Michael C. Hillman, Ph.D.

Principal Scientist, Karagozian and Case Inc.

Tel: 408-888-2584 Email: hillman@kcse.com Web: mcharleshillman.com

Education

2013 **Ph.D.**, Civil Engineering, University of California, Los Angeles
Topic: An Arbitrary Order Variationally Consistent Integration Method for Galerkin Meshfree Methods
Advisor: J. S. Chen
Focus: Computational Mechanics

2009 **M.S.**, Civil Engineering, University of California, Los Angeles
Focus: Structural and geotechnical earthquake engineering

2008 **B.S.**, Civil Engineering, California State University, Fullerton

Appointments

2022–present **Principal Scientist I**, Karagozian and Case, Inc.

2022 **Associate Professor (with tenure)**, The Pennsylvania State University
Department of Civil and Environmental Engineering

2016–2022 **Kimball Assistant Professor**, The Pennsylvania State University
Department of Civil and Environmental Engineering

2014–2016 **Postdoctoral Scholar, Instructor**, University of California, San Diego
Department of Structural Engineering (Advisor: J. S. Chen)

2013 **Postdoctoral Scholar, Instructor**, University of California, Los Angeles
Department of Civil and Environmental Engineering (Advisor: J. S. Chen)

2009–2013 **Graduate Student Researcher**, University of California, Los Angeles
Department of Civil and Environmental Engineering

Research Interests

Development of Advanced Computational Methods

- Meshfree formulations for predictive simulation of problems challenging for conventional methods (e.g. commercial software): impact, fragmentation, blast, and geomechanics
- Variationally consistent domain integration for arbitrary-order accuracy and convergence
- Accelerated stabilized nodal integration for linear, large deformation, and coupled problems
- Physics-based shock enrichment in meshfree methods
- Stabilized meshfree methods for convection-dominated problems
- Unified and high-order local and non-local meshfree methods

Application of Computational Mechanics to Material Failure and Extreme Deformations

- Stabilized meshfree methods for numerical investigation and validated simulations of
  - Tillage and earth-moving operations
  - Shear band formation in landslides
  - Three-dimensional deposition printing (concrete, thermoplastics)
  - Image-based micro-structural failure and toughening mechanisms of high-strength concrete
  - Shock propagation in reinforced concrete members subjected to blast and bullet penetration (see below)
- Numerical investigation of damage processes and failure mechanisms of concrete walls and steel panels subject to blast and bullet penetration using advanced Galerkin meshfree methods
  - Varying wall thickness and penetration impact velocities, standoff blast distance
  - Validation with entrance and exit hole size, crater size, velocity reduction
  - Agreement with shear-cone formation, radial, lateral, and circumferential cracking patterns

Select Honors and Awards

1. CAREER Award, The National Science Foundation, 2020
2. L. Robert and Mary L. Kimball Early Career Development Endowed Professorship, The Pennsylvania State University, 2016, 2019

Technology Adapted in the Field

2019 **Naturally Stabilized Nodal Integration**
Case New Holland Industrial LLC
Research adapted in the MEGA code for providing stable and efficient advanced simulations of geotechnical problems

2019 **Conforming Naturally Stabilized Nodal Integration**
Karagozian & Case, Inc.
Research adapted in the FEMFRE code for providing accurate, stable and efficient advanced simulations of impact problems

2017 **Naturally Stabilized Nodal Integration**
Livermore Software Technology Corp.
Research adapted in the LS-DYNA code for providing stable and efficient advanced extreme event simulations

2015 **Variationally Consistent Naturally Stabilized Nodal Integration**
Sandia National Laboratories
Research adapted in the SIERRA/SolidMechanics code for providing stabilized and efficient advanced high-order accurate extreme event simulations

2015 **Variationally Consistent Naturally Stabilized Nodal Integration**
U.S. Army Engineer Research and Development Center
Research adapted in the NMAP code for providing stabilized and efficient high-order accurate advanced simulations of bullet penetration/perforation, blast, explosive welding, and geotechnical problems

Select Project Experience

Research, Development, and Implementation of Novel Meshfree Methods for Explicit Dynamics (NLFLEX, NMAP, SIERRA/SolidMechanics, MEGA/MECA, KC-FEMFRE)

- Specialized in numerical algorithms to improve the accuracy (e.g. by 10x-1000x), stability, efficiency (e.g. 10x-20x speedup), and robustness of large-scale parallel explicit dynamic codes
- Developing novel methods to simulate engineering applications such as natural and man-made disasters (e.g. landslides, impact/penetration, blast), three dimensional printing (fused deposition modeling, printing concrete), geotechnical problems (e.g. bulldozing, tillage), and damage evolution of complex composite microstructures based on CT-scans.
- Implementing and overseeing verification and validation.
- Researching and implementing damage-plasticity material models with streamlined numerical testing and calibration, including soft materials, geomaterials, and composites.

2022–present **The K&C Finite Element and MeshFree (KC-FEMFRE) analysis code**
Role: Research scientist, developer
Funding Source: external sponsors, K&C
Summary: FEMFRE is an explicit meshfree nonlinear solver for extreme deformations. Since joining K&C, Hillman has been spearheading the development of this software for the planned v1.0 release in 2024. The code extends engineers' capability to solve problems difficult or impossible to solve via the finite element analysis, including blast, penetration, bio-mechanics, etc.

- Oversaw implementation, verification, and validation of semi-Lagrangian RKPM, enabling extreme-deformation analysis not previously possible; a key code enhancement for the success of several externally funded projects. Also implemented numerous necessary supporting features.
- Implemented various elastic and elastic-plastic-damage material models such as hyperelasticity, anisotropic damage-plasticity, and Drucker-Prager plasticity
- Oversaw and implemented regression testing suite for quality control
- Wrote python scripts to automate (process data, plot data, output tables) post-processing of results to compare FEMFRE output to analytical, experimental or other reference solutions, to assure QA/QC
- Spearheading new coupled fluid-structure interaction code including theory, implementation guidance, and running regular meetings

Publications

[†]Supervised student author
[‡]Supervised postdoctoral author

Books

1. Belystchko, T., Chen, J.S., Hillman, M. Meshfree and Particle Methods, Wiley: Hoboken, NJ, 2024. Amazon link.

Journal Publications

[†]Supervised student author at Penn State
[‡]Supervised postdoctoral author at Penn State

1. Cheng, H.[†], Radlinska, A., Hillman, M., Li, F.[†] , Wang, J.[‡] Modeling Concrete Deposition Via 3D Printing Concrete Using Reproducing Kernel Particle Method. Cement and Concrete Research, under review.
2. Wang, J.[‡], Hillman, M., Wilmes, D., Magallanes, J., Bazilevs, Y. Smoothed naturally stabilized RKPM for non-linear explicit dynamics with novel stress gradient update. Computational Mechanics, under review.
3. Wang, J.[‡], Hillman, M. Upwind reproducing kernel collocation method for convection-dominated problems. Computer Methods in Applied Mechanics and Engineering, Vol 420 p. 116711, 2024. Download.
4. Wang, Y., Baek, J., Tang., Y · Du, J., Hillman, M., Chen, J.S. Support vector machine guided reproducing kernel particle method for image-based modeling of microstructures. Computer Methods in Applied Mechanics and Engineering. https://doi.org/10.1007/s00466-023-02394-9, 2023. Download.
5. Li, W., Moutsanidis, G., Behzadinasab, M., Hillman, M., Bazilevs, Y. Reduced quadrature for

Finite Element and Isogeometric methods in nonlinear solids. Computer Methods in Applied Mechanics and Engineering, Vol 399, p. 115389, 2022. Download.
6. Wang, J.‡, Hillman, M., Temporal stability of collocation, Petrov-Galerkin, and other Non-symmetric methods in elastodynamics and an energy conserving time integration. Computer Methods in Applied Mechanics and Engineering, Vol 393, p. 114738, 2021. Download.
7. Williams, B., Madra, A.‡ Heard, W., Graham, S., Grotke, M., Hillman, M., & Nie, X. Characterizing damage modes and size effects in high-strength concrete under hydrostatic and triaxial stress states using X-ray microtomography. Construction and Building Materials, Vol. 311, p. 125338, 2021. Download.
8. Behzadinasab, M., Hillman, M. Bazilevs, Y. IGA-PD penalty-based coupling for immersed air-blast fluid-structure interaction: a simple and effective solution for fracture and fragmentation. Journal of Mechanics, Vol. 27, pp. 680-692, 2021. Download.
9. Wang, J.†, Zhou, G.‡, Hillman, M., Madra, A.‡, Bazilevs, Y., Du, J., Su, K. Consistent immersed volumetric Nitsche methods for composite analysis, *Computer Methods in Applied Mechanics and Engineering*, Vol 385, p.114042, 2021. Download.
10. Hillman, M., Lin, K. C.†, Nodally integrated thermomechanical RKPM: Part II — Generalized thermoelasticity and hyperbolic finite-strain thermoplasticity, *Computational Mechanics*, Vol. 68, pp. 821-844, 2021. Download.
11. Hillman, M., Lin, K. C.†, Nodally integrated thermomechanical RKPM: Part I — Thermoelasticity, *Computational Mechanics*, Vol 68, pp. 795-820, 2021. Download.
12. Tang, Y., Su, K., Man, R., Hillman, M., Du, J., Investigation of internal cracks in epoxy-alumina using in situ mechanical testing coupled with micro-CT, *JOM*, Vol. 73, pp. 2452–2459, 2021 Download.
13. Baek, J., Chen, J. S., Zhou, G.‡, Arnett, K. P., Hillman, M., Hegemier, G., Hardesty, S., A semi-Lagrangian RKPM with node-based shock algorithm for explosive welding simulation, *Computational Mechanics*, Vol. 67, pp. 1601–1627, 2021. Download.
14. Hillman, M., Lin, K. C.†, Consistent weak forms for meshfree methods: Full realization of h-refinement, p-refinement, and a-refinement in strong-type essential boundary condition enforcement, *Computer Methods in Applied Mechanics and Engineering*, Vol. 373, p. 113448, 2021. Download.
15. Hillman, M., Pasetto, M., Zhou, G.‡, Generalized reproducing kernel peridynamics: Unification of local and non-local meshfree methods, non-local derivative operations, and an arbitrary-order state-based peridynamic formulation, *Computational Particle Mechanics*, Vol. 7, pp. 435–469, 2020. Download.
16. Zhou, G.‡, Hillman, M., A Non-ordinary state-based Godunov peridynamics formulation for strong shocks in solids, *Computational Particle Mechanics*, Vol. 7, pp. 365–375, 2020. Download.
17. Chen, J. S., Huang, T. H., Wei, H., Hillman, M., RKPM2D: An open-source implementation of nodally integrated reproducing kernel particle method for solving partial differential equations, *Computational Particle Mechanics*, Vol. 7, pp. 393–433, 2020. Download.
18. Khaghani, M., Rajabipour, F., Gholizadeh-Vayghan, A., Hillman, M., Characterization of viscoelastic behavior of synthetic alkali–silica reaction gels, *Cement and Concrete Composites*, Vol. 104, p. 103359, 2019. Download.
19. Liang, S., Chen, J. S., Li, J., Lin, S. P., Chi, S. W., Hillman, M., Roth, M. J., Heard, W., Numerical investigation of statistical variation of concrete damage between scales, *International Journal of Fracture*, Vol 208(1), pp. 97–113, 2017. Download.
20. Bazilevs, Y., Moutsanidis, G., Bueno, J., Kamran, K., Kamensky, D., Hillman, M., Gomez, H., Chen, J.S., A new formulation for air-blast fluid structure interaction using an immersed approach. Part II — Coupling of IGA and meshfree discretizations, *Computational Mechanics*, Vol. 60, pp.

101–116, 2017. Download.

21. Chen, J. S., Hillman, M., Chi, S. W., Meshfree methods: progress made after 20 years, *Journal of Engineering Mechanics*, Vol. 143(4), p. 04017001, 2017. Download.
22. Hillman, M., Chen, J. S., An accelerated, convergent and stable nodal integration in Galerkin meshfree methods for linear and nonlinear mechanics, *International Journal for Numerical Methods in Engineering*, Vol. 107, pp. 603–630, 2016. Download.
23. Hillman, M., Chen, J. S., Nodally integrated implicit gradient reproducing kernel particle method for convection dominated problems, *Computer Methods in Applied Mechanics and Engineering*, Vol. 299, pp. 381–400, 2016. Download.
24. Haoyan W., Chen, J. S., Hillman, M., A stabilized nodally integrated meshfree formulation for fully coupled hydro-mechanical analysis of fluid-saturated porous media, *Computers and Fluids*, Vol. 141, pp. 105–115, 2016. Download.
25. Sherburn, J., Roth, M. J., Chen, J. S., Hillman, M., Meshfree modeling of concrete slab perforation using a reproducing kernel particle impact and penetration formulation, *International Journal of Impact Engineering*, Vol. 86, pp. 96–110, 2015. Download.
26. Hillman, M., Chen, J. S., Bazilevs, Y., Variationally consistent domain integration for isogeometric analysis, *Computer Methods in Applied Mechanics and Engineering*, Vol. 284, pp. 521–540, 2015. Download.
27. Hillman, M., Chen, J. S., Stabilized and variationally consistent nodal integration for meshfree modeling of impact problems, *Computational Particle Mechanics*, Vol. 1, pp. 245–256, 2014. Download.
28. Chen, J. S., Hillman, M., Rüter, M., An arbitrary order variationally consistent method for Galerkin meshfree methods, *International Journal for Numerical Methods in Engineering*, Vol. 95, pp. 387–418, 2013. Download.

Book Chapters

1. Hillman, M., Chen, J. S., Performance comparison of nodally Integrated Galerkin meshfree methods and nodally collocated strong form meshfree methods, In: Advances in Computational Plasticity Vol. 46, Eugenio Oñate, Djordje Peric, Eduardo de Souza Neto, and Michele Chiumenti (Eds.), pp. 145–164, Cham: Springer, 2018. Download.
2. Hillman, M., Chen, J. S., An implicit gradient meshfree formulation for convection-dominated problems, In: Advances in Computational Fluid-Structure Interaction and Flow Simulation, Yuri Bazilevs and Kenji Takizawa (Eds.), pp. 25–37, Cham: Springer, 2016. Download.
3. Rüter, M., Hillman, M., Chen, J. S., Corrected stabilized non-conforming nodal integration in meshfree methods, In: Lecture Notes in Computational Science and Engineering VI, Michael Griebel and Marc Alexander Schweitzer (Eds.), pp. 75–93, Cham: Springer, 2013. Download.

Encyclopedia Entries

1. Chen, J. S., Liu, W. K., Hillman, M., Chi, S. W., Lian, Y., Bessa, M. A., Reproducing kernel particle method for solving partial differential equations, In: Encyclopedia of Computational Mechanics Second Edition, Erwin Stein, Renè de Borst and Tom Hughes (Eds.), Volume 2, Chapter 17, London: Wiley, 2018. Download.

Articles

1. Chen, J. S., Chi, S. W., Hillman, M., Preface: Meshfree and particle methods for modeling extreme loadings, in memory of Steve Attaway, *Computational Particle Mechanics*, Vol. 7, pp. 173–176, 2020. Download.
2. Hillman, M., Chen, J. S., Roth, M. J., Advanced computational methods to understand & mitigate extreme events, *IACM Expressions*, Vol. 39, pp. 12–16, 2016. Download.
3. Chen, J. S., Hillman, M., Rüter, M., Hu, H. Y., Chi, S. W., The role of quadrature in meshfree

Methods: Variational consistency in Galerkin weak form and collocation in strong form, *IACM Expressions*, Vol. 34. pp. 11–17, 2014. Download.

Conference Papers

1. Chen, J. S., Baek, J., Huang, T. H., Hillman, M., Accelerated and stabilized meshfree method for impact-blast modeling, proceedings, 2020 ASCE Structures Congress, St. Louis, Missouri, April 5–8, 2020. Download.
2. Hillman, M., Lin, K. C.†, Madra, A.‡, The meshfree explicit Galerkin analysis (MEGA) code, proceedings, 14ème Colloque National en Calcul des Structures, Presqu'île de Giens, May 13–17, 2019. Download.
3. Madra, A.‡, Su., K., Du, J., Hillman, M., Multi-scale reduced-order model of composite microstructure based on X-ray micro-CT imaging, proceedings, 14ème Colloque National en Calcul des Structures, Presqu'île de Giens, May 13–17, 2019. Download.
4. Littlewood, D., Hillman, M., Yreux, E., Bishop, J., Chen, J.S., Implementation and verification of RKPM in the Sierra/SolidMechanics analysis code, proceedings, ASME 2015 International Mechanical Engineering Congress & Exposition, Houston, Texas, November 13–19, 2015. Download.

Graduated Supervised Students

Ph.D. Dissertation Advisor

2018–2021	Wang, J., Ph.D.	"Stabilized meshfree methods for material failure and composite analysis"
2017–2021	Yang, S., Ph.D.	"Reproducing kernel finite volume methods for dynamic brittle fracture"
2016–2020	Lin, K. C., Ph.D.	"A nodally integrated thermo-mechanical meshfree formulation with application to fused deposition modeling"
2017–2017	Chen, G., M.S. (co-advised)	"A numerical framework of viscoelastic modeling for 3D printable concrete simulation"

Supervised Students and Postdoctoral Scholars

Ph.D. Dissertation Advisor

2020–2022	Wang, Y.	"A cohesive reproducing kernel particle method for brittle fracture"
2020–2022	Groeneveld, A.	"An immersed variational multiscale reproducing kernel particle method with application to fiber reinforcement in ultra-high performance concrete"
2020–2022	Liu, F.	"Hybrid reproducing kernel peridynamic method for extreme event simulation"

Ph.D. Dissertation Co-advisor

2021–2022	Cheng, H.	"An experimental-computational approach for the analysis of 3D printing of concrete structures"

Postdoctoral Advisor

2020–2022	Wang, J.	"Immersed thermo-mechanical fluid-structure interaction for impact and penetration"
2020–2022	Jafarzadeh, S.	"Fast convolution-based Galerkin meshfree methods for extreme event simulation"
2018–2020	Madra, A.	"Damage characterization and data-driven meshfree modeling of composite structures"
2017–2018	Zhou, G.	"Immersed meshfree methods for composite solid analysis and fluid-structure interaction"

Undergraduate Research Advisor

2019–2020	Wang, Y.	"Linear system solver selection in meshfree methods"
2019–2020	Cai, V.	"Parametric studies in meshfree simulations of large deformation problems"

Supervised Student and Postdoctoral Scholar Awards

Students

1. Yang, S., Harry G. Miller Fellowship In Engineering, The Pennsylvania State University, 2020
2. Yang, S., USACM Thematic Conference on Meshfree and Particle Methods Travel Award, US Association for Computational Mechanics, 2018
3. Lin, K. C., USACM Thematic Conference on Meshfree and Particle Methods Travel Award, US Association for Computational Mechanics, 2018
4. Yang, S., IMECE2018 Travel Award, American Society of Mechanical Engineers, 2018
5. Yang, S., WCCM13 Travel Award, International Association for Computational Mechanics, 2018

Postdoctoral Scholars

1. Madra, M., Second Place, Computation/Modeling, Materials Visualization Competition, The Pennsylvania State University, 2018

Teaching Experience

[§]New course developed

Graduate: Meshfree Methods for Linear and Nonlinear Solid Mechanics[§], The Finite Element Method (linear static and dynamic analysis using solid elements)
Undergraduate: Introduction to Computing for Civil Engineers, Algorithms and Programming for Structural Engineering, Structural Analysis, Design of Reinforced Concrete Structures

Presentations

- Author/co-author of over 100 talks at national and international conferences
- Eight invited talks, including two keynotes
- Two short courses on meshfree methods for advanced numerical simulations

Research Grants

Hillman has been Principle Investigator on nine externally funded research projects at Penn State with awards totalling $1.8M.

2021–2023 **STTR phase II: Enhancing thermo-mechanically coupled computational models for high-temperature impact and fracture** (PI: M. Hillman)
Funding Source: Karagozian and Case, Inc.; Prime: Missile Defense Agency
Total awarded: $358,228 (100% to Hillman)

2021–2022 **Numerical modeling of 3D printable concrete** (PI: A. Radlinska, co-PI: M. Hillman)
Funding Source: Penn State
Total awarded: $60,000 (50% to Hillman)

2020–2021 **Enhanced reproducing kernel particle method for strong shock hydrodynamics** (PI: M. Hillman)
Funding Source: Karagozian and Case, Inc.
Total awarded: $23,090 (100% to Hillman)

2020–2025 **CAREER: A hybrid local-nonlocal peridynamics framework to model failure across deformations and strain rates** (PI: M. Hillman)
Funding Source: The National Science Foundation
Total awarded: $580,845 (100% to Hillman)

2019–2020 **STTR phase I: High temperature fracture mechanics** (PI: M. Hillman)
Funding Source: Karagozian and Case, Inc.; Prime: Missile Defense Agency
Total awarded: $30,000 (100% to Hillman)

2019–2021 **Prototype of an enhanced and validated discrete-continuum particle method for microstructural failure simulation in high-performance concrete** (PI: M. Hillman)
Funding Source: Integrated Solutions for Systems, Inc.; Prime: U.S. Army Engineer Research and Development Center
Total awarded: $300,000 (100% to Hillman)

2019–2020 **Enhanced reproducing kernel particle method: Variationally consistent naturally stabilized nodal integration** (PI: M. Hillman)
Funding Source: Karagozian and Case, Inc.
Total awarded: $72,698 (100% to Hillman)

2018–2021 **An integrated computational-experimental approach to three-dimensional fracture in polymer-ceramic composites** (PI: M. Hillman, Co-PI: J. Du)
Funding Source: The National Science Foundation
Total awarded: $545,418 (47% to Hillman)

2019 **Benchmarking the reproducing kernel particle method for geotechnical operations** (PI: M. Hillman)
Funding Source: Case New Holland Industrial America LLC
Total awarded: $59,995 (100% to Hillman)

2019 **Evaluation of concrete materials performance in aging structures** (PI: A. Siad, Co-PI: M. Hillman)
Funding Source: The Johns Hopkins University Applied Physics Laboratory LLC
Total awarded: $34,900 (35% to Hillman)

2018–2019 **A discrete continuum particle method for understanding microstructural failure of concrete** (PI: M. Hillman)
Funding Source: Integrated Solutions for Systems, Inc.; Prime: U.S. Army Engineer Research and Development Center
Total awarded: $103,995 (100% to Hillman)

2018–2019 **Development and experimental validation of variational collocation meshfree simulation of fracture of nanoparticle toughened composite materials** (PI: M. Hillman, co-PI: C. Bakis)
Funding Source: Penn State
Total awarded: $60,000 (96% to Hillman)

Service to the Computational Mechanics Community

Professional Committees

1. Elected Chair, Engineering Mechanics Institute Computational Mechanics Technical Committee (2021–2023)
2. Elected Member, US Association for Computational Mechanics Technical Thrust Area on Novel Methods in Computational Engineering & Sciences (2019–present)
3. Elected Member, Engineering Mechanics Institute Computational Mechanics Technical Committee (2016–present)

Editorial Service

1. Guest Editor, Engineering with Computers, Advances in Meshfree and Particle Methods (2024)
2. Guest Editor, Computational Particle Mechanics, Thematic Issue, Meshfree and Particle Methods for Modeling Extreme Loadings (2019)

Organizing Minisymposia

1. Session Organizer, "Meshfree, Peridynamic, and Particle Methods: Contemporary Methods and Applications," 2024 Engineering Mechanics Institute Conference, Chicago, Illinois, May 28–31, 2024
2. Session Organizer, "Advances and applications in meshfree, particle, and peridynamic methods," 16th World Congress in Computational Mechanics, Vancouver, Canada, July 21–26, 2024
3. Invited Session Organizer, "Meshfree, Particle, and Peridynamic Methods," 17th International Conference on Computational Plasticity, Barcelona, Spain, September 5–7, 2023
4. Session Organizer, "Meshfree, Peridynamic, and Particle Methods: Contemporary Methods and Applications," 16th US National Congress of Computational Mechanics. Albuquerque, New Mexico, July 23–37, 2023
5. Session Organizer, "Meshfree, Peridynamic, and Particle Methods: Contemporary Methods and Applications," 2023 Engineering Mechanics Institute Conference, Atlanta, Georgia, June 6–9, 2023
6. Invited Session Organizer, "Extreme Events," Meshfree and Novel Finite Elements with Applications, Berkeley, California, September 25–27, 2022
7. Session Organizer, "Simulation-based Disaster Prediction and Mitigation," 15th World Congress in Computational Mechanics, Yokohama, Japan, July 31–August 5, 2022
8. Session Organizer, "Advances and Applications of Meshfree and Particle Methods," 15th World Congress in Computational Mechanics, Yokohama, Japan, July 31–August 5, 2022
9. Session Organizer, "Advances and Applications of Meshfree and Particle Methods," 19th U.S. National Congress on Theoretical and Applied Mechanics. Austin, Texas, June 19–24, 2022
10. Session Organizer, "Peridynamics, and Particle Methods: Contemporary Methods and Applications," 2022 Engineering Mechanics Institute Conference, Baltimore, Maryland, June 1–July 3,

2022

11. Invited Topic Organizer, "Recent Advances and Applications in Meshfree and Particle Methods," 2021 International Mechanical Engineering Congress and Exposition, Virtual, November 1–5, 2021
12. Invited Session Organizer, "Meshfree, Peridynamics, and Particle Methods: Contemporary Methods and Applications," 16th International Conference on Computational Plasticity, Barcelona, Spain, September 7–10, 2021
13. Session Organizer, "Recent Advances and Applications in Meshfree and Particle Methods," 16th US National Congress of Computational Mechanics, Virtual, July 25–29, 2021
14. Session Organizer, "Meshfree, Peridynamic, and Particle Methods: Contemporary Methods and Applications," 2021 Engineering Mechanics Institute Conference, Virtual, May 25–28, 2021
15. Session Organizer, "Advances and Application of Meshfree and Particle Methods," 14th World Congress in Computational Mechanics, Virtual, January 11–15, 2021
16. Session Organizer, "Computational Modeling of Natural and Manmade Disasters," 14th World Congress in Computational Mechanics, Virtual, January 11–15, 2021
17. Invited Topic Organizer, "Recent Advances and Applications in Meshfree and Particle Methods," 2020 International Mechanical Engineering Congress and Exposition, Virtual, November 16–19, 2020
18. Topic Organizer, "Recent Advances and Applications in Meshfree and Particle Methods," 2019 International Mechanical Engineering Congress and Exposition, Salt Lake City, Utah, November 11–14, 2019
19. Session Organizer, "Meshfree, Particle, and Peridynamic Methods," 15th International Conference on Computational Plasticity, Barcelona, Spain, September 3–5, 2019
20. Session Organizer, "Advances and Applications in Meshfree and Particle Methods," 15th US National Congress of Computational Mechanics, Austin, Texas, July 28–August 1, 2019
21. Session Organizer, "Meshfree, Peridynamics, and Particle Methods: Contemporary Methods and Applications," 2019 Engineering Mechanics Institute Conference, Pasadena, California, June 18–21, 2019
22. Session Organizer, "Robust, Adaptive, High-Resolution Methods For Unsteady Flows," 20th International Conference on Fluid Flow Problems, Chicago, Illinois, March 31–April 3, 2019
23. Session Organizer, "Recent Advances and Applications in Meshfree and Particle Methods," 2018 International Mechanical Engineering Congress and Exposition, Pittsburgh, Pennsylvania, November 9–15, 2018
24. Invited Focus Area Organizer, "Penetration and Perforation," Meshfree and Particle Methods: Applications and Theory, Santa Fe, New Mexico, September 10–12, 2018
25. Session Organizer, "New Trends in Extreme Events Modeling," 13th World Congress in Computational Mechanics, New York, New York, July 22–27, 2018
26. Session Organizer, "Meshfree, Peridynamics, and Particle Methods: Contemporary Methods and Applications," 2018 Engineering Mechanics Institute Conference, Cambridge, Massachusetts, May 29–June 1, 2018
27. Session Organizer, "Simulation, Prediction, and Mitigation of Extreme Events," 2018 Engineering Mechanics Institute Conference, Cambridge, Massachusetts, May 29–June 1, 2018
28. Session Organizer, "Meshfree and Particle Methods: New Developments and Applications," 14th US National Congress of Computational Mechanics, Montréal, Québec, Canada, July 17–20, 2017
29. Session Organizer, "Extreme Event Modeling," 2017 Engineering Mechanics Institute Conference, La Jolla, California, June 4–7, 2017
30. Invited Session Organizer, "Quadrature and Stability Issues in IGA and Meshfree Methods," US-

ACM Conference on Isogeometric Analysis and Meshfree Methods, La Jolla, California, October 10–12, 2016

Conferences Committees

1. Member, Scientific Organizing Committee, 18th US National Congress of Computational Mechanics, Chicago, Illinois, July 20–24, 2024
2. Member, Scientific Organizing Committee, 17th US National Congress of Computational Mechanics, Albuquerque, New Mexico, July 23–27, 2023
3. Member, International Scientific Committee, 16th US National Congress of Computational Mechanics, Virtual, July 25–29, 2021
4. Member, International Scientific Committee, 2021 Engineering Mechanics Institute Conference, Virtual, May 25–28, 2021
5. Member, Technical Committee, Workshop on Meshfree Method and Advances in Computational Mechanics, Pleasanton, California, March 10–12, 2019
6. Member, Scientific Committee, 18th US Congress for Theoretical and Applied Mechanics, Chicago, Illinois, June 4–9, 2018
7. Member, International Scientific Committee, 2018 Engineering Mechanics Institute Conference, Cambridge, Massachusetts, May 29 – June 1, 2018
8. Member, Scientific Organizing Committee, Meshfree and Particle Methods: Applications and Theory, Santa Fe, New Mexico, September 10–12, 2018
9. Member, Scientific Committee, Computations Subcommittee, 18th U.S. National Congress for Theoretical and Applied Mechanics, Chicago, Illinois, June 4–9, 2018
10. Member, International Scientific Committee, 2017 Engineering Mechanics Institute Conference, La Jolla, California, June 4–7, 2017
11. Member, Scientific Committee, USACM Conference on Isogeometric Analysis and Meshfree Methods, La Jolla, California, October 10–12, 2016

Peer Review of Manuscripts

1. Reviewer, Computational Mechanics (10)
2. Reviewer, Computer Methods in Applied Mechanics and Engineering (6)
3. Reviewer, International Journal for Numerical Methods in Engineering (5)
4. Reviewer, Journal of Engineering Mechanics (4)
5. Reviewer, Finite Elements in Analysis and Design (1)
6. Reviewer, Computers and Geotechnics (1)

Peer Review of Grant Proposals

1. Reviewer, The National Science Foundation (1 panel)
2. Reviewer, The Research Grants Council of Hong Kong (2 proposals)

Memberships

1. American Society of Civil Engineers, Central Pennsylvania (2016–2022)
2. Engineering Mechanics Institute (2016–present)
3. International Association of Computational Mechanics (2014–present)
4. US Association of Computational Mechanics (2013–present)
5. American Society of Civil Engineers (2008–present)