Yue Yu

Contact Information	Chandler Ullmann Hall, Room 243 Bethlehem, PA, 18015, USA	*Tel:* +1 (610) 758-3752 *E-mail:* yuy214@lehigh.edu

Research Interests Numerical Analysis, Scientific Machine Learning, Computational Mechanics, Material Modeling, Multiscale and Multiphysics Problems, High Performance Computing, Nonlocal Models, Graph Neural Networks.

Education

Brown University, Providence, RI   09/2008 - 05/2014
  Ph.D. in Applied Mathematics
  Ph.D. Thesis: *Numerical methods for fluid-structure interactions: analysis and simulations*
  M.Sc. in Mechanical Engineering

Peking University, Beijing, China   09/2004 - 07/2008
  B.Sc. in Mathematics

Summary of Scholarly Contributions

Refereed Journal and Conference Papers: **57**
  Citations: **2436** (Google Scholar)
  h-index: **28** (Google Scholar)
Refereed Book Chapters: **3**
Formally Invited Departmental Seminar and Keynote Lectures: **66**

Academia Appointment

Professor, Lehigh University   06/2023 - present
Department of Mathematics.

Affiliated Faculty, Lehigh University   03/2022 - present
The College of Health.

Affiliated Faculty, Lehigh University   09/2018 - present
Institute for Data, Intelligent Systems, and Computation (I-DISC).

Associate Professor, Lehigh University   06/2019 - 05/2023
Department of Mathematics.

Assistant Professor, Lehigh University   08/2014 - 05/2019
Department of Mathematics.

Postdoc Fellowship, Harvard University   06/2014 - 07/2014
School of Engineering and Applied Sciences; Adviser: Prof. Chris H. Rycroft.

Research Assistant, Brown University   06/2009 - 05/2014
Division of Applied Mathematics; Adviser: Prof. George E. Karniadakis.

IBM Visiting Professor, Brown University   11/2023 - 12/2023
Division of Applied Mathematics; Host: Prof. George E. Karniadakis.

Visiting Professor, University of Texas, Austin   02/2017 - 03/2017
Institute for Computational Engineering and Sciences; Host: Prof. Thomas J.R. Hughes.

Visiting Scholar, Lawrence Berkeley National Laboratory   2014-2016 summer
Mathematics Group; Host: Prof. James Sethian.

Visiting Student, University of Campinas, Brazil   02/2012-04/2012
School of Mechanical Engineering; Host: Prof. Marco L. Bittencourt.

Honors and Awards

IBM Visiting Faculty Fellowship, Brown University	2023
Recognition for Outstanding Academic Achivement, Lehigh University	2022
Air Force Young Investigator Award	2022
NSF-MAPWISELY Faculty Success Fellowship	2021
National Science Foundation CAREER Award	2018
Class of 1968 Junior Faculty Fellowship, Lehigh University	2017, 2018
Travel Award, The International Council for Industrial and Applied Mathematics	2015
AWM-NSF Travel Award, Association for Women in Mathematics (AWM)	2014

Dunmu Ji Thesis Award, Brown University	2014
Simon Ostrach Fellowship Award, Brown University	2012-2013
Brown University Graduate Fellowship, Brown University	2008-2009
Southwest Education Scholarship, Peking University	2007
Mary Kay Education Scholarship, Peking University	2005, 2006
New Student Scholarship, Peking University	2004

Publications   **Refereed Journal Papers** (* denotes the corresponding author, Yu's trainees highlighted):

1. **H. You** (Ph.D. student), **Y. Yu***, S. Silling, M. D'Elia. "Nonlocal operator learning for homogenized models: from high-fidelity simulations to constitutive laws". *Journal of Peridynamics and Nonlocal Modeling, 2024.*

2. S. Silling*, **S. Jafarzadeh** (Postdoc advisee), **Y. Yu**. "Peridynamic Models for Random Media Found by Coarse Graining". *Journal of Peridynamics and Nonlocal Modeling, 2024.*

3. **S. Jafarzadeh** (Postdoc advisee), S. Silling, N. Liu, Z. Zhang, **Y. Yu***. "Peridynamic Neural Operators: A Data-Driven Nonlocal Constitutive Model for Complex Material Responses". *Computer Methods in Applied Mechanics and Engineering, Volume 425, 116914, 2024.*

4. D. Lee, **L. Zhang** (Ph.D. student), **Y. Yu**, W. Chen*. "Deep Neural Operator Enabled Concurrent Multitask Design for Multifunctional Metamaterials under Heterogeneous Fields". *Advanced Optical Materials, 2303087, 2024.*

5. **L. Zhang** (Ph.D. student), **H. You** (Ph.D. student), T. Gao, M. Yu, C-H. Lee, **Y. Yu***. "MetaNO: how to transfer your knowledge on learning hidden physics". *Computer Methods in Applied Mechanics and Engineering, 116280, 2023.*

6. Lu F., An Q., **Yu Y***. "Nonparametric learning of kernels in nonlocal operators". *Journal of Peridynamics and Nonlocal Modeling, 1-24, 2023.*

7. **H. You** (Ph.D. student), X. Xu, **Y. Yu***, S. Silling, M. D'Elia, J. Foster. "Towards a unified nonlocal, peridynamics framework for the coarse-graining of molecular dynamics data with fractures". *Applied Mathematics and Mechanics, Volume 44, 1125-1150, 2023.*

8. **Y. Fan** (Ph.D. student), **H. You** (Ph.D. student), **Y. Yu***. "OBMeshfree: An optimization-based meshfree solver for nonlocal diffusion and peridynamics models". *Journal of Peridynamics and Nonlocal Modeling, 2023.*

9. **Y. Fan** (Ph.D. student), M. D'Elia, **Y. Yu***, H. Najm, S. Silling. "Bayesian Nonlocal Operator Regression (BNOR): A Data-Driven Learning Framework of Nonlocal Models with Uncertainty Quantification". *ASCE's Journal of Engineering Mechanics, Volume 149, Issue 8, 2023.*

10. **H. You** (Ph.D. student), **Q. Zhang** (undergraduate student), C. Ross, C-H. Lee, M-C. Hsu, **Y. Yu***. "A Physics-Guided Neural Operator Learning Approach to Model Biological Tissues from Digital Image Correlation Measurements". *Journal of Biomechanical Engineering, 144(12), 121012, 2022.*

11. **L. Zhang** (Ph.D. student), **H. You** (Ph.D. student), **Y. Yu***. "MetaNOR: A Meta-Learnt Nonlocal Operator Regression Approach for Metamaterial Modeling". *MRS Communications, 2022*

12. D.J. Fitzpatrick, K. Pham, C.J. Ross, D.W. Laurence, L.T. Hudson, **Y. Yu**, C-H Lee*. "Ex vivo experimental characterizations for understanding the interrelationship between tissue mechanics and collagen microstructure of porcine mitral valve leaflets". *Journal of the Mechanical Behavior of Biomedical Materials, 105401, 2022*

13. **H. You** (Ph.D. student), **Y. Yu***, M. D'Elia, T. Gao, S. Silling. "Nonlocal Kernel Network (NKN): a stable and resolution independent deep neural network". *Journal of Computational Physics. Volume 469, 111534, 2022.*

14. X. Tang*, **Y. Yu**, A. Oztekin. "Asymptotic Method for Entropic Multiple Relaxation Time Model in Lattice Boltzmann Method". *Physical Review E, Volume 106(1), 015303, 2022.*

15. **Fan Y.** (Ph.D. student), **You H.** (Ph.D. student), Tian X, Yang X, Li X, Prakash N, **Yu Y***. "A Meshfree Peridynamic Model for Brittle Fracture in Randomly Heterogeneous Material". *Computer Methods in Applied Mechanics and Engineering, Volume 399, 115340, 2022.*

16. **H. You** (Ph.D. student), **Q. Zhang** (undergraduate student), C. Ross, C-H. Lee, **Y. Yu***. "Learning Deep Implicit Fourier Neural Operators (IFNOs) with Applications to Heteroge-

neous Material Modeling". *Computer Methods in Applied Mechanics and Engineering, Volume 398, 115296, 2022.*

17. **Fan Y.** (Ph.D. student), Tian X, Yang X, Li X, Webster C, **Yu Y***. "An asymptotically compatible probabilistic collocation method for randomly heterogeneous nonlocal problems". *Journal of Computational Physics. Volume 465, 111376, 2022.*

18. Q. Du, X. Tian, **C. Wright** (Postdoc Advisee), **Y. Yu*** (authors are ordered in alphabetic). "Nonlocal Trace Spaces and Extension Results for Nonlocal Calculus". *Journal of Functional Analysis. Volume 282(12), 109453, 2022.*

19. M. Yin, E. Zhang, **Y. Yu**, G. Karniadakis*. "Interfacing finite elements with deep neural operators for fast multiscale modeling of mechanics problems". *Computer Methods in Applied Mechanics and Engineering, 115027, 2022.*

20. S. Goswami, M. Yin, **Y. Yu**, G. Karniadakis*. "A physics-informed variational DeepONet for predicting the crack path in brittle materials". *Computer Methods in Applied Mechanics and Engineering, Volume 391, 114587, 2022.*

21. S. A Silling*, M. D'Elia, **Y. Yu**, **H. You** (Ph.D. student), M. Fermen-Coker. "Peridynamic Model for Single-Layer Graphene Obtained from Coarse Grained Bond Forces". *Journal of Peridynamics and Nonlocal Modeling, 1-12, 2022.*

22. M. Foss, P. Radu , **Y. Yu*** (authors are ordered in alphabetic). "Convergence Analysis and Numerical Studies for Linearly Elastic Peridynamics with Dirichlet-Type Boundary Conditions". *Journal of Peridynamics and Nonlocal Modeling, 1-36, 2022.*

23. **H. You** (Ph.D. student), **Y. Yu***, S. Silling, M. D'Elia. "A data-driven peridynamic continuum model for upscaling molecular dynamics". *Computer Methods in Applied Mechanics and Engineering, Volume 389, 114400, 2022.*

24. M. D'Elia*, **Y. Yu**. "On the prescription of boundary conditions for nonlocal diffusion and peridynamics models". *Association for Women in Mathematics Series: Research in the Mathematics of Materials Science, 2021.*

25. **Y. Yu***, **H. You** (Ph.D. student), N. Trask. "An asymptotically compatible treatment of traction loading in linearly elastic peridynamic fracture". *Computer Methods in Applied Mechanics and Engineering, Volume 377, 113691, 2021.*

26. **H. You** (Ph.D. student), **Y. Yu**, N. Trask*, M. Gulian, M. D'Elia. "Data-driven learning of nonlocal physics from high-fidelity synthetic data". *Computer Methods in Applied Mechanics and Engineering, Volume 374, 2021*

27. **H. You** (Ph.D. student), **Y. Yu***, D. Kamensky. "An asymptotically compatible formulation for local-to-nonlocal coupling problems without overlapping regions.". *Computer Methods in Applied Mechanics and Engineering, Volume 366, 2020*

28. M. D'Elia*, X. Li, P. Seleson, X. Tian, **Y. Yu** (authors are ordered in alphabetic). "A review of Local-to-Nonlocal coupling methods in nonlocal diffusion and nonlocal mechanics". *Journal of Peridynamics and Nonlocal Modeling, 2020*

29. M. D'Elia*, C. Flores, X. Li, P. Radu, **Y. Yu** (authors are ordered in alphabetic). "Helmholtz-Hodge decompositions in the nonlocal framework. Well-posedness analysis and applications". *Journal of Peridynamics and Nonlocal Modeling, 2020*

30. M. D'Elia*, X. Tian, **Y. Yu** (authors are ordered in alphabetic). "A physically-consistent, flexible and efficient strategy to convert local boundary conditions into nonlocal volume constraints". *SIAM Journal on Scientific Computing, Volume 42(4), A1935-A1949, 2020*

31. C. H. Rycroft*, C-H. Wu, **Y. Yu**, K. Kamrin. "An Eulerian Approach for Modeling Passive and Active Soft Solids in Fluids". *Journal of Fluid Mechanics, Volume 898, A9, 2020.*

32. **H. You** (Ph.D. student), X-Y. Lu, N. Trask, **Y. Yu***. "An Asymptotically Compatible Approach for Neumann-Type Boundary Condition on Nonlocal Problems". *ESAIM: Mathematical Modelling and Numerical Analysis (ESAIM: M2AN), Volume 54 (4), 1373-1413, 2020.*

33. N. Trask*, **H. You** (Ph.D. student), **Y. Yu**, M. L. Parks. "An Asymptotically Compatible Meshfree Quadrature Rule for Non-Local Problems with Applications to Peridynamics". *Computer Methods in Applied Mechanics and Engineering, Volume 343, Pages 151-165, 2019*

34. **Y. Yu***, D. Kamensky, M-C. Hsu, X-Y. Lu, Y. Bazilevs, T. J. R. Hughes. "Error Estimates for Projection-Based Dynamic Augmented Lagrangian Boundary Condition Enforcement, with Application to Fluid-Structure Interaction". *Mathematical Models and Methods in Applied Sciences, Volume 28, No. 12, Pages 2457-2509, 2018*

35. **Y. Yu***, F. Bargos, **H. You** (Ph.D. student), M. L. Bittencourt, M. L. Parks, G. E. Karni-

adakis. "A Partitioned Coupling Framework for Peridynamics and Classical Theory: Analysis and Simulations". *Computer Methods in Applied Mechanics and Engineering, Volume 340, Pages 905-931, 2018.*

36. D. Kamensky*, M. Hsu, **Y. Yu**, J. A. Evans, M. S. Sacks, T. J. R. Hughes. "Immersogeometric Cardiovascular Fluid-Structure Interaction Analysis with Divergence-Conforming B-Splines". *Computer Methods in Applied Mechanics and Engineering, Volume 314, Pages 408-472, 2017.*

37. D. Schillinger*, I. Harari, M. Hsu, D. Kamensky, K. Stoter, **Y. Yu**, Y. Zhao. (besides the first author, all other authors are ordered in alphabetic) "The Non-Symmetric Nitsche Method for the Parameter-Free Imposition of Weak Boundary and Coupling Conditions in Immersed Finite Elements". *Computer Methods in Applied Mechanics and Engineering, Volume 309, Pages 625-652, 2016.*

38. **Y. Yu***, P. Perdikaris, G.E. Karniadakis. "Fractional Modeling of Viscoelasticity in 3D Cerebral Arteries and Aneurysms". *Journal of Computational Physics, Volume 323, Pages 219-242, 2016.*

39. P. Perdikaris, J.A. Insley, L. Grinberg, **Y. Yu**, M.E. Papka, G.E. Karniadakis*. "Visualizing Multiphysics, Fluid-Structure Interaction Phenomena in Intracranial Aneurysms". *Parallel Computing, Volume 55, Pages 9-16, 2016.*

40. F. Xie, **Y. Yu**, Y. Constantinides, M. S. Triantafyllou, G. E. Karniadakis*. "U-Shaped Fairings Suppress Vortex-Induced Vibrations for Cylinders in Cross-Flow". *Journal of Fluid Mechanics, Volume 782, Pages 300-332, 2015.*

41. **Y. Yu**, F. Xie, H. Yan, Y. Constantinides, O. Oakley, G.E. Karniadakis*. "Suppression of Vortex-Induced Vibrations by Fairings: a Numerical Study". *Journal of Fluids and Structures, Volume 54, Pages 679-700, 2015.*

42. **Y. Yu**, M.L. Bittencourt, G.E. Karniadakis*. "A Semi-Local Spectral/*hp* Element Solver for Linear Elasticity Problems". *International Journal for Numerical Methods in Engineering, Volume 100, Issue 5, Pages 347-373, 2014.*

43. D.A. Steinman*, et al. (groups are ordered in alphabetic) "Variability of Computational Fluid Dynamics Solutions for Pressure and Flow in a Giant Aneurysm: the ASME 2012 Summer Bioengineering Conference CFD Challenge". *Journal of Biomechanical Engineering, Volume 135, Issue 2, 2013.*

44. **Y. Yu**, H. Baek, G.E. Karniadakis*. "Generalized Fictitious Methods for Fluid–Structure Interactions: Analysis and Simulations". *Journal of Computational Physics, Volume 245, Pages 317-346, 2013.*

45. **Y. Yu**, H. Baek, M.L. Bittencourt, G.E. Karniadakis*. "Mixed Spectral/hp Element Formulation for Nonlinear Elasticity". *Computer Methods in Applied Mechanics and Engineering, Volumes 213-216, Pages 42-57, 2012.*

Refereed Conference Papers:

46. N. Yin, T. Gao, **Y. Yu**, Q. Ji*. "Effective Causal Discovery under Identifiable Heteroscedastic Noise Model". *the 38th AAAI Conference on Artificial Intelligence (AAAI-24), 2024.* **Acceptance rate** $\sim 23.8\%$**.**

47. N. Liu, **S. Jafarzadeh** (Postdoc advisee), **Y. Yu***. "Domain Agnostic Fourier Neural Operators". *Advances in Neural Information Processing Systems, 2023.* **Acceptance rate** $\sim 26\%$**.**

48. N. Liu, **Y. Yu***, **H. You** (Ph.D. student), **N. Tatikola** (Master student). "INO: Invariant Neural Operators for Learning Complex Physical Systems with Momentum Conservation". *The 26th International Conference on Artificial Intelligence and Statistics (AISTATS).* **Acceptance rate** $\sim 29\%$**.**

49. Yin M., Zhang E., **Yu Y.**, Karniadakis G.* "Interfacing finite elements with deep neural operators for multiscale modeling in mechanics". *Melosh Medal Competition, 2022.*

50. T. Gao*, E. Nelson, D. Bhattacharjya, M. Liu, **Y. Yu**. "IDYNO: Learning Nonparametric DAGs from Interventional Dynamic Data". *Proceedings of the 39th International Conference on Machine Learning (ICML), PMLR 162:6988-7001, 2022.* **Acceptance rate** $\sim 20\%$**.**

51. **Y. Yu***, T. Gao, N. Yin, Q. Ji. "DAGs with No Curl: An Efficient DAG Structure Learning Approach". *Proceedings of the 38th International Conference on Machine Learning (ICML), 2021.* **Acceptance rate** $\sim 20\%$**.**

52. **H. You** (Ph.D. student), **Y. Yu**, S. Silling, M. D'Elia*. "Data-driven learning of nonlocal models: from high-fidelity simulations to constitutive laws". *AAAI Spring Symposium: MLPS, 2021*

53. **Zhang, L.**[*] (Ph.D. student), Yu, M., Gao, T., **Yu, Y.** "MCMH: Learning Multi-Chain Multi-Hop Rules for Knowledge Graph Reasoning". *KR2ML - Knowledge Representation and Reasoning Meets Machine Learning Workshop, 2020*

54. **Yu, Y.**[*], Gao, T. "DAGs with No Curl: Efficient DAG Structure Learning". *NeurIPS Workshop on Causal Discovery and Causality-Inspired Machine Learning, 2020*

55. Wei, D.[*], Gao, T., **Yu, Y.** "DAGs with No Fears: A Closer Look at Continuous Optimization for Learning Bayesian Networks". *Advances in Neural Information Processing Systems (Spotlight paper), 2020.* **Acceptance rate** $\sim 2\%$**.**

56. **Zhang, L.** (Ph.D. student), Yu, M., Gao, T., **Yu, Y.**[*] "MCMH: Learning Multi-Chain Multi-Hop Rules for Knowledge Graph Reasoning". *Proceedings of the 2020 Conference on Empirical Methods in Natural Language Processing (EMNLP): Findings 2020 (pp. 3948-3954)*

57. **Y. Yu**[*], J. Chen[*], T. Gao, M. Yu. "DAG-GNN: DAG Structure Learning with Graph Neural Networks". *Proceedings of the 36th International Conference on Machine Learning (ICML), 2019.* **Acceptance rate** $\sim 20\%$**.**

Book Chapters:

58. S. Goswami, A. Bora, **Y. Yu**, G. Karniadakis. "Physics-Informed Deep Neural Operator Networks". *Machine Learning in Modeling and Simulation: Methods and Applications. Editors: Timon Rabczuk, Klaus J. Bathe, 2023.*

59. **Y. Yu**. "Fluid-Structure Interaction Modeling in 3D Cerebral Arteries and Aneurysms", *Lecture Notes in Applied and Computational Mechanics: Biomedical Technology. Springer, Cham. Pages 123-146, 2018.*

60. **Y. Yu**, M. Kirby, G.E. Karniadakis. "Spectral Element and hp Methods". *Encyclopedia of Computational Mechanics, John Wiley and Sons, NY, 1:1-43, 2017.*

Submitted Preprints:

61. N. Yin, T. Gao, **Y. Yu**, Q. Ji[*], T. Ma, D. Wei. "Efficient Non-parametric DAG Structure Learning". *Submitted.*

62. M. Yu[*], Y. Sang, K. Pu, Z. Wei, H. Wang, J. Li, **Y. Yu**, J. Zhou. "Few-Shot Character Understanding in Movies as an Assessment to Meta-Learning of Theory-of-Mind". *Submitted.*

63. B. Li, **Y. Yu**, X. Yang[*]. "The Sparse-Grid-Based Adaptive Spectral Koopman Method". *Submitted.*

64. N. Liu, **Y. Fan** (Ph.D. student), X. Zeng, M. Klower, **L. Zhang** (Ph.D. student), **Y. Yu**[*]. "Harnessing the Power of Neural Operators with Automatically Encoded Conservation Laws". *Submitted.*

65. N. Yin, H. Wang, **Y. Yu**, T. Gao, A. Dhurandhar, Q. Ji[*]. "Causal Representation Learning and Inference for Generalizable Cross-Domain Predictions". *Submitted.*

66. T. Gao[*], S. Lu, J. Lee, E. Nelson, **Y. Yu**, M. Liu, D. Bhattacharjya. "Meta-D^{2}AG: Causal Graph Learning with Interventional Dynamic Data". *Submitted.*

67. **S. Jafarzadeh** (Postdoc advisee), S. Silling, **L. Zhang** (Ph.D. student), C. Ross, C.-H. Lee, R. Rahman, S. Wang, **Y. Yu**[*]. "Heterogeneous Peridynamic Neural Operators: Discover Bio-tissue Constitutive Law and Microstructure from Digital Image Correlation Measurements". *Submitted.*

68. N. Yin, H. Wang, **Y. Yu**, T. Gao, A. Dhurandhar, Q. Ji[*]. "Causal Markov Blanket Representation Learning for Domain Generalization Prediction". *Submitted.*

69. N. Liu[*], X. Li, M. Rajanna, E. Reutzel, B. Sawyer, P. Rao, J. Lua, N. Phan, **Y. Yu**[*]. "Deep Neural Operator Enabled Digital Twin Modeling for Additive Manufacturing". *Submitted.*

Leadership and Professional Services	1. **Associate Editor**: Advances in Computational Science and Engineering (ACSE). (2022-Present)
	2. **Editorial Board Member**: Computer Methods in Applied Mechanics and Engineering (CMAME), (Nature) Scientific Reports, Numerical Methods for Partial Differential Equations (NMPDE). (2022-Present)
	3. **Guest Editor**: Frontiers in Mechanical Engineering, Special Issue on Hybrid Modeling – Blending Physics with Data. (2023-Present)
	4. **Co-Founder and Vice President**: Society for Industrial and Applied Mathematics (SIAM) NYNJPA Section. (2022-Present)

5. **Co-Founder**: The One Nonlocal World project[1], an online platform for people working on nonlocal problems. (2021-Present)
6. **Publicity Officer**: International Association for Computational Mechanics (IACM) Female Researchers Chapter. (2023-Present)
7. **Reviewer for Funding Agencies**: National Science Foundation, National Science Centre in Poland. (2016-Present)
8. **Committee Member**: USACM Technical Thrust Area "Computational Fluid Dynamics and Fluid-Structure Interaction" (2015-2019)
9. **Scientific Committee for Conferences**: the USACM Thematic Conference on Isogeometric Analysis (IGA 2018), The 8th edition of the International Conference on Computational Methods for Coupled Problems in Science and Engineering (COUPLED PROBLEMS 2019), the International Conference on Isogeometric Analysis (IGA 2019), the International Conference on Isogeometric Analysis (IGA 2022), the International Conference on Isogeometric Analysis (IGA 2024), the 18th US National Congress of Computational Mechanics (USNCCM18).
10. **Conference Organizer**: USACM Virtual Seminar Series on Computational Fluid-Structure Interaction (since 2021), Uncertainty Quantification for Machine Learning Integrated Physics modeling (MLIP 2022), CBMS Conference: Deep Learning and Numerical PDEs (2023), First Annual Meeting of Society for Industrial and Applied Mathematics NYNJPA Section (SIAM-NNP 2023).

Institutional Services (at Lehigh)

1. Serving as a new faculty search committee member for the Electrical and Computer Engineering department. (2022-present)
2. Serving as a committee member for the Lehigh Educational Policy Committee. (2022-present)
3. Serving as a committee member for the Lehigh Internal Review Committee. (2022-present)
4. Serving in the Chair's Advisory Committee for the Lehigh Math department. (2022-present)
5. Serving as the mentor of a junior faculty member for the Lehigh Math department. (2022-present)
6. Serving as a committee member for the Lehigh I-DISC Diversity, Inclusion, and Equity Working group. (2021-present)
7. Serving as a member for the Lehigh Research Computing Allocation Review Committee (RCARC). (2021-present)
8. Serving in the Calculus committee which helps organizing the calculus courses at the Lehigh Math department. (2018-present)
9. Organizing an annual two-day high performance computing (HPC) workshop at Lehigh University, to provide access of HPC for LVAIC schools as well as for the general public. (2017-present)
10. Advising/advised 10+ students and postdoc researchers in applied mathematics; Co-advising students and participating in 20+ Ph.D. thesis committees in computational mechanics. (2014-present)
11. Served as the chair in the new faculty search committee for the Lehigh Math department. (2021-2022)
12. Served as a council member for the Institute for Data, Intelligent Systems & Computation (I-DISC). (2018-2020)
13. Served in the new faculty search committee for the Lehigh Math department. (2017-2018)
14. Co-organized the math department colloquium. (2016-2017)
15. Served in the Christmas-Saucon Renovation Program Committee, which is the program committee for the renovation project of Christmas-Saucon Hall. (2016-2017)
16. Served in the Infrastructure group which determines the new infrastructure priorities at Lehigh. (2016)
17. Worked with the Chemistry department at Lehigh in the search committee for new faculty member. (2016)
18. Leaded a research team in the Biosystems Dynamics Summer Institute (BDSI) interdisciplinary research program. (06/2015-08/2015)

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[1]https://sites.google.com/view/onenonlocalworld/

Grants

1. Title: Machine Learning Database to Guide Development of Low Flammability Polymer Matrix Composites;
   Source and Role: Dept of the Navy/Global Engineering & Materials, Inc., PI;
   Amount: $42,000;
   Grant Periods: 12/01/2023-05/31/2024.

2. Title: CBMS Conference: Deep Learning and Numerical PDEs;
   Source and Role: National Science Foundation, Co-PI;
   Amount: $35,000;
   Grant Periods: 03/01/2023-02/29/2024.

3. Title: MRI: Development of Heterogeneous Edge Computing Platform for Real-Time Scientific Machine Learning;
   Source and Role: National Science Foundation, Co-PI;
   Amount: $999,600;
   Grant Periods: 10/01/2022-09/30/2025.

4. Title: Young Investigator Program: Learning Peridynamic (Nonlocal) Operators: A Reliable and Generalizable Approach to Predict Material Damage;
   Source and Role: DOD - Department of the Air Force, Sole PI;
   Amount: $449,854;
   Grant Periods: 05/01/2022-04/30/2025.

5. Title: CAREER: A Local–Nonlocal Coupling Framework for Tissue Damage in Fluid–Structure Interaction;
   Source and Role: National Science Foundation, Sole PI;
   Amount: $402,451;
   Grant Periods: 09/01/2018-08/31/2024.

6. Title: Data driven learning of robust nonlocal models;
   Source and Role: Sandia National Labratories, Team Member;
   Amount: $125,000;
   Grant Periods: 11/01/2020-08/31/2021.

7. Title: MAPWisely Faculty Success Fellowship;
   Source and Role: National Science Foundation, Sole PI;
   Amount: $3,000;
   Grant Periods: 09/15/2015-08/31/2021.

8. Title: A Framework for Multiscale/Multiphysics Mathematical Modeling of Cerebral Aneurysm Rupture;
   Source and Role: National Science Foundation, Sole PI;
   Amount: $235,000;
   Grant Periods: 08/01/2016-07/31/2020.

9. Title: A High-Order Numerical Solver for Peridynamics with Application to Damage Problems;
   Source and Role: Faculty Research Grant, Lehigh University, Sole PI;
   Amount: $5,993;
   Grant Periods: 03/15/2018-03/14/2019.

10. Title: A Nonlocal Model for Bioprosthetic Heart Valves;
    Source and Role: Paul J.Franz, Jr. and Class of '68 Faculty Fellowship, Sole PI;
    Amount: $2,600;
    Grant Periods: 05/20/2018-08/31/2018.

11. Title: A Multiscale Fluid-Thin Structure Modeling Framework for Aircraft Damage;
    Source and Role: Paul J.Franz, Jr. and Class of '68 Faculty Fellowship, Sole PI;
    Amount: $1,950;
    Grant Periods: 05/20/2017-08/31/2017.

12. Title: A Multiphysics Mathematical Framework on Modeling Cerebral Aneurysms;
    Source and Role: Simons Foundation Collaboration Grant, Sole PI;
    Amount: $35,000;
    Grant Periods: 09/01/2015-08/31/2017.

13. Title: High-Performance Fluid-Structure Interaction (FSI) Solver for Modeling Aneurysms;
    Source and Role: Faculty Research Grant, Lehigh University, Sole PI;

Amount: \$6,000;
Grant Periods: 01/01/2015-12/31/2016.

14. Title: Biomechanics of Cerebral Aneurysms and Collapsible Vasculature;
    Source and Role: Biosystems Dynamics Summer Institute (BDSI) program, Co-PI;
    Amount: \$44,375;
    Grant Periods: 05/20/2015-07/31/2015.

Recent (3 Yrs) Conference Presentations

1. Minisymposium on Recent Advances in Numerical PDE Solvers by Deep Learning, AMS Central Sectional Meeting, Milwaukee, WI, April, 2024.
2. Workshop on Nonlocality: Challenges in Modeling and Simulation, Providence, RI, April, 2024.
3. Workshop on Experimental and Computational Fracture Mechanics, Baton Rouge, LA, March, 2024.
4. Workshop on Numerical Analysis of Multiphysics Problems, Providence, RI, February, 2024.
5. Modeling and Optimization Simulation Tools for Additive Manufacturing (MOST-AM) Consortium, Pittsburgh, PA, December, 2023.
6. Neural Information Processing Systems (NeurIPS), New Orleans, LA, December, 2023.
7. Minisymposium on Data-Enabled Predictive Modeling, Scientific Machine Learning, and Uncertainty Quantification in Computational Mechanics, ASME's International Mechanical Engineering Congress and Exposition (IMECE 2023), New Orleans, LA, November, 2023.
8. Minisymposium on Complex Fluids and FSI, Advances in Computational Mechanics (ACM 2023), Austin, TX, October, 2023.
9. Minisymposium on Data-Driven Computational Solid Mechanics, 2023 Society of Engineering Science Annual Technical Meeting (SES 2023), Minneapolis, MN, October, 2023.
10. Minisymposium on Advances Over Numerical Methods and Applications of Fractional and Nonlocal Calculus, 2nd IACM Conference on Mechanistic Machine Learning and Digital Engineering for Computational Science, Engineering & Technology (MMLDE/CSET 2023), El Paso, TX, September, 2023.
11. Minisymposium on Physics Informed Machine Learning for Multiscale Materials and Engineering Systems, 2nd IACM Conference on Mechanistic Machine Learning and Digital Engineering for Computational Science, Engineering & Technology (MMLDE/CSET 2023), El Paso, TX, September, 2023.
12. The Innovations in Fractional Calculus and Applications to Functional and Biological Materials Workshop, Lausanne, Switzerland, September, 2023.
13. Minisymposium on Nonlocal Modeling, Analysis, and Computation, 10th International Congress on Industrial and Applied Mathematics (ICIAM 2023), Tokyo, Japan, August, 2023.
14. Workshop on Mathematical Mechanical Biology: Old School and New School, Methods and Applications, Cambridge, England, August, 2023.
15. Minisymposium on Interface Problems in Nonlocal Modeling: Advances in Local-to-Nonlocal and Nonlocal-to-Nonlocal Coupling Methods, 17th U. S. National Congress on Computational Mechanics (USNCCM17), Albuquerque, NM, July, 2023.
16. CBMS Conference: Deep Learning and Numerical PDEs, Baltimore, MD, June, 2023.
17. Keynote Presentation, Mathematical and Scientific Machine Learning Conference (MSML2023), Providence, RI, June, 2023.
18. Keynote Presentation, Track of Machine Learning and Data Science, the Annual Conference on Experimental and Applied Mechanics (SEM 2023), Orlando, FL, June, 2023.
19. The 18th Annual Conference on Frontiers in Applied and Computational Mathematics (FACM23), Newark, NJ, May, 2023.
20. International Conference on Artificial Intelligence and Statistics, April, 2023.
21. Workshop on USACM Data-Driven Benchmarks Workshop, Los Angeles, CA, April, 2022.
22. Minisymposium on Machine Learning for Large-Scale Scientific Data Analysis and Model Simulations, the SIAM Conference on Computational Science and Engineering (CSE23), March, 2023.
23. Minisymposium on Nonlocal Models in Computational Science and Engineering, the SIAM

Conference on Computational Science and Engineering (CSE23), March, 2023.

24. AMS Special Session on Nonlocal Frameworks in Analysis and Mathematical Modeling, the Joint Mathematics Meetings (JMM 2023), Boston, MA, January, 2023.

25. Keynote Presentation, Minisymposium on New Frontiers in IGA, the 10th International Conference on Isogeometric Analysis (IGA 2022), Banff, Canada, November, 2022.

26. CONCAM Distinguished Lectures on Computational Mechanics, the ASME 2022 International Mechanical Engineering Congress and Exposition (IMECE2022), Columbus, OH, October, 2022.

27. Minisymposium on Peridynamics Modeling, the ASME 2022 International Mechanical Engineering Congress and Exposition (IMECE2022), Columbus, OH, October, 2022.

28. Keynote Presentation, A Celebration of Peridynamics: Honoring the contributions of Dr. Stewart Silling, the 2022 Annual Technical Meeting of the Society of Engineering Science (SES), College Station, TX, October, 2022.

29. 2022 Monie A. Ferst Award Symposium in Honor of Dr. Thomas J.R. Hughes, Atlanta, GA, October, 2022.

30. Minisymposium on Machine Learning Methods for PDEs, the AMS Sectional Meeting, Amherst, MA, October, 2022.

31. Minisymposium on Machine Learning in Heterogeneous Material Modeling and Design, the 2022 SIAM on Conference on Mathematics of Data Science (MDS22), San Diego, CA, September, 2022.

32. Workshop on Uncertainty Quantification for Machine Learning Integrated Physics modeling (MLIP 2022), Arlington, VA, August, 2022.

33. Minisymposium on Model Learning and Optimization for Nonlocal and Fractional Equations, the 15th World Congress on Computational Mechanics & 8th Asian Pacific Congress on Computational Mechanics (WCCM-APCOM 2022), August, 2022.

34. BIRS Theoretical and Applied Aspects for nonlocal Models Workshop, July, 2022.

35. Minisymposium on Recent Advances in Machine Learning for Multiscale System, the 2022 SIAM Annual Meeting (AN22), July, 2022.

36. Keynote Presentation, Minisymposium on Trustworthy Augmented Intelligence and Data-driven Material Modeling, the 19th U.S. National Congress on Theoretical and Applied Mechanics (USNCTAM 2022), Austin, TX, June, 2022.

37. Minisymposium on Contemporary Meshfree Methods in Computational Mechanics, the 19th U.S. National Congress on Theoretical and Applied Mechanics (USNCTAM 2022), Austin, TX, June, 2022.

38. Minisymposium on Meshfree, Peridynamics, and Particle Methods: Contemporary Methods and Applications, The Engineering Mechanics Institute Conference (EMI 2022), Baltimore, MD, May, 2022.

39. Minisymposium on Operator Learning for Uncertainty Quantification, the SIAM Conference on Uncertainty Quantification (UQ22), April, 2022.

40. AMS Special Session on Recent Developments in Nonlocal Modeling and Analysis, the Joint Mathematics Meetings, April, 2022.

41. Workshop on Reduced order models; Approximation theory; Machine learning; Surrogates, Emulators and Simulators. (RAMSES), December, 2021.

42. Minisymposium on Recent Advances and Applications in Meshfree and Particle Methods, The International Mechanical Engineering Congress and Exposition (IMECE 2021), November, 2021.

43. Minisymposium on Identifying constitutive behavior and dynamics via physics-informed machine learning, the conference on Mechanistic Machine Learning and Digital Twins for Computational Science, Engineering & Technology (MMLDT 2021), September, 2021.

44. Minisymposium on Local-to-Nonlocal and Nonlocal-to-Nonlocal Coupling Methods: Advances in Coupling Techniques and Treatment of Interfaces in Nonlocal Mechanics and Diffusion, the 16th US National Congress on Computational Mechanics (USNCCM 2021), July, 2021.

45. International Conference on Machine Learning, July, 2021.

46. Minisymposium on Physics-aware machine learning for solving and discovering PDEs, the

SIAM Annual Meeting (AN21), July, 2021.

47. Minisymposium on Nonlocality in data-driven and physics-based materials modeling , the SIAM Conference on Mathematical Aspects of Materials Science (MS21), May, 2021.

48. Minisymposium on Meshfree, Peridynamic, and Particle Methods: Contemporary Methods and Applications, the Engineering Mechanics Institute Conference/Probabilistic Mechanics and Reliability 2021 Conference (EMI/PMC 2021), May, 2021.

Recent (3 Yrs) Invited Seminar Talks

1. Invited lecture in the Mechanical Engineering and Materials Science Graduate Seminar, University of Pittsburgh, Pittsburgh, PA, April 2024.

2. Invited lecture in Department of Mathematics Colloquium, Louisiana State University, Baton Rouge, LA, March 2024.

3. Invited lecture in the Radiology Magnetic Resonance Imaging Research Institute, Cornell University, New York, NY, March 2024.

4. Invited lecture in the Civil and Environmental Engineering Graduate Colloquium, Duke University, Durham, NC, March 2024.

5. Invited lecture in the Translational AI Center (TrAC) Seminar, Iowa State University, Ames, IA, March 2024.

6. Invited lecture in the Department of Applied Mathematics and Statistics Seminar, Johns Hopkins University, New York, NY, March 2024.

7. Invited lecture in the Mathematics in Computation seminar, Oak Ridge National Laboratory, Oak Ridge, TN, March 2024.

8. Invited lecture in the Continuum Mechanics Seminar, University of Nebraska–Lincoln, Lincoln, NE, February 2024.

9. Invited lecture in the Applied Math Colloquium, Northwestern University, Evanston, IL, February 2024.

10. Invited lecture in the Oden Institute, University of Texas, Austin, TX, October 2023.

11. Invited lecture in the Department of Mathematics, Pennsylvania State University, State College, PA, May 2023.

12. Invited lecture in the Analysis and PDE Seminar, Department of Mathematics, Worcester Polytechnic Institute (WPI), Worcester, MA, April 2023.

13. Invited lecture in the Mathematics in Computation Seminar, Oak Ridge National Laboratory, Oak Ridge, TN, April 2023.

14. Invited lecture in the MFM & S Community Webinar, Schlumberger Ltd, online, April 2023.

15. Invited lecture in the Department of Mathematical Sciences, Rensselaer Polytechnic Institute (RPI), Troy, NY, March 2023.

16. Invited lecture in the AI Lecture Series, Center for Computation & Technology, Louisiana State University, Baton Rouge, LA, February 2023.

17. Invited lecture in the Applied Analysis Seminar, Department of Mathematics, Louisiana State University, Baton Rouge, LA, February 2023.

18. Invited lecture in the Department of Chemical and Biomolecular Engineering, University of Pennsylvania, Philadelphia, PA, February 2023.

19. Invited lecture in the Department of Mathematics, Purdue University, West Lafayette, IN, January 2023.

20. Invited lecture in the CAM Colloquium of the Department of Mathematics, Southern University of Science and Technology, online, December 2022.

21. Invited lecture in the Numerical Analysis (NA) and PDE seminar, Department of Mathematics, University of Delaware, Newark, DE, November 2022.

22. Invited lecture in the Applied Math Colloquium of the Department of Mathematical Sciences, New Jersey Institute of Technology, Newark, NJ, October 2022.

23. Invited lecture in the Biomedical Informatics Grand Rounds, Stony Brook University, Stony Brook, NY, October 2022.

24. Invited lecture in the Computational Mathematics seminar of Math Department, Ohio State University, Columbus, OH, October 2022.

25. Invited lecture in the mathematics in imaging, data and optimization seminar of Math Department, Rensselaer Polytechnic Institute, Albany, NY, September 2022.

26. Invited lecture in the CRUNCH seminar, Brown University, Providence, RI, May 2022.

27. Invited lecture in the Mathematical Data Science seminar, Purdue University, West Lafayette, IN, February 2022.

28. Invited lecture in the Morgan Mathematics Colloquium, Mathematics Department, Morgan State University, Baltimore, MD, February 2022.

29. Invited lecture in the graphical models and causality seminar, Booth School of Business, the University of Chicago, Chicago, IL, August 2021.

30. Invited lecture in the CRUNCH seminar, Brown University, Providence, RI, July 2021.

Organized Sessions

1. High-Performance Computing Workshop, Lehigh University, Bethlehem, PA, 2017-present.

2. Seminar in Applied Mathematics, Lehigh University, Bethlehem, PA, 2023-present.

3. Minisymposium on Immersed Discretizations, Advances in Computational Mechanics (ACM 2023), Austin, TX, October, 2023.

4. Minisymposium on Recent Advances in Scientific Computing and Data Science, First Annual Meeting of Society for Industrial and Applied Mathematics NYNJPA Section (SIAM-NNP 2023), Newark, NJ, October, 2023.

5. Minisymposium on Numerical Techniques for Coarse-Graining, Model Reducing and Simulation of Complex Physical Systems, 10th International Congress on Industrial and Applied Mathematics (ICIAM 2023), August, 2023.

6. Minisymposium on Recent Developments in Operator Networks, 17th U. S. National Congress on Computational Mechanics (USNCCM17), July, 2023.

7. CBMS Conference: Deep Learning and Numerical PDEs, Baltimore, MD, June, 2023.

8. Minisymposium on Nonlocal Models in Computational Science and Engineering, the SIAM Conference on Computational Science and Engineering (CSE23), March, 2023.

9. Minisymposium on Machine Learning in Heterogeneous Material Modeling and Design, the 2022 SIAM on Conference on Mathematics of Data Science (MDS22), September, 2022.

10. Minisymposium on Model Learning and Optimization for Nonlocal and Fractional Equations, the 15th World Congress on Computational Mechanics & 8th Asian Pacific Congress on Computational Mechanics (WCCM-APCOM 2022), August, 2022.

11. Minisymposium on Uncertainty in Material Modeling and Design, the SIAM Conference on Uncertainty Quantification (UQ22), April, 2022.

12. Code Event of the One Nonlocal World project, December 2021.

13. Minisymposium on Identifying constitutive behavior and dynamics via physics-informed machine learning, the conference on Mechanistic Machine Learning and Digital Twins for Computational Science, Engineering & Technology (MMLDT 2021), September, 2021.

14. Minisymposium on Computational Fluid-Structure Interaction: Methods and Applications, the 16th U.S. National Congress on Computational Mechanics (USNCCM 2021), Chicago, IL, July 2021.

15. Minisymposium on Multiscale methods and Data-driven Models, the 16th U.S. National Congress on Computational Mechanics (USNCCM 2021), Chicago, IL, July 2021.

16. Minisymposium on Nonlocality in data-driven and physics-based materials modeling, The SIAM Conference on the Mathematical Aspects of Materials Science (MS20), May 2021

17. Virtual Workshop on Computational Fluid-Structure Interaction: Frontiers in Methods and Applications, April 2021.

18. Minisymposium on Nonlocal Models in Computational Science and Engineering, the SIAM Conference on Computational Science and Engineering (CSE21), March 2021.

19. Opening Event of the One Nonlocal World project, January 2021.

20. Minisymposium on Computational Fluid Dynamics (CFD) and Fluid-structure Interaction (FSI): Algorithms and Applications, the Asian Pacific Congress on Computational Mechanics (APCOM 2019), Taipei, Taiwan, December 2019.

21. Minisymposium on Multiphysics and Multiscale Problems in Computational Science and En-

gineering, SIAM Conference on Computational Science and Engineering (CSE19), Spokane, WA, February 2019

22. Minisymposium on Trim, Immersed, Cut-cell and Finite Cell Methods, the USACM Thematic Conference on Isogeometric Analysis (IGA 2018), Austin, TX, October 2018.

23. Minisymposium on Computational Biomechanics: From Cell, Tissue, to Organ-Level Modeling, the 2018 Engineering Mechanics Institute Conference (EMI 2018), Boston, MA, May 2018.

24. Minisymposium on Computational Biomechanics for Biological Tissues & Human Body Systems, the 2017 Engineering Mechanics Institute conference (EMI 2017), San Diego, CA, June, 2017.

25. Minisymposium on Multiphysics and Multiscale Problems, SIAM conference on Computational Science and Engineering (CSE 2017), Atlanta, GA, February 2017.

26. Mathematics Department Colloquium, Lehigh University, Bethlehem, PA, January 2016-December 2016.

27. Minisymposium on High-Order and Isogeometric Methods for Multiphysics and Multiscale Problems, International Conference on Spectral and High Order Methods(ICOSAHOM 2016), Rio de Janeiro, Brazil, June 2016.

Teaching and Advising Experiences	**Instructor, Lehigh University**	
	MATH 450: Topics in Numerical Analysis	since Fall 2017
	Graduate level	
	MATH 450: Numerical Methods for PDEs	since Fall 2018
	Graduate level	
	MATH 341: Mathematical Models and Their Formulation	since Spring 2015
	Undergraduate and graduate level	
	MATH 230: Numerical Methods	since Fall 2017
	Undergraduate level	
	MATH 205: Linear Methods	since Fall 2014
	Undergraduate level, Service course.	
	MATH 023: Calculus III	since Fall 2019
	Undergraduate level, Service course.	
	Students Mentored, Lehigh University	
	Neeraj Tatikola, master student of Applied Mathematics	05/2022-present
	Jiuzhou Chen, Ph.D. student of Mathematics	08/2022-present
	Lu Zhang, Ph.D. student of Mathematics	09/2019-present
	Yiming Fan, Ph.D. student of Mathematics	09/2019-present
	Huaiqian You, Ph.D. student of Mathematics	09/2016-12/2022
	Quinn Zhang, undergraduate student of statistics	05/2021-05/2022
	Anna Thomas, undergraduate student of summer research	06/2018-07/2018
	Katherine Wu, undergraduate student of summer research	06/2017-08/2017
	Josiah Mount, master student of Applied Mathematics	05/2015-07/2015
	Mengran He, undergraduate student of summer research	05/2015-07/2015
	Cianael Paasewe, undergraduate student of summer research	05/2015-07/2015
	Yang Chen, Ph.D. student of Mechanical Engineering	11/2014-08/2018
	Haolin Ma, Ph.D. student of Mechanical Engineering	12/2015-07/2017
	Postdoc Advised, Lehigh University	
	Siavash Jafarzadeh, C.-C. Hsiung Visiting Assistant Professor	08/2022-present
	Shang-Huan Chiu, C.-C. Hsiung Visiting Assistant Professor	08/2022-preset
	Cory Wright, C.-C. Hsiung Visiting Assistant Professor	09/2018-08/2021
Professional Associations	International Association for Computational Mechanics (IACM)	
	United States Association for Computational Mechanics (USACM)	

Association for Women in Mathematics (AWM)
Society for Industrial and Applied Mathematics (SIAM)
American Physical Society (APS)
American Mathematical Society (AMS)