain size", Nanoscale Multilayers, Madrid, Spain, October 1 - 4, 2013. Oral presentation.

3. M. Daly, and C. V. Singh "Effects of thermal activation on the crack-initiation stress of polycrystalline graphene", Canadian Materials Science Conference, Montreal, PQ, Canada, June 17 - 19, 2013. Oral presentation.
2. M. Reeve, S. Yadav, M. Daly, and C. V. Singh "Computational study of topological defects in graphene: structural and surface properties", Canadian Materials Science Conference (CMSC), Montreal, PQ, Canada, June 17 - 19, 2013. Poster presentation.
1. M. Daly, B. Panton, A. Pequegnat, J. Wang, Y. Zhou, and M. I. Khan "Modification of NiTi shape memory alloy functional properties via laser processing: proof of concept", Materials Science & Technology (MS&T), Pittsburgh, PA, USA, October 7 - 11, 2012. Oral presentation.

Invited Seminars

4. Illinois Institute of Technology,"Deformation Mechanisms at the Mesoscale: From 2D Materials to High Entropy Alloys", November 1, 2023.
3. The Ohio State University,"Tracking Deformation Over Microstructural Length Scales: Looking Beyond Incipient Events", September 23, 2022.
2. Indian Institute of Technology - Kharagpur,"Deformation mechanisms in concentrated FCC solid solutions", *Scientific computing in materials engineering,* September 28, 2021. (Virtual)
1. ArcelorMittal,"Revealing deformation mechanisms in advanced materials through small-scale materials testing", East Chicago, IN, January 10, 2020.

Teaching Appointments

CME/ME 261: Materials for manufacturing — University of Illinois Chicago
Enrollment: 85 undergraduate students — Jan. 2023 - May 2023
Overall Evaluation: 4.26/5

CME 260: Properties of materials — University of Illinois Chicago
Enrollment: 92 undergraduate and 2 graduate students — Aug. 2022 - Dec. 2022
Overall Evaluation: 3.9/5

CME 460/594: Advanced crystallography — University of Illinois Chicago
Enrollment: 2 undergraduate and 20 graduate students — Jan. 2022 - May 2022
Overall Evaluation: 4.83/5

CME/ME 261: Materials for manufacturing — University of Illinois Chicago
Enrollment: 82 undergraduate students — Jan. 2022 - May 2022
Overall Evaluation: 4.32/5

CME 470: Physical and mechanical properties of materials — University of Illinois Chicago
Enrollment: 4 undergraduate and 7 graduate students — Aug. 2021 - Dec. 2021
Overall Evaluation: 4.88/5

CME 594: Physical properties of nanostructured materials — University of Illinois Chicago
Enrollment: 12 graduate students — Jan. 2021 - May 2021
Overall Evaluation: 4.91/5

CME/ME 261: Materials for manufacturing — University of Illinois Chicago
Enrollment: 123 undergraduate students — Jan. 2021 - May 2021
Overall Evaluation: 3.87/5

CME/ME 261: Materials for manufacturing University of Illinois Chicago
Enrollment: 102 undergraduate students Aug. 2020 - Dec. 2020
Overall Evaluation: 4.12/5

CME 260: Properties of materials (Co-taught) University of Illinois Chicago
Enrollment: 39 undergraduate students June 2020 - July 2020

CME 460/594: Advanced crystallography University of Illinois Chicago
Enrollment: 2 undergraduate and 16 graduate students Jan. 2020 - May 2020
Overall Evaluation: 4.83/5

CME 260: Properties of materials University of Illinois Chicago
Enrollment: 103 undergraduate students Sept. 2019 - Dec. 2019
Overall Evaluation: 4.38/5

CME 594: Physical properties of nanostructured materials University of Illinois Chicago
Enrollment: 15 graduate students Jan. 2019 - May 2019
Overall Evaluation: 4.86/5

CME 260: Properties of materials University of Illinois Chicago
Enrollment: 108 undergraduate students Sept. 2018 - Dec. 2018
Overall Evaluation: 4.11/5

MSE 550: Advanced physical properties of structural nanomaterials University of Toronto
Enrollment: 16 undergraduate and graduate students Jan. 2016 - Apr. 2016
Overall Evaluation: 4.8/5

MSE 550: Advanced physical properties of structural nanomaterials University of Toronto
Enrollment: 29 undergraduate and graduate students Jan. 2015 - Apr. 2015
Overall Evaluation: 4.3/5

Trainee Advising

Ph.D. Students

Junaid Ahmed, Graduated Spring 2023
Multi-scale deformation studies on a metastable high entropy alloy

Ritesh Jagatramka, Graduated Spring 2023
Solute-induced heterogeneities in the deformation behavior of face-centered cubic solid solutions.

Novin Rasouli, Fall 2022-Present
Thesis advisor for project on mechanical metallurgy of high entropy alloys.

Javier Obregon, Fall 2022-June 2023
Advisor for project creep testing of stainless steels. Student was funded as a research assistant while completing thesis work in another lab.

Amir Shirsalimian, Spring 2023
Thesis advisor for project on computational metallurgy. Withdrew from program in good standing to accept industry position.

William Keaty, Fall 2023-Present
Thesis advisor for project on materials for medical devices.

Muhammad Shahzeb Khan, Fall 2023-Present
Thesis advisor for project on materials for extreme environments.

Akash Baski, Spring 2024-Present

Thesis advisor for project on defect metallurgy of high entropy alloys.

M.S. Students
Yingjie Lu, Graduated Spring 2023
Measurement of transformation stress in metastable high entropy alloys by spherical nanoindentation

Chheng Lang Ngov, Spring 2023
Advisor for graduate project small scale mechanics of high entropy materials.

Alejandro Lara, Spring 2023
Advisor for graduate project on creep testing of materials in extreme environments.

Chu Wang, Graduated Fall 2021
Quantifying fluctuations in the potential energy of concentrated solid solutions

Austin Bernat, Summer 2019
Advisor for summer project on flexible load cells for mechanical testing of nanomaterials.

Siyao Tong, Summer 2019
Advisor for summer project on calorimetry of nanomaterials.

Undergraduate Researchers
Juan Alanis, B.S. Mechanical Engineering, Spring 2023

Peter Siegler, B.S. Computer Science Sum. 2022 - Spring 2023

Jacob Lasso, B.S. Mechanical Engineering, Sum. 2022

Ariana Del Valle, B.S. Physics, Spring 2022 - Sum. 2022

Amir Shirsalimian, B.S. Mechanical Engineering, Spring 2021 - Fall 2022
1st place in Engineering/Physical Sciences category at the 2022 Undergraduate Research Forum at UIC (among $\approx$ 100 projects)

Andres Cruz, B.S. Civil Engineering, Spring 2020

Michael Cuzco, B.S. Mechanical Engineering, Fall 2019

Luke Zanoni, B.S. Civil Engineering, Fall 2019

Jeremy Harris, B.S. Civil Engineering, Fall 2019

Alex Jorgensen, B.S. Civil Engineering, Summer 2019

Marius Zavistanavicius, B.S. Engineering Physics, Spring 2019

Jim Brennan, B.S. Civil Engineering, Spring 2019

Service

Journal Peer Review
Acta Materialia, *Materials Science and Engineering: A*, *Materialia*, *Advanced Materials*, *Computational Materials Science*, *Applied Surface Science*, *ACS Applied Materials and Interfaces*, *International Journal of Mechanical Sciences*, *Carbon*, *Mechanics of Materials*, *Journal of Micromechanics and Microengineering*, *Journal of Materials Engineering and Performance*, *Journal of Bio- and Tribo-Corrosion*, *Carbon Trends*, *JOM*

Proposal Review
Panelist - *National Science Foundation*
External reviewer - *National Research Development and Innovation Office of Hungary*
External reviewer - *Mitacs Accelerate Entrepreneur Research Program (Canada)*

External reviewer - *Natural Sciences and Engineering Research Council of Canada*
Fellow - *NSF CMMI Game Changers Academy, 2021 cohort*

Expert Opinion
"Microstructures and Mechanical Engineers" *American Society of Mechanical Engineers.*
"Microstructures Improve Design and Function" *American Society of Mechanical Engineers.*
"Graphene fabric keeps mosquitoes from biting" *ScienceNews for Students.*

Thesis Committees
Ali Davariashtiyani, Ph.D. Materials Engineering, University of Illinois Chicago (Fall 2023)
Thesis: *A deep learning model for formation enthalpy and synthesizability of crystalline materials*

Manisha Barsa, M.S. Materials Engineering, University of Illinois Chicago (Summer 2023)
Thesis: *Analysis of defects in Ce5O9 through density functional theory*

Junaid Ahmed, Ph.D. Materials Engineering, University of Illinois Chicago (Spring 2023)
Thesis: *Multi-scale deformation studies on a metastable high entropy alloy*

Ritesh Jagatramka, Ph.D. Materials Engineering, University of Illinois Chicago (Spring 2023)
Thesis: *Solute-induced heterogeneities in the deformation behavior of face-centered cubic solid solutions*

Yingjie Lu, M.S. Materials Engineering, University of Illinois Chicago (Spring 2023)
Thesis: *Measurement of transformation stress in metastable high entropy alloys by spherical nanoindentation*

Javier Obregon, Ph.D. Materials Engineering, University of Illinois Chicago (Spring 2023)
Thesis: *Development and optimization of multiphase alloys and oxide composites for corrosive environments*

Milad Bashirzadeh, Ph.D. Mechanical Engineering, University of Illinois Chicago (Spring 2023)
Thesis: *Stress and fatigue analysis of solder joints subjected to extreme aging for normal and overmolded PCBs*

Mohammed Mujtaba Atif, Ph.D. Civil Engineering, University of Illinois Chicago (Fall 2022)
Thesis: *Stable reproducing kernel particle method for studying munitions penetration into geo-materials*

Jason Gross, Ph.D. Chemistry, University of Illinois Chicago (Summer 2022)
Thesis: *Ultrashort pulse laser ablation for depth profiling in mass spectrometry*

Chu Wang, M.S. Materials Engineering, University of Illinois Chicago (Fall 2021)
Thesis: *Quantifying fluctuations in the potential energy of concentrated solid solutions*

John Klein, Ph.D. Materials Engineering, University of Illinois Chicago (Spring 2021)
Thesis: *Collective behavior of mechanical metamaterials in response to harmonically distributed loads*

Boao Song, Ph.D. Mechanical Engineering, University of Illinois Chicago (Fall 2020)
Thesis: *Formation and stability of particles on 2D substrates via in situ TEM technique for advanced catalyst*

Hisham Maddah, Ph.D. Chemical Engineering, University of Illinois Chicago (Summer 2020)
Thesis: *Naturally-Sensitized Photoanodes for Molecular Photovoltaics*

Kai Yuan Cheng, Ph.D. Materials Engineering, University of Illinois Chicago (Spring 2020)
Thesis: *Tribological Materials on Titanium Alloy (Ti6Al4V)for Orthopedic Applications*

Debajyoti Saha, M.S. Civil Engineering, University of Illinois Chicago (Spring 2019)
Thesis: *Chiral thermomechanical metamaterials with continuous negative thermal expansion*

Leqing Yang, M.S. Materials Engineering, University of Illinois Chicago (Spring 2019)
Thesis: *Preparation of carbide derived carbon coatings on carburized Ti-6Al-4V surfaces by molten salt electrolysis*

Raymond Bassim, Ph.D. Civil Engineering, University of Illinois Chicago (Spring 2019)
Thesis: *Effect of Early Opening to Traffic Criteria on Concrete Elastic Properties and Fatigue*

Characteristics in PCC pavements

Niloofar Tehrani, Ph.D. Materials Engineering, University of Illinois Chicago (Spring 2019)
Thesis: *Microstructural Characterization and Damage Detection in Steels and Aluminum with Linear and Nonlinear Ultrasonic Testing*

Larry Danso, Ph.D. Civil Engineering, University of Illinois Chicago (Spring 2019)
Thesis: *Strain energy and deformation pattern anomalies in bistable and nonlocal mechanical metamaterials*

Department, College, and University Committees/Memberships

Faculty advisory committee — University of Illinois Chicago
Nanotechnology Core Facility — Appointed term: 2021 - present

Faculty advisory committee — University of Illinois Chicago
Electron Microscopy Core — Appointed term: 2019 - present

CME department advisory committee — University of Illinois Chicago
Elected member — Terms: 2019 - 2021 and 2023 - 2025

Faculty fellow — University of Illinois Chicago
UIC honors college — 2019 - Present

Full member — University of Illinois Chicago
UIC graduate college — 2019 - Present

Conference Session Chairing

1. "Nanomaterials and Nanomechanics II", The 57th Society of Engineering Science Technical Meeting, September 29 - October 1, 2020 (Virtual)
2. "Deformation Mechanisms I", TMS 2022 annual meeting, Anaheim, California, February 27 - March 3, 2022.
3. "Size Effects", TMS 2022 annual meeting, Anaheim, California, February 27 - March 3, 2022.
4. "Contact and Fracture", TMS 2022 annual meeting, Anaheim, California, February 27 - March 3, 2022.
5. "Thin Films and Multilayers", TMS 2022 annual meeting, Anaheim, California, February 27 - March 3, 2022.
6. "Phase Transformation Plasticity", TMS 2023 annual meeting, San Diego, California, March 19 - 23, 2023.

Conference Symposium Organization

1. The Minerals, Metals and Materials Society (TMS) – Lead symposium organizer, "Mechanical Behavior at the Nanoscale VI", TMS 2022 annual meeting, Anaheim, California, February 27 - March 3, 2022.
2. The Minerals, Metals and Materials Society (TMS) – Symposium organizer, "Deformation Mechanisms, Microstructure Evolution, and Mechanical Properties of Nanoscale Materials", TMS 2023 annual meeting, San Diego, California, March 19 - March 23, 2023.
3. The Minerals, Metals and Materials Society (TMS) – Lead symposium organizer, "Mechanical Behavior at the Nanoscale VII", TMS 2024 annual meeting, Orlando, Florida, March 3 - March 7, 2024.

Workshop Organization

1. Emerging Professionals Committee of The Minerals, Metals and Materials Society (TMS) –

Panelist,"Preparing a Winning Application", TMS 2022 annual meeting, Anaheim, California, February 27 - March 3, 2022.

Service to Professional Societies

Member - Program Committee — Appointment Term: 2022 - 2025
The Minerals, Metals and Materials Society (TMS)

Member - MPMD Council — Appointment Term: 2022 - 2025
The Minerals, Metals and Materials Society (TMS)

Professional Memberships

The Minerals, Metals, and Materials Society (TMS), American Chemical Society (ACS), The Society of Engineering Science (SES)

Selected Honors and Awards

TMS MPMD Young Leaders Professional Development Award	2023
National Science Foundation CAREER Award	2022
College of Engineering Teaching Award	2022
Edmund Burke Faculty Award for teaching excellence	2019
NSERC Postdoctoral Fellowship	2017-2018
Queen Elizabeth II Graduate Scholarship in Science and Technology	2015-2016
NSERC Postgraduate Scholarship	2012-2015
MSE Impact Student Choice Award	2013 and 2014
Governor General of Canada Gold Medal	2012
Best Student Paper Award at SMASIS	2011