

Gregory J. Wagner

Associate Professor
Mechanical Engineering
Northwestern University

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2145 Sheridan Rd., Evanston, IL 60208

EDUCATION

Northwestern University, Evanston, IL

- Ph. D., Mechanical Engineering, 2001
 - Thesis: "A Numerical Investigation of Particulate Channel Flow"
- M.S., Mechanical Engineering, 1999

Boston University, Boston, MA

- B.S., Mechanical Engineering, 1996

APPOINTMENTS

Northwestern University, Evanston, IL

Associate Professor 2015-Present

Sandia National Laboratories, Livermore, CA

Manager 2012-2014

Principal Member of Technical Staff 2006-2012

Senior Member of Technical Staff 2002-2006

Northwestern University, Evanston, IL

Research Assistant Professor 2001-2002

HONORS AND AWARDS

- Bette and Neison Harris Chair in Teaching Excellence, 2021-2024
- NIST Additive Manufacturing Benchmark Challenge, 1st Place (2 awards), 2022
- NIST Additive Manufacturing Benchmark Challenge, 1st Place (3 awards), 2018
- Zienkiewicz Numerical Methods in Engineering Prize, 2004
- B.L. Martin Fellowship, Northwestern University, 2000-2001
- National Defense Science and Engineering Graduate Fellowship, DoD, 1997-2000
- Cabell Fellowship, Northwestern University, 1996-1997
- Valedictorian, College of Engineering, Boston University, 1996
- Trustee Scholarship, Boston University, 1992-1996

PUBLICATIONS

JOURNAL ARTICLES:

h-index = 40 (August 1, 2023)

1. C. Park, Y. Lu, S. Saha, T. Xue, J. Guo, S. Mojumder, D. W. Apley, G. J. Wagner, W. K. Liu. "Convolution hierarchical deep-learning neural network (C-HiDeNN) with graphics processing unit (GPU) acceleration." *Computational Mechanics*, **72**:383-409. 2023.

2. Y. Lu, H. Li, L. Zhang, C. Park, S. Mojumder, S. Knapik, Z. Sang, S. Tang, D. W. Apley, G. J. Wagner, W. K. Liu. "Convolution Hierarchical Deep-learning Neural Networks (C-HiDeNN): finite elements, isogeometric analysis, tensor decomposition, and beyond." *Computational Mechanics*, **72**:333-362. 2023.
3. A. Samaei, Z. Sang, J. A. Glerum, J. E. Mogonye, G. J. Wagner. "Multiphysics modeling of mixing and material transport in additive manufacturing with multicomponent powder beds." *Additive Manufacturing*, **67**: 03481. 2023.
4. J. Lee, S. S. Mitter, L. Van Assche, H. Huh, G. J. Wagner, E. Wu, A. J. Barker, M. Markl, J. D. Thomas. "Impact of assuming a circular orifice on flow error through elliptical regurgitant orifices: computational fluid dynamics and in vitro analysis of proximal flow convergence." *Int J Cardiovasc Imaging* (2022). <https://doi.org/10.1007/s10554-022-02729-2>
5. U. F. Ghumman, L. Fang, G. J. Wagner, W. Chen. "Calibration of cellular automaton model for microstructure prediction in additive manufacturing using dissimilarity score." *J. Manufacturing Science and Engineering*. 145:061002-1. 2023.
6. L. Fang, L. Cheng, J. Glerum, J. Bennett, J. Cao, G. J. Wagner. "Data-driven analysis of thermal simulations, microstructure, and mechanical properties of Inconel 718 thin walls deposited by metal additive manufacturing.", *npj Computational Materials*, **8**:126. 2022.
7. L. Cheng, G. J. Wagner. "A representative volume element network (RVE-net) for accelerating RVE analysis, microscale material identification, and defect characterization." *Comput. Methods Appl. Mech. Engrg.* **390**:114507. 2022.
8. D. Kats, Z. Wang, Z. Gan, W. K. Liu, G. J. Wagner, Y. Lian. "A physics-informed machine learning method for predicting grain structure characteristics in directed energy deposition." *Computational Materials Science*, **202**:110958. 2022.
9. Y. Lian, J. Dallmann, B. Sonin, K. Roche, A.I. Packman, W. K. Liu, G. J. Wagner. "Double averaging analysis applied to a large eddy simulation of coupled turbulent overlying and pore-water flow." *Water Resources Research*, **57**(11):e2021WR029918. 2021.
10. J. Fish, G. J. Wagner, S. Keten. "Mesoscopic and multiscale modelling in materials." *Nature Materials*, **20**(6):774-786. 2021.
11. L. Cheng, G. J. Wagner. "An optimally-coupled multi-time stepping method for transient heat conduction simulation for additive manufacturing." *Comput. Methods Appl. Mech. Engrg., Comput. Methods Appl. Mech. Engrg.*, **381**:113825, 2021.
12. S. Lin, Z. Gan, J. Yan, G. J. Wagner. "A conservative level set method on unstructured meshes for modeling multiphase thermo-fluid flow in additive manufacturing processes." *Comput. Methods Appl. Mech. Engrg.*, **372**:113348, 2020.
13. W. Yan, Y. Lu, K. Jones, Z. Yang, J. Fox, P. Witherell, G. Wagner, W.K. Liu. "Data-driven characterization of thermal models for powder-bed-fusion additive manufacturing." *Additive Manufacturing*, **36**:101503, 2020.
14. Z. Gan, H. Li, S. J. Wolff, J. L. Bennett, G. Hyatt, G. J. Wagner, J. Cao, W. K. Liu. "Data-driven microstructure and microhardness design in additive manufacturing using self-organizing map." *Engineering*, **5**:730-735, 2019.
15. M. Mozaffar, E. Ndip-Agbor, S. Lin, G.J. Wagner, K. Ehmann, J. Cao. "Acceleration strategies for explicit finite element analysis of metal powder-based additive

- manufacturing processes using graphical processing units." *Computational Mechanics*, **64**:879-894, 2019.
16. Z. Gan, Y. Lian, S. E. Lin, K. K. Jones, W. K. Liu, G. J. Wagner. "Benchmark study of thermal behavior, surface topography and dendritic microstructure in laser melting of Inconel 625." *Integrating Materials and Manufacturing Innovation*, **8**:178-193, 2019.
 17. K. R. Roche, A. Li, D. Bolster, G. J. Wagner, A. I. Packman. "Effects of turbulent hyporheic mixing on reach-scale transport." **55**:3780-3795, 2019
 18. S. Wolff, Z. Gan, S. Lin, J.L. Bennett, W. Yan, G. Hyatt, K.F. Ehmann, G.J. Wagner, W.K. Liu, J. Cao. "Experimentally validated predictions of thermal history and microhardness in laser-deposited Inconel 718 on carbon steel." *Additive Manufacturing*, **27**:540-551, 2019.
 19. J. Yan, S. Lin, Y. Bazilevs, G.J. Wagner. "Isogeometric analysis of multi-phase flows with surface tension and with application to dynamics of rising bubbles." *Computers and Fluids*, **179**:777-789, 2019.
 20. Y. Lian, Z. Gan, C. Yu, D. Kats, W.K. Liu, G.J. Wagner. "A cellular automaton finite volume method for microstructure evolution during additive manufacturing." *Materials & Design*, **169**:107672. 2019.
 21. Y. Lian, J. Dallmann, B. Sonin, K. Roche, W.K. Liu, A.I. Packman, G.J. Wagner. "Large eddy simulation of turbulent flow over and through a permeable bed." *Computers and Fluids*, **180**:128-138. 2019.
 22. S. Lin, J. Yan, D. Kats, G.J. Wagner. "A volume-conserving balanced-force level set method on unstructured meshes using a control volume finite element formulation." *J. Comp. Phys.*, **380**:119-142. 2019.
 23. O.L. Kafka, C. Yu, M. Shakoar, Z. Liu, G.J. Wagner, W.K. Liu, "Data-driven mechanistic modeling of influence of microstructure on high-cycle fatigue life of nickel titanium." *JOM*, **70**(7):1154-1158. 2018.
 24. J. Yan, W. Yan, S. Lin, G.J. Wagner. "A fully coupled finite element formulation for liquid-solid-gas thermo-fluid flow with melting and solidification." *Comput. Methods Appl. Mech. Eng.*, **336**: 444-470, 2018.
 25. W. Yan, Y. Lian, C. Yu, O.L. Kafka, Z. Liu, W.K. Liu, G.J. Wagner. "An integrated process-structure-property modeling framework for additive manufacturing." *Comput. Methods Appl. Mech. Eng.*, **339**:184-204, 2018.
 26. Y. Lian, S. Lin, W. Yan, W.K. Liu, G.J. Wagner. "A parallelized three-dimensional cellular automaton model for grain growth during additive manufacturing." *Computational Mechanics*, **61**(5):543-558, 2018.
 27. W. Yan, S. Lin, O.L. Kafka, Y. Lian, C. Yu, Z. Liu, J. Yan, S. Wolff, H. Wu, E. Ndip-Agbor, M. Mozaffar, K. Ehmann, J. Cao, G.J. Wagner, W.K. Liu. "Data-driven multi-scale multi-physics models to derive process-structure-property relationships for additive manufacturing." *Computational Mechanics*, **61**(5):521-541, 2018.
 28. W. Yan, Y. Qian, W. Ge, S. Lin, W.K. Liu, F. Lin, G.J. Wagner. "Meso-scale modeling of multiple-layer fabrication process in Selective Electron Beam Melting: inter-layer/track voids formation." *Materials & Design*, **141**:210-219, 2018.

29. W. Yan, S. Lin, O.L. Kafka, C. Yu, Z. Liu, Y. Lian, S. Wolff, J. Cao, G.J. Wagner, W.K. Liu. "Modeling process-structure-property relationships for additive manufacturing." *Frontiers in Mechanical Engineering*, **13**(4):482-492, 2018.
30. S.J. Wolff, S. Lin, E.J. Faierman, W.K. Liu, G.J. Wagner, J. Cao. "A framework to link localized cooling and properties of directed energy deposition (DED)-processed Ti-6Al-4V." *Acta Materialia*, **132**:106-117, 2017.
31. W. Yan, W. Ge, Y. Qian, S. Lin, B. Zhou, W.K. Liu, F. Lin, G.J. Wagner. "Multi-physics modeling of single/multiple-track defect mechanisms in electron beam selective melting." *Acta Materialia*, **134**:324-333, 2017.
32. S. Luan, Y. Lian, Y. Ying, S. Tang, G.J. Wagner, W.K. Liu. "An enriched finite element method to fractional advection-diffusion equation." *Computational Mechanics*, **60**:181-201, 2017.
33. S. Lin, J. Smith, W.K. Liu, G.J. Wagner. "An energetically consistent concurrent multiscale method for heterogeneous heat transfer and phase transition applications." *Comput. Methods Appl. Mech. Eng.*, **315**:100-120, 2017.
34. S. Tang, Y. Ying, Y. Lian, S. Lin, Y. Yang, G.J. Wagner, W.K. Liu. "Differential operator multiplication method for fractional differential equations." *Computational Mechanics*, **58**:879-888, 2016.
35. Y. Lian, Y. Ying, S. Tang, S. Lin, G.J. Wagner, W.K. Liu. "A Petrov-Galerkin finite element method for the fractional advection-diffusion equation." *Comput. Methods Appl. Mech. Eng.*, **309**:388-410, 2016.
36. J. Smith, W. Xiong, W. Yan, S. Lin, P. Cheng, O.L. Kafka, G.J. Wagner, J. Cao, W.K. Liu. "Linking process, structure, property, and performance for metal-based additive manufacturing: computational approaches with experimental support." *Computational Mechanics*, **57**(4):583-610, 2016.
37. M. Markl, G.J. Wagner, A.J. Barker. "Re: Blood flow analysis of the aortic arch using computational fluid dynamics." *European Journal of Cardio-Thoracic Surgery*, **49**:1586-1587, 2016.
38. J. Deng, G.J. Wagner, R.P. Muller. "Phase field modeling of solid electrolyte interface formation in lithium ion batteries." *J. Electrochem. Soc.*, **160**(3):A487-A496, 2013.
39. B. Jelinek, S. Groh, A. Moitra, M.F. Horstemeyer, J. Houze, S.G. Kim, G.J. Wagner, M.I. Baskes. "Modified embedded atom method potential for Al, Si, Mg, Cu, and Fe alloys." *Phys. Rev. B*, **24**:245102, 2012.
40. A.L. Brown, G.J. Wagner, K.E. Metzinger. "Impact, fire and fluid spread code coupling for complex transportation accident environment simulation." *J. Thermal Sci. and Eng. Appl.*, **4**:021004-1, 2011.
41. M.P. Klein, B.W. Jacobs, M.D. Ong, S.J. Fares, D.B. Robinson, V. Stavila, G.J. Wagner, I. Arslan. "Three-dimensional pore evolution of nanoporous metal particles for energy storage." *J. Amer. Chem. Soc.*, **133**(24):9144-9147, 2011.
42. G.J. Wagner, X. Zhou, S.J. Plimpton. "Equation-free accelerated simulations of the morphological relaxation of crystal surfaces." *Int. J. Multiscale. Comp. Eng.*, **8**(4):423-439, 2010.

43. J.A. Templeton, R.E. Jones, G.J. Wagner. "Application of a field-based method to spatially varying thermal transport problems in molecular dynamics." *Modelling and Simulation in Materials Science and Engineering*, **18(8)**:085007, 2010.
44. R.E. Jones, J.A. Templeton, G.J. Wagner, D. Olmsted, N. Modine. "Electron-transport enhanced molecular dynamics for metals and semi-metals." *Int. J. Numer. Meth. Eng.*, **83(8-9)**:940-967, 2010.
45. G.J. Wagner, R.E. Jones, J.A. Templeton, M.L. Parks. "An atomistic-to-continuum coupling method for heat transfer in solids." *Comput. Meth. Appl. Mech. Eng.*, **197**:3351-65, 2008.
46. M.Q. Chandler, M.F. Horstemeyer, M.I. Baskes, P.M. Gullett, G.J. Wagner, B. Jelinek. "Hydrogen effects on nanovoid nucleation in FCC single crystals." *Acta Materialia*, **56(1)**:95-104, 2008.
47. M.Q. Chandler, M.F. Horstemeyer, M.I. Baskes, G.J. Wagner, P.M. Gullett, B. Jelinek. "Hydrogen effects on nanovoid nucleation at nickel grain boundaries." *Acta Materialia*, **56(3)**:619-631, 2008.
48. S.G. Srinivasan, M.I. Baskes, G.J. Wagner. "Atomistic simulations of shock induced microstructural evolution and spallation in single crystal nickel." *J. Appl. Phys.*, **101(4)**:043504, 2007.
49. S.G. Srinivasan, M.I. Baskes, G.J. Wagner. "Spallation of single crystal nickel by void nucleation at shock induced grain junctions." *J. Mater. Sci.*, **41(23)**:7838-42, 2006.
50. H.S. Park, P.A. Klein, G.J. Wagner. "A surface Cauchy-Born model for nanoscale materials." *Int. J. Numer. Meth. Eng.*, **68(10)**:1072-95, 2006.
51. G.P. Potirniche, M.F. Horstemeyer, G.J. Wagner, P.M. Gullett. "A molecular dynamics study of void growth and coalescence in single crystal nickel." *Int. J. Plasticity*, **22**:257-78, 2006.
52. W.K. Liu, H.S. Park, D. Qian, E.G. Karpov, H. Kadowaki, G.J. Wagner. "Bridging scale methods for nanomechanics and materials." *Comput. Meth. Appl. Mech. Eng.*, **62**:1250-62, 2006.
53. G.P. Potirniche, M.F. Horstemeyer, B. Jelinek, G.J. Wagner. "Fatigue damage in nickel and copper single crystals at nanoscale." *Int. J. Fatigue*, **27**:1179-85, 2005.
54. E.G. Karpov, G.J. Wagner, W.K. Liu. "A Green's function approach to deriving non-reflecting boundary conditions in molecular dynamics simulations." *Int. J. Numer. Meth. Eng.*, **69(2)**:1250-1262, 2005.
55. X.Q. Chen, S.L. Zhang, G.J. Wagner, W.Q. Ding, R.S. Ruoff. "Mechanical resonance of quartz microfibers and boundary condition effects." *J. Appl. Phys.*, **95**: 4823-4828, 2004.
56. S. Zhang, G.J. Wagner, S.N. Medyanik, W.K. Liu, Y.H. Yu, Y.W. Chung. "Experimental and molecular dynamics simulation studies of friction behavior of hydrogenated carbon films." *Surface and Coatings Technology*, **177**: 818-823, 2004.
57. G.J. Wagner, E.G. Karpov, W.K. Liu. "Molecular dynamics boundary conditions for regular crystal lattices." *Comput. Meth. Appl. Mech. Eng.*, **193**: 1579-1601, 2003.
58. G.J. Wagner, W.K. Liu. "Coupling of atomistic and continuum simulations using a bridging scale decomposition." *J. Comput. Phys.*, **190**: 249-274, 2003.

59. G.J. Wagner, S. Ghosal, W.K. Liu. "Particulate flow simulations using lubrication theory solution enrichment." *Int. J. Numer. Meth. Eng.*, **56(9)**:1261-1289, 2003.
60. S.L. Zhang, H.T. Johnson, G.J. Wagner, W.K. Liu, K.J. Hsia. "Stress generation mechanisms in carbon thin films grown by ion-beam deposition." *Acta Materialia*, **51**:5211-22, 2003.
61. D. Qian, G.J. Wagner, W.K. Liu. "A multiscale projection method for the analysis of carbon nanotubes." *Comput. Meth. Appl. Mech. Eng.*, **193**:1603-1632, 2003.
62. E.G. Karpov, G.J. Wagner, W.K. Liu. "A Green's function approach to deriving wave-transmitting boundary conditions in molecular dynamics simulations." *Int. J. Numer. Meth. Eng.*, **62(9)**:1250-62, 2003.
63. L.T. Zhang, G.J. Wagner, W.K. Liu. "Modeling and simulation of fluid structure interaction by meshfree and FEM." *Communications in Numerical Methods in Engineering*, **19**:615-621, 2003.
64. D.A. Dikin, X. Chen, W. Ding, G. Wagner, R.S. Ruoff. "Resonance vibration of amorphous SiO₂ nanowires driven by mechanical or electrical field excitation." *J. Appl. Phys.*, **93(1)**:226-230, 2003.
65. M.F. Yu, G.J. Wagner, R.S. Ruoff, M.J. Dyer. "Realization of parametric resonances in a nanowire mechanical system with nanomanipulation inside a scanning electron microscope" *Phys. Rev. B*, 66: art. no. 073406, 2002.
66. D. Qian, G.J. Wagner, W.K. Liu, M.F. Yu, R.S. Ruoff. "Mechanics of carbon nanotubes." *Applied Mechanics Reviews*, **55(6)**:495-553, 2002.
67. L. Zhang, G.J. Wagner, W.K. Liu. "A parallelized meshfree method with boundary enrichment for large-scale CFD." *J. Comput. Phys.*, **176**:483-506, 2002.
68. W. Han, G.J. Wagner, W.K. Liu. "Convergence analysis of a hierarchical enrichment of Dirichlet boundary conditions in a meshfree method." *Int. J. Numer. Meth. Eng.*, **53**: 1323-1336, 2002.
69. G.J. Wagner, N. Möes, W.K. Liu, T. Belytschko. "The extended finite element method for viscous particulate flows." *Int. J. Numer. Meth. Eng.*, **51**: 293-313, 2001.
70. G.J. Wagner, W.K. Liu. "Hierarchical enrichment for bridging scales and meshfree boundary conditions." *Int. J. Numer. Meth. Eng.*, **50**: 507-524, 2000.
71. G.J. Wagner and W.K. Liu. "Turbulence simulation and multiple scale subgrid models." *Computational Mechanics*, **25**: 117-136, 2000.
72. G.J. Wagner and W.K. Liu. "Application of essential boundary conditions in mesh-free methods: a corrected collocation method." *Int. J. Numer. Meth. Eng.*, **47**: 1367-1379, 2000.

BOOK CHAPTERS

1. Y. Lian, G.J. Wagner, W.K. Liu. "A Meshfree Method for the Fractional Advection-Diffusion Equation." in *Meshfree Methods for Partial Differential Equations VIII.*, pp. 63-66. Eds. M. Griebel, M. Schweitzer. Springer, Cham, 2017.
2. G.J. Wagner. "Atomistic-to-Continuum Coupling Methods for Heat Transfer in Solids." in *Multiscale Simulations and Mechanics of Biological Materials*, pp. 3-20. Eds. S. Li and D. Qian. John Wiley & Sons, Ltd., 2013.

3. D. Qian, G.J. Wagner, W.K. Liu, M.-F. Yu, R.S. Ruoff. "Mechanics of Carbon Nanotubes." in *Handbook of Nanoscience, Engineering, and Technology*, 2nd Ed., p. 23-1. Eds. W.A. Goddard, III, D.W. Brenner, S.E. Lyshevski, and G.J. Iafrate. CRC Press, 2007.

CONFERENCE PROCEEDINGS

1. S.S. Mitter, G.J. Wagner, A.J. Barker, M. Markl, J.D. Thomas. "Impact of assuming a circular orifice on flow error through elliptical regurgitant orifices: A computational fluid dynamics (CFD) analysis." *Circulation*, **132 (Suppl 3)**, p. A16560. 2015.
2. W. Yan, W. Ge, J. Smith, G.J. Wagner, F. Lin, W.K. Liu. "Towards high-quality selective beam melting technologies: modeling and experiments of single track formations." *26th Annual International Symposium on Solid Freeform Fabrication*, Austin, TX. 2015.
3. A.L. Brown, K.E. Metzinger, G.J. Wagner. "Predictions of transport accident fires using coupled structural dynamics and computational fluid dynamics." *Fire Safety Science -- Proceedings of the 11th International Symposium*, pp. 584-597. 2014.
4. J. Deng, G.J. Wagner, R.P. Muller. "A phase field model of solid electrolyte interface formation in lithium-ion batteries." *MRS Proceedings*, 1440, DOI:10.1557/op1.2012.1278, 2012.
5. G.J. Wagner, D. Seif, M.D. Ong. "Kinetic Monte Carlo simulation of the aging of nanoporous metals." *MRS Online Proceedings Library*, 1263: 1263-Y04-04, 2010.
6. A.L. Brown and G.J. Wagner. "Fluid spread model validation for emerging liquid tank impact predictive methods." *ASME Conf. Proc.* 2010, 925, DOI:10.1115/IHTC14-23067, 2010.

INVITED TALKS

- "Combining multi-physics simulations with data-driven models for accelerated AM process prediction." Plenary Lecture. Additive Manufacturing Benchmarks 2022, Bethesda, MD. August 2022.
- "Multiphysics and data-driven process-structure simulations for additive manufacturing in metals." Invited Lectures on Modeling and Simulation for Additive Manufacturing. University of Pavia (online). June 2021.
- "Multiscale process-structure simulations for additive manufacturing in metals." Plenary Lecture. II International Conference on Simulation for Additive Manufacturing (Sim-AM 2019), Pavia, Italy. September 2019.
- "A balanced-force level set method on unstructured meshes for modeling powder-scale additive manufacturing processes." Keynote Talk, US National Congress on Computational Mechanics (USNCCM15), Austin, TX. July 2019.
- "Multiscale process-structure simulations for additive manufacturing in metals." Plenary Lecture. International Conference on Fluid Flow Problems (FEF-2019), Chicago, IL. April 2019.
- "Multiscale process-structure simulations for additive manufacturing in metals." Johns Hopkins University, Mechanical Engineering Department Seminar. December 2018.

- “Multiscale, data-driven process-structure-property modeling for additive manufacturing in metals.” Keynote Talk, IMECE Conference, Pittsburgh, PA. November 2018.
- “Multiscale process-structure simulations for additive manufacturing in metals.” Northwestern University, Mechanical Engineering Department Seminar. November 2018.
- “Multiscale process-structure simulation for additive manufacturing in metals using a cellular automaton model.” World Congress on Computational Mechanics, New York. July 2018.
- “Microstructure predictions for additively manufactured metals using a cellular automaton/finite element model.” Plenary Lecture. Additive Manufacturing Benchmarks 2018, Gaithersburg, MD. June 2018.
- “A parallelized three-dimensional cellular automaton model for grain growth during additive manufacturing.” Lawrence Livermore National Laboratory, ACAMM Seminar. April 2018.
- “Multiscale process-structure-properties modeling for additive manufacturing in metals.” Sandia National Laboratories. November 2017.
- “Interface capturing on unstructured meshes using a control volume finite element method.” Engineering Mechanics Institute Conference, San Diego, CA. June 2017.
- “Multi-scale, multi-physics simulation methods for complex engineering problems.” Northwestern University, CEE SEGIM Seminar. May 2016.
- “Multi-physics and multi-scale computations for complex problems in engineering.” Illinois Institute of Technology, Applied Mathematics Colloquium. April 2016.
- “Computational and analytical methods in AM: Linking process to microstructure.” Workshop on Predictive Theoretical and Computational Approaches for AM, Washington D.C., October 2015.
- “A Petrov-Galerkin method for the fractional advection-diffusion equation.” Workshop on Nonlocal Models in Mathematics, Computation, Science, and Engineering, Oak Ridge, TN. October 2015.
- “Optimal conjugate heat transfer coupling through a Dirichlet-Robin boundary condition.” US National Congress on Computational Mechanics, San Diego, CA. July 2015.
- “Atomistic-to-continuum coupling for heat transfer in solids.” University of Minnesota, Aerospace Engineering and Mechanics Department. September 2015.
- “Computational approaches to large-scale multi-physics simulations.” University of Illinois at Chicago, Civil and Materials Engineering Department. February 2015.
- “Computational approaches to large-scale multi-physics simulations.” Northwestern University, Mechanical Engineering Department. February 2014.
- “Atomistic-to-continuum simulation methods for nanoscale transport phenomena.” Rensselaer Polytechnic Institute, Department of Mechanical, Aerospace & Nuclear Engineering. November 2008.
- “An atomistic-to-continuum coupling method for non-equilibrium heat transfer in solids.” Sandia National Laboratories, AtC Workshop. April 2007.

- “Atomistic-to-continuum coupling for multiscale solid materials simulation.” Mississippi State University, Center for Advanced Vehicular Systems. September 2006.
- “Coupling of atomistic and continuum simulations using a bridging scale decomposition.” Sandia National Laboratories, Computer Science Research Institute. January 2004.

STUDENTS AND POSTDOCS ADVISED

POSTDOCS

- Dr. Jinhui Yan, 2016-2018
 - Current: Assistant Professor, U. of Illinois Urbana-Champaign
- Dr. Shiva Esna Ashari, 2016-2018
 - Current: Structural Engineer, SC Solutions
- Dr. Lin Cheng, 2019-2021
 - Current: Assistant Professor, Worcester Polytechnic Institute
- Dr. Arash Samaei, 2021-present

PH.D. STUDENTS

- Stephen Lin, Ph.D., September 2019
- Jonathan Dallmann, Ph.D. June 2021
- Lichao Fang, Ph.D. September 2022
- Roger Sang, Ph.D. expected 2025
- Joseph Leonor, Ph.D. expected 2026
- Shardul Kamat, Ph.D. expected 2026

M.S. STUDENTS

- Rhushikesh Ghotkar, M.S., 2016
- Benjamin Sonin, M.S., 2017
- Kevin Krout, M.S., 2017
- Jihoon Shin, M.S., 2021
- Roberto Votta, M.S., 2021
- Mohammadjavad Sarfi, M.S., 2021
- Bohan Yao, M.S., 2021
- Peace Mutwiri, M.S., 2022
- Jacob Silacci, M.S., 2023

UNDERGRADUATE STUDENTS

- Kevin Rosenthal, 2015-2016
- Shawn Sobel, 2016
- Nicholas Tan, 2018-2020

TEACHING

COURSES TAUGHT

- Heat Transfer (MECH_ENG 377)

- Winter 2016, Spring 2017, Spring 2018, Spring 2019, Spring 2020
- Applied Computational Fluid Dynamics and Heat Transfer (MECH_ENG 395)
 - Created course
 - Winter 2018, Winter 2019, Winter 2020, Winter 2021, Winter 2022, Winter 2023
- Advanced Topics in Computational Fluid Dynamics (MECH_ENG 424)
 - Redesigned course
 - Fall 2015, Winter 2017, Spring 2020, Spring 2022
- High Performance Computing for Multiphysics Applications (MECH_ENG 470)
 - Created course
 - Spring 2015, Spring 2016, Spring 2017, Spring 2018, Spring 2019, Spring 2021, Spring 2023

PROFESSIONAL ACTIVITIES

EDITORSHIPS

- Associate Editor, *Journal of Micromechanics and Molecular Physics* (2016-present)
- Associate Editor, *Computer Modeling in Engineering & Sciences* (2018-present)
- Guest Editor, *JOM*, Special Issue: “Integrated Computational and Experimental Methods for Additive Manufacturing.” 2018.
- Guest Editor (Lead), *Computer Modeling in Engineering & Sciences*, Special Issue: “Data-driven computational modeling and simulations.” 2018.

CONFERENCE ORGANIZATION

- Conference Co-Organizer, “Recent Advances in Integrated Computational and Experimental Methods for Additive Manufacturing.” Golden, CO. September 2017.
- Conference Co-Organizer, “Recent Advances in Computational Methods for Nanoscale Phenomena.” Ann Arbor, MI. August 2016.
- Mini-symposium Co-Organizer, “Modeling and Experimental Measurements for Metal Additive Manufacturing,” Multiscale Materials Modeling (MMM10), Baltimore, MD. October 2022.
- Mini-symposium Co-Organizer, “Solid Mechanics of Additively Manufactured Materials.” U.S. National Congress for Theoretical and Applied Mechanics, Chicago, IL. June 2018.
- Mini-symposium Co-Organizer, “Modeling and Simulation for Solidification Processes in Manufacturing.” US National Congress on Computational Mechanics, Montreal, Canada. July 2017.
- Mini-symposium Co-Organizer, “IGA and Meshfree Methods for Fluids, Turbulence, and Transport Phenomena.” USACM Conference on Isogeometric and Meshfree Methods, San Diego, CA. October 2016.

COMMITTEES AND ADVISORY BOARDS

- U.S. Association for Computational Mechanics, Technical Thrust Area Committee Member, Nanotechnology and Lower Scale Phenomena
- Board of Directors, Computational Marine Ethology Research Institute

- Computational Materials for Qualification and Certification (CM4QC), Industry-Government-Academia Steering Group

REVIEWER

- Funding Agencies:
 - National Science Foundation
 - Department of Energy
 - European Research Council
 - Swiss National Science Foundation
- Journals:

Acta Materialia, Additive Manufacturing, Additive Manufacturing Letters, Advanced Modeling and Simulation in Engineering Sciences, Applied Energy, Archives of Computational Methods in Engineering, Communications in Computational Physics, Computational Mechanics, Computational Geosciences, Computational Materials Science, Computers and Fluids, Computers and Structures, Computer Methods in Applied Mechanics and Engineering, Computer Physics Communications, Coupled System Mechanics, Engineering Analysis with Boundary Elements, Engineering Applications of Computational Fluid Mechanics, European Journal of Mechanics, Europhysics Letters, Extreme Mechanics Letters, Finite Elements in Analysis and Design, IEEE Transactions on Nanotechnology, Integrating Materials and Manufacturing Innovation, International Journal for Multiscale Computational Engineering, International Journal for Numerical Methods in Engineering, International Journal for Numerical Methods in Fluids, International Journal of Heat and Mass Transfer, International Journal of Machine Tools and Manufacture, International Journal of Mechanical Sciences, International Journal of Mechanics and Materials in Design, International Journal of Solids and Structures, JOM, Journal of Applied and Computational Mechanics, Journal of Computational Physics, Journal of Engineering Mechanics, Journal of Manufacturing Processes, Journal of Micromechanics and Microengineering, Journal of Physics D, Materials Today Communications, Mechanics of Materials, Modelling and Simulation in Materials Science and Engineering, Multiscale Modeling and Simulation, Nano Letters, Nanotechnology, Numerical Heat Transfer Part B, Powder Metallurgy, Science and Technology of Welding and Joining, Soft Matter, Transport in Porous Media

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- U.S. Association for Computational Mechanics
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