

Kasra Momeni, Ph.D.

Mechanical Engineering Department
Institute for Micromanufacturing
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STATUS: U.S. permanent resident.

SUMMARY

My main areas of expertise are *Accelerating Materials Innovation* and *Materials Genome*. My goal is to develop a *synergistic interaction among computation, experiment, and theory* to design new advanced materials with superior properties at the fraction of current cost and time-to-market. Specifically, I focus on *developing theoretical/numerical tools* to understand multi-scale/physics response of materials. I am utilizing various analytical methods, including atomistic-, meso-, and macro-scale models/simulations, along with experimental techniques with atomic resolutions to achieve this goal. I have developed advanced analytical models for hierarchical materials, innovative numerical methods combining artificial intelligence and atomistic simulations, and a unique integrated software for multi-scale modeling of nanomaterials with interactive 3D modeling environment and parallel computing capabilities.

RESEARCH INTERESTS

Accelerating Materials Innovation; Material Genomics; Hierarchical Materials by Design; Materials Under Extreme Environments; Materials for Energy; Additive Manufacturing; Molecular Dynamics; Phase-Field; Continuum Mechanics

EDUCATION AND TRAINING

	Organization	Reception Date
Postdoc	Materials Research Institute - The Pennsylvania State University	2016
PhD/ Postdoc	Aerospace Engineering - Iowa State University- A Phase-Field Approach to Solid-Solid Phase Transformation via Virtual Melting (Highest Honor)	2015
M.Sc.	Mechanical Engineering - Sharif University of Technology - Accelerating Molecular Dynamics Simulations of Nanoscale Structures	2008
B.Sc.	Mechanical Engineering - KNT University of Technology – Analysis of Mechanical Properties of Carbon Nanotube Composites (Highest Honor)	2006

GRANTS

- "A Phase-Field Model of Plastic Deformation for Multiscale Metal Forming Processes," NSF-CIMM, PI: Kasra Momeni, **\$10,000** for 1 year (1/2018-1/2019)
- "An Advanced Phase-Field Model of Microcrack Initiation for Alloys in Aerospace Applications using Direct Experimentation," LaSPACE REA, PI: Kasra Momeni, **\$62,589** for one year (7/1/2017-8/31/2018).
- "Engineering Multifunctional Materials: Defects, Functionalization, and Microstructure," LONI, PI: Kasra Momeni, **\$127,049** for one year (4/1/17-4/1/18).

- "*Modeling Growth Morphology of h-BN Using a Multiscale Approach*," **ATOMIC**, **co-PI**: Kasra Momeni, **\$20,000** for one year (1/1/17-12/31/17).
- "*Multiscale Modeling of Multifunctional Materials: Theory and Code Development*," **XSEDE**, **co-PI**: Kasra Momeni, **\$32,204** for one year (3/15/17-3/14/18).
- "*Multiphysics Model and Application Development for Controlled 2D Materials Growth*," **NSF-MIP**, **PI**: Kasra Momeni, **\$18,078** for 1 years (1/2017-1/2018)
- "*An advanced phase-field approach to engineering laser-based 3D metal printing: effect of mechanics and interfaces*," **NSF-CIMM**, **PI**: Kasra Momeni, **\$20,000** for 1 year (1/2017-1/2019)
- "CFA-16-10667: *A Coupled Experimental and Simulation Approach to Investigate the Impact of Grain Growth, Amorphization, and Grain Subdivision in Accident Tolerant U₃Si₂ Light Water Reactor Fuel*," **DOE-NEUP**, **co-PI**: Kasra Momeni, **\$800,000** for 3 years (8/2016-7/2019)
- "*A Multi-scale/Multi-physics Tool for Predicting Fatigue Crack Initiation and Propagation in Aircraft Structural Components using Coupled FEM Phase Field Approach*," **STTR**, **co-PI**: Kasra Momeni, **\$160,000** for 13 month (1/2016-2/2017)
- "*Developing a 3D Microstructure Reconstruction Capability in the Materials Computation Center*," **PennState Seed Funding**, **co-PI**: Kasra Momeni, **\$12,000** for 4 month (11/2015-2/2016)
- "*New Low-dimensional Multifunctional Materials: Defect Engineering and Functionalization*," **LONI**, **PI**: Kasra Momeni, **\$18,150** for a year (10/01/2016-10/01/2017)

AWARDS AND HONORS

- Award from President's Office of Financial Support for Advanced Technologies for my book entitled *Introduction to Nanotechnology* (in Persian), ISBN: 964-5544-52-1.
- Lead Editor of special issue on "Low-Dimensional Phase Transforming Materials" in Journal of Nanomaterials
- Best Paper Award of Institute for Micromanufacturing for 2017
- Iowa State University Zaffarano Prize Honorable Mention Award for 2015
- Iowa State University Research Excellence Award for 2015
- Graduate and Professional Student Senate Research Excellence Award for 2015
- Graduate and Professional Student Senate Teaching Excellence Award for 2015
- Iowa State University Teaching Excellence Award for 2014
- Aerospace Engineering Department Travel Grant, Spring 2013
- Aerospace Engineering Department Fellowship, Spring 2013
- NSF travel grant award to ASME IMECE 2012 conference (Rank 2nd)
- BRC travel grant, 2010, 2011
- Third top student in the National Entrance Exam for M.S. 2006
- Best undergraduate research award for my senior thesis entitled "Analysis of Mechanical Properties of Carbon Nanotube Reinforced Composites," 2006
- Top 1% in the National Entrance Exam for B.S. 2001, among 400,000 rivals
- Member of Engineering Honor Society TBII and ΣΞ

PUBLICATIONS

1. *An Introduction to Nanotechnology*, A. Shokuhfar & **K. Momeni**, 2004, ISBN: 964-5544-52-1.
2. co-Editor of Persian translated version of *Materials Science and Engineering: An Introduction*, William D. Callister, Jr., John Wiley and Sons, 2000, ISBN: 964 8703-03-5.

JOURNAL PAPERS

3. "Simulation Guided Growth of 2D Materials: A Multiscale Framework Integrating Phase-field Method with FEM CVD Chamber-Scale Calculations," **K. Momeni**, Y. Ji, K. Zhang, J. A. Robinson, L.-Q. Chen, *npj 2D Materials and Applications*, (submitted).
4. "Additively-Manufactured Lightweight Metamaterials for Energy Absorption," M. Mohsenizadeh, F. Gasbarri, M. Munther, A. Beheshti, **K. Momeni**, and K. Davami, *Materials Science & Engineering A* (submitted).
5. "Multiscale Fast Fourier Transform Based Phase Field and Extended Finite Element Methods for Fatigue Crack Initiation and Propagation Modeling," A. Sadeghirad, **K. Momeni**, Y. Ji, L.-Q. Chen, J. Lua, *Acta Materialia*, (submitted).
6. "Engineering low-dimensional materials: Defects and size," **K. Momeni** and H. Attariani, *Nanoscale* (submitted).
7. "Reduction induced amorphization in metal suboxides at high heating rates: theoretically guided experimentation," Yongming Hu, Linfeng Fei, **K. Momeni**, Wei Lu, Tiejun Sun, Haoshuang Gu, Long-Qing Chen, Yu Wang, *ACS Nano* (submitted).
8. "Roadmap for 2D Synthesis," L.-Q. Chen, K. Cho, V. Crespi, V. Meunier, **K. Momeni**, J. A. Robinson, S. Sinnott, B. G. Sumpter, A. van Duin, *2D Materials* (invited).
9. "Engineering Defects, a Path to Exceed Perfection," H. Attariani, **K. Momeni**, and K. Adkins, *ACS OMEGA* 2 (2), 663 (2017); (*ACS Editors' Choice*).
10. "From vertical to planar 2D MoS₂: a controlled synthesis technique," F. Zhang, **K. Momeni**, M. Abu AlSaud, M. Hailey Jr., J. M. Redwing, L.-Q. Chen, and N. Alem, *2D Materials*, 4 (2), 025029 (2017).
11. "Bottom-Up Synthesis of Vertically Oriented Two-Dimensional Materials," R. A. Vilá, **K. Momeni**, Q. Wang, B. M. Bersch, N. Lu, M. J. Kim, L.-Q. Chen, and J. A. Robinson, *2D Materials*, 3 (4), 041003 (2016).
12. "Atomic defects influenced mechanics of II-VI nanocrystals," M. Ghosh, S. Ghosh, H. Attariani, **K. Momeni**, M. Seibt, G. M. Rao, *Nano Letters*, 16 (10), 5969-5974 (2016).
13. "Structural transformation in monolayer materials: A 2D to 1D transformation," **K. Momeni**, H. Attariani, and R LeSar, *Physical Chemistry Chemical Physics*, 18 (29), 19873-19879 (2016).
14. "Fast 180° magnetization switching in a strain-mediated multiferroic heterostructure driven by a voltage," R.-C. Peng, J.-M. Hu, **K. Momeni**, J.-J. Wang, L.-Q. Chen, and C.-W. Nan, *Scientific Reports*, 6, 27561 (2016).
15. "Fast and unidirectional magnetic domain-wall motion driven by a voltage," J.-M. Hu, T. Yang, **K. Momeni**, X. Cheng, L. Chen, S. Lei, J. Wang, H. Huang, Z. Zhang, S. Trolier-McKinstry, V. Gopalan, G. P. Carman, C-W Nan, and L-Q Chen, *Nano Letters*, 16 (4), 2341-2348, (2016).
16. "A phase-field approach to nonequilibrium phase transformations in elastic solids via an intermediate phase (melt) allowing for interface stresses," **K. Momeni** and V. I. Levitas, *Physical Chemistry Chemical Physics*, 18 (17), 12183-12203 (2016).

17. "The strong influence of internal stresses on the nucleation of a nanosized, deeply undercooled melt at a solid–solid phase interface," **K. Momeni**, V. I. Levitas, and J. A. Warren, *Nano Letters*, 15 (4), 2298–2303, (2015).
18. "A Phase-Field Approach to Scale Effects and Mechanics in Solid-Solid Phase Transformation With Intermediate Interfacial Phases," **K. Momeni** and V. I. Levitas, *International Journal of Solids and Structures*, 71, 39–56, (2015).
19. "Propagating Phase Interface with Intermediate Interfacial Phase: Phase Field Approach," **K. Momeni** and V. I. Levitas, *Physical Review B*, 89 (18), 184102, (2014).
20. "Enhanced mechanical properties of ZnO nanowire-reinforced nanocomposites: a size-scale effect," **K. Momeni**, *Acta Mechanica*, 225 (9), 2549-2562, (2014).
21. "A Multiscale Approach to Nanocomposite Electrical Generators," **K. Momeni**, *Nano Energy*, 4, 132-139, (2014).
22. "Electromechanical properties of 1D ZnO nanostructures: Nanopiezotronics building blocks, surface and size-scale effects", **K. Momeni** and H. Attariani, *Physical Chemistry Chemical Physics*, 16 (10), 4522-4527 (2014).
23. "Solid-Solid Transformation via Nanoscale Intermediate Interfacial Phase: Multiple Structures, Scale, and Mechanics Effects," V.I. Levitas and **K. Momeni**, *Acta Materialia*, 65, 125-132 (2014).
24. "Finite size effect on piezoelectric properties of ZnO nanobelts: A molecular dynamics approach," **K. Momeni**, G. M. Odegard, and R. S. Yassar, *Acta Materialia*, 60 (13), 5117-5124 (2012).
25. "Structural inhomogeneity and piezoelectric enhancement in ZnO nanobelts," **K. Momeni**, A. Asthana, A. Prasad, Y. K. Yap and R.S. Yassar, *Applied Physics A*, 1-6 (2012).
26. "Optimal Aspect Ratio of Zinc Oxide Nanowires for a Nanocomposite Electrical Generator," **K. Momeni** and S. Mehdi Mortazavi Z., *Journal of Computational and Theoretical Nanoscience*, 9, 1670-1674 (2012).
27. "In situ observation of size-scale effects on the mechanical properties of ZnO nanowires," A. Asthana, **K. Momeni**, A. Prasad, Y.K.Yap, and R.S. Yassar, *Nanotechnology*, 22, 265712 (2011).
28. "On the correlation of crystal defects and band gap properties of ZnO nanobelts," A. Asthana, **K. Momeni**, A. Prasad, Y.K.Yap, and R.S. Yassar, *Applied Physics A*, 105, 909-914 (2011).
29. "A Study on the Structure-Piezoresponse Property of a ZnO Nanobelt by In Situ Transmission Microscopy," A. Asthana, **K. Momeni**, A. Prasad, Y. Yap and R. Yassar, *Microscopy and Microanalysis*, 17.S2, 1724-1725 (2011).
30. "In situ Probing of Structural and Electromechanical Properties of an Individual ZnO Nanobelt," A. Asthana, **K. Momeni**, A. Prasad, Y. Yap and R. Yassar, *Microscopy and Microanalysis*, 17.S2, 492-493 (2011).
31. "Nanocomposite Electrical Generator Based on Piezoelectric Zinc Oxide Nanowires," **K. Momeni**, G. M. Odegard and R.S. Yassar, *Journal of Applied Physics*, 108, 114303 (2010).
32. "Introducing Structural Approximation Method for Modeling Nanostructures," **K. Momeni** and A. Alasty, *Journal of Computational and Theoretical Nanoscience*, 7 (10), 423-428 (2010).
33. "Stress distribution on a single-walled carbon nanohorn embedded in an epoxy matrix composite under axial force," **K. Momeni**, R.S. Yassar, *Journal of Computational and Theoretical Nanoscience*, 7 (6), 1035-1041 (2010).
34. "Analytical formulation of stress distribution in cellulose nanocomposites," **K. Momeni**, R.S. Yassar, *Journal of Computational and Theoretical Nanoscience*, 6 (7), 1511-1518 (2009).

35. “*In situ* probing of electromechanical properties of an individual ZnO nanobelt,” A. Asthana, **K. Momeni**, A. Prasad, Y. Khin Yap, and R.S. Yassar, *Applied Physical Letters*, 95, 172106 (2009).
36. “Analytical Solution of Stress Distribution on a Hollow Cylindrical Fiber of a Composite with Cylindrical Volume Element under Axial Loading,” M. H. Kargarnovin and **K. Momeni**, *International Journal of Mechanical, Industrial and Aerospace Engineering*, 1 (4), 196-203 (2007).

CONFERENCE PRESENTATIONS

37. “Coupling Crystal-Plasticity Phase Field and Extended Finite Element Methods for Efficient Modeling of Fatigue Crack Initiation and Propagation,” Alireza Sadeghirad, **Kasra Momeni**, Yanzhou Ji, Xiang Ren, Long-Qing Chen, Jim Lua, 2nd Pan American Congress on Computational Mechanics, New York City, July 22-27, 2018.
38. “Size-Extreme Loading Duality in Low-Dimensional Materials,” **K. Momeni** and H. Attariani, MACH2018, April 4-6, Annapolis, MD, USA.
39. “Novel intrinsic Phase Transition and Strengthening in Low-dimensional Nanostructures Through Defect Engineering,” H. Attariani and **K. Momeni**, MACH2018, April 4-6, Annapolis, MD, USA.
40. “Simulation Guided Growth of 2D Materials—A Generalized Multiscale Framework,” **Kasra Momeni**, Y. Ji, R. A. Vilá, J.A. Robinson, L-Q Chen, MRS, 2018, April 2-6, Phoenix, AZ, USA.
41. “An Advanced Phase-field Framework For Design of 3D-Printed Metal Parts,” **K. Momeni**, CIMM, 2018, Feb 2018, Baton Rouge, LA, USA.
42. “Fuzzy Molecular Dynamics: An Adaptive Multilevel Coarse-Graining Framework,” **K. Momeni**, SES 54th Annual Technical Meeting, 2017, Jul 25-28, Boston, MA, USA.
43. “Property enhancement in low-dimensional materials via defect engineering, new path to materials’ architecture,” H. Attariani, **K. Momeni**, SES 54th Annual Technical Meeting, 2017, Jul 25-28, Boston, MA, USA.
44. “Controlled Growth of 2D Materials via Simulation Guided Experiments,” **K. Momeni**, R. A. Vilá, J. A. Robinson, and L.-Q. Chen, MRS, 2017, April 17-21, Phoenix, AZ, USA.
45. “Property enhancement in low-dimensional materials via defect engineering, new path to materials’ architecture,” **K. Momeni** and H. Attariani, MACH2017, April 5-7, Annapolis, MD, USA.
46. “An Advanced Phase-field Approach to Engineering Laser-Based 3D Metal Printing: Effect of Mechanics and Interfaces,” **K. Momeni**, CIMM, 2017, Feb 6th, Baton Rouge, LA, USA.
47. “Structural Transformation of 2D Nanosheets to 1D Materials,” **K. Momeni**, H. Attariani, R. LeSar, SES 53th Annual Technical Meeting, 2016, Oct 2-5, College Park, MD, USA.
48. “Phase-Field Approach to Nonequilibrium Phase Transformation with Moving Interfacial Phases and Interfacial Tension,” **K. Momeni** and V. I. Levitas, SES 52th Annual Technical Meeting, 2015, Oct 26-28, College Station, TX, USA.
49. “Propagating phase interface with intermediate interfacial phase: Phase field approach,” **K. Momeni** and V. I. Levitas, SES 51th Annual Technical Meeting, 2014, Oct 1-3, 2014, West Lafayette, IN, USA.
50. “Solid-Solid Transformations via Nanoscale Intermediate Interfacial Phases,” **K. Momeni** and V. I. Levitas, Third International Symposium on Phase-field Method 2014, Aug 26-29, 2014, State College, PA, USA.
51. “Intermediate Interfacial Phases: Effect of Mechanics and Size Scale,” **K. Momeni** and V. I. Levitas, USNCTAM-2014, June 15-20, 2014, East Lansing, Michigan USA.

52. "Solid-Solid Transformations via Nanoscale Intermediate Melt: Scale and Mechanics Effects," **K. Momeni** and V. I. Levitas, 1st Annual Graduate and Professional Student Research Conference, April 4, 2014, Ames, IA, USA.
53. "Phase-Field Model for Melt-Mediated Solid-Solid Phase Transformation," **K. Momeni** and V.I. Levitas, SES 50th Annual Technical Meeting, July 28-31, 2013, Providence, RI, USA.
54. "A Nonequilibrium Diffuse Interface Model for Solid-Solid Phase Transformation of Energetic HMX Crystals," **K. Momeni** and V.I. Levitas, IMECE 2012, Nov 9-15, 2012, Houston, TX, USA.
55. "Size Scale effect on generated electric potential of nanocomposite electrical generators," **K. Momeni**, IMECE 2012, Nov 9-15, 2012, Houston, Texas, USA.
56. "Mechanics of Low Dimensional Material for Energy Harvesting and Storage," R. Yassar, H. Ghassemi, **K. Momeni**, A. Asthana, Y. Yap and G. Odegard, TMS2012, March 1-15, 2012, Orlando, FL, USA.
57. "Effect of Size on Piezoelectric Charge Generated in Zinc Oxide Nanobelts," **K. Momeni**, A. Asthana, A. Parasad, Y.K. Yap, R.S. Yassar, 2010 MRS Spring Meeting, April 25-29, 2011, San Francisco, CA, USA.
58. "Nanowires and Nanocomposites for Electrical Energy Generators: Modeling and In-Situ Microscopy," Reza Shahbazian Yassar, **K. Momeni**, A. Asthana and Y. K. Yap, 2011 MRS Spring Meeting, April 25-29, 2011, San Francisco, CA, USA.
59. "Effect of Defect on the Piezoelectric Response of Zinc Oxide Nanobelts," **K. Momeni**, A. Asthana, A. Parasad, Y.K. Yap, R.S. Yassar, 2010 MRS Spring Meeting, April 25-29, 2011, San Francisco, CA, USA.
60. "Mechanics of Nanotubes/Nanowires: In Situ Microscopy," R. Yassar, R., **K. Momeni**, H. Ghassemi, A. Asthana, and Y. Yap, TMS 2011, Feb 27-March 3, 2011, San Diego, CA, United States.
61. "In Situ Probing of Electromechanical Properties of an Individual ZnO Nanobelt," A. Asthana, **K. Momeni**, R. Shahbazian-Yassar, A. Prasad and Y. K. Yap, Microscopy and Microanalysis, August 1-5, 2010, Oregon, USA, pp 1744-1745.
62. "Molecular Dynamics Simulation of Size Effect on Piezoelectric Properties of ZnO Nanobelts using GPUs," **K. Momeni**, G. M. Odegard, R.S. Yassar, 2010 MRS Spring Meeting, April 25-29, 2011, San Francisco, CA, USA.
63. "In-Situ TEM Studies of Nanomechanics and Fracture in Nanowires and Nanotubes," R. Yassar, H. Ghassemi, A. Pakzad, **K. Momeni**, A. Asthana, Y. Yap, TMS2010, February 14-18, 2010, Seattle, WA, USA.
64. "Electric potential distribution along ZnO nanowires, embedded in epoxy matrix," **K. Momeni**, G.M. Odegard and R.S. Yassar, 2010 MRS Spring Meeting, April 5-9, 2010, San Francisco, CA, USA.
65. "Governing Differential Equation of the Stress Distribution on a Single-Walled Carbon Nanohorn in an Epoxy Matrix Nanocomposite," **K. Momeni**, A. Alasty, A. Shokuhfar, NS2008, March 11-14, 2008, Conference, Kish Island.
66. "Designing an Intelligent Controller for a Molecular Valve," **K. Momeni** and A. Alasty, MicroNano08, June 3-5, 2008, Kowloon, Hong Kong.
67. "Stress Distribution on Open-Ended Carbon Nanotubes," **K. Momeni** and A. Alasty, MicroNano08, June 3-5, 2008, Kowloon, Hong Kong.

68. “Analytical Solution of Stress Distribution on a Hollow Cylindrical Fiber of a Composite with Cylindrical Volume Element under Axial Loading,” M. H. Kargarnovin and **K. Momeni**, ICME2007, Dec 20, 2007, Bangkok, Thailand.

INVITED TALKS

- “Size-Extreme Loading Duality in Low-Dimensional Materials,” **K. Momeni**, April 2018, MACH 2018, Annapolis, MD
- “A Multi-scale/physics Approach to Hierarchically-Structured Materials: Mild to Extreme Environments,” **K. Momeni**, May 2016, LaTech Institute for Micromanufacturing, Ruston, LA
- “A Multi-scale/physics Approach to Hierarchically-Structured Materials: Mild to Extreme Environments,” **K. Momeni**, March 2016, Mississippi State University, Starkville, MS
- “Phase Field Modeling Approach,” **K. Momeni**, February 2016, Pennsylvania State University, University Park, PA
- “Modeling Considerations for Low-D Materials,” **K. Momeni**, September 2015, Pennsylvania State University, University Park, PA
- “Multi-scale/physics Approach to Hierarchically Structured Materials: Nanocomposites and Smart Materials,” **K. Momeni**, March 2015, Center for Infrastructure Engineering Studies, Missouri University of Science and Technology, Rolla, MO
- “Research Writing Seminar Series: Effective Writing Tips from Published Authors,” **K. Momeni**, December 2013, Ames, IA
- “Phase field modeling of solid-solid phase transformation via virtual melting: Effect of interface energy, width, and interactions,” **K. Momeni**, October 2013, Ames, IA

ACADEMIC/TEACHING EXPERIENCE

- Invited Lecturer – Multiscale Modeling of Phase Transforming Materials, Leonard De Vinci France 2018
- Lecturer – Mechanics of Materials, Fall & Winter 2017
- Lecturer – Multiscale Material Design, Spring 2017
- Lecturer – Engineering Problem Solving, Fall & Winter 2016
- Lecturer – Statics of Engineering, Spring 2014
- Guest lecturer – Nanotechnology, Fall 2010
- Guest lecturer – Nanoscience and Nanotechnology, Fall 2006
- Lecturer – Computer Programming, 2002-2005
- Teaching assistant for *Fluid Mechanics*, *Statics*, *Dynamics*, and *Aerospace Structures*
- Mentoring undergraduates/graduate of Iowa State University, College of Engineering

COURSES DEVELOPED

- Designed a graduate multidisciplinary course entitled “*Multiscale Material Design: from Atoms to Structures*,” covering theories across multiple scales with hands on coding
- Designed a course entitled “*An Introduction to Nanotechnology*,” for graduate students specially in the field of mechanical engineering and materials science

- Designed extracurricular student seminar series entitled “*Multi Physics/Scale Modeling/Simulation of Nanomaterials (using COMSOL)*”
- Designed extracurricular student seminar series entitled “*High Performance Computing in Materials Science*”

SERVICE TO THE PROFESSION

Invited Participant, NSF workshop on *Advancing and Accelerating Materials Innovation* (2017)

Panelist, NSF (2016), DoE (2017)

Symposium Organization: *MACH 2018 – Low-Dimensional Materials Under Extreme Environments*

Journal Reviewer (31 Journals)

npj Computational Materials; Nanoscale-Royal Society of Chemistry; Physical Chemistry Chemical Physics; Advanced Electronic Materials; Journal of Materials Chemistry C; Materials Research Letters; Journal of Mechanics and Physics of Solids; Journal of Alloys and Compounds; Journal of Nanomedicine & Nanotechnology; Journal of Nanotechnology (IOP publishing); European Journal of Mechanics; Journal of Applied Mechanics; Journal of Materials Science; Journal of Smart Materials and Structures; Computational Materials Science; Journal of Physics D: Applied Physics; Journal of Physics and Chemistry of Solids; Journal of Applied Physics A; Molecular Simulation (Taylor and Francis); Journal of Applied Surface Science; Physica E: Low-dimensional Systems and Nanostructures; Journal of Computational Electronics; Materials Research Express (IOP publishing); Journal of Chemical Engineering & Process Technology; International Journal of Mechanical Sciences; Sensors; Applied Sciences; Journal of Nanomaterials; Current Nanoscience; Scientia Iranica Journal; Journal of Engineering Materials and Technology

Conference Reviewer (5 Conferences)

The 2012 IEEE Energy Conversion Congress and Exposition (ECCE 2012); The 2013 IEEE Energy Conversion Congress and Exposition (ECCE 2013); The 2014 IEEE Energy Conversion Congress and Exposition (ECCE 2014); The 2015 IEEE Energy Conversion Congress and Exposition (ECCE 2015); ASME-IMECE2017

RESEARCH AND PROFESSIONAL POSITIONS

- Assistant Professor, Louisiana Tech University, 2016-Now
- Postdoctoral Research Associate, Pennsylvania State University, 2015-2016
- Postdoctoral Research Associate, Iowa State University, Summer 2015
- Research Assistance, Iowa State University, 2011-2015
- Research Assistance, MichiganTech, 2008-2011
- Research Engineer, Sharif Research Center, 2005-2007.
- Research Engineer, NET, 2006-2007.
- Research Fellow, KNT University; Center of Advanced Materials and Nanotechnology, 2005-2006.

PROFESSIONAL SKILLS/EXPERIENCE

- Developing numerical models for multi-grain/phase materials utilizing experimental data (e.g. EBSD)
- Developing parallel molecular dynamics code using OpenMM
- Developing software for 3D Modeling of different CNTs and nanocomposites of CNTs

- Developing software for modeling nanostructured materials based on an innovative method for increasing modeling speed while keeping accuracy in an acceptable range
- Leading the group on characterizing mechanical properties of polymers using nanoindentation technique and Atomic Force Microscopy, 2010 (Selected as best team)
- Experience in using *in situ* characterization techniques (nanoFACTORY™ *in situ* AFM)
- Proficiency with Scanning Probe Microscopy Techniques, such as Atomic Force Microscopy (Veeco Dimension 3000, and Veeco Icon), Piezoresponse Force Microscope (Veeco Icon), Magnetic Force Microscopy (Veeco Dimension 3000, and Veeco Icon), Electric Force Microscopy (Veeco Icon)
- Familiarity and experience in using Transmission Electron Microscope
- Experience in growing ZnO nanostructures using Chemical Vapor Deposition (CVD)
- Designing power transmission Gear box for machine shops

INDUSTRIAL EXPERIENCES

- **Consultant**, IRITEC oil and gas industry (2003)
An innovative approach was developed for calculating the stress values in gas and oil pipeline expansion loops and implemented in a software. This software is aiding IRITEC to calculate the optimum number of expansion loops in a distance based on the material of the pipe.
- **Consultant**, Industrial Zones Inc. (2006-2007)
Developing software package for collecting and managing the information of small and medium sized industries, and promoting collaboration among the manufacturers. Designing new products for small industries and improving their manufacturing process.
- **Consultant**, NET (2006-2007)
Designing solar powered industrial fruit drier for reducing costs and providing environmentally friendly design.
- **Consultant**, Danesh Biotechnology Lab. (2006-2008)
Developing software to collect of blood test data, perform a primary analysis and store the data in a central SQL database. The software is designed to manage multiple users and work with large data sets.
- **Technical Researcher**, Sharif University Research Center (2005-2007)
Modeled multiphase flow and cavitation formation at the interface of solid and fluid, with the goal of reducing the wear due to bubble collapse and microjet formation.

PROFESSIONAL AFFILIATIONS

- Member of *American Society of Mechanical Engineers (ASME)*, *Materials Research Society (MRS)*, *Society of Automotive Engineers (SAE)*, *United States Association for Computational Mechanics (USACM)*, *Society of Engineering Science (SES)*, *World Academy of Science Engineering and Technology (WASET)*

SOFTWARE DEVELOPMENT

- **KMD**, A software for simulating and visualizing nanostructure materials behavior based on molecular dynamics and structural approximation techniques. It has a GUI like FEM analysis software packages for lowering the learning curve
- **KPaperOrganizer**, A software for organizing research material with visualization capability in a graph format

- **KSystemex**, A software for collecting data from a CBC blood tester device and analysis
- **KSMIndustries**, A database of small and medium industries for marketing and networking with a purpose of reducing costs
- **KTrans**, A software for organizing students' grades and preparing transcripts
- **KFarsiMenu**, A software which translates the menu items and put them in a right-to-left order
- **KExpanLoop**, A software for designing expansion loops in gas and oil pipelines

SPECIAL TRAINING AND WORKSHOPS

- Molecular Dynamics (MD) Workshop Series: Running and Developing MD Algorithms on GPUs with OpenMM, Stanford University, 2010.
- Molecular Dynamics (MD) Workshop Series: Introduction to Molecular Dynamics and Trajectory Analysis, Stanford University, 2010.
- Leadership Workshop, Iowa State University, March, 2012.
- Teaching an Online Course Workshop, Pennsylvania State University, March 2016.
- Teaching Your First Course and Use of Technology in Teaching Workshop, PennState, March 2016.
- Writing Your First NSF Grant Workshop, PennState, June, 2016.
- The Multiphysics Object-Oriented Simulation Environment (MOOSE) finite-element, multiphysics framework Workshop, PennState, March, 2017.