ÇAĞLAR OSKAY, Ph.D.

CURRICULUM VITAE

February 2026

CONTACT INFORMATION

Mailing Address:
VU Station B#351831
2301 Vanderbilt Place
Nashville, TN 37235

Office Address:
Jacobs Hall
Room 267A
Nashville, TN 37235

Phone: (518) 331-7296 (cell)
Email: caglar.oskay@vanderbilt.edu
URL: https://my.vanderbilt.edu/mcml/

ACADEMIC LEADERSHIP HIGHLIGHTS

As ***Chair of the Civil and Environmental Engineering (CEE) Department*** at Vanderbilt University since January 2022 – responsible for vision, leadership and oversight of all departmental activities.

- I oversee 27 full-time primary CEE faculty (with 15 tenured/tenure track, 5 professors-of-practice and 7 research professors), 17 staff, 200 undergraduate and graduate students.
- I oversee ~$7 million/year departmental budget that consists of operational and faculty/staff salaries, and ~$14 million/year research departmental research expenditure.
- I developed and implemented a *strategic plan* that led to realignment of departmental priorities on research and education.
- I have closely worked with department of alumni relations for fundraising, recently on renewal of a $350,000 cash gift from a FL-based construction company, and a major additional multi-million-dollar gifts (ongoing efforts) related to structural engineering lab renovations, and for sustainability research.
- Under my direction, we have developed and implemented a *new undergraduate degree program in Environmental Engineering.* The program received its second cohort in 2025 and the size of the second cohort already reached other established programs such as civil engineering and chemical engineering at Vanderbilt University.
- We have launched two new centers/institutes at Vanderbilt that were developed and led by CEE faculty: *Vanderbilt Center for Sustainability, Energy and Climate* and *Institute for National Security*. The launch of a third center (that I will co-direct) is about to be announced: *Vanderbilt Center for Simulation, Computational-modeling, and AI-integrated Learning for Engineering Systems* (SCALES).
- Among other recruitment successes, we have recruited two very senior and nationally renowned engineering faculty to the department.
- I launched a *full modernization effort for the undergraduate CE curriculum* to address revolutionary changes to the engineering profession and to steer curriculum towards addressing grand societal challenges. This effort is on-going.

- In the past three years, the CEE department saw a *10-step rise in the US News and World Report* departmental rankings.

As ***Program Director*** at the ***National Science Foundation*** (2019-2021 and in 2024) – responsible for overseeing NSF's research investments in *Advanced Materials*, *Structural Engineering*, *Geotechnical Engineering*, *Coastal Engineering*, *Architectural Engineering*, *Construction Engineering, Mechanics of Materials and Structures*.

- I served as a program director of NSF's research portfolio for the *Engineering for Civil Infrastructure* Program (2019-2021).
- I served as an expert program director of NSF's research portfolio for the *Mechanics of Materials and Structures* Program (2024-2025).
- I co-created the NSF *Boosting Research Ideas for Transformative and Equitable Advances in Engineering (BRITE)* Program. BRITE enables and creates opportunities to advance scientific discoveries and new research using a variety of approaches that harness the national talent ecosystem of experienced faculty to support NSF's strategic goal of expanding knowledge and building capacity for the science and engineering workforce. To date, the BRITE program awarded research projects with a total budget of $37 million.
- I have been a member of a interdisciplinary group that developed and launched the *Strengthening American Infrastructure* (SAI) Program. SAI builds research capacity to address the fundamental challenges regarding the nation's infrastructure that require a human and social-centered approach. To date, the SAI program awarded research projects with a total budget of $38.8 million.

As a leading ***faculty member*** at Vanderbilt University – key ongoing highlights,

- I am co-chairing the committee to envision the research and graduate education priorities associated with the newly announced *Institute for Quantum Innovation* – a collaborative institute between Vanderbilt and Electric Power Board to be launched in Chattanooga, TN.
- I am leading a taskforce charged with the development of a new research and educational thrust at Vanderbilt University in *Space Engineering*. The taskforce is establishing a vision and faculty hiring priorities at the intersection of existing research strengths and space engineering.

As ***Director of Graduate Studies*** of the Civil Engineering Graduate Program at Vanderbilt University (2015-2019) – responsible for overseeing the recruitment, well-being and research progress of approximately 60 graduate students each year within the CEE department.

- I have led the committee tasked with full revision and modernization of the M.S. and Ph.D. programs in civil engineering. The current structure of the civil engineering graduate programs is the result of this effort.

CURRENT POSITIONS

Cornelius Vanderbilt Professor of Engineering December 2022– Present
Vanderbilt University, Nashville, TN

Chair and Professor
Department of Civil and Environmental Engineering January 2022– Present
Vanderbilt University, Nashville, TN

Professor
Department of Mechanical Engineering (courtesy) June 2018– Present
Vanderbilt University, Nashville, TN

AREAS OF EXPERTISE

- Computational mechanics on quantum and other non-Von Neumann computers.
- Multiscale computational failure modeling of solids, structures and infrastructure systems
- Life prediction and performance assessment of structures and infrastructure systems
- Multiscale computational modeling of architected materials, polycrystals, composites and other heterogeneous materials

EDUCATION

Ph.D., Civil Engineering May 2003
Rensselaer Polytechnic Institute, Troy, NY
Research: System identification of geophysical systems

M.Sc., Civil Engineering December 2001
Rensselaer Polytechnic Institute, Troy, NY
Research: System identification of geophysical systems

M.Sc., Applied Mathematics December, 2000
Rensselaer Polytechnic Institute, Troy, NY
Research: Continuous wavelet transforms

B.Sc., Civil Engineering June 1998
Middle East Technical University (METU), Ankara, Turkey

PREVIOUS ACADEMIC EXPERIENCE

Professor June 2018 – December 2022
Civil and Environmental Engineering
Vanderbilt University, Nashville, TN

Program Director (Expert)
Mechanics of Materials and Structures (MOMS) Program April 2024 – February 2025
Civil, Mechanical and Manufacturing Innovation (CMMI) Division
Engineering (ENG) Directorate
National Science Foundation, Alexandria, VA

Program Director
Engineering for Civil Infrastructure (ECI) Program September 2019 – September 2021
Civil, Mechanical and Manufacturing Innovation (CMMI) Division
Engineering (ENG) Directorate
National Science Foundation, Alexandria, VA

Associate Professor August 2013 – June 2018
Civil and Environmental Engineering
Vanderbilt University, Nashville, TN

Associate Professor (courtesy) January 2015 – June 2018
Mechanical Engineering
Vanderbilt University, Nashville, TN

Assistant Professor August 2006 – August 2013
Civil and Environmental Engineering
Vanderbilt University, Nashville, TN

Research Associate October 2005 – July 2006
Scientific Computation Research Center (SCOREC)
Rensselaer Polytechnic Institute, Troy, NY

Post-Doctoral Research Associate January 2003 – September 2005
Civil and Environmental Engineering
Rensselaer Polytechnic Institute, Troy, NY

Graduate Student Research and Teaching Assistant September 1998 – January 2003
Civil and Environmental Engineering
Rensselaer Polytechnic Institute, Troy, NY

AWARDS AND HONORS

- Fellow of the U.S. Association for Computational Mechanics (USACM), 2025.
- Fellow of the Engineering Mechanics Institute (EMI), 2019.
- Fellow of the American Society of Mechanical Engineers (ASME), 2017.
- Chancellor Faculty Fellow, Vanderbilt University, 2016-2018.
- American Society of Civil Engineers (ASCE) Excellence in Civil Engineering Education (ExCEEd) Fellow, 2011.
- Air Force Office of Scientific Research Summer Faculty Fellow, 2010.
- Air Force Office of Scientific Research Summer Faculty Fellow, 2009.
- Thomas Archibald Bedford Prize for Best Ph.D. Dissertation, Civil and Environmental Engineering Department, Rensselaer Polytechnic Institute, 2003.

PROFESSIONAL ACTIVITIES AND LEADERSHIP

Nationwide Committees

- *Member,* Interagency Steering Group on Computational Materials for Qualification and Certification (CM4QC), 2020-Current.
- *Ex-Officio Member (*in NSF Official capacity*),* The Mine Safety and Health Research Advisory Committee (MSHRAC) for the Center for Disease Control and Prevention (CDC) National Institute for Occupational Safety and Health (NIOSH), 2020.

American Society of Civil Engineers (ASCE)

- *Conference Chair,* The joint ASCE Engineering Mechanics Institute 2016 Conference and Probabilistic Mechanics and Reliability Conference at Vanderbilt University, Nashville TN, May 22-15, 2016 (co-chaired with Prof. Sankaran Mahadevan, Vanderbilt University).
- *Conference Track Chair,* Multiscale - Multiphysics Track, ASCE Engineering Mechanics Institute 2019 Conference at California Institute of Technology, Pasadena, CA, June 19-21, 2019.
- *Conference Track Chair,* Theoretical, Applied and Computational Mechanics Track, ASCE Engineering Mechanics Institute 2013 Conference at Northwestern University, Evanston, IL, August 4-7, 2013 (co-chaired with Prof. Haim Waisman at Columbia University).
- *Strategic Planning Committee Member,* Engineering Mechanics Institute, 2024-current.
- *Technical Committee Chair*, ASCE Engineering Mechanics Institute Committee on Inelasticity and Multiscale Behavior. Term: October 1, 2015-September 30, 2017.
- *Engineering Mechanics Institute Representative* at the ASCE Workshop for Section, Branch and Institute Leaders, Las Vegas, NV, January 12-13, 2018.
- *Scientific Advisory Board Member* - ASCE Engineering Mechanics Institute (EMI)
    - 2021 Virtual Conference, May 25-28, 2021
    - 2020 Conference, New York, NY, May 26-29, 2020 (cancelled)
    - 2019 Conference, Pasadena, CA, June 18-21, 2019
    - 2018 Conference, Boston, MA, May 29-June 1, 2018
    - 2017 Conference, San Diego, CA, June 4-7, 2017.
    - 2016 Conference and Probabilistic Mechanics and Reliability Conference, Nashville, TN, May 22-25, 2016.
    - 2014 Conference at McMaster University, Hamilton, Ontario, Canada, August 5-7, 2014.
    - 2013 Conference at Northwestern University, Evanston, IL, August 4-7, 2013.
- *Technical Committee Member*,
    - EMI Committee on Nanomechanics and Micromechanics, 2014 - present.
    - EMI Committee on Computational Mechanics, 2011- present.
    - EMI Committee on Inelasticity and Multiscale Behavior, 2011- present.
- *Symposium Organizer*
    - "A New Horizon - Quantum Computing and Quantum Materials," ASCE EMI Conference, Chicago, IL, May 28-31, 2024.
    - "Machine Learning-based Computational Modeling for Civil Engineering Applications," ASCE EMI Conferences (1) Baltimore, MD, May 31-June 3, 2022; (2) Virtual Conference, May 25-28, 2021.
    - "Multiscale and Computational Methods in Fracture and Damage Mechanics," ASCE EMI Conference, Pasadena, CA, June 18-21, 2019.
    - "Computational Methods and Applications for Solid and Structural Mechanics," ASCE EMI Conferences (1) Boston, MA, May 29-June 1, 2018; (2) San Diego, CA, June 4-7, 2017; (3) Nashville, TN, May 22-25, 2016; (4) Stanford, CA, June 16-19, 2015; (6) Hamilton, Ontario, Canada, August 5-7, 2014.
    - "Cyber Physical Infrastructure," ASCE EMI Conference, Nashville, TN, May 22-25, 2016.

  - Computational Modeling in Civil Engineering," ASCE EMI 2014 Conference, Hamilton, Ontario, Canada, August 5-7, 2014
- *Member*, ASCE, 2000 – present

American Society of Mechanical Engineers (ASME)

- *Executive Committee Chair*, ASME Materials Division (MD). 2023 – 2024.
- *Executive Committee Member*, ASME Materials Division. 2018 – 2024.
- *Congress Steering Committee Member-at-Large*, ASME International Mechanical Engineering Congress and Exposition (IMECE). 2021 – 2022.
- *Conference Track Chair,* Advanced Materials: Design, Processing, Characterization and Applications, 2022 ASME IMECE Conference, November 2022.
- *Conference Track Co-Chair,* Advanced Materials: Design, Processing, Characterization and Applications, 2021 ASME IMECE, Virtual Conference, November 1 – 4, 2021.
- *Technical Committee Chair,* ASME Applied Mechanics Division (AMD) Committee on Composite Materials. Term: November 1, 2016 – October 31, 2019
- *Technical Committee Chair,* ASME AMD Committee on Computing in Applied Mechanics. Term: November 1, 2017 – October 31, 2019.
- *Technical Committee Vice Chair,* ASME AMD Committee Composite Materials. Term: November 1, 2014 – October 31, 2016.
- *Technical Committee Vice Chair,* ASME AMD Committee on Computing in Applied Mechanics. Term: November 1, 2015 – October 31, 2017.
- *Technical Committee Member*,

  ASME AMD Committee on Computing in Applied Mechanics, 2008 – current.

  ASME AMD Committee on Composite Materials, 2014 – current.
- *Symposium Organizer,*
  - "Multiscale Models and Experimental Techniques for Composite Materials," ASME IMECE Conferences (1) Memphis, TN, November 16-20, 2025; (2) Portland, OR, November 17-21, 2024; (3) New Orleans, LA, October 29-November 2, 2023; (4) Columbus, OH, October 29-November 3, 2022; (5) Virtual Conference, November 1-4, 2021; (6) Virtual Conference, November 15-19, 2020; (7) Salt Lake City, UT, November 8-14, 2019; (8) Pittsburgh, PA, November 9-15, 2018; (9) Tampa, FL, November 3-9, 2017; (10) Phoenix, AZ, November 11-17, 2016; (11) Houston, TX, November 13-19, 2015.
  - "Best Student Poster Competition on Computational Mechanics," ASME IMECE Conferences (1) Salt Lake City, UT, November 8-14, 2019; (2) Pittsburgh, PA, November 9-15, 2018.
  - "Keynote Lectures on Computational Mechanics," ASME IMECE Conferences (1) Salt Lake City, UT, November 8-14, 2019; (2) Pittsburgh, PA, November 9-15, 2018.
  - "Recent Advances in Mechanics of Composites," ASME IMECE, Tampa, FL, November 3-9, 2017.

  - *"*Recent Advances in Computational Materials Science and Multiscale Materials Modeling," ASME IMECE Conferences (1) Vancouver, British Columbia, Canada, November 12-18, 2010; (2) Boston MA, November 2-6, 2008.
  - *"*Mechanical Behavior of Nanocomposite Materials," ASME IMECE, Lake Buena Vista FL, November 13-19, 2009.
- *Member*, ASME, 2003 – current

United States Association of Computational Mechanics (USACM) and International Association of Computational Mechanics (IACM)

- *Executive Committee Member-at-Large*, USACM. 2020 – 2024.
- *Founding co-Chair,* USACM Technical Thrust Area on Quantum Computing, 2025-present.
- *Technical Committee Vice Chair,* USACM Technical Thrust Area on Manufacturing and Materials Processing. Term: August 1, 2015-2020.
- *Scientific Advisory Board Member*,

  - AI-Empowered Simulations & CAE Applications via Engineering Software 2.0 and 3.0 (AESCAPE), Dallas, Texas, September 8–11, 2026

  - International Congress on New Trends in Mechanics (ICNTM25), Baku, Azerbaijan, September 2-5, 2025.

  - 4th International Conference on Computational Engineering and Science for Safety and Environmental Problems (COMPSAFE), Kobe, Japan, July 1-4, 2025.

  - US National Congress on Computational Mechanics (USNCCM)
    - 17th USNCCM, Albuquerque, NM, July 23-27, 2023
    - 16th USNCCM, Virtual Conference, July 25-29, 2021.
    - 15th USNCCM, Austin, TX, July 28-August 1, 2019.
    - 13th USNCCM, San Diego, CA, July 26-30, 2015.

  - World Congress on Computational Mechanics (WCCM)
    - 17th WCCM, Munich, Germany, July 16-24, 2026.
    - 16th WCCM, Vancouver, BC, Canada, July 21-26, 2024.
    - 13th WCCM, New York City, NY, July 22-27, 2018.
- *Symposium Organizer,*
  - "Quantum Computing in Engineering Mechanics: Opportunities and Challenges," 17th WCCM, Munich, Germany, July 16-24, 2026.
  - "Quantum Scientific Computing," 17th WCCM, Munich, Germany, July 16-24, 2026.
  - ""Multi-scale and Computational Scale Bridging," 17th International Conference on Computational Plasticity (COMPLAS), Barcelona, Spain, September 2-5, 2025.
  - "Quantum Computing for Computational Mechanics," 18th USNCCM, Chicago, IL, July 20-25, 2025.

- "Computational Intelligence for Multiscale, Mesoscale, and Reduced Order Methods of Heterogeneous Solids," Advances in Computational Mechanics (ACM), Austin, TX, October 22-25, 2023.
- "Multiscale Structure-Materials Modeling: Addressing the State of the Art and Identified Gaps," 13th WCCM, New York, NY, July 22-27, 2018.
- "Advanced Computational Methods and Theories for Predicting Material Behaviors at Various Length Scales," 13th WCCM, New York, NY, July 22-27, 2018.
- "Multiscale and Computational Methods in Failure Mechanics," WCCM and USNCCM Conferences (1) 13th WCCM, New York, NY, July 22-27, 2018; (2)14th USNCCM, Montreal, Quebec, Canada, July 17-20, 2017.
- "Advanced Computational Methods and Theories for Predicting Material Behaviors at Various Length Scales," 14th USNCCM, Montreal, Quebec, Canada, July 17-20, 2017.
- "Multiscale and Computational Approaches to Fracture and Failure," European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS), Crete, Greece, June 5-10, 2016.
- "Modeling Dynamic Response of Heterogeneous Materials," 13th USNCCM, San Diego, CA, July 26-30, 2015.
- "Computational Methods for Blast and Impact in Mechanics of Materials," 12th USNCCM, Raleigh, NC, July 22-25, 2013.
- "Multi-Scale and Multi-Physics Computations in Fluids and Solids," 11th USNCCM, Minneapolis, MN, July 25-28, 2011.
- "Recent Advances in Computational Materials Science and Multiscale Materials Modeling," 10th USNCCM, Columbus OH, July 16-19, 2009.

- *Member*,

  IACM, 2008 – current

  USACM, 2006 – current

Journal Editorship:

- *Associate Editor,* International Journal for Multiscale Computational Engineering, 2015-current.
- *Associate Editor,* Journal of Applied Mechanics, 2019-2025.
- *Editorial Board Member*, Computer Methods in Applied Mechanics and Engineering, 2022-current.
- *Editorial Board Member*, International Journal for Multiscale Computational Engineering, 2014-current.
- *Guest Editor,*

  Special Issue on *"*Recent Advances in Computational Materials Science and Multiscale Materials Modeling". Co-Editor: Karel Matous (University of Notre Dame). *International Journal for Multiscale Computational Engineering*. Published in 2010.

Special Issue on "Model Reduction Approaches in Multiscale Modeling of Heterogeneous Materials". *International Journal for Multiscale Computational Engineering*. Published in 2013.

Four (4) Special Issues on "Mechanics of Nanocomposites and Nanostructure". Co-Editors: Nima Rahbar (Worcester Polytechnic Institute), Huiming Yin (Columbia University). *Journal of Nanomechanics and Micromechanics*. Two (2) issues published in 2014; two (2) issues published in 2015.

Membership in Other Professional Societies:

- American Association for the Advancement of Science (AAAS)
- American Institute of Aeronautics and Astronautics (AIAA).
- Society of Engineering Sciences (SES).
- European Mechanics Society (EUROMECH)
- The Minerals, Metals and Materials Society (TMS)

Peer-Reviewer for Technical Journals:

Technical journals on Computational Mechanics -

Computer Methods in Applied Mechanics and Engineering; Engineering with Computers; Finite Elements in Analysis and Design; International Journal for Multiscale Computational Engineering; International Journal of Computational Methods in Engineering Science and Mechanics; International Journal of Numerical Methods in Engineering; Journal of Computational Mechanics; Journal of Computational Physics.

Technical journals on Infrastructure, Structures and Theoretical and Applied Mechanics -

AIAA Journal; Archives of Applied Mechanics; ASCE Journal of Engineering Mechanics; ASCE Journal of Nanomechanics and Micromechanics; ASCE Journal of Structural Engineering; ASME Journal of Applied Mechanics; Computer Aided Civil and Infrastructure Engineering; International Journal of Damage Mechanics; International Journal of Fracture; International Journal of Solids and Structures; Journal of Mechanics and Physics of Solids**;** Journal of Mechanics of Materials and Structures; Journal of Strain Analysis for Engineering Design; Mechanics of Materials; Mechanics Research Communications; Proceedings of the Royal Society A**;** Soil Dynamics and Earthquake Engineering; Theoretical and Applied Fracture Mechanics; Thin-Walled Structures.

Technical journals on Materials Science –

Additive Manufacturing; Cement and Concrete Composites; Composites Part B; Composites Science and Technology; Composite Structures; Express Polymer Letters; Journal of Composite Materials; Journal of Materials Science; Modeling and Simulation in Materials Science and Engineering

Peer-Reviewer for National and International Funding Agencies

Air Force Office of Scientific Research (AFOSR); Army Research Office (ARO); Department of Energy, Flanders Innovation and Entrepreneurship, Belgium; National Aeronautics and Space Administration (NASA); Nuclear Energy University Program; Luxembourg National Research

Funds; National Science Foundation (NSF); Ohio Supercomputing Center; US Army Engineering Research and Development Center.

SERVICE ACTIVITIES WITHIN VANDERBILT UNIVERSITY

University Service

- *Vanderbilt University Research Council Member*, 2024-current
- *Faculty Senator*, 2014-2017.
- *Committee Member*, Academic Policies and Services Committee of the Faculty Senate, 2014-2017.
- *Committee Member*, Consultative Committee of the Faculty Senate, 2017.

School of Engineering (VUSE) Service

- *Co-Chair*, Strategic visioning committee for the Quantum Innovation Institute, 2025-current.
- *Co-Chair*, Strategic visioning committee for Innovate Beyond Earth, 2025-current.
- *Committee Member*, Ad-hoc Committee for Strategic Planning, 2017 – 2018.
- *Committee Member*, Electrical Engineering and Computer Science Department Faculty search committee, 2017 – 2018.
- *Member*, Working Group on Faculty Financial Incentives Related to Research, 2015.
- *Member,* Working Group on Graduate Education, 2014.
- *Committee Member*, Admissions and Scholarship committee, 2009 – 2014.
- *Committee Member,* Information Technology committee, 2007 – 2009.
- *Committee Member,* Library committee, 2006 – 2007.

Civil and Environmental Engineering (CEE) Department Service

- *Department Chair*, 2022-present.
- *Director of Graduate Studies*, Civil Engineering Graduate Program, 2015-2019.
- *Director of Graduate Recruitment*, Civil Engineering Graduate Program, 2014-2015.
- *Academic advisor,* Undergraduate Class of 2022, 2018-present.
- *Academic advisor,* Undergraduate Class of 2017, 2013-2017.
- *Academic advisor,* Undergraduate Class of 2011, 2007-2011.
- *Coordinator,* CEE Invited and Special Seminar Series, 2014-present.
- *Committee Chair*, Tenure-track faculty evaluation committee, 2019.
- *Committee Chair*, Tenure-track faculty evaluation committee, 2018.
- *Committee Chair*, Civil Engineering Graduate Program review committee, 2017-2018.
- *Committee Member*, Tenure-track faculty evaluation committee, 2015.

- *Committee Member*, Mentoring committee for a tenure-track faculty member, 2014-present.
- *Committee Member,* Faculty search committees: 2017-2018, 2016-2017; 2014-2015; 2011-2012; 2007-2008
- *Coordinator*, School of Engineering Open House activities for the CEE Department, 2008.

COURSES TAUGHT

- **CE3250 (formerly CE240) Geotechnical Engineering.** *Semesters taught:* Fall 2006-2011 (every year). *Subject*: Fundamentals of soil mechanics and geotechnical engineering. Origins, formation, identification of soil properties, compressibility, shear strength, stress analysis, earth pressure theories and bearing capacity.
- **CE6205 (formerly CE 302) Theory of Inelasticity (formerly Advanced Solid Mechanics II).** *Semesters taught:* Spring 2007-2018, Spring 2022, Spring 2024. *Subject*: Theory of plasticity, plastic stability, linear elastic and elasto-plastic fracture mechanics, topics in geometrically nonlinear continuum mechanics.
- **CE2205 (formerly CE182) Mechanics of Materials.** *Semesters taught:* Fall 2008, Fall 2009, Fall 2010, Fall 2013, Fall 2017. *Subject*: Stress and strain, tension, compression and shear; Hooke's law, Mohr's circle, combined stresses, strain energy, Beams, columns, shafts and continuous beams. Deflections, shear and moment diagrams.
- **CE6313 (formerly CE314) Multiscale Modeling.** *Semesters taught:* Fall 2013, Fall 2014, Fall 2016, Fall 2018, Spring 2023, Spring 2025. *Subject*: The state-of-the-art and emerging multiscale computational methods for modeling of mechanics and transport phenomena. Principles of information transfer between multiple spatial and temporal scales. Enrichment methods including generalized finite elements, partition of unity, variational multiscale enrichment methods.

GRANTS (Total: ~$11.5M As PI - Total: ~$7.7M)

1. *Project title:* "Quantum Computing Algorithms for Nonlinear and History-Dependent Solid Mechanics,"
   Principal investigators: Caglar Oskay (PI, Vanderbilt University)
   Source of support: National Science Foundation.
   Award amount: $600,000,
   Project period: September 1, 2025 – August 31, 2028.
2. *Project title:* "Collaborative Research: Understanding Backward Erosion Piping in Geotechnical Flood Protection Infrastructure,"
   Principal investigators: Caglar Oskay (PI, Vanderbilt University)
   Source of support: National Science Foundation.
   Award amount: $411,496,
   Project period: September 1, 2024 – August 31, 2027.
3. *Project title:* "Mixed-Precision-PCM-GaAs-MemResonator-NaPSAC,"
   Principal investigators: Caglar Oskay (PI, Vanderbilt University)
   Source of support: Defense Advanced Research Projects Agency / U. California, Davis.
   Award amount: $500,000,
   Project period: November 1, 2023 – October 30, 2027.

4. *Project title:* "STRI: An Integrated Computational Modeling and Simulation Platform for Qualification and Certification of Metals Additive Manufacturing,"
   Principal investigators: Sankaran Mahadevan (PI, Vanderbilt University), Caglar Oskay (co-PI, Vanderbilt University)
   Source of support: National Aeronautics and Space Administration / Carnegie Mellon U.
   Award amount: $2,250,000,
   Project period: December 15, 2023 - December 13, 2028.
5. *Project title:* "Modeling Properties of Heterogeneous Materials via Quantum Computing - a New Frontier for Multiscale Modeling and Simulation,"
   Principal investigators: Caglar Oskay (PI, Vanderbilt University)
   Source of support: Vanderbilt University
   Award amount: $120,000,
   Project period: July 1, 2023 – June 30, 2025.
6. *Project title:* "GAME Change NSF Type-I Engine,"
   Principal investigators: Douglas Adams (Vanderbilt University), Caglar Oskay (senior personnel, Vanderbilt University)
   Source of support: National Science Foundation / University of Kentucky
   Award amount: $80,000,
   Project period: May 11, 2023 - May 10, 2025.
7. *Project title:* "Architected Multi-layered Materials for High-Velocity Impact Mitigation,"
   Principal investigators: Caglar Oskay (PI, Vanderbilt University), Yanyu Chen (co-PI, University of Louisville)
   Source of support: Army Research Office
   Award amount: $685,000,
   Project period: June 10, 2023 - June 9, 2026.
8. *Project title:* "EAGER: Quantum Algorithms for Solving Computational Mechanics Problems in Hybrid Quantum Computers,"
   Principal investigators: Caglar Oskay (PI, Vanderbilt University)
   Source of support: National Science Foundation
   Award amount: $308,000,
   Project period: August 15, 2022 - August 14, 2026.
9. *Project title:* "Stochastic Multiscale Fatigue Life Prediction Framework for Next Generation Durability and Damage Tolerance,"
   Principal investigators: Thomas Hood (Rentec, LLC, PI), and Douglas Adams and Caglar Oskay (co-PIs, Vanderbilt University)
   Source of support: Department of the Army STTR
   Award amount: $165,000,
   Project period: January 15, 2021 - August 14, 2021.
10. *Project title:* "Data-Driven In-Situ Characterization of Microscale Properties of Composite Materials,"
    Principal investigators: James Ratcliffe (PI, NASA), Nelson Carvalho (co-PI, NIA and NASA), Caglar Oskay (co-PI, Vanderbilt University), Michael Czabaj (University of Utah)
    Source of support: National Aeronautics and Space Administration,
    Award amount: $125,000,

Project period: October 1, 2020 - September 30, 2021.

11. *Project title:* "Stochastic Multiscale Fatigue Life Prediction Framework for Next Generation Durability and Damage Tolerance,"
    Principal investigators: Caglar Oskay (PI, Vanderbilt University)
    Source of support: National Aeronautics and Space Administration,
    Award amount: $550,000,
    Project period: January 15, 2020 - January 14, 2024.
12. *Project title:* IPA
    Principal investigators: Caglar Oskay (Vanderbilt University)
    Source of support: National Science Foundation,
    Award amount: $460,000,
    Project period: September 3, 2019 - September 2, 2021.
13. *Project title:* "Modeling Compression-After-Impact Response of Aerospace Composites with Enhanced Interfaces,"
    Principal investigators: Caglar Oskay (PI, Vanderbilt University)
    Source of support: Air Force Research Laboratory,
    Award amount: $400,000,
    Project period: September 3, 2019 - February 27, 2024.
14. *Project title:* "Prediction of Damage Growth in Large-Scale Composite Structures,"
    Principal investigators: Caglar Oskay (PI, Vanderbilt University)
    Source of support: Air Force Research Laboratory / University of Dayton Research Institute,
    Award amount: $376,714,
    Project period: December 22, 2016 – November 30, 2019.
15. *Project title:* "Multiscale Modeling of Composites Subjected to Fatigue Loading,"
    Principal investigators: Caglar Oskay (PI, Vanderbilt University), Ravindra Duddu (Co-PI, Vanderbilt University),
    Source of support: Office of Naval Research,
    Award amount: $492,960,
    Project period: January 1, 2017 – December 31, 2019.
16. *Project title:* "Vanderbilt Initiative on Intelligent Resilient Infrastructure Systems,"
    Principal investigators: Caglar Oskay (PI), Mark Abkowitz, Julie Adams, Hiba Baroud, Ralf Bennartz, Craig Philip and Jennifer Trueblood (all at Vanderbilt University)
    Source of support: Vanderbilt TIPS program,
    Award amount: $197,762,
    Project period: September 13, 2016 – September 12, 2017.
17. *Project title:* "Tools for Assessing the Durability and Damage Tolerance of Fastened Composite Joints,"
    Principal investigators: Caglar Oskay (PI, Vanderbilt University)
    Source of support: Northrup Grumman Corp,
    Award amount: $160,000,
    Project period: September 13, 2016 – September 12, 2017.
18. *Project title:* "Numerical Simulation of Structural Response in Operational Conditions of Hypersonic Vehicles,"

Principal investigators: Caglar Oskay (PI, Vanderbilt University
Source of support: Air Force Research Laboratory,
Award amount: $50,000,
Project period: May 1, 2015 – November 30, 2015.

19. *Project title:* "Multiscale Experiments and Modeling of Dynamic Energetic Material Failure Including Stochastic Interfaces,"
Principal investigators: Caglar Oskay (PI, Vanderbilt University), Vikas Tomar (Co-PI, Purdue University), Emre Gunduz (Co-PI, Purdue University)
Source of support: National Science Foundation,
Award amount: $619,000,
Project period: April 1, 2015 – March 31, 2018.
20. *Project title:* "Mechanics and Dynamics of Viscoelastic Metacomposites,"
Principal investigators: Caglar Oskay (PI),
Source of support: National Science Foundation,
Award amount: $205,000,
Project period: September 1, 2014 – August 31, 2018.
21. *Project title:* "Multi-Resolution In-Situ Testing and Multiscale Simulation for Creep Fatigue Damage Analysis of Alloy 617,"
Principal investigators: Yongming Liu (PI, Arizona State University) and Caglar Oskay (Co-PI, Vanderbilt University),
Source of support: Department of Energy, Nuclear Energy University Program
Award amount: $800,000 ($350,000 to Vanderbilt University),
Project period: December 16, 2013 – February 28, 2017.
22. *Project title:* "Development of a Nano-modified Concrete for Next Generation of Storage Systems,"
Principal investigators: Florence Sanchez (PI), Caglar Oskay (co-PI) and David S. Kosson,
Source of support: Department of Energy, Nuclear Energy University Program
Award amount: $800,000,
Project period: December 16, 2013 – December 15, 2016.
23. *Project title:* "Multiscale-Multiphysics Computational Framework for Damage Prognosis in Hypersonic Structures,"
Principal investigators: Caglar Oskay,
Source of support: Air Force Office of Scientific Research
Award amount: $400,000,
Project period: March 1, 2013 – February 28, 2017.
24. *Project title*: "Multi-Scale Computational Modeling for Damage Accumulation in Aero-Thermo Structures Operating in Combined Extreme Environments,"
Principal investigator: Caglar Oskay,
Source of support: Air Force Research Laboratory, High Performance Technologies Inc.
Award amount: $109,496,
Project period: September 1, 2011-December 31, 2012.
Subawards:

25. *Project title*: "Multiscale Modeling of Alpha-Case Formation Induced Embrittlement in Titanium Structures,"
    Principal investigator: Caglar Oskay,
    Source of support: Air Force Research Laboratory, High Performance Technologies Inc.
    Award amount: $148,500,
    Project period: January 1, 2010-August 31, 2011.
26. *Project title:* "Collaborative Research: Blast Resistance of Polyurea-Steel Composite Structures for Infrastructure Protection,"
    Principal investigator: Caglar Oskay,
    Source of support: National Science Foundation,
    Award amount: $165,000,
    Project period: September 1, 2009 – August 31, 2013.
27. *Project title:* "Continuum Damage Modeling of Structural Composites under Operating Conditions,"
    Principal investigator: Caglar Oskay,
    Source of support: Air Force Research Laboratory, DRC High Performance Technologies Group,
    Award amount: $402,044,
    Project period: July 1, 2012 – August 31, 2016.
28. *Project title:* "Multi-scale Modeling of Composite Structures Subjected to Cyclic Loading,"
    Principal investigator: Caglar Oskay,
    Source of support: Air Force Research Laboratory, General Dynamics Information Technology Corp.,
    Award amount: $189,586,
    Project period: January 1, 2010 – December 31, 2012.
29. *Project title:* "Nanoscale Interface Engineering for Cement Composites,"
    Principal investigators: Caglar Oskay (PI) and Professor Florence Sanchez (co-PI),
    Source of support: Vanderbilt University Discovery Grant Program,
    Award amount: $50,000,
    Project period: July 23, 2011 – June 30, 2013.

PUBLICATIONS

Book Chapters and Journal Special Issues –

B1. **C. Oskay** and K. Matous, "Recent Advances in Computational Material Science and Multiscale Materials Modeling," *International Journal for Computational Multiscale Engineering*, DOI: 10.1615/IntJMultCompEng.v8.i5.10, **8**:vii-vii, 2010.

B2. **C. Oskay**, "Model Reduction Approaches in Multiscale Modeling of Heterogeneous Materials," *International Journal for Multiscale Computational Engineering*, DOI: 10.1615/IntJMultCompEng.2013005986, **11**:vii-viii, 2013.

B3. N. Rahbar, **C. Oskay** and H. Yin, "Special Section on Mechanics of Nanocomposites and Nanostructures," *ASCE Journal of Nanomechanics and Micromechanics*, DOI: 10.1061/(ASCE)NM.2153-5477.0000073, **3**:36-36, 2013.

B4. **C. Oskay**, "Multiscale Modeling of the Response and Life Prediction of Composite Materials," in *Numerical Modelling of Failure in Advanced Composite Materials*, P. Camanho and S. Hallett (eds.), Woodhead publishing, ISBN: 978-0-08-100332-9, 2015.

Refereed Journal Articles –

Underline indicates graduate student or postdoc.

J1. M. Zeghal and **C. Oskay**, "Local system identification analyses of the dynamic response of soil systems,'' *Soil Dynamics and Earthquake Engineering*, DOI: 10.1016/S0267-7261(02)00123-9, **22**:985-993, 2002.

J2. M. Zeghal and **C. Oskay**, "A local identification technique for geotechnical and geophysical systems," *International Journal for Numerical and Analytical Methods in Geomechanics*, DOI: 10.1002/nag.302, **27**:967-987, 2003.

J3. **C. Oskay** and J. Fish, "Fatigue life prediction using 2-scale temporal asymptotic homogenization," *International Journal for Numerical Methods in Engineering*, DOI: 10.1002/nme.1069, **61**:329-359, 2004.

J4. **C. Oskay** and J. Fish, "Multiscale modeling of fatigue for ductile materials," *International Journal for Multiscale Computational Engineering,* DOI: 10.1615/IntJMultCompEng.v2.i3.10, **4**(3):1-25, 2004.

J5. J. Fish and **C. Oskay**, "A nonlocal multiscale fatigue model," *Mechanics of Advanced Materials and Structures,* DOI: 10.1080/15376490500259319, **12**:485-500, 2005.

J6. M. Zeghal, P. V. Kallou, **C. Oskay**, T. Abdoun and M. K. Sharp, "Visualization of soil and soil-structure response in the presence of liquefaction," *Earthquake Engineering and Engineering Vibration,* DOI: 10.1007/s11803-006-0610-5, **5**:1-12, 2006.

J7. **C. Oskay** and J. Fish, "Eigendeformation-based reduced order homogenization for failure analysis of heterogeneous materials," *Computer Methods in Applied Mechanics and Engineering,* DOI: 10.1016/j.cma.2006.08.015, **196**:1216-1243, 2007.

J8. **C. Oskay** and J. Fish, "On calibration and validation of eigendeformation-based multiscale models for failure analysis of heterogeneous materials," *Computational Mechanics,* DOI: 10.1007/s00466-007-0197-3, **42**:181-195, 2008.

J9. **C. Oskay**, "Two-level multiscale enrichment methodology for modeling of heterogeneous plates," *International Journal for Numerical Methods in Engineering*, DOI: 10.1002/nme.2652, **80**:1143-1170, 2009.

J10. **C. Oskay** and G. Pal, "A multiscale failure model for analysis of thin heterogeneous plates," *International Journal of Damage Mechanics*, DOI: 10.1177/1056789509104729, **19**:575-610, 2010.

J11. H. Yan, **C. Oskay**, A. Krishnan and L. R. Xu, "Compression after impact response of woven fiber reinforced composite," *Composites Science and Technology*, DOI: 10.1016/j.compscitech.2010.08.012, **70**:2128-2136, 2010.

J12. R. Crouch and **C. Oskay**, "Symmetric meso-mechanical model for failure analysis of heterogeneous materials," *International Journal for Multiscale Computational Engineering,* DOI: 10.1615/IntJMultCompEng.v8.i5.20, **8**:447-461, 2010.

J13. **C. Oskay** and M. Haney, "Computational modeling of titanium structures subjected to thermo-chemo-mechanical environment," *International Journal of Solids and Structures*, DOI: 10.1016/j.ijsolstr.2010.08.014, **47**:3341-3351, 2010.

J14. **C. Oskay** and M. Zeghal, "A survey of geotechnical system identification techniques," *Soil Dynamics and Earthquake Engineering*, DOI: 10.1016/j.soildyn.2010.11.011, **31**:568-582, 2011.

J15. **C. Oskay**, "Variational multiscale enrichment for modeling coupled mechano-diffusion problems," *International Journal for Numerical Methods in Engineering*, DOI: 10.1002/nme.3258, **89**:686-705, 2012.

J16. T. Hui and **C. Oskay**, "Computational modeling of polyurea-coated composites subjected to blast loads," *Journal of Composite Materials*, DOI: 10.1177/0021998311430160, **46**:2167-2178, 2012.

J17. A. Krishnan and **C. Oskay**, "Modeling compression-after-impact response of polymer matrix composites subjected to seawater aging," *Journal of Composite Materials,* DOI: 10.1177/0021998311433343, **46**:2851-2861, 2012.

J18. T. Hui and **C. Oskay**, "A nonlocal homogenization model for wave dispersion in dissipative composite materials," *International Journal for Solids and Structures*, DOI:10.1016/j.ijsolstr.2012.09.007, **50**:38-48, 2013.

J19. R. Crouch, **C. Oskay** and S. B. Clay, "Multiple spatio-temporal scale modeling of composites subjected to cyclic loading," *Computational Mechanics*, DOI: 10.1007/s00466-012-0707-9, **51**:93-107, 2013.

J20. M. J. Bogdanor, S. Mahadevan and **C. Oskay**, "Uncertainty Quantification in Damage Modeling of Heterogeneous Materials," *International Journal for Multiscale Computational Engineering*, DOI: 10.1615/IntJMultCompEng.2013005821, **11**:289-307, 2013.

J21. P. Sparks and **C. Oskay**, "Identification of optimal reduced-order multiscale models for failure modeling of heterogeneous materials," *International Journal for Multiscale Computational Engineering,* DOI: 10.1615/IntJMultCompEng.2013005373, **11**:185-200, 2013.

J22. R. Crouch, S. B. Clay and **C. Oskay**, "Experimental and computational investigation of progressive damage in graphite/epoxy composites," *Composites Part B: Engineering*, DOI: 10.1016/j.compositesb.2012.12.005, **48**:59-67, 2013.

J23. H. Yan and **C. Oskay**, "A three-field (displacement-pressure-concentration) formulation for coupled transport-deformation problems," *Finite Elements in Analysis and Design,* DOI: 10.1016/j.finel.2014.06.005, **90**:20-30, 2014.

J24. **C. Oskay**, "Variational multiscale enrichment method with mixed boundary conditions for modeling diffusion and deformation problems," *Computer Methods in Applied Mechanics and Engineering*, DOI: 10.1016/j.cma.2013.05.022, **264**:178-190, 2013.

J25. D. T. Pierce, J. A. Jimenez, and J. Bentley, D. Raabe, **C. Oskay** and J. E. Wittig, "The influence of manganese content on the stacking-fault and austenite/ε-martensite interfacial energies in Fe-Mn-(Al-Si) steels investigated by experiment and theory," *Acta Materialia*, DOI: 10.1016/j.actamat.2014.01.001, **68**:238-253, 2014.

J26. T. Hui and **C. Oskay**, "A high order homogenization model for transient dynamics of heterogeneous media including micro-inertia effects," *Computer Methods in Applied Mechanics and Engineering*, DOI: 10.1016/j.cma.2014.01.028, **273**:181-203, 2014.

J27. M. G. Pike and **C. Oskay**, "Modeling random short nanofiber- and microfiber- reinforced composites using the extended finite element method," *ASCE Journal of Nanomechanics and Micromechanics*, DOI: 10.1061/(ASCE)NM.2153-5477.0000092, **5**:A4014005, 2015.

J28. R. D. Crouch and **C. Oskay**, "Accelerated time integrator for multiple time scale homogenization," *International Journal for Numerical Methods in Engineering*, DOI: 10.1002/nme.4863, **101**:1019-1042, 2015.

J29. T. Hui and **C. Oskay**, "Laplace-domain, high-order homogenization for transient dynamic response of viscoelastic composites," *International Journal for Numerical Methods in Engineering*, DOI: 10.1002/nme.4916, **103**:937-957, 2015.

J30. H. Yan and **C. Oskay**, "A viscoelastic-viscoplastic model of titanium structures subjected to thermo-chemo-mechanical environment," *International Journal of Solids and Structures*, DOI: 10.1016/j.ijsolstr.2014.12.012, **56-57**:29-42, 2015.

J31. S. Zhang and **C. Oskay**, "Variational multiscale enrichment method with mixed boundary conditions for elasto-viscoplastic problems," *Computational Mechanics*, DOI: 10.1007/s00466-015-1135-4, **55**:771-787, 2015.

J32. M. G. Pike and **C. Oskay**, "XFEM modeling of short microfiber reinforced composites with cohesive interfaces," *Finite Elements in Analysis and Design*, DOI: 10.1016/j.finel.2015.07.007, **106**:16-31, 2015.

J33. M. J. Bogdanor, **C. Oskay** and S. B. Clay, "Multiscale modeling of failure in composites under model parameter uncertainty," *Computational Mechanics*, DOI: 10.1007/s00466-015-1177-7, **56**:389-404, 2015.

J34. X. Zhang and **C. Oskay**, "Eigenstrain based reduced order homogenization for polycrystalline materials," *Computer Methods in Applied Mechanics and Engineering,* DOI: 10.1016/j.cma.2015.09.006, **297**:408-436, 2015.

J35. M. G. Pike, M. A. Hickman and **C. Oskay**, "Interactions between multiple enrichments in extended finite element analysis of short fiber reinforced composites," *International Journal for Multiscale Computational Engineering*, DOI: 10.1615/IntJMultCompEng.2015015486, **13**:507-531, 2015.

J36. S. Zhang and **C. Oskay**, "Reduced order variational multiscale enrichment method for elasto-viscoplastic problems," *Computer Methods in Applied Mechanics and Engineering,* DOI: 10.1016/j.cma.2015.11.020, **300**:199-224, 2016, 2015.

J37. X. Zhang and **C. Oskay**, "Polycrystal plasticity modeling of nickel-based superalloy in 617 subjected to cyclic loading at high temperature," *Modelling and Simulation in Materials Science and Engineering*, DOI: 10.1088/0965-0393/24/5/055009, **24**:055009, 2016.

J38. M. G. Pike and **C. Oskay**, "Three dimensional modeling of short fiber reinforced composites with the extended finite element method," *Journal of Engineering Mechanics*, DOI: 10.1061/(ASCE)EM.1943-7889.0001149, **142**:04016087, 2016.

J39. P. A. Sparks and **C. Oskay**, "The method of failure paths for reduced-order computational homogenization," *International Journal for Multiscale Computational Engineering*, DOI: 10.1615/IntJMultCompEng.2016018702, **14**:515-534, 2016.

J40. R. Hu and **C. Oskay**, "Nonlocal homogenization model for elastic wave dispersion and attenuation in heterogeneous media: one-dimensional case," *Journal of Applied Mechanics,* **84**:031003, 2017.

J41. R. Hu, C. Prakash, V. Tomar, M. Harr, I. E. Gunduz and **C. Oskay**, "Experimentally-validated mesoscale modeling of the coupled mechanical-thermal response of AP-HTPB energetic material under dynamic loading," *International Journal of Fracture*, DOI: 10.1007/s10704-016-0141-7, **203**:277-298, 2017.

J42. M. J. Bogdanor, **C. Oskay**, "Prediction of progressive damage and strength of IM7/977-3 composites using the eigendeformation based homogenization approach: Static loading," *Journal of Composite Materials*, DOI: 10.1177/0021998316650982, **51**:1455-1472, 2017.

J43. M. J. Bogdanor, **C. Oskay**, "Prediction of progressive fatigue damage and failure behavior of IM7/977-3 composites using the reduced-order multiple space-time homogenization approach," *Journal of Composite Materials*, DOI: 10.1177/0021998316665683, **51**:2101-2117, 2017.

J44. S. Zhang and **C. Oskay**, "Reduced order variational multiscale enrichment method for thermo-mechanical problems," *Computational Mechanics*, DOI: 10.1007/s00466-017-1380-9, **59**:887-907, 2017.

J45. H. Yan and **C. Oskay**, "Multi-yield surface modeling of viscoplastic materials," *International Journal for Multiscale Computational Engineering*, DOI: 10.1615/IntJMultCompEng.2017020087, **15**:121-142, 2017.

J46. X. Zhang and **C. Oskay**, "Sparse and scalable eigenstrain-based reduced order homogenization models for polycrystal plasticity," *Computer Methods in Applied Mechanics and Engineering,* DOI: 10.1016/j.cma.2017.07.027, **326**:241-269, 2017.

J47. V. T. Phan, X. Zhang, Y. Li, and **C. Oskay**, "Microscale modeling of creep deformation and rupture in nickel-based superalloy in 617 at high temperature," *Mechanics of Materials*, DOI: 10.1016/j.mechmat.2017.08.008, **114**:215-227, 2017.

J48. S. Zhang and **C. Oskay**, "Hybrid multiscale integration for directionally scale separable problems," *International Journal for Numerical Methods in Engineering*, DOI: 10.1002/nme.5719, **113**:1755-1778, 2018.

J49. X. Y. Zhang and **C. Oskay**, "Material and morphology parameter sensitivity analysis in particulate composite materials," *Computational Mechanics*, DOI: 10.1007/s00466-017-1512-2, **62**:543-561, 2018.

J50. Y. Liu, Z. Yigui, **C. Oskay**, H. Ping, Y. Liang, and W. Dantong, "Experimental and computational study of microstructural effect on ductile fracture of hot-forming materials," *Materials Science and Engineering: A*, DOI: 10.1016/j.msea.2018.03.049, **724**:298-323, 2018.

J51. C. Prakash, I. Gunduz, **C. Oskay** and V. Tomar, "Effect of interface chemistry and strain rate on strain rate dependent particle-matrix delamination in an energetic material," *Engineering Fracture Mechanics*, DOI: 10.1016/j.engfracmech.2018.01.010, **191**:46-64, 2018.

J52. R. Hu and **C. Oskay**, "Spatial-temporal nonlocal homogenization model for transient anti-plane shear wave propagation in periodic viscoelastic composites," *Computer Methods in Applied Mechanics and Engineering*, DOI: 10.1016/j.cma.2018.07.037, **342**:1-31, 2018.

J53. A. Fascetti and **C. Oskay**, "Dual Random Lattice Modeling of Backward Erosion Piping," *Computers and Geotechnics*, DOI: 10.1016/j.compgeo.2018.08.018, **105**:265-276, 2019.

J54. R. Hu and **C. Oskay**, "Multiscale Nonlocal Effective Medium Model for In-plane Elastic Wave Dispersion and Attenuation in Periodic Composites," *Journal of the Mechanics and Physics of Solids*, DOI: 10.1016/j.jmps.2018.10.014, **124**:220-243, 2019.

J55. J.T. Benzing, Y. Liu, X. Zhang, W.E. Luecke, A. Dutta, D. Ponge, J. Han, J. Bentley, **C. Oskay**, D. Raabe, J.E. Wittig, "Influences of strain rate on mechanical properties of a multi-phase medium-Mn TWIP-TRIP steel," *Acta Materialia*, DOI: 10.1016/j.actamat.2019.07.036, **177**:250-265, 2019.

J56. M. J. Bogdanor, S. B. Clay and **C. Oskay**, "Interacting damage mechanisms in laminated composites subjected to high amplitude fatigue," *Journal of Engineering Mechanics*, DOI: 10.1061/(ASCE)EM.1943-7889.0001655, **145**:04019083, 2019.

J57. X. Y. Zhang and **C. Oskay**, "Plastic Dissipation Sensitivity to Mechanical Properties in Polycrystalline β-HMX Subjected to Impact Loading," *Mechanics of Materials*, DOI: 10.1016/j.mechmat.2019.103079, **138**:103079, 2019.

J58. A. Fascetti and **C. Oskay**, "Multiscale Modeling of Backward Erosion Piping in Flood Protection System Infrastructure," *Computer-Aided Civil and Infrastructure Engineering*, DOI: 10.1111/mice.12489, **34**:1071-1086, 2019.

J59. **C. Oskay**, Z. Su and B. Kapusuzoglu, "Discrete Eigenseparation-based Reduced Order Homogenization Method for Failure Modeling of Composite Materials," *Computer Methods in Applied Mechanics and Engineering*, DOI:10.1016/j/cma.2019.112656, **359**:112656, 2020.

J60. R. Hu and **C. Oskay**, "Spectral Variational Multiscale Model for Transient Dynamics of Phononic Crystals and Acoustic Metamaterials," *Computer Methods in Applied Mechanics and Engineering*, DOI:10.1016/j.cma.2019.112761, **359**:112761, 2020.

J61. Y. Liu, X. Zhang, Y. Zhu, P. Hu and **C. Oskay**, "Dislocation Density Informed Eigenstrain Based Reduced Order Homogenization Modeling: Verification and Application on a Titanium Alloy Structure Subjected To Cyclic Loading," *Modelling Simul. Mater. Sci. Eng.,* DOI: 10.1088/1361-651X/ab602e, **28**:025004, 2020.

J62. Z. Su and **C. Oskay**, "Mesh Size Objective Fatigue Damage Propagation in Laminated Composites using the Multiscale Discrete Damage Theory," *Computational Mechanics*, DOI: 10.1007/s00466-021-01978-7, **67**:969-987, 2021.

J63. X. Y. Zhang and **C. Oskay**, "Modeling and Numerical Investigation of Mechanical Twinning in beta-HMX Crystals Subjected to Shock Loading," *Modelling and Simulation in Materials Science and Engineering*, DOI: 10.1088/1361-651X/ac21a6, **29**:075009, 2021.

J64. D. Xia, X. Zhang and **C. Oskay**, "Large-Deformation Reduced Order Homogenization of Polycrystalline Materials," *Computer Methods in Applied Mechanics and Engineering*, DOI: 10.1016/j.cma.2021.114119, **387**:114119, 2021.

J65. X. Zhang, Y. Liu and **C. Oskay**, "Multiscale Reduced Order Modeling of a Titanium Supersonic Skin Panel Subjected to Thermo-Mechanical Loading," *AIAA Journal*, DOI:10.2514/1.J060497, DOI: 10.2514/1.J060497, 2021.

J66. T. Schlick, S. Portillo-Ledesma, M. Blaszczyk, L. Dalessandro, S. Ghosh, K. Hackl, C. Harnish, S. Kotha,D. Livescu, A. Masud, Karel Matouš, A. Moyeda, **C. Oskay** and J. Fish, "A Multiscale Vision – Illustrative Applications from Biology to Engineering," *International Journal for Multiscale Computational Engineering*, **19**:37-73, 2021.

J67. X. Y. Zhang, Y. Liu and **C. Oskay,** "Uncertainty Quantification for Microstructure-Sensitive Fatigue Nucleation and Application to Titanium Alloy, Ti6242," *Frontiers in Materials*, **9**:897998, 2022.

J68. Z. Su and **C. Oskay**, "Modeling Arbitrarily Oriented and Reorienting Multiscale Cracks in Composite Materials with Adaptive Multiscale Discrete Damage Theory," *Computational Mechanics*, **70**:1041–1058, 2022.

J69. A. Faupel, I. Meshi and C. Oskay, "Reduced Order Multiscale Model for Compression Kink-Band Failure in Composites," *Journal of Composite Materials*, **56**:3385-3400, 2022.

J70. Y. Liu, X. Zhang and **C. Oskay**, "A Comparative Study on Fatigue Indicator Parameters for Near-α Titanium Alloys," *Fatigue and Fracture of Engineering Materials and Structures*, **46**:271-294, 2023.

J71. D. Xia and **C. Oskay**, "Reduced Order Mathematical Homogenization Method for Polycrystalline Microstructure with Microstructurally Small Cracks" *International Journal for Numerical Methods in Engineering*, **124**:3166–3190, 2023.

J72. A. Nasirov, X. Zhang, D. Wagner, S. R. Yeratapally and **C. Oskay**, "Achieving High Efficiency in Reduced Order Modeling for Large Scale Polycrystal Plasticity Simulations," *Finite Elements in Analysis and Design*, **228**:104053, 2023.

J73. D. Xia and **C. Oskay**, "Proper Orthogonal Decomposition Assisted Eigendeformation-based Mathematical Homogenization Method for Modeling Cracks in 3D Polycrystalline Microstructures," *Computer Methods in Applied Mechanics and Engineering*, **418**:116508, 2024.

J74. S. Clay, W. Ault, A. Faupel, **C. Oskay**, P. Knoth, N. N. Y. Shemesh, R. Haj-Ali, U. Breiman, I. Meshi, and O. Shor "Experimental Characterization of Compression Failure Mechanism Initiation and Growth in Notched Carbon Fiber Reinforced Composite Specimens," *Composites Part A*, **176**: 107865, 2024.

J75. V. Subraveti, B. Richter, S. R. Yeratapally and **C. Oskay**, "Three-Dimensional Prediction of Lack-of-Fusion Porosity Volume Fraction and Morphology for Powder Bed Fusion Additively Manufactured Ti-6Al-4V," *Integrating Materials and Manufacturing Innovation*, **13**:511-525, 2024.

J76. Z. Su, N. Carvalho, M. W. Czabaj and **C. Oskay**, "Image-based Inverse Characterization of In-situ Microscopic Composite Properties," *Computational Mechanics*, **74**:763-778, 2024.

J77. Z. Wang, **C. Oskay** and A. Fascetti, "Three-Dimensional Numerical Modeling of the Temporal Evolution of Backward Erosion Piping," *Computers and Geotechnics*, **171**:106381, 2024.

J78. A. Nasirov and **C. Oskay**, "A Reduced Order Variational Spectral Method for Efficient Construction of Eigenstrain-based Reduced Order Homogenization Models," *International Journal for Numerical Methods in Engineering*, in press, 2024.

J79. A. Faupel and **C. Oskay**, "Computational Analysis of the Failure Mechanisms of a Laminated Composite in Double-Edge Notch Compression Configuration," *Composite Structures*, **344**:118281, 2024.

J80. Y. Wang, C. Negron, A. Khoshnaw, S. Edwards, H. Vu, J. Quatela, N. Park, F. Maldonado, C. Demarest, V. Simon, **C. Oskay** and X. Dong, "Sensory Artificial Cilia for In Situ Monitoring of Airway Physiological Properties," *Proceedings of the National Academy of Sciences (PNAC)*, **121**: e2412086121, 2024.

J81. A. Nasirov and **C. Oskay**, "An Affine Formulation of Eigenstrain-based Homogenization Method and Its Application to Polycrystal Plasticity," *Modelling Simul. Mater. Sci. Eng*, **32**:085017, 2024.

J82. Z. Wang, **C. Oskay** and A. Fascetti, "Backward Erosion Piping in Geotechnical Infrastructure: A Rate Process Perspective," *Geotechnique*, **75**:486-500, 2025.

J83. Z. Wang, **C. Oskay** and A. Fascetti, "Multiscale Stochastic Modeling of Backward Erosion Piping Initiation, From Grain Kinetics to Weibull Statistics. Part I: Analytical Derivations," *International Journal for Numerical and Analytical Methods in Geomechanics*, **49**:1262-1277, 2025.

J84. Z. Wang, **C. Oskay** and A. Fascetti, "Multiscale Stochastic Modeling of Backward Erosion Piping Initiation, From Grain Kinetics to Weibull Statistics. Part II: Model Validation and Applications," *International Journal for Numerical and Analytical Methods in Geomechanics*, **49**:1247-1261, 2025.

J85. B. Richter, J. D. Pribe, G. R. Weber, V. Subraveti and **C. Oskay**, "Analytical Prediction of Lack-of-Fusion Porosity Including Uncertainty and Variable Melt Pools for Powder Bed Fusion," *Additive Manufacturing*, **103**:104733, 2025.

J86. A. Arora, B. M. Ward and **C. Oskay**, "An implementation of the finite element method in hybrid classical/quantum computers," *Finite Elements in Analysis and Design*, **103**:104733, 2025.

J87. **C. Oskay**, "Quantum Computing – Promise of a New Future for Computational Mechanics," *IACM Expressions*, **55**:2-7, 2025.

J88. V. Subraveti, B. Richter, J. D. Pribe, G. R. Weber and **C. Oskay**, "Process Uncertainty Analysis of Stochastic Lack-of-Fusion Defects in Laser Powder Bed Fused Inconel 718," *Integrating Materials and Manufacturing Innovation*, **14**:657-678, 2025.

J89. A. Arora and **C. Oskay**, "Variational multiscale enrichment method for dynamic response of hyperelastic materials at finite deformation," *Journal of Applied Mechanics*, **93**:021002, 2026.

J90. A. Nasirov and **C. Oskay**. Surrogate-enhanced higher order eigenstrain-based reduced order homogenization for polycrystal plasticity. *Computer Methods in Applied Mechanics and Engineering*, **452**:118772, 2026.

Refereed Conference Proceedings –

C1. M. Zeghal, **C. Oskay**, M. K. Sharp and R. Dobry, "Visual interpretation of site dynamic response,'' *Proceedings of the 7th US-Japan Workshop on Earthquake Resistant Design of Lifeline Facilities and Countermeasures Against Liquefaction*, Seattle, WA, August 15-17, 1999.

C2. **C. Oskay** and M. Zeghal, "Identification and analyses of the deformation of soil systems subjected to seismic excitations,'' *Proceedings of the XVth International Conference on Soil Mechanics and Geotechnical Engineering*, Istanbul, Turkey, August 27-31, 2001.

C3. T. Abdoun, **C. Oskay**, Y. Wang, C-J. Lee and M. Zeghal, "Visualization of measured quay wall seismic response,'' *Proceedings of the XVth International Conference on Soil Mechanics and Geotechnical Engineering*, Istanbul, Turkey, August 27-31, 2001.

C4. **C. Oskay** and M. Zeghal, "Identification of the dynamic response of soil systems," *Proceedings of the 15th ASCE Engineering Mechanics Division Conference*, New York, NY, June 2-5, 2002.

C5. **C. Oskay**, P. V. Kallou, M. Zeghal and T. Abdoun, "Visualization of the seismic response of soil systems,'' *Proceedings of the 1st International Conference on Physical Modeling in Geotechnics*, St. John's, Newfoundland, Canada, July 2002.

C6. M. Zeghal, T. Abdoun and **C. Oskay**, "A novel shape-acceleration array and local identification of geotechnical systems," *International Workshop for Site Selection, Installation and Operation of Geotechnical Strong-Motion Arrays: Inventory of Current and Planned Arrays*, Los Angeles, CA, October 14-15, 2004.

C7. **C. Oskay** and J. Fish, "A multiscale model of composite failure under impact," *Proceedings of the ASME 2006 International Mechanical Engineering Congress and Exposition*, Chicago, IL, November 5-10, 2006.

C8. **C. Oskay**, "A multiscale failure model for thin heterogeneous plates," *Proceedings of the American Society for Composites – 23rd Technical Conference*, Memphis, TN, September 9-11, 2008.

C9. R. Crouch, **C. Oskay**, S. Clay, "Multiscale modeling of damage accumulation in carbon fiber reinforced polymers subjected to fatigue," *Proceedings of the 53rd AIAA/ASME/ ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*, Honolulu, HI, April 23-26, 2012.

C10. M. G. Pike, **C. Oskay** and F. Sanchez, "Multiscale computational methodology for the mechanical response of nano- and micro-fiber reinforced cementitious composites," *International US-Poland workshop on Multiscale Computational Modeling of Cementitious Materials (MCMoCM 2012)*, Cracow, Poland, October 18-19, 2012.

C11. M. J. Bogdanor, R. D. Crouch, S. B. Clay and **C. Oskay**, "Modeling rate dependent damage evolution in composite structures," *Proceedings of the 54th AIAA Structures, Structural Dynamics, and Materials*, Boston, MA, April 8-11, 2013.

C12. **C. Oskay** and H. Yan, "Modeling the coupled transport-deformation response of titanium alloys subjected to thermo-mechanical environment," *Proceedings of the AIAA Science and Technology Forum and Exposition 2014*, National Harbor, MD, January 13-17, 2014.

C13. R. D. Crouch, **C. Oskay** and S. B. Clay, "Fast life prediction model for composites based on multiple temporal scale homogenization," *Proceedings of the AIAA Science and Technology Forum and Exposition 2014*, National Harbor, MD, January 13-17, 2014.

C14. M. J. Bogdanor and **C. Oskay**, "Application of reduced order multiscale homogenization to 'assess and quantify the benefits of applying damage tolerant design principles to advanced composite aircraft structures," *Proceedings of the AIAA Science and Technology Forum and Exposition 2015*, Kissimmee, FL, January 5-9, 2015.

C15. M. J. Bogdanor and **C. Oskay**, "Fatigue life prediction of im7/977-3 composite laminates with multispatial/multitemporal homogenization," *Proceedings of the AIAA Science and Technology Forum and Exposition 2016*, San Diego, CA, January 4-8, 2016.

C16. X. Zhang, V. T. Phan and **C. Oskay**, "Microstructural creep, fatigue and creep-fatigue modeling of nickel-based superalloy inconel 617 at high temperature," *Proceedings of the High Temperature Reactor Technology (HTR) Meeting 2016*, Las Vegas, NV, November 7-10, 2016.

C17. X. Zhang and **C. Oskay**, "Eigenstrain-based reduced order homogenization models for polycrystal plasticity: addressing scalability," *Proceedings of the XIV International Conference on Computational Plasticity*, Fundamentals and Applications, Barcelona, Spain, September 5-7, 2017.

C18. W. J. Paulson and **C. Oskay**, "Failure prediction of countersunk composite bolted joints using reduced order multiple space-time homogenization," *Proceedings of the 32th American Society for Composites Conference*, West Lafayette, IN, October 23-25, 2017.

C19. M. J. Bogdanor and **C. Oskay**, "Multiscale modeling of composites subjected to fatigue loading," *Proceedings of the 32th American Society for Composites Conference*, West Lafayette, IN, October 23-25, 2017.

C20. W. J. Paulson and **C. Oskay**, "Prediction of the behavior of composite bolted joints subjected to fatigue loading using the reduced order multiple space-time homogenization," *Proceedings of the AIAA Science and Technology Forum and Exposition 2018,* Kissimmee, FL, January 8-12, 2018.

C21. **C. Oskay** and C. Tian, "A New Approach to Alleviating Mesh Size Independence in Multiscale Fatigue Life Prediction in Composites," *Proceedings of the 33rd Annual American Society for Composites Technical Conference*, Seattle, WA, September 24-26, 2018.

C22. Z. Su and **C. Oskay**, "Prediction of Fatigue Failure in Fibrous Composites using the Reduced-Order Multiscale Discrete Damage Theory," *Proceedings of the SAMPE Conference*, Charlotte, NC, May 20-23, 2019.

C23. A. Fascetti and **C. Oskay**, "Performance-Based Design of Flood Protection Infrastructure," *Proceedings of the 2019 International Conference on Sustainable Infrastructure*, Los Angeles, CA, November 6-9, 2019.

C24. X. Y. Zhang and **C. Oskay**, "Uncertainty Quantification for Fatigue Nucleation in Titanium Alloy Microstructures," *Proceedings of the AIAA Science and Technology Forum and Exposition 2020.* Virtual Conference, January 11-15, 2021.

C25. A. Faupel and **C. Oskay**, "Modeling the Compress-after-impact Behavior of a Z-pinned Composite Laminate," *Proceedings of the AIAA Science and Technology Forum and Exposition 2020.* Virtual Conference, January 11-15, 2021.

C26. Z. Su and **C. Oskay**, "Achieving Mesh-Size Objectivity in Fatigue Damage Analysis in Laminated Composites," *Proceedings of the AIAA Science and Technology Forum and Exposition 2020.* Virtual Conference, January 11-15, 2021.

C27. M. Lin, Y. Liu, **C. Oskay** and X. Zhang, "Microstructure-Informed Reduced-Order Modeling of Fatigue Initiation in a Titanium Skin Panel Subjected to Thermo-Mechanical Loading," *Proceedings of the AIAA Science and Technology Forum and Exposition 2022,* January *3-7,* 2022.

C28. A. Faupel and C. Oskay, "Multiscale Modeling of Failure Mechanisms in Multidirectional Double-Edge Notch Compression Specimens," *Proceedings of the American Society for Composites (ASC) 38th Annual Technical Conference*, Boston, MA, September 17-20, 2023.

C29. M. Abdelghany, G. Charalampous, M. B. On, Y.-J. Lee, J. Wang, A. Nasirov, Z. Bai, **C. Oskay** and S. J. B. Yoo, "Microring Resonator based Photonic Circuits as Limited Precision Differential Equation Solvers," *Proceedings of the Annual Conference of the IEEE Photonics Society*, Rome, Italy, November 10-14, 2024.

PRESENTATIONS

Italic indicates presenter; Underline indicates graduate student or postdoc.

Plenary and Keynote Lectures –

P1. ***C. Oskay*** and D. Xia, "Modeling Strategies for Short Fatigue Cracks in 3D Polycrystalline Materials," **Symposium Keynote Lecture** at the *16th World Congress on Computational*

Mechanics and 4th Pan American Congress on Computational Mechanics, Vancouver, BC, Canada, July 21-26, 2024.

P2. ***C. Oskay*** and D. Xia, "Reduced Order Multiscale Modeling of Polycrystalline Materials with Microstructurally-Short Cracks Through POD Enhanced EHM," **Symposium Keynote Lecture** at the *17th U.S. National Congress on Computational Mechanics*, Albuquerque, NM, July 23 – 27, 2023.

P3. ***C. Oskay,*** D. Xia, X. Xiang and A. Nasirov, "A New Finite Strain Reduced Order Multiscale Formulation for Polycrystalline Materials," **Symposium Keynote Lecture** at the *8th European Congress on Computational Methods in Applied Sciences and Engineering*, Oslo, Norway, June 5 – 9, 2022.

P4. ***C. Oskay***, "Multiscale Modeling of Fracture in Composite Materials and Structures," **Conference Plenary Lecture** at the *22nd Turkish National Congress on Mechanics*, Virtual Conference, September 6 – 10, 2021.

P5. ***C. Oskay***, "Stochastic Multiscale Prediction of Failure Initiation in Polycrystalline Materials," **Conference Plenary Lecture** at the *ASCE Engineering Mechanics Institute International Conference*, Virtual Conference, March 22 – 24, 2021.

P6. ***C. Oskay***, "Multiscale Methods for Unraveling Unique Dynamic Behavior of Architected Materials," **Conference Semi-Plenary Lecture** at the *15th US National Congress on Computational Mechanics*, Austin, TX, July 28 – August 1, 2019.

P7. ***C. Oskay***, "Prediction of Localized Events in Multiscale Simulations: Achieving Failure Initiation Predictions in Large Scale Structural Simulations," **Distinguished Lecture** at the Virtual *ASME International Mechanical Engineering Congress and Exposition (IMECE)*, November 16 – 19, 2020.

P8. ***C. Oskay***, "Multiscale Modeling of Fiber Kink Band Formation and Propagation in Composite Laminates under Compression," **Symposium Keynote Lecture** at the *14th World Congress on Computational Mechanics*, Paris, France, July 19 – 23, 2020 (*Canceled due to COVID pandemic*).

P9. X. Zhang, Yang Liu and ***C. Oskay***, "Coupling Crystal Plasticity with Structural Mechanics for Prediction of Failure Initiation in Large Scale Structures," **Symposium Keynote Lecture** at the *6th European Conference on Computational Mechanics*, Glasgow, UK, June 11 – 15, 2018.

P10. ***C. Oskay***, "A multiscale-multiphysics computational framework for modeling embrittlement in heterogeneous materials," **Symposium Keynote Lecture** at the *6th European Congress on Computational Methods in Applied Sciences and Engineering*, Vienna, Austria, September 12, 2012.

P11. ***C. Oskay*** and J. Fish "Mesoscale modeling of fragmentation and failure in composites" **Symposium Keynote Lecture** at the *7th World Congress on Computational Mechanics,* Los Angeles CA, July 19, 2006.

Conference Presentations –

P12. A. Arora, G. Odenyo, Z. Zhang, Y. Chen and ***C. Oskay***, "Variational multiscale enrichment method for dynamic response of hyperelastic materials at finite deformation," **Invited presentation** at *Amerimech Symposium on Mechanics of Materials in Extreme Environments*, Providence, RI, September 22-24, 2025.

P13. A. Arora and ***C. Oskay***, "Variational multiscale enrichment method for dynamic response of hyperelastic materials at finite deformation," *XVIII International Conference on Computational Plasticity (COMPLAS 2025)*, Barcelona, Spain, September 2-5, 2025.

P14. A. Nasirov and ***C. Oskay***, "Improving Accuracy of Eigenstrain Homogenization Method for Modeling Polycrystalline Microstructures," *18th U.S. National Congress on Computational Mechanics (USNCCM18)*, Chicago, IL, July 20-24, 2025.

P15. *S. Narra*, B. Webler, M. Mousavi-Taheri, T. Sun, **C. Oskay**, L. Ma, K. O'Donnell and A. Rollett, "Building a digital twin of metals additive manufacturing for fatigue modeling," *18th U.S. National Congress on Computational Mechanics (USNCCM18)*, Chicago, IL, July 20-24, 2025.

P16. *A. Nasirov* and **C. Oskay**, "Towards solving mechanics problems using photonic in-memory computing devices," *18th U.S. National Congress on Computational Mechanics (USNCCM18)*, Chicago, IL, July 20-24, 2025.

P17. A. Arora, T. Philo, B. M. Ward and ***C. Oskay***, "VQLS-based Quantum Finite Element Method (QFEM) Implementation for Hybrid (Quantum/Classical) Computers," *18th U.S. National Congress on Computational Mechanics (USNCCM18)*, Chicago, IL, July 20-24, 2025.

P18. *A. Arora* and **C. Oskay**, "Variational multiscale enrichment method for dynamic response of hyperelastic materials at finite deformation," *18th U.S. National Congress on Computational Mechanics (USNCCM18)*, Chicago, IL, July 20-24, 2025.

P19. *V. Subraveti*, J. Coleman, A. Plotkowski and **C. Oskay**, "Modeling of stochastic lack-of-fusion defects within the process window for laser powder bed fusion," *18th U.S. National Congress on Computational Mechanics (USNCCM18)*, Chicago, IL, July 20-24, 2025.

P20. *G. Odenyo* and **C. Oskay**, "Multilayered fractal architected materials for impact energy absorption," *Engineering Mechanics Institute Conference*, Anaheim, CA, May 27-30, 2025.

P21. A. Nasirov and ***C. Oskay***, "Towards Solving Mechanics Problems using Photonic In-Memory Computing Devices," *Engineering Mechanics Institute Conference*, Anaheim, CA, May 27-30, 2025.

P22. *Z. Wang*, A. Fascetti and **C. Oskay**, "Multiscale Stochastic Modeling of Backward Erosion Piping Initiation: A Grain Kinetics-Based Probabilistic Approach," *Engineering Mechanics Institute Conference*, Anaheim, CA, May 27-30, 2025.

P23. A. Nasirov and ***C. Oskay***, "On Efficiency and Accuracy of Eigenstrain Homogenization Method for Modeling Polycrystalline Materials," *ECCOMAS Thematic Conference: Computational Modeling of Complex Materials Across the Scales (CMCS),* Champs-sur-Marne, France, May 13-16, 2025.

P24. A. Nasirov and ***C. Oskay***, "On Improving Efficiency and Accuracy of Reduced Order Models for Multiscale Analysis of Polycrystalline Behavior," *International Mechanical Engineering Congress & Exposition*, Portland, OR, November 17-21, 2024.

P25. *V. Subraveti* and **C. Oskay**, "Data-Driven Process Uncertainty Analysis of Stochastic Lack-of- Fusion in Laser Powder Bed Fusion," **Invited presentation** at *Materials Science and Technology (MS&T'24) Technical Meeting and Exhibition*, Pittsburgh, PA, October 6-9, 2024.

P26. *L. Levine*, H. Millwater, Corbett Battaile, E. H. Glaessgen, M. Kane, S. Mahadevan, **C. Oskay**, C. Popelar, T. Rollett, E. Schwalbach, P. Toivonen, D. Lamm and N. Raghavan,

"Transitioning from Basic Research to Industrial Applications for Metal AM Components," **Invited presentation** at *Materials Science and Technology (MS&T'24) Technical Meeting and Exhibition*, Pittsburgh, PA, October 6-9, 2024.

P27. ***C. Oskay*** and X. Zhang, "Quantification of Microstructure-Induced Uncertainty in Fatigue Nucleation in Polycrystalline Materials," **Invited presentation** at *Materials Science and Technology (MS&T'24) Technical Meeting and Exhibition*, Pittsburgh, PA, October 6-9, 2024.

P28. ***C. Oskay*** and D. Xia, "Modeling Microstructurally Short Cracks in 3D Polycrystalline Microstructures to Predict Fatigue Initiation Behavior in Metals and Alloys," **Invited presentation** at *4th International Workshops on Advances in Computational Mechanics (IWACOM-IV)*, Kitakyushu, Japan, September 18-20, 2024.

P29. A. Nasirov and ***C. Oskay***, "Training Efficiency and Accuracy Improvement Strategies for Reduced Order Homogenization," *9th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS)*, Lisbon, Portugal, June 3-7, 2024.

P30. *Z. Wang*, **C. Oskay** and A. Fascetti, "A Dual Random Lattice Model for the Simulation of the Time Evolution of Backward Erosion Piping," *Engineering Mechanics Institute Conference*, Chicago, IL, May 28-31, 2024.

P31. *V. Subraveti* and **C. Oskay**, "Data-Driven Process Uncertainty Analysis of Stochastic Lack-Of-Fusion in Laser Powder Bed Fusion," *Engineering Mechanics Institute Conference*, Chicago, IL, May 28-31, 2024.

P32. ***C. Oskay***, A. Arora and B. M. Ward, "Element Stiffness-Based Matrix Decomposition for Quantum Computing Implementation of the Finite Element Method," *Engineering Mechanics Institute Conference*, Chicago, IL, May 28-31, 2024.

P33. A. Nasirov and ***C. Oskay***, "Efficient Computation of Reduced Order Basis for Eigenstrain Homogenization Method for Multiscale Polycrystal Plasticity Simulations," *Engineering Mechanics Institute Conference*, Chicago, IL, May 28-31, 2024.

P34. *A. Faupel* and **C. Oskay**, "On Calibration And Validation of a Cohesive Zone Model for Mixed-Mode Delamination in Z-Pinned Composites," *Engineering Mechanics Institute Conference*, Chicago, IL, May 28-31, 2024.

P35. *B. Richter*, J. D. Pribe, S. J. A. Hocker, V. R. Subraveti, **C. Oskay** and E. H. Glaessgen, "Quantifying Performance Impacts of Microstructure and Defect Interactions on Powder Bed Fusion Parts Using Integrated Computational Materials Engineering," *International Conference on Advanced Manufacturing*, Washington, D.C., October 30-November 3, 2023.

P36. ***C. Oskay*** and D. Xia, "Reduced Order Modeling of Polycrystalline Microstructures with Defects," *Advances in Computational Mechanics (ACM) Conference*, Austin, TX, October 22-25, 2023.

P37. *A. Faupel* and **C. Oskay**, "Multiscale Modeling of Failure Mechanisms in Multidirectional Double-edge Notch Compression Specimens," *American Society of Composites 38th Annual Technical Conference*, Boston, MA, September 17-20, 2023.

P38. *A. Nasirov* and **C. Oskay**, "Towards Achieving High Efficiency in Reduced Order Modeling for Large Scale Polycrystal Plasticity Simulations," *17th U.S. National Congress on Computational Mechanics*, Albuquerque, NM, July 23 – 27, 2023.

P39. *V. Subraveti* and **C. Oskay**, "Lack-of-Fusion Porosity Prediction Integrated into Monte Carlo Framework for Additively Manufactured Ti-6Al-4V," presented at the *17th U.S. National Congress on Computational Mechanics*, Albuquerque, NM, July 23 – 27, 2023.

P40. *D. Xia* and **C. Oskay**, "Computationally Efficient Modeling of Microstructurally Short Cracks in Polycrystalline Materials," presented at the *Engineering Mechanics Institute Conference*, Atlanta, GA, June 6-9, 2023.

P41. *A. Faupel* and **C. Oskay**, "A Physics-based Homogenized Model of Composite Interfaces with Through-Thickness, Z-pin Reinforcements," presented at the *Engineering Mechanics Institute Conference*, Atlanta, GA, June 6-9, 2023.

P42. *D. Xia* and **C. Oskay**, "A Multiscale Reduced Order Model for Polycrystalline Microstructure with Cracks," presented at the *Engineering Mechanics Institute Conference*, Baltimore, MD, May 31-June 3, 2022.

P43. *Z. Su* and **C. Oskay**, "Data-Driven Inverse Characterization for In-situ Microscopic Composite Properties," presented at the *Engineering Mechanics Institute Conference*, Baltimore, MD, May 31-June 3, 2022.

P44. ***C. Oskay***, D. Adams, S. Mahadevan, F. Sanchez, R. Duddu, "From Aircraft to Airfield: Computational Tools for Ensuring Structural Integrity and Durability," presented at the *USACE Innovation Summit*, Virtual Event, October 25-29, 2021.

P45. *Z. Su* and **C. Oskay**, "Multiscale Reduced Order Discrete Damage Theory for Fracture of Composite Materials," presented at the *U.S. National Congress on Computational Mechanics*, Virtual Conference, July 25-29, 2021.

P46. *D. Xia* and **C. Oskay**, "Reduced Order Homogenization of Polycrystalline Materials Undergoing Large Deformation," presented at the *U.S. National Congress on Computational Mechanics*, Virtual Conference, July 25-29, 2021.

P47. *Z. Su* and **C. Oskay**, "Prediction of Fatigue Damage Propagation in Laminated Composites Using Reduced-Order Multiscale Discrete Damage Theory," presented at the *Engineering Mechanics Institute Virtual Conference*, May 25-28, 2021.

P48. ***C. Oskay*** and R. Hu, "Spectral Variational Multiscale Enrichment Method – A New Computational Approach to Transient Dynamics of Phononic Crystals and Acoustic Metamaterials," **Invited Presentation** presented at the Acoustic Society of America Spring 2021 Meeting, Virtual Conference, June 8-10, 2021.

P49. Z. Su and ***C. Oskay***, "Mesh Size Objective and Multiscale Fatigue Failure Prediction in Fiber Reinforced Composites," presented at the *ASCE Engineering Mechanics Institute International Conference*, Virtual Conference, March 22 – 24, 2021.

P50. *A. Faupel* and **C. Oskay**, "Modeling the Compression-After-Impact Behavior of a Z-pinned Composite Laminate," presented at the 2021 AIAA SciTech Forum, Virtual Conference, 11–15 & 19–21 January 2021.

P51. *X. Y. Zhang* and **C. Oskay**, "Uncertainty Quantification for Fatigue Nucleation in Titanium Alloy Microstructures," presented at the 2021 AIAA SciTech Forum, Virtual Conference, 11–15 & 19–21 January 2021.

P52. Z. Su and **C. Oskay**, "Achieving Mesh-Size Objectivity in Fatigue Damage Analysis in Laminated Composites," presented at the 2021 AIAA SciTech Forum, Virtual Conference, 11–15 & 19–21 January 2021.

P53. *I. Meshi* and **C. Oskay**, "A Multiscale Nonlocal Fiber Kinking Model for Carbon-Fiber Composites under Compression based on the Symmetric Eigendeformation-based Homogenization Method," presented at the *ASME International Mechanical Engineering Congress and Exposition,* Salt Lake City, UT, November 8 – 14, 2019.

P54. *X. Y. Zhang* and **C. Oskay**, "Sensitivity Analysis and Variability Assessment of the Dynamic Response of Polycrystalline Energetic Materials subjected to Impact Loading," presented at the *U.S. National Congress on Computational Mechanics,* Austin, TX, July 28 – August 1, 2019.

P55. R. Hu and ***C. Oskay***, "Spectral Variational Multiscale Approach for Transient Dynamics of Phononic Crystals and Acoustic Metamaterials," presented at the *Engineering Mechanics Institute Conference,* Pasadena, CA, June 18 – 21, 2019.

P56. *Z. Su* and **C. Oskay**, "Multiscale Discrete Damage Theory for Fatigue Failure Prediction of Heterogeneous Materials," presented at the *Engineering Mechanics Institute Conference,* Pasadena, CA, June 18 – 21, 2019.

P57. ***C. Oskay*** and R. Hu, "Multiscale Design Tools to Control Wave Propagation in Architected Materials," **Invited lecture** at the *National Academy/Amerimech Workshop on the Intersection of Advanced Additive Manufacturing, Mechanics, and Materials*, Berkeley, CA, June 4 – 5, 2019.

P58. Z. Su and ***C. Oskay***, "Prediction of Fatigue Failure in Fibrous Composites using the Reduced-Order Multiscale Discrete Damage Theory," presented at the *SAMPE Conference,* Charlotte, NC, May 20 – 23, 2019.

P59. Z. Su, B. Kapusuzoglu and ***C. Oskay,*** "A New Approach to Mesh Size Objective Multiscale Modeling of Failure in Composite Materials," **Invited lecture** at the *Meshfree Method and Advances in Computational Mechanics Workshop*, March 10 – 12, 2019.

P60. ***C. Oskay***, Z. Su and B. Kapusuzoglu, "Multiscale Reduced Order Modeling of Failure in Composites Based on Discrete Interfaces," presented at the *ASME International Mechanical Engineering Congress and Exposition*, Pittsburgh, PA, November 9 – 15, 2018.

P61. Z. Su, B. Kapusuzoglu, C. Tian and ***C. Oskay,*** "A New Approach to Alleviating Mesh Size Sensitivity in Multiscale Fatigue Life Prediction in Composites," presented at the *33rd Annual American Society for Composites Technical Conference*, Seattle, WA, September 24-26, 2018.

P62. R. Hu and ***C. Oskay***, "Spatial-Temporal Nonlocal Homogenization Model for Transient Wave Propagation in Periodic Viscoelastic Composites," presented at the *13th World Congress on Computational Mechanics*, New York City, NY, July 22 – 27, 2018.

P63. *X. Y. Zhang*, C. Prakash, A. M. Olokun, I. E. Gunduz, V. Tomar and **C. Oskay**, "Experimental and Computational Investigations of Interface Chemistry Dependence and Parameter Sensitivity of Dynamic Response and Fracture in Energetic Materials," presented at the *Gordon Research Seminars on Energetic Materials*, Newry, ME, June 2 – 3, 2018.

P64. *R. Hu* and **C. Oskay**, "Multiscale Modeling of Wave Dispersion and Attenuation in Periodic Viscoelastic Composites," presented at the *Engineering Mechanics Institute Conference*, Boston, MA, May 29 – June 1, 2018.

P65. *Y. Liu*, X. Zhang and **C. Oskay**, "Multiscale Prediction of Crack Initiation in Titanium Alloy, Ti-6242S," presented at the *Engineering Mechanics Institute Conference*, Boston, MA, May 29 – June 1, 2018.

P66. *X. Y. Zhang* and **C. Oskay**, "Material Properties and Morphology Parameters Sensitivity Analysis in Polymer-Bonded Polycrystalline Energetic Materials," presented at the *2018 Mach Conference*, Annapolis, MD, April 4 – 6, 2018.

P67. W. J. Paulson, C. Erel and ***C. Oskay***, "Prediction of the Behavior of Composite Bolted Joints Using the Eigendeformation-based Reduced Order Homogenization," presented at the *2018 AIAA Science and Technology Forum and Exposition*, Kissimmee, FL, January 8 – 12, 2018.

P68. *R. Hu* and **C. Oskay**, "Spatial-Temporal Nonlocal Homogenization Model for Transient Wave Propagation in Viscoelastic Phononic Crystals," presented at the *ASME International Mechanical Engineering Congress and Exposition*, Tampa, FL, November 3 – 9, 2017.

P69. *X. Zhang* and **C. Oskay**, "Sparse and Scalable Eigenstrain-based Reduced Order Homogenization Models for Polycrystal Plasticity," presented at the *ASME International Mechanical Engineering Congress and Exposition*, Tampa, FL, November 3 – 9, 2017.

P70. *R. Bhattacharyya* and **C. Oskay**, "Mesh Objective Multiscale Damage Modeling for Fiber-composites Subjected to Multi-Axial Loading," presented at the *ASME International Mechanical Engineering Congress and Exposition*, Tampa, FL, November 3 – 9, 2017.

P71. W. J. Paulson and ***C. Oskay***, "Failure Prediction of Countersunk Composite Bolted Joints using Reduced Order Multiple Space-Time Homogenization," presented at the *32nd Technical Conference of the American Society of Composites*, West Lafayette, IN, October 23-25, 2017.

P72. M. J. Bogdanor, C. Erel and ***C. Oskay***, "Damage Interactions in CFRP Composites under High Cycle Fatigue," presented at the *32nd Technical Conference of the American Society of Composites*, West Lafayette, IN, October 23-25, 2017.

P73. *R. Hu* and **C. Oskay**, "Spatial-Temporal Nonlocal Homogenization Model for Transient Wave Propagation in Viscoelastic Composite," presented at the *14th US National Congress on Computational Mechanics*, Montreal, Quebec, Canada, July 17 – 20, 2017.

P74. S. Zhang and ***C. Oskay***, "Reduced Order Variational Multiscale Enrichment Method (ROVME) for Coupled Thermo-Mechanical Problems," presented at the *14th US National Congress on Computational Mechanics*, Montreal, Quebec, Canada, July 17 – 20, 2017

P75. *X. Zhang* and **C. Oskay**, "Material and Morphology Parameter Sensitivity Analysis in Particulate Composite Materials," presented at the *14th US National Congress on Computational Mechanics*, Montreal, Quebec, Canada, July 17 – 20, 2017.

P76. *X. Zhang* and **C. Oskay**, "Sparse and Scalable Eigenstrain-based Reduced Order Homogenization Models for Polycrystal Plasticity," presented at the *14th US National Congress on Computational Mechanics*, Montreal, Quebec, Canada, July 17 – 20, 2017

P77. *R. Bhattacharrya* and **C. Oskay**, "Mesh-size independent multiscale damage modeling of fiber-reinforced composites subjected to multi-axial loading," presented at the *Engineering Mechanics Institute Conference*, San Diego, CA, June 4 – 7, 2017.

P78. V. T. Phan, *X. Zhang* and **C. Oskay**, "Microscale modeling of creep deformation and rupture using cohesive zone-crystal plasticity finite element analysis," presented at the *Engineering Mechanics Institute Conference*, San Diego, CA, June 4 – 7, 2017.

P79. S. Zhang and ***C. Oskay***, "Reduced order variational multiscale enrichment method with hybrid multiscale integrators (ROVME-H)," presented at the *Engineering Mechanics Institute Conference*, San Diego, CA, June 4 – 7, 2017.

P80. *X. Zhang* and **C. Oskay**, "Sparse and scalable eigenstrain-based reduced order homogenization models for polycrystal plasticity," presented at the *Engineering Mechanics Institute Conference*, San Diego, CA, June 4 – 7, 2017.

P81. *R. Hu* and **C. Oskay**, "Nonlocal Homogenization model for wave dispersion and attenuation in elastic and viscoelastic heterogeneous media," presented at the *ASME International Mechanical Engineering Congress and Exposition*, Phoenix, AZ, November 11 – 17, 2016.

P82. *R. Hu* and **C. Oskay**, "Mesoscale modeling of the coupled mechanical- thermal response of HTPB-AP energetic material under transient load," presented at the *ASME International Mechanical Engineering Congress and Exposition*, Phoenix, AZ, November 11 – 17, 2016.

P83. *X. Zhang*, V. T. Phan and **C. Oskay**, "Microstructural creep, fatigue and creep-fatigue modeling of nickel-based superalloy inconel 617 at high temperature," presented at the *the High Temperature Reactor Technology Topical Meeting within the American Nuclear Society Winter Meeting and Expo*, Las Vegas, NV, November 6-10, 2016.

P84. *R. Bhattacharrya* and **C. Oskay**, "Micromechanical damage model for mode I fracture of fiber composite under static loading," presented at the *Engineering Mechanics Institute Conference and Probabilistic Mechanics and Reliability Conference,* Nashville, TN, May 22-25, 2016.

P85. *R. Hu* and **C. Oskay**, "Mesoscale thermomechanical modeling of energetic material interfaces under transient loading," presented at the *Engineering Mechanics Institute Conference and Probabilistic Mechanics and Reliability Conference,* Nashville, TN, May 22-25, 2016.

P86. *M. J. Bogdanor* and **C. Oskay**, "Interaction of failure modes in the fatigue life of laminated composites," presented at the *Engineering Mechanics Institute Conference and Probabilistic Mechanics and Reliability Conference,* Nashville, TN, May 22-25, 2016.

P87. *S. Zhang* and **C. Oskay**, "Reduced order variational multiscale enrichment method for thermo-mechanical problems," presented at the *Engineering Mechanics Institute Conference and Probabilistic Mechanics and Reliability Conference,* Nashville, TN, May 22-25, 2016.

P88. *X. Zhang* and **C. Oskay**, "Eigenstrain based reduced order homogenization for polycrystalline materials," presented at the *Engineering Mechanics Institute Conference and Probabilistic Mechanics and Reliability Conference,* Nashville, TN, May 22-25, 2016.

P89. H. Yan and ***C. Oskay***, "Multi-yield surface modeling of viscoplastic materials," presented at the *Engineering Mechanics Institute Conference and Probabilistic Mechanics and Reliability Conference,* Nashville, TN, May 22-25, 2016.

P90. M. J. Bogdanor and ***C. Oskay***, "Fatigue life prediction of im7/977-3 composite laminates with multispatial/multitemporal homogenization," presented at the *AIAA Science and Technology Forum and Exposition 2016*, San Diego, CA, January 4-8, 2016.

P91. X. Zhang and ***C. Oskay***, "Accelerated reduced order homogenization of polycrystal plasticity," presented at the *Euromech Colloquium 584, Multi-Uncertainty and Multi-Scale Methods and Related Applications,* Porto, Portugal, September 13-16, 2016.

P92. ***C. Oskay***, M. J. Bogdanor and S. B. Clay, "Interaction of microstructural damage mechanisms in laminated composites subjected to cyclic loading," presented at the *ASME International Mechanical Engineering Congress and Exposition*, Houston, TX, November 13–19, 2015.

P93. S. Zhang and ***C. Oskay***, "Reduced order modeling of variational multiscale enrichment method for elasto-viscoplastic problems," presented at the *ASME International Mechanical Engineering Congress and Exposition*, Houston, TX, November 13 – 19, 2015.

P94. *X. Zhang* and **C. Oskay**, "Fatigue and creep-fatigue modeling of alloy 617 at high temperature," presented at the ASME International Mechanical Engineering Congress and Exposition, Houston, TX, November 13 – 19, 2015.

P95. ***C. Oskay***, Tong Hui and Ruize Hu, "High order nonlocal multiscale homogenization model for analysis of wave propagation in composite materials," presented at the *13th US National Congress on Computational Mechanics*, July 26-30, 2015.

P96. M. J. Bogdanor and ***C. Oskay***, "Blind prediction of laminated composites under monotonic loading using reduced order computational homogenization," presented at the *Engineering Mechanics Institute Conference*, Stanford, CA, June 16-19, 2015.

P97. *S. Zhang* and **C. Oskay**, "Variational multiscale enrichment method for elasto-viscoplastic problems," presented at the *Engineering Mechanics Institute Conference*, Stanford, CA, June 16-19, 2015.

P98. ***C. Oskay***, "Spatio-temporal multiscale modeling of composites for fatigue life prediction," **Invited Presentation** at the *EuroMech Colloquium 559: Multiscale Computational Methods for Bridging Scales in Materials and Structures*, Eindhoven, the Netherlands, February 23, 2015.

P99. *M. J. Bogdanor* and **C. Oskay**, "Application of reduced order multiscale homogenization to assess and quantify the benefits of applying damage tolerant design principles to advanced composite aircraft structures," presented at the *AIAA Scitech 2015 Conference*, Kissimmee, FL, January 8, 2015.

P100. ***C. Oskay***, "Predicting response and fatigue life of composites using homogenization-based multiscale simulation framework," **Invited Lecture** presented at the *Composite Materials and Computational Tools Workshop: Industrial, Academic, and Government Perspective to DOD Applications*, Dayton, OH, November 4, 2014.

P101. ***C. Oskay***, "Multiscale modeling of the transient dynamic response of heterogeneous materials: dispersion, dissipation and band gaps," **Invited Presentation** at the *USACM/IUTAM Symposium on Connecting Multiscale Mechanics to Complex Material Design*, Evanston, IL, May 14, 2014

P102. X. Zhang and ***C. Oskay***, "Reduced order homogenization of polycrystal plasticity," presented at the *ASME International Mechanical Engineering Congress & Exposition*, Montreal, Quebec, Canada, November 17, 2014.

P103. ***C. Oskay*** and H. Yan, "Interaction effects of aggressive agent transport and mechanical deformation in metals at high temperatures," presented at the *ASME International Mechanical Engineering Congress & Exposition*, Montreal, Quebec, Canada, November 17, 2014.

P104. ***C. Oskay*** and R. D. Crouch, "Accelerated time integrator for simulation-based fatigue life prediction of structures and materials," presented at the *Engineering Mechanics Institute Conference*, Hamilton, Ontario, Canada, August 6, 2014.

P105. *M. Pike* and **C. Oskay**, "Mechanical modeling of nano and micro fiber reinforced cemen55ous composites using XFEM," presented at the *Engineering Mechanics Institute Conference*, Hamilton, Ontario, Canada, August 6, 2014.

P106. ***C. Oskay*** and R. D. Crouch, "Accelerated multiple temporal scale computation for fatigue loadings in composite materials," presented at the *11th World Congress on Computational Mechanics*, Barcelona, Spain, July 21, 2014.

P107. ***C. Oskay*** and H. Yan, "Modeling coupled transport-deformation response of titanium alloys subjected to thermo-mechanical environment," presented at the *AIAA Scitech 2014 Conference*, National Harbor, MD, January 15, 2014.

P108. ***C. Oskay*****,** R. D. Crouch, and S. B. Clay, "Fast temporal scale modeling of failure in composites subjected to fatigue loading," presented at the *AIAA Scitech 2014 Conference*, National Harbor, MD, January 13, 2014.

P109. *H. Yan* and **C. Oskay**, "A three-field (displacement-pressure-concentration) formulation for coupled transport-deformation problems," presented at the *ASME International Mechanical Engineering Congress & Exposition*, San Diego, CA, November 20, 2013.

P110. ***C. Oskay*** and T. Hui, "A dispersive multiscale computational model for elastic composites," presented at the *ASME International Mechanical Engineering Congress & Exposition*, San Diego, CA, November 20, 2013.

P111. T. Hui and ***C. Oskay***, "A nonlocal multiscale model of viscoelastic composite materials," presented at the *Engineering Mechanics Institute Conference*, Evanston, IL, August 4-7, 2013.

P112. ***C. Oskay***, "Variational multiscale enrichment method with new boundary conditions for surface degradation problems," presented at the *Engineering Mechanics Institute Conference*, Evanston, IL, August 4-7, 2013.

P113. *R. D. Crouch*, **C. Oskay** and S. B. Clay, "Multiple temporal scale life prediction in composite structures undergoing cyclic loadings," presented at the *Engineering Mechanics Institute Conference*, Evanston, IL, August 4-7, 2013.

P114. *P. A. Sparks* and **C. Oskay**, "Reduced order homogenization of heterogeneous materials with overlapping failure paths," presented at the *Engineering Mechanics Institute Conference*, Evanston, IL, August 4-7, 2013.

P115. *M. J. Bogdanor*, **C. Oskay** and S. B. Clay, "Multiscale modeling of failure evolution in composite materials: Transitioning from diffuse damage to cracks," presented at the *Engineering Mechanics Institute Conference*, Evanston, IL, August 4-7, 2013.

P116. *R. D. Crouch*, **C. Oskay** and S. B. Clay, "Multiple temporal scale life prediction in composite structures undergoing cyclic loadings," presented at the *12th U.S. National Congress on Computational Mechanics,* Raleigh, NC, July 23, 2013.

P117. *M. J. Bogdanor*, **C. Oskay**, R. D. Crouch and S. B. Clay, "Failure prediction of composite structures: capturing uncertainty and rate dependence," presented at the *12th U.S. National Congress on Computational Mechanics,* Raleigh, NC, July 23, 2013.

P118. ***C. Oskay,*** R. D. Crouch, and S. B. Clay, "Multiple spatio-temporal scale modeling of failure in composites subjected to cyclic loading," presented at the *Third International Conference on Computational Modeling of Fracture and Failure of Materials and Structures*, Prague, Czech Republic, June 6, 2013.

P119. ***C. Oskay,*** *"*Multiple spatio-temporal modeling of fatigue failure in composites," **Invited Talk** at the *Advances in Computational Mechanics with Emphasis on Fracture and Multiscale Phenomena Workshop Honoring Professor Ted Belytschko's 70th Birthday*, Evanston, IL, April 19, 2013.

P120. ***C. Oskay,*** *"*Scale bridging in hierarchical multiscale modeling: A tutorial," **Invited Tutorial Lecture** at the *2013 Mach Conference*, Annapolis, MD, April 11, 2013.

P121. ***C. Oskay***, M. J. Bogdanor, R. D. Crouch and S. B. Clay, "Modeling rate dependent damage evolution in composite structures," presented at the *54th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference*, Boston, MA, April 10, 2013.

P122. ***C. Oskay,*** A. Krishnan and H. Yan, "Compression-after-impact response of environmentally-aged fiber-reinforced composites," presented at the *ASME International Mechanical Engineering Congress and Exposition*, Houston, TX, November 13, 2012.

P123. ***C. Oskay*** and T. Hui, "A non-local homogenization method for wave dispersion and dissipation in viscoelastic composite materials," presented at the *22nd International Workshop on Computational Mechanics of Materials*, Baltimore, MD, September 25, 2012.

P124. *T. Hui* and **C. Oskay**, "A non-local homogenization method for wave dispersion and dissipation in viscoelastic composite materials," presented at the *Engineering Mechanics Institute Conference*, University of Notre Dame, South Bend, IN, June 18, 2012.

P125. ***C. Oskay,*** R. Crouch, and S. B. Clay, "A spatio-temporal homogenization method for life prediction of heterogeneous materials subjected to cyclic loading," presented at the *Engineering Mechanics Institute Conference*, University of Notre Dame, South Bend, IN, June 18, 2012.

P126. ***C. Oskay,*** R. Crouch, and S. B. Clay, "Multiscale modeling of failure under cyclic loading in composite materials," presented at the *53rd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference*, Honolulu, HI, April 24, 2012.

P127. ***C. Oskay,*** A. Krishnan and H. Yan, "Compression-after-impact response of polymer-matrix composites subjected to environmental aging," presented at the *48th Annual Technical Conference of the Society of Engineering Science*, Evanston, IL, October 13, 2011.

P128. ***C. Oskay***, "Variational multiscale enrichment method for coupled deformation-transport problems," **Invited presentation** at the *48th Annual Technical Conference of the Society of Engineering Science*, Evanston, IL, October 12, 2011.

P129. ***C. Oskay***, "Variational multiscale enrichment method for coupled deformation-diffusion problems," **Invited presentation** at the *11th United States Congress on Computational Mechanics*, Minneapolis, MN, July 26, 2011.

P130. *T. Eason*, **C. Oskay** and R. John, "Computational model for titanium structures subjected to thermo-chemo-mechanical environment," presented at the *11th United States Congress on Computational Mechanics*, Minneapolis, MN, July 26, 2011.

P131. *T. Hui* and **C. Oskay**, "Computational modeling of polyurea-coated composites subjected to blast," presented at the *11th United States Congress on Computational Mechanics*, Minneapolis, MN, July 25, 2011.

P132. ***C. Oskay*** and Tong Hui, "Computational modeling of polyurea-coated composites subjected to blast," presented at the *Engineering Mechanics Institute Conference*, Northeastern University, Boston, MA, June 2, 2011.

P133. *R. Crouch*, **C. Oskay** and S. B. Clay, "Multiscale modeling of failure under cyclic loading in composite materials," presented at the *Engineering Mechanics Institute Conference*, Northeastern University, Boston, MA, June 2, 2011.

P134. ***C. Oskay***, "Variational multiscale enrichment for coupled transport-deformation problems," presented at the *ASME 2010 International Mechanical Engineering Congress and Exposition,* Vancouver, British Columbia, Canada, November 15, 2010.

P135. ***C. Oskay***, R. Crouch and S. B. Clay, "Multiscale modeling of failure under cyclic loading in composite materials," presented at the *16th US National Congress of Theoretical and Applied Mechanics*, State College, PA, July 1, 2010.

P136. ***C. Oskay*** and M. Haney, "Computational model for titanium structures subjected to thermo-chemo-mechanical environment," presented at the *16th US National Congress of Theoretical and Applied Mechanics*, State College, PA, July 1, 2010.

P137. ***C. Oskay*** and M. Haney, "Multiscale computational modeling of alpha-case formation in titanium structures," presented at the *IV European Conference on Computational Mechanics*, Paris, France, May 20, 2010.

P138. ***C. Oskay***, "A reduced-order multiscale modeling framework for failure analysis of heterogeneous materials using gradient-enhanced computational homogenization," **Invited presentation** at the *ASME 2009 International Mechanical Engineering Congress and Exposition*, Lake Buena Vista FL, November 18, 2009.

P139. *R. Crouch* and **C. Oskay**, "Two-level multiscale failure model for heterogeneous materials," Invited Presentation, presented at the *10th US National Congress on Computational Mechanics*, July 17, 1009.

P140. ***C. Oskay***, "Two-level multiscale enrichment methodology for modeling of heterogeneous plates" presented at the *10th United States National Congress on Computational Mechanics,* Columbus OH, July 19, 2009.

P141. ***C. Oskay***, "Multiscale modeling of heterogeneous plates" presented at the *Joint ASCE-ASME-SES Conference on Mechanics of Materials,* Blacksburg VA, June 26, 2009.

P142. ***C. Oskay*** and R. Crouch, "Meso-mechanical model for failure analysis of heterogeneous materials," presented at *Joint ASCE-ASME-SES Conference on Mechanics of Materials*, Blacksburg VA, June 25, 2009.

P143. ***C. Oskay***, "Failure modeling of heterogeneous structures based on multiscale enrichment" **Invited presentation** at the *ASME 2008 International Mechanical Engineering Congress and Exposition*, Boston MA, November 3, 2008.

P144. ***C. Oskay*** and G. Pal "A multiscale failure model for thin heterogeneous plates," presented at the *23rd Annual Technical Conference on Composite Materials*, American Society for Composites, Memphis TN, September 10, 2008.

P145. ***C. Oskay*** and G. Pal "Multiscale modeling of thin heterogeneous structures" presented at the *ASME 2007 International Mechanical Engineering Congress and Exposition*, Seattle WA, November 13, 2007.

P146. ***C. Oskay*** and G. Pal "A new multiscale approach to failure analysis of composite plates and shells" presented at the *44th Annual Technical Meeting of the Society of Engineering Science,* College Station TX, October 23, 2007.

P147. ***C. Oskay***, G. Pal and J. Fish "Eigendeformation-based reduced order homogenization" presented at the *9th United States National Congress on Computational Mechanics,* San Francisco CA, July 25, 2007.

P148. ***C. Oskay*** and J. Fish "Eigendeformation-based reduced order homogenization" presented at the *ASME 2006 International Mechanical Engineering Congress and Exposition,* Chicago IL, November 9, 2006.

P149. ***C. Oskay*** and J. Fish "Multiscale modeling of heterogeneous materials with interface damage" presented at *8th United States National Congress on Computational Mechanics,* Austin TX, July 26, 2005.

P150. ***C. Oskay*** and J. Fish "A nonlocal multiscale model for fatigue" presented at *8th United States National Congress on Computational Mechanics,* Austin TX, July 26, 2005.

P151. *J. Fish* and **C. Oskay** "Fatigue life prediction using multiple temporal scales" presented at *6th World Congress on Computational Mechanics,* Beijing, China, September 7, 2004.

P152. *J. Fish* and **C. Oskay** "Fatigue life prediction using multiple temporal scales" presented at *6th World Congress on Computational Mechanics,* Albuquerque NM, July 30, 2003.

P153. *M. Zeghal* and **C. Oskay** "Identification of the dynamic response of soil-structure systems" presented at *15th ASCE Engineering Mechanics Division Conference,* New York NY, June 4, 2002.

P154. ***C. Oskay*** and M. Zeghal "Local identification analyses of the dynamic respose of geophysical systems" presented at *10th International Conference on Soil Dynamics and Earthquake Engineering,* Philadelphia PA, October 9, 2001.

Presentations at Universities –

P155. ***C. Oskay***, "Quantum Computing – Promise of a New Future for Computational Mechanics," Department of Mechanical Engineering at *University of Wyoming*, Laramie, WY, October 9, 2025.

P156. ***C. Oskay***, "Probabilistic Prediction of Fatigue Performance of Additively Manufactured Materials via Multiscale Computational Modeling," Department of Civil Engineering and Engineering Mechanics at *Columbia University*, New York, NY, February 20, 2024.

P157. ***C. Oskay***, "Computational Multiscale Mechanics for Connecting Microstructure and Mechanical Properties of Additively Manufactured Metals," Department of Mechanical and Aerospace Engineering at the *University of North Carolina, Charlotte*, Charlotte, NC, April 5, 2023.

P158. ***C. Oskay***, "Computational Multiscale Mechanics for Connecting Microstructure and Mechanical Properties of Additively Manufactured Metals," Department of Mechanical and Aerospace Engineering at the *North Carolina State University*, Raleigh, NC, February 17, 2023.

P159. ***C. Oskay***, "Multiscale Discrete Damage Theory – A New Approach to Predictive Simulation of Failure in Composites," Department of Civil and Environmental Engineering at the *University of Pittsburgh*, Pittsburgh, PA, November 5, 2021.

P160. ***C. Oskay***, "Multiscale Modeling of Failure in Heterogeneous Materials and Structures: Roles of Reduced Order Modeling and Machine Learning," Department of Civil and Environmental Engineering at the *Johns Hopkins University*, Baltimore, MD, February 6, 2020.

P161. ***C. Oskay***, "Viscoelastic Phononic Crystals: Unraveling Their Dynamic Behavior through Multiscale Modeling and Simulation," Department of Mechanical and Aerospace Engineering at the *Ohio State University*, Columbus, OH, November 2, 2018.

P162. ***C. Oskay***, "Bridging Computational Materials Science and Structural Mechanics: A New Paradigm for Predictive Simulation," Department of Mechanical and Nuclear Engineering at *Virginia Commonwealth University*, Richmond, VA, March 16, 2018.

P163. ***C. Oskay***, "Bridging Computational Materials Science and Structural Mechanics: A New Paradigm for Predictive Simulation," Department of Civil and Environmental Engineering at *University of Tennessee, Knoxville*, Knoxville, TN, February 15, 2018.

P164. ***C. Oskay***, "Bridging Computational Materials Science and Structural Mechanics: A New Paradigm for Predictive Simulation," Department of Civil and Environmental Engineering at *Duke University*, Durham, NC, December 4, 2017.

P165. ***C. Oskay***, "Reduced-Order Multiscale Modeling of Heterogeneous Materials and Structures" Department of Aerospace Engineering at *University of Illinois at Urbana-Champaign*, Urbana, IL, February 27, 2017.

P166. ***C. Oskay***, "Modeling High Performing Structures at Extreme Environments: Effects of Environmental Degradation" Department of Civil Engineering and Engineering Mechanics at *Columbia University*, New York, NY, August 21, 2014.

P167. ***C. Oskay***, "A Multiscale Simulation-Based Life Prediction Approach for Composite Materials" Department of Civil and Environmental Engineering at *Northwestern University*, Evanston, IL, January 29, 2014.

P168. ***C. Oskay***, "Prediction of Damage Accumulation and Failure in Heterogeneous Structures" Department of Mechanical Engineering at the *University of Texas at San Antonio*, San Antonio, TX, February 21, 2013.

P169. ***C. Oskay***, "Prediction of Damage Accumulation and Failure in Heterogeneous Structures" Department of Civil and Environmental Engineering at the *University of Tennessee*, Knoxville, TN, October 24, 2012.

P170. ***C. Oskay***, "Prediction of Damage Accumulation and Failure in Heterogeneous Structures" Department of Civil and Environmental Engineering at the *University of Pittsburgh*, Pittsburgh, PA, October 12, 2012.

P171. ***C. Oskay***, "Prediction of Damage Accumulation and Failure in Heterogeneous Structures" Department of Civil and Environmental Engineering at the *Vanderbilt University*, Nashville, TN, September 19, 2012.

P172. ***C. Oskay***, "Modeling Mechanical Response of Structures Operating in Extreme Environments" Department of Civil and Environmental Engineering at *Tennessee Technological University*, Cookeville, TN, November 1, 2011.

P173. ***C. Oskay***, "Multiscale Computational Modeling of Failure in Materials and Structures" Department of Civil and Environmental Engineering at *Northwestern University*, Evanston, IL, January 20, 2011.

P174. ***C. Oskay***, "Multiscale Computational Modeling of Failure in Materials and Structures" Department of Aerospace and Mechanical Engineering at *Notre Dame University*, South Bend, IN, November 9, 2010.

P175. ***C. Oskay***, "Multiscale Computational Modeling of Failure in Materials and Structures" Department of Civil and Environmental Engineering at *Cornell University*, Ithaca, NY, October 5, 2010.

P176. ***C. Oskay***, "Multiscale Modeling of Failure in Materials and Structures" Department of Mechatronics Engineering at *Sabanci University*, Istanbul, Turkey, December 24, 2008.

P177. ***C. Oskay***, "Simulation-Based Engineering" *ASCE Student Chapter Meeting at Vanderbilt University,* Nashville TN, October 12, 2006.

P178. ***C. Oskay*** "Life Prediction and Survivability of Structures: A Multiscale Perspective" Department of Civil and Environmental Engineering at *Vanderbilt University,* Nashville TN, February 27, 2006.

P179. ***C. Oskay*** "Life Prediction and Survivability of Structures: A Multiscale Perspective" Department of Civil and Environmental Engineering at *Rice University,* Houston TX, February 13, 2006.

P180. *J. Fish* and **C. Oskay** "Mesoscale Modeling of Fragmentation and Failure in Composites" *Challenges in Computational Mechanics,* Cachan, France, May 11, 2006

P181. ***C. Oskay*** "Life Prediction and Survivability of Structures: A Multiscale Perspective" Department of Civil and Environmental Engineering at *Rensselaer Polytechnic Institute,* Troy NY, March 29, 2005.

Presentations at National Laboratories and Industry –

P182. ***C. Oskay***, "Quantum Computing Algorithms for the Finite Element Method," *Oak Ridge National Laboratory*, January 21, 2026 (Virtual Presentation).

P183. ***C. Oskay***, "Computational Multiscale Mechanics for Connecting Microstructure and Mechanical Properties of Additively Manufactured Metals," *NASA Langley Research Center*, February 22, 2023 (Virtual Presentation).

P184. ***C. Oskay,*** "Multiscale Discrete Damage Theory – A Novel Approach for Multiscale Modeling of Failure in Heterogeneous Materials," *Chamber of Civil Engineers*, Istanbul Chapter, December 1, 2021 (Virtual Presentation).

P185. ***C. Oskay,*** "Stochastic Multiscale Fatigue Life Prediction Framework for Next Generation Durability and Damage Tolerance," *NASA Langley Research Center*, July 15, 2020 (Virtual Presentation).

P186. ***C. Oskay,*** "A Multiscale Approach to Progressive Damage Analysis in Composite Materials – New Developments," *NASA Langley Research Center*, Hampton, VA, November 21, 2019.

P187. ***C. Oskay,*** "Multiscale State and Failure Prediction in Structures Operating in Severe Loading and Environments," *U.S. Army Engineering and Development Center*, Vicksburg, MS, June 11, 2019.

P188. ***C. Oskay,*** "Multiscale Modeling of Internal Erosion in Earthen Embankments," *U.S. Army Engineering and Development Center*, Vicksburg, MS, April 23, 2018.

P189. ***C. Oskay***, "Vanderbilt Initiative on Intelligent Resilient Infrastructure Systems," *Tennessee Valley Authority*, Chattanooga, TN, March 7, 2018.

P190. ***C. Oskay***, "A Reduced Order Multiscaling Paradigm for Predictive Simulation of Large-Scale Engineering Structures," *Sandia National Laboratory*, Albuquerque, NM, September 25, 2017.

P191. ***C. Oskay***, "Vanderbilt's Homogenization-based Multiscale Simulation Framework," *Air Force Research Laboratory – Israel Air Force Collaboration Technical Interchange Meeting*, Wright Patterson AFB, OH, December 12, 2016.

P192. ***C. Oskay***, "Variational Multiscale Enrichment Method for Thermo-Mechanical Response of Materials and Structures," *Air Force Research Laboratory Structural Sciences Center Scientific Advisory Board Meeting*, Columbus, OH, May 12, 2016.

P193. ***C. Oskay***, "Variational Multiscale Enrichment Method for Thermo-Mechanical Response of Materials and Structures," *Air Force Research Laboratory Structural Sciences Center Technical Interchange Meeting*, Fairborn, OH, February 23, 2016.

P194. ***C. Oskay***, "Multiscale-Multiphysics Computational Framework for Damage Prognosis in Hypersonic Structures," *United Technologies Research Center*, East Hartford, CT, August 25, 2015.

P195. ***C. Oskay***, "Reduced Order Multiscale Modeling of Materials with Heterogeneous Microstructures" *Naval Research Laboratory*, Washington, DC, May 19, 2015.

P196. ***C. Oskay***, "A Multiscale Simulation-Based Life Prediction Approach for Composite Materials" *Army Research Laboratory*, Aberdeen Proving Ground, April 30, 2015.

P197. ***C. Oskay***, "Variational Multiscale Enrichment for Coupled Mechanical-Diffusion Problems," *Air Force Research Laboratory*, WPAFB, Dayton OH, July 30, 2010.

P198. ***C. Oskay***, "Multiscale Modeling of Failure in Heterogeneous Materials," *Oak Ridge National Laboratory*, Oak Ridge, TN, February 25, 2010.

P199. ***C. Oskay***, "Multiscale Computational Modeling of Alpha-Case Formation in Titanium Structures," *Air Force Research Laboratory*, WPAFB, Dayton OH, July 31, 2009.

P200. ***C. Oskay***, "Multiscale Modeling of Failure in Materials and Structures," *Air Force Research Laboratory*, WPAFB, Dayton OH, June 09, 2009.

P201. ***C. Oskay***, "Eigendeformation-Based Computational Homogenization for Failure Modeling of Composite Materials," *NASA Multiscale Modeling Workshop*, Cleveland OH, July 24, 2009.

STUDENT ADVISING

Ph.D. Dissertation Committees Chaired –

	Name	**Dissertation (Research) Title**	**Graduation Date**
1	Arun Krishnan	The Interfacial Failure of Bonded Materials and Composites	12/2010
2	Robert D. Crouch	Multiscale Modeling of Carbon Fiber Reinforced Polymers Using Reduced Order Computational Homogenization	08/2012
3	Tong Hui	Multiscale Modeling of the Dynamic Response of Composite Structures	08/2014
4	Hao Yan	Computational Modeling of Coupled Oxygen Transport and Mechanical Deformation in Titanium Structures Subjected to Extreme Environments	05/2015

5	Paul A. Sparks	Reduced Order Homogenization Models for Failure of Heterogeneous Materials	05/2015
6	Michael J. Bogdanor	Failure Prediction of Fiber Reinforced Composites Using Reduced Order Multiscale Models	12/2015
7	Matthew G. Pike	Mechanical Modeling of Short Fiber Reinforced Composites Using the Extended Finite Element Method	12/2015
8	Shuhai Zhang	Variational Multiscale Enrichment Method for Modeling of Structures Subjected to Extreme Environments	08/2017
9	Xiang Zhang	Reduced Order Modeling and Multiscale Investigations of High Performance Alloys under Monotonic and Cyclic Loading	08/2017
10	Ruize Hu	Multiscale Computational Methods for Wave Propagation in 2D Phononic Crystals and Acoustic Metamaterials	05/2019
11	Xiaoyu Zhang	Uncertainty Quantification and Sensitivity Analyses of the Nonlinear Behavior of Heterogeneous Material Microstructures: Applications to Dynamic Response of Energetic Materials and Cyclic Response of a Titanium Alloy	12/2020
12	Zimu Su	Multiscale Discrete Damage Theory for Failure Modeling of Composite Materials	08/2022
13	Damin Xia	Highly Efficient Computational Models for Micro-Mechanics of Polycrystalline Materials in the Presence of Large Strains and Microstructurally Short Cracks	05/2024
14	Alexander Faupel	Multiscale Investigation of the Compression Failure in Laminated CFRP Composites with and without Z-pin Reinforcements	08/2024
15	Aslan Nasirov	Reduced Order Nonlinear Homogenization: Efficiency and Accuracy Improvement Strategies	12/2025
16	Vamsi Subraveti	Modeling process-induced defects in laser powder bed fusion additively manufactured alloys	
17	Gloria Odenyo	High-rate impact behavior of multi-layered architected materials	

Other Ph.D. Dissertation Committee Memberships –

	Name	**Dissertation Title**	**Program**	**Chair**	**Graduation**
1	Liming Liu	Modeling of Mixed-Mode Fatigue Crack Growth”	Civil Engineering	Sankaran Mahadevan	05/2008
2	Barron J. Bichon	Efficient Surrogate Modeling for Reliability Analysis and Design	Civil Engineering	Sankaran Mahadevan	08/2009
3	Sohini Sarkar	Durability Assessment of Cementitious Materials under Sulfate Attack	Civil Engineering	David Kosson	08/2010
4	Jae-Seok Ahn	Efficient High Precision Modeling of Irregularities in Laminated Systems	Civil Engineering	Prodyot K. Basu	08/2010
5	Chris Shantz	Damage Tolerance Under Uncertainty for Structures Subjected to Multi-Axial Variable Amplitude Loading	Civil Engineering	Sankaran Mahadevan	08/2010
6	Venkata S. Sura	Advanced Modeling Techniques for Railroad Wheel Failure Analysis	Civil Engineering	Sankaran Mahadevan	12/2012
7	Hu Dai	Numerical Study of Flow Structure Interaction in Biological Flying and Swimming	Mechanical Engineering	Haoxiang Luo	01/2013
8	You Ling	Uncertainty quantification in time-dependent reliability analysis	Civil Engineering	Sankaran Mahadevan	08/2013

9	Nicholas A. Nordendale	Modeling And Simulation Of Brittle Armors Under Impact And Blast Effects	Civil Engineering	Prodyot K. Basu	12/2013
10	Dean T. Pierce	The Influence of Manganese Content and Temperature on the Relative FCC/ HCP Phase Stability and Strain-Hardening Behavior of High-Manganese TRIP/TWIP Steels	Materials Science	James E. Wittig	01/2014
11	William F. Heard	Development and Multi-Scale Characterization of a Self-Consolidating High-Strength Concrete for Quasi-Static and Transient Loads	Civil Engineering	Prodyot K. Basu	03/2014
12	Joshua G. Mullins	Resource Allocation for Uncertainty Quantification and Reduction	Civil Engineering	Sankaran Mahadevan	08/2014
13	Ozgur Yapar	AE Based Health Monitoring and Bonded FRP Patch Repair in Bridge Management	Civil Engineering	Prodyot K. Basu	05/2015
14	Jialei Song	Computational Modeling of Unsteady Aerodynamics in Hummingbird Flight	Mechanical Engineering	Haoxiang Luo	01/2016
15	Chenzhao Li	Sensitivity Analysis and Uncertainty Integration in Reliability Analysis	Civil Engineering	Sankaran Mahadevan	08/2016
16	Siyuan Chang	Computational fluid-structure interaction for vocal fold modeling	Mechanical Engineering	Haoxiang Luo	08/2016
17	Stephen Jimenez	Application of damage mechanics approaches for modeling sharp and diffuse fracture evolution	Civil Engineering	Ravindra Duddu	12/2017
18	Yao Pan	Gray Computing: A Framework for Distributed Computing with Web Browsers	Computer Science	Jules White	12/2017
19	Jake T. Benzing	The Influences of Strain Rate on Mechanical Properties and Deformation Mechanisms of High-Mn and Medium-Mn TWIP-TRIP Steels	Materials Science	James E. Wittig	05/2018
20	Yu Zhang	Molecular Dynamics Study of Electrical Double Layer: Modified Surfaces and Electrolyte Composition	Chemical Engineering	Peter Cummings	08/2019
21	Shiying Li	Spline Finite Element Analysis	Mathematics	Larry Shoemaker	08/2019
22	Yi Chen	Computational Fluid-Structure Interaction of Soft Tissues using an Immersed Boundary Method	Mechanical Engineering	Haoxiang Luo	12/2019
23	Mason Hickman	Characterization and Prediction of Engineered Random Composite Material Properties	Civil Engineering	Prodyot K. Basu	05/2020
24	Xiangming Sun	Modeling of Material Degradation using Decoupled Finite Element Approaches: Applications to Localized Corrosion of Iron Alloys and Hydraulic Fracture of Glaciers	Civil Engineering	Ravindra Duddu	12/2020
25	Gourab Ghosh	Robust Finite Element Implementation of Damage-based Cohesive Zone Models: Application to Composite Delamination and Hydrofracturing of Glaciers	Civil Engineering	Ravindra Duddu	05/2021

26	Amid G. Avhad	Subject-Specific Computational Fluid-Structure Interaction Modeling of Type-1 Thyroplasty	Mechanical Engineering	Haoxiang Luo	12/2023
27	Mohammed Alaloula	Impact Resistance of Corner Supported Concrete Panels	Civil Engineering	Prodyot K. Basu	05/2024
28	Yuxiang Gao	Damage Mechanics Based Deep Learning Model Surrogates for Fracture Prediction and Inverse Design	Civil Engineering	Ravindra Duddu	12/2024
29	Bradly Baer	Calculating Interfacial Thermal Transport Using Atomistic Simulation Methods	Mechanical Engineering	Greg Walker	08/2025
30	Roshan Saji	Advancements in Finite Element Modeling of Non-linear Material Response During Damage Evolution	NYU Mechanical Engineering	Mostafa Mobasher	08/2025

Postdoctoral Research Fellows Advised

	Name	**Research**	**Period**
1	Robert D. Crouch	Fatigue Life Prediction of Carbon Fiber Reinforced Polymers Using Reduced Order Computational Homogenization	08/2012-08/2014
2	Hao Yan	Numerical Simulation of Structural Response in Operational Conditions of Hypersonic Vehicles	05/2015-11/2015
3	Yumeng Li	Computational Modeling of High-Temperature Creep-Fatigue Failure	05/2015-01/2016
4	Van Tung Phan	Computational Modeling of High-Temperature Creep-Fatigue Failure	02/2016-02/2017
5	Can Erel	Multiscale Modeling of Composite Bonded Joints under Fatigue Loading	01/2017-01/2018
6	Alessandro Fascetti	Multiscale-Multiphysics Characterization of the Health of Flood Protection Systems	01/2017-06/2018
7	Xiaoyu Zhang	Stochastic Prediction of Fatigue Nucleation in Polycrystalline Alloys	01/2021-11/2021
8	Abhishek Arora	Development of Quantum Computing Algorithms for the Finite Element Method	10/2023-present
9	Uditnarayan Kouskiya	Development of Quantum Computing Algorithms for the Nonlinear Finite Element Method	10/2024-present
10	Ge Gao	Prediction of Health of Geotechnical Infrastructure Protection Systems and Analysis of Backward Erosion Piping	02/2026-present

Visiting Researchers Advised

	Name	**Research**	**Period**
1	Shuiwen Zhu	Dynamic Response of Particulate Composite Materials	05/2015-02/2016
2	Hao Li	Modeling of Calcium Leaching in Concrete	09/2016-08/2018
3	Yang Liu	Modeling and Prediction of Fatigue Fracture Initiation in Advanced Structural Metals	09/2016-08/2018
4	Ido Meshi	Analysis of Failure in Random Composite Microstructures	01/2019-03/2023

Master of Science Thesis Advisees

	Name	**Thesis (Research) Title**	**Graduation Date**
1	Veda Laohom	Computational Characterization of Novel Engineering Materials	05/2007

2	Ghanshyam Pal	Multiscale Failure Modeling of Thin Heterogeneous Plates	12/2008
3	Wendy Tabler	Modeling the Failure Behavior of Countersunk Composite Bolted Joints Subjected to Monotonic Loading	05/2017
4	Scott Williams	Thermo-mechanical response of titanium structure subjected to hypersonic conditions	12/2019

Undergraduate Research Advisees

	Name	**Research Title**	**Program**	**Period**
1	David Salvetti	Cartilage Material Property Modulation Using Varying Density; Columnar Arrangements	Biomedical Engineering	08/2007-12/2007
2	Lizzie Young	Parallel Implementation of Optimal Reduced Order Model Identification	Civil Engineering	08/2010-05/2011
3	El-Mehdi El Hailouch	Analysis of Failure Mechanisms in Polymer Composites using Acoustic Emission Testing	Civil Engineering	08/2011-05/2012
4	Theodore Russell	Parallel simulations of composite material response under static and fatigue loading conditions	Mechanical Engineering	05/2013-08/2014
5	Jimmy Pan	Characterization of the bandgaps in 1-D core shell type composites	Mechanical Engineering	05/2015-08/2015
6	Yixiao Sun	High frequency vibrations in viscoelastic particulate composites	Engineering Mechanics / Tsinghua University	05/2015-08/2015
7	Jacqueline Machesky	Modeling Energetic Material Morphologies	Civil Engineering	05/2016-08/2016
8	Ali Kilic	Modeling Laminated Composite Fracture using MDDT	Mechanical Engineering	01/2019-05/2019
9	Hantang Zhang	Machine Learning Models for Fatigue Failure Nucleation in Titanium Alloy Microstructures	Computer Science	05/2020-08/2020
10	Vamsi Subraveti	Modeling Process-Property Relationships in Polycrystalline Alloys	Mathematics / UC Berkeley	05/2020-08/2021
11	Akaash Seemakurty	Modeling Process-Property Relationships in Polycrystalline Alloys	Computer Science	08/2022-12/2022
12	Eden Villanueva	The Effect of Melt Pool Morphology on Porosity in Metals Manufactured using Laser Powder Bed Fusion	Civil Engineering	05/2023-08/2023
13	Anish Giri	Exploring Quantum Fourier Transform for Implementation of Spectral Methods for Solving Mechanics Problems	Electrical & Computer Engineering	05/2024-08/2024
14	Misa Viveiros	Recurrent Neural Networks as Surrogate Models for High Velocity Dynamic Behavior of Architected Materials	Mathematics	05/2024-03/2025
15	Abbott van Heerden	Quantum Computing Algorithms for Time Dependent Partial Differential Equations	Physics	05/2024-12/2024
16	Tillman Philo	Variational Quantum Linear Solvers based Algorithms for Solving Diffusion Equation	Physics	08/2023-Present