TANAJI PAUL

Department of Mechanical and Materials Engineering, EC 3445
Florida International University
10555 West Flagler Street
Miami, FL 33174, United States.

tpaul@fiu.edu
Google Scholar
LinkedIn

EDUCATION

Doctor of Philosophy, Mechanical Engineering
Oklahoma State University, Stillwater, United States

Master of Engineering (*with Distinction*), Materials Engineering
Indian Institute of Science, Bangalore, India

Bachelor of Engineering, Metallurgy and Materials Engineering
Bengal Engineering and Science University, India

RESEARCH EXPERTISE

- **Manufacturing**

  Ultrasonic Casting; Cold Spray; Wire Arc Additive Manufacturing; Spark Plasma Sintering

- **Characterization**

  Mechanical: Nanoindentation; Nano-DMA; Nanoscratch; Profilometry-based Plastometry; Dynamic Mechanical Analysis
  Imaging: Scanning Electron Microscopy; Scanning Probe Microscopy; Electron Probe Microanalysis
  Thermal: Differential Scanning Calorimetry; Thermogravimetric Analysis
  Spectroscopy: Ultra-small Angle X-ray Scattering; Small Angle Neutron Scattering; X-ray Diffraction

- **Materials**

  Metallic Alloys; Metal Matrix Composites; Coatings; 2D Materials; Metallic Glass; Amorphous Alloys

PREVIOUS APPOINTMENTS

1. **Research Assistant Professor** (Graduate Faculty)
Florida International University, Miami FL, United States
Department of Mechanical and Materials Engineering

- **Ultrasonic Casting**: Development of ultrasonic cavitation assisted processing of 1D, 2D & 3D nanoparticle reinforced lightweight, high strength metal matrix composites
- **Cold Sprayed Additive Manufacturing**: Multiscale structural, mechanical and thermal behavior of cold sprayed deposits from single splat to bulk
- **Wire Arc Additive Manufacturing**: Role of layer-by-layer deposition on texture, mechanics, and corrosion resistance of marine metals
- **Nanomechanics of Materials**: Establishment of nanomechanical and nanotribological behavior of materials by instrumented indentation
- **2D Materials**: Tribological, Delamination, and Damping behavior of 2D layered materials
- **BNNT Reinforced Composites**: Boron Nitride Nanotube dispersion and integration in metal and polymer matrix composites

2. **Postdoctoral Research Associate**
Florida International University, Miami FL, United States
Department of Mechanical and Materials Engineering

- **Ultrasonic Casting**: Processing of ceramic nanoparticle reinforced aluminum matrix composites
- **Ultra-high Temperature Ceramics Welding**: Investigation of nanomechanical behavior of the interface of joined similar and dissimilar ultra-high temperature ceramics

3. **Graduate Research Associate**
Oklahoma State University, Stillwater OK, United States
School of Mechanical and Aerospace Engineering

- **Spark Plasma Sintering of Metallic Glass**: Dilatometry analysis for establishment of amorphous alloy processing maps as mathematical functions of temperature, heating rate and pressure
- **Laser Processing**: Additive manufacturing (Directed Energy Deposition) for repairing stainless steel, laser surface textured Ti-6Al-4V alloys for biomedical applications and laser surface coating for wear resistance
- **Metallic Glass Devitrification**: Crystallization mechanism, kinetics, size and volume distribution analysis by DSC, XRD, TEM and Small Angle Neutron Scattering at beamline CG-2, High Flux Isotope Reactor, Oak Ridge National Laboratory
- **Metallic Glass Matrix Composites**: Analysis of *ex-situ* nickel and *in-situ* crystal reinforcement on hardness, corrosion and wear behavior

4. **Synchrotron Beamline Associate**
Argonne National Laboratory, Lemont IL, United States
X-ray Science Division, Advanced Photon Source

- **Oxidation in Metallic Glass Powder**: First of its kind integrated modelling and validation of oxidation mechanism and kinetics. *Ex-situ* Raman spectroscopy and XRD coupled with *in-situ* thermogravimetric analysis and Ultra-small Angle X-ray Scattering at beamline 9-ID, Advanced Photon Source, Argonne National Laboratory

PATENTS

Patents Issued by the United States Patent and Trademark Office

1. A. Agarwal, **T. Paul**, C. Zhang, P. Nautiyal.
   "Metal Nanoparticle Composites and Manufacturing Methods Thereof by Ultrasonic Casting"
   United States Patent No. US 10,941,464 B1 March 09, 2021
   Licensed *to United States-based manufacturing solutions provider*
2. A. Hamrani, A. Agarwal, **T. Paul**.
   "Multidirectional Synchronized Ultrasonic Devices and Methods for Assisting Wire Arc Additive Manufacturing"
   United States Patent No. US 11,491,569 B1 November 08, 2022
3. **T. Paul**, A. Agarwal, C. Zhang. S.M.A.K. Mohammed
   "Aluminum Boron Nitride Nanotube Composites and Methods of Manufacturing the Same"
   United States Patent No. US 11,780,023 B2 October 10, 2023
   Licensed *to United States-based manufacturing solutions provider*
4. A. Agarwal, C. Zhang, **T. Paul**. S.M.A.K. Mohammed, D. John
   "Boron Nitride Nanotube Aluminum Composites And Methods Of Manufacturing The Same"
   United States Patent No. US 11,958,108 B2 April 16, 2024
   Licensed *to United States-based manufacturing solutions provider*
5. A. Agarwal, C. Zhang, **T. Paul**. S.M.A.K. Mohammed, D. John
   "Boron Nitride Nanotube Aluminum Composites And Methods Of Manufacturing The Same"
   United States Patent No. US 12,005,497 B2 June 11, 2024
   Licensed *to United States-based manufacturing solutions provider*
6. A. Agarwal, C. Zhang, **T. Paul**. S.M.A.K. Mohammed, D. John
   "Boron Nitride Nanotube Aluminum Composites And Methods Of Manufacturing The Same"
   United States Patent No. US 12,103,071 B2 October 1, 2024
   Licensed *to United States-based manufacturing solutions provider*

FUNDED GRANTS

1. **Co-PI: Tanaji Paul,** PI: Arvind Agarwal

Title: Acquisition of an Ultra-high Resolution Electron Backscatter Diffractometer for Studying Structure and Properties of Composites Manufactured by Ultrasonic Cavitation

Agency: Army Research Office

INFRASTRUCTURE DEVELOPMENT

- **EBSD Laboratory**

Assisted in the establishment of **electron backscatter diffraction facility** in AMERI for materials texture analysis.

- **Plastometry Laboratory**

Contributed to the establishment of **indentation plastometry facility** in PFL for plastic flow analysis of miniature specimens.

- **Nanoindentation Laboratory**

Established laboratory for **high-speed nanoindentation** in PFL for targeted mechanical analysis at 600 measurements per hour.

COLLABORATIONS

- **Industry, United States**

Partnered with an industrial technology solutions provider in the United States on **cold spray** and **wire arc** additive manufacturing of metals.

- **Industry, Poland**

Established collaborations with an industrial partner in Poland on research on **ultrasonic manufacturing** of advanced metals.

- **Non-profit, United States**

Established collaborations and developed workshops with a strategic think-tank organization based in United States for establishing an additive manufacturing hub in Florida.

- **Standards Organization, Global**

Developing partnership with international **material properties standardization and certification** organization.

- **Academia, United Kingdom**

Assisted in nurturing collaborations with a university/industrial laboratory in United Kingdom on **mechanical testing** of metals.

AWARDS AND HONORS

Senior Member, National Academy of Inventors **2024**
Class of 2024, "*Recognized as an academic inventor who is a rising leader in the field with success in patents, licensing, and commercialization and for producing "technologies that have brought, or aspire to bring, real impact on the welfare of society"*" (Featured News) (Class of 2024)

SPOT Award, Florida International University **2024**
"*In appreciation for continued accomplishments and contributions, service, commitment, and support to the Department of Mechanical and Materials Engineering and the College of Engineering*"

Certificate of Outstanding Contribution in Reviewing, Elsevier **2018**
Surface and Coatings Technology, "*In recognition of the contributions made to the quality of the journal*"

Robberson Summer Dissertation Fellowship, Oklahoma State University **2018**
"*In recognition of outstanding doctoral students for research, scholarly and service accomplishments*"

1st Place Winner, 3 Minute Thesis, CEAT, Oklahoma State University **2017**
"*For a compelling oration on significance of research topic in 3 minutes using 1 PowerPoint slide to a non-specialist public audience*" (Featured News)

Certificate of Outstanding Contribution in Reviewing, Elsevier **2017**
Journal of Alloys and Compounds, "*In recognition of the contributions made to the quality of the journal*"

Best Paper Award 'Spark Plasma Sintering of Fe-based Bulk Amorphous Alloys' **2017**
Twenty-sixth International Conference on the Processing and Fabrication of the Advanced Materials

OSU Foundation Distinguished Graduate Fellowship **2017 - 2019**
Oklahoma State University, "*In recognition of outstanding doctoral students*"

Tom J. Cunningham Distinguished Graduate Fellowship **2015**
Oklahoma State University, "*In recognition of outstanding doctoral students*"

Top Tier Graduate Fellowship **2015**
Oklahoma State University, "*In recognition of outstanding doctoral students*"

PUBLICATIONS

Journals Citations: **501** h-index: **14** (Google Scholar)

Invited Articles

1. S.M.A.K. Mohammed, P. Nautiyal, **T. Paul**, C. Zhang, A. Agarwal. "A Critique on Boron Nitride Nanotube Reinforced Metal Matrix Composites"
Critical Reviews in Solid State and Materials Sciences (**2023**) 1-38 DOI: 10.1080/10408436.2023.2229867 (link)
2. N. Bacca, C. Zhang, **T. Paul**, A.K. Sukumaran, D. John, S. Rengifo, C. Park, S. Chu, M. Mazurkivich, W. Scott, A. Agarwal. "Tribological and Neutron Radiation Properties of Boron Nitride Nanotubes Reinforced Titanium Composites Under Lunar Environment"
Journal of Materials Research 37 (**2022**) 4582-4593 (link)
3. **T. Paul**, C. Zhang, B. Boesl, A. Agarwal. "Analytical Review of Reinforcement Addition Techniques During Ultrasonic Casting of Metal Matrix Composites"
Advanced Engineering Materials 22 (**2020**) 2000524 (link)

Research Articles

1. S.M.A.K. Mohammed, A. Nisar, D. John, A. Sukumaran, Y. Fu, **T. Paul**, A. Hernandez, S. Seal, A. Agarwal. "Boron nitride nanotubes induced strengthening in aluminum 7075 composite via cryomilling and spark plasma sintering"
Advanced Composites and Hybrid Materials 8 (**2025**) 1-18 (link)
2. B. Palacios, S.M.A.K. Mohammed, **T. Paul**, B. Aguiar, S. Langan, A. Agarwal. "In-situ observation of twinning and grain rotation assisted deformation in wire-arc direct energy deposited (WDED) single phase titanium"
Journal of Materials Research and Technology 34 (**2025**) 273-285 (link)
3. D. John, A. Sukumaran, S.M.A.K. Mohammed, K. Orikasa, L. Lou, A. Nisar, **T. Paul**, A. Lama, C. Park, S. Chu, A. Agarwal. "Cold-Sprayed Boron-Nitride-Nanotube-Reinforced Aluminum Matrix Composites with Improved Wear Resistance and Radiation Shielding"
Advanced Engineering Materials 26 (**2024**) 2401490 (link)
4. D. John, A. Lama, A. Nisar, S.M.A.K. Mohammed, **T. Paul**, A. Agarwal. "Microstructural evolution and interfaces in cold sprayed hybrid aluminum alloy powders of different hardness"
Surface and Coatings Technology 494 (**2024**) 131393 (link)
5. B. Palacios, **T. Paul**, S.M.A.K. Mohammed, A. Sukumaran, G. Seisdedos, S. Langan, A. Agarwal. "Role of crystalline orientations and additive layers on bulk tensile response of wire-arc directed energy deposited (WDED) single phase titanium"
Materials Science and Engineering: A 911 (**2024**) 146921 (link)
6. **T. Paul**, T Dolmetsch, L. Lou, A. Agarwal. "Frictional resistance and delamination mechanisms in 2D tungsten diselenide revealed by multi-scale scratch and in-situ observations"
Nanotechnology 35 (**2024**) 395703 (link)
7. U. Bansal, N. Esakkiraja, T. Baskaran, **T. Paul**, R. Ravi, P. Kumar, V. Jayaram, A. Paul. "Synergistic effects of Pt and Y addition in (Ni, Pt)CrAlY bond coat on oxide spallation resistance and growth of interdiffusion zone between bond coat and Ni-based single crystal

superalloy"
Corrosion Science 240 (**2024**) 112485 (link)

8. R. Joshi, **T. Paul**, C. Zhang, B. Boesl, A. Agarwal. "A Critique on the Role of Object-Oriented Finite Element Analysis (OOF2) in Predicting Thermal and Mechanical Properties in Thermal Sprayed Coatings"
Journal of Thermal Spray Technology (**2024**) 1-19 (link)
9. D. John, B.C. Sousa, **T. Paul**, S.M.A.K. Mohammed, D.L. Cote, A. Agarwal. "Devitrification-Induced Tailoring of Microstructure and Strength in Aluminum High-Entropy Alloy Powder for Cold Spray Deposition"
Journal of Thermal Spray Technology 33 (**2024**) 1-17 (link)
10. A. Lama, R. Sarvesha, D. John, **T. Paul**, A. Sukumaran, A. Agarwal. "Role of nitrogen and helium gases on microstructure and anisotropic mechanical properties of cold-sprayed scalmalloy deposits"
Journal of Materials Research and Technology 30 (**2024**) 1341-1353 (link)
11. S.M.A.K. Mohammed, AA Aleman, D. John, **T. Paul**, A. Agarwal. "Exploring the Potential of Wire Fed Direct Energy Deposition of Aluminum–Boron Nitride Nanotube Composite: Microstructural Evolution and Mechanical Properties"
Advanced Engineering Materials 25 (**2023**) 2300770 (link)
12. S.M.A.K. Mohammed, **T. Paul**, D. John, C. Zhang, A. Agarwal. "Understanding the Role of Ultrasonic Cavitation Assisted Casting of Boron Nitride Nanotube-reinforced Aluminum Matrix Composite"
Journal of Materials Research and Technology 25 (**2023**) 2405-2418 (link)
13. B. Palacios, **T. Paul**, S.M.A.K. Mohammed, K. Orikasa, D. John, K. Rodriguez, T. Thomas, S. Langan, A. Michelson, A. Agarwal. "Role of Structural Hierarchy on Mechanics and Electrochemistry of Wire Arc Additive Manufactured (WAAM) Single Phase Titanium"
Journal of Manufacturing Processes 93 (**2023**) 239-249 (link)
14. D. John, **T. Paul**, S.M.A.K. Mohammed, G. Seisdedos, B. Boesl, A. Agarwal. "Profilometry-Based Indentation Plastometry for Evaluating Bulk Tensile Properties of Aluminum-Silicon Carbide Composites"
Advanced Engineering Materials (**2023**) 2201890 DOI: 10.1002/adem.202201890 (link)
15. T. Thomas, **T. Paul**, D. John, K. Orikasa, A. Agarwal. "Novel Method to Investigate Plastic Flow in Micrometer Powder Particles by Integrated Experimental and Computational Approach"
Materials Today Communications 34 (**2023**) 105275 (link)
16. **T. Paul**, R. Joshi, C. Walde, C. Zhang, A. Birt, M. Pepi, A. Agarwal. "Multi-scale Elastic Behavior of Cold Sprayed Refractory Metal from Splat to Bulk Deposit by Integrated Experimental and Modeling Approach"
Materials Science and Engineering A 853 (**2022**) 143751 (link)
17. **T. Paul**, R. Joshi, A. Exime, W. Edward, C. Zhang, B. Boesl, A. Agarwal. "Role of Ultrasonic Treatment on Microstructure, Multi-scale Mechanical and Tribological Behavior of 2D Tungsten Disulfide Reinforced Aluminum Composites"
Advanced Engineering Materials 24 (**2022**) 2200543 (link)
18. L. Lou, **T. Paul**, B. Aguiar, T. Dolmetsch, C. Zhang, A. Agarwal. "Direct Observation of Adhesion and Mechanical Behavior of a Single PLGA Fiber using *In-situ* Technique for

Tissue Engineering"
ACS Applied Materials and Interfaces 14 (**2022**) 42876–42886 (link)

19. D. John, **T. Paul**, K. Orikasa, C. Zhang, B. Boesl, A. Agarwal. "Engineered Aluminum Powder Microstructure and Mechanical Properties by Heat-Treatment for Optimized Cold Spray Deposition of High Strength Coatings"
Journal of Thermal Spray Technology 31 (**2022**) 2537-2559 (link)

20. A.E. Tallman, **T. Paul**, D. John, A. Agarwal.
"Uncertainty Quantification of a High-throughput Profilometry-based Indentation Plasticity Test of Al 7075 T6 Alloy "
Frontiers in Materials: Computational Materials Science 6 (**2022**) 919797, 1 - 14 (link)

21. G. Bianco, **T. Paul**, A. Nisar, A. Hamrani, B. Boesl, A. Agarwal. "Nanoindentation Mapping Defects Filtration for Heterogeneous Materials Using Generative Adversarial Networks"
Materials Characterization 191 (**2022**) 112107 (link)

22. A. Nisar, T. Dolmetsch, **T. Paul**, T.S. Sakthivel, C. Zhang, B. Boesl, S. Seal, A. Agarwal. "Unveiling Enhanced Oxidation Resistance and Mechanical Integrity of Multicomponent Ultra-high Temperature Carbides"
Journal of the American Ceramic Society 105 (**2021**) 2500 - 2516 (link)
Top Downloaded Article among work published in journal between Jan - Dec, 2021

23. **T. Paul**, P. Nautiyal, C. Zhang, B. Boesl, A. Agarwal. "Role of *In-situ* Splat Sintering on Elastic and Damping Behavior of Cold Sprayed Aluminum Coatings"
Scripta Materialia 204 (**2021**) 114125 (link)
Topmost Downloaded in EngRN: Process Engineering, Jun - Aug, 2021

24. **T. Paul**, C. Zhang, N. Denis, B. Boesl, A. Agarwal. "Role of Ultrasonic Treatment on Microstructure, Mechanical and Tribological Behavior of 2D Boron Nitride Reinforced Aluminum Composites"
Materials Science and Engineering: A 809 (**2021**) 140970 (link)

25. A. Nisar, T. Dolmetsch, **T. Paul**, C. Zhang, B. Boesl, A. Agarwal. "Electric Field Assisted Solid State Interfacial Joining of TaC-HfC Ceramics without Filler"
Journal of the American Ceramic Society 104 (**2021**) 2483 - 2494 (link)

26. **T. Paul**, C. Zhang, B. Boesl, A. Agarwal. "Correlations to Predict Microstructure and Mechanical Properties of Ultrasonically Cast Metal Matrix Nanocomposites as a Function of Treatment Time"
Advanced Engineering Materials 22 (**2020**) 2000413 (link)

27. **T. Paul**, A. Singh, K.C. Littrell, J. Ilavsky, S.P. Harimkar. "Crystallization Mechanism in Spark Plasma Sintered Bulk Metallic Glass Analyzed using Small Angle Neutron Scattering"
Scientific Reports 10 (**2020**) 1 - 11 (link)

28. **T. Paul**, L. Zhang, S. Biswas, A. Loganathan, M.G. Frith, J. Ilavsky, I. Kuzmenko, J. Puckette, A. Agarwal, K.A. Kalkan, S.P. Harimkar. "Quantification of Thermal Oxidation in Metallic Glass Powder using Ultra-small Angle X-ray Scattering"
Scientific Reports 9 (**2019**) 1 - 12 (link)

29. **T. Paul**, A. Loganathan, A. Agarwal, S.P. Harimkar. "Kinetics of Isochronal Crystallization in a Fe-based Amorphous Alloy"
Journal of Alloys and Compounds 753 (**2018**) 679 - 687 (link)

30. **T. Paul**, N. Chawake, R.S. Kottada, S.P. Harimkar. "Pressure Controlled Micro-viscous Deformation Assisted Spark Plasma Sintering of Fe-based Bulk Amorphous Alloy"
Journal of Alloys and Compounds 738 (**2018**) 10 - 15 (link)
31. H. Kasturi, **T. Paul**, S. Biswas, S.H. Alavi, S.P. Harimkar. "Sliding Wear Behavior of Spark Plasma Sintered Fe-based Amorphous Alloy Coatings on Cu-Ni Alloy"
Journal of Materials Engineering and Performance 27 (**2018**) 3629 - 3635 (link)
32. **T. Paul**, S.P. Harimkar. "Prediction of Heating Rate Controlled Viscous Flow Activation Energy During Spark Plasma Sintering of Amorphous Alloy Powders"
Journal of Physics D: Applied Physics 50 (**2017**) 1 - 4 (link)
33. **T. Paul**, A. Singh, S.P. Harimkar. "Densification and Crystallization in Fe-based Bulk Amorphous Alloy Spark Plasma Sintered in the Supercooled Liquid Region"
Advanced Engineering Materials 19 (**2017**) 1700224 (link)
34. **T. Paul**, S.P. Harimkar. "Viscous Flow Activation Energy Adaptation by Isochronal Spark Plasma Sintering"
Scripta Materialia 126 (**2017**) 37 - 40 (link)
35. **T. Paul**, S.P. Harimkar. "Initial Stage Densification During Spark Plasma Sintering of Fe-based Amorphous Alloy Powder: Analysis of Viscous Flow"
Journal of Applied Physics 120 (**2016**) 134901 (link)
36. A. Singh, **T. Paul**, S. Katakam, N.B. Dahotre, S.P. Harimkar. "*In-Situ* Nanocrystallization Induced Hardening of Amorphous Alloy Matrix Composites"
JOM 68 (**2016**) 1932 - 1937 (link)
37. **T. Paul**, S.H. Alavi, S. Biswas, S.P. Harimkar. "Microstructure and Wear Behavior of Laser Clad Multi-layered Fe-based Amorphous Coatings on Steel Substrates"
Lasers in Manufacturing and Materials Processing 2 (**2015**) 231 - 241 (link)
38. **T. Paul**, A. Paul. "Interdiffusion in the Ni-Zr System"
Journal of Phase Equilibria and Diffusion 36 (**2015**) 381 - 389 (link)
39. N. Chawake, P. Ghosh, L. Raman, A.K. Srivastav, **T. Paul**, S.P. Harimkar, J. Eckert, R.S. Kottada. "Estimation of Diffusivity from Densification Data Obtained During Spark Plasma Sintering"
Scripta Materialia 161 (**2019**) 36 - 39 (link)
40. H. Kasturi, **T. Paul**, S. Biswas, S.P. Harimkar. "Effect of Nickel Reinforcement on Electrochemical and Wear Behavior of Spark Plasma Sintered Fe-based Metallic Glass Composites"
Materials Research Express 6 (**2019**) 025206 (link)

Conference Proceeding

1. **T. Paul**, A. Singh, S.P. Harimkar. "Spark Plasma Sintering of Fe-based Bulk Amorphous Alloys" *Proceedings of the Twenty-sixth International Conference on the Processing and Fabrication of the Advanced Materials (PFAM-XXVI) Editors: J.H. Lee, N.H. Kim, T.S. Srivatsan* (**2017**) 429 - 435

Media

1. B. Palacios, **T. Paul**, A. Agarwal, S. Langan. "Exploring the Tensile-Compressive Assysmetry of Titanium Samples made by Wire Arc Directed Energy Deposition" *Advanced Materials & Processes, ASM International* Volume 182 (**2024**) 11-15 (link)
2. **T. Paul**, C. Zhang, A. Agarwal. "Florida International University Performs Cold Spray Multiscale Mechanical Testing from Bulk Coating to Single Splat" *Spraytime, The American Welding Society* Third Quarter, Volume 28 (**2021**) 8 (link)
3. **T. Paul**. "Recent Trends in Spark Plasma Sintered Ceramic Thermal Barrier Coatings" *American Ceramic Society Bulletin* 96 (**2017**) 32 (link)

PRESENTATIONS

Oral

1. **T. Paul**, D. John, A. Lama, A. Agarwal. "Can Novel Cold Sprayed Al Alloys Surpass Al 7075 Deposits in Strength?" *Science and Technology*, **Cold Spray Action Team (2024)**, Worcester, MA, United States
2. **T. Paul**, B. Palacios, D. John, K. Orikasa, T. Dolmetsch, S. Mohammed, G. Seisdedos, S. Langan, A. Michelson, C. Zhang, A. Agarwal. "Multi-scale Tensile Deformation of Wire Arc Additive Manufactured Titanium from Microscopic Beads to Macroscopic Component" *Additive Manufacturing: Length Scale Phenomena in Mechanical Response*, **TMS (2023)**, San Diego, CA, United States
3. D. Garcia, T. Wang, S. Rajasekara, R. Eberheim, A. Agarwal, **T. Paul**, K. Ross. "Friction Stir Additive Manufacturing of Al-5083" *Additive Manufacturing: Beyond the Beam IV*, **TMS (2023)**, San Diego, CA, United States
4. S. Rajashekara, D. Garcia, R. Eberheim, K. Ross, A. Agarwal. **T. Paul**. "Effect of Microstructure on Mechanical Properties of Friction Stir Processed Al Alloy" *Friction Stir Welding and Processing XII*, **TMS (2023)** San Diego CA, United States
5. **T. Paul**, R. Joshi, C. Zhang, B. Boesl, A. Agarwal. **Invited** "Correlations between Ultrasonic Processing, Reinforcement Morphology, and Multi-scale Mechanical Performance of Metal Matrix Composites" *Metal Podwer Synthesis and Processing - Section I* **MS&T (2022)** Pittsburgh PA, United States
6. **T. Paul**, B. Palacios, T. Dolmetsch, C. Zhang, B. Boesl, A. Agarwal. "Role of Build Orientation and Layers on Microstructure and Multi-scale Mechanical Properties of Wire Arc Additive Manufactured Commercially Pure Titanium" *Additive Manufacturing of Titanium-based Materials: Processing, Microstructure and Material Properties — Ti-processing* **MS&T (2022)** Pittsburgh PA, United States
7. A. Tallman, D. John, **T. Paul**, A. Agarwal. "Uncertainty Quantification of a High-throughput Local Plasticity Test: Profilometry-based Indentation Plastometry of Al 7075 T6 Alloy" *Uncertainty Quantification in Data-Driven Materials and Process Design — Materials Design under Uncertainty* **MS&T (2022)** Pittsburgh PA, United States
8. D. John, K. Orikasa, **T. Paul**, C. Zhang, A. Agarwal. "Engineering Amorphous Aluminum High Entropy Powder for Producing High Strength Cold Sprayed Deposits" *Metal Podwer Synthesis and Processing - Section I* **MS&T (2022)** Pittsburgh PA, United States

9. R. Joshi, **T. Paul**, C. Zhang, B. Boesl, A. Agarwal. "Microstructure Based Computational Analysis of Heterogeneous Materials" *Multi Scale Modeling of Microstructure Deformation in Material Processing — Multi Scale Modeling of Microstructure Deformation in Material Processing* **MS&T (2022)** Pittsburgh PA, United States
10. L. Lou, **T. Paul**, A. Rubifaro, J. He, A. Agarwal. "Exploring Single Electrospun PLGA Fiber Mechanics and Fiber Mat Applications in Cardiac Bioengineering" *Society for Biomaterials: Biomaterial Applications — Cardiovascular Biomaterials* **MS&T (2022)** Pittsburgh PA, United States
11. **T. Paul**, D. John, K. Orikasa, C. Zhang, A. Agarwal. "Engineering Aluminum Powder Microstructures for High Strength Cold Sprayed Deposits" *Science and Technology* **CSAT Cold Spray Action Team (2022)** Worcester MA, United States
12. **T. Paul**, B. Palacios, D. John, K. Orikasa, T. Dolmetsch, S. Mohammed, S. Langan, A. Michelson, C. Zhang, A. Agarwal. "Large Scale Wire Arc Additive Manufacturing (WAAM) of Commercially Pure Titanium" **LSAAT Large Scale Additive Action Team (2022)** Worcester MA, United States
13. G.B. Atria, A. Nisar, **T. Paul**, A. Hamrani, A. Agarwal. "Nanoindentation Mapping Defects Filtration for Heterogeneous Materials using Generative Adversarial Networks (GAN's)" **First World Congress on Artificial Intelligence in Materials and Manufacturing (AIM) (2022)** Pittsburgh, PA, United States
14. **T. Paul**, A. Exime, R. Joshi, C. Zhang, B. Boesl, A. Agarwal. "Role of Ultrasonic Cavitation on Microstructure, Bulk Mechanical and Tribological Behavior of 2D Tungsten Disulfide Reinforced Aluminum Matrix Composites" *Metal-Matrix Composites: Advances in Processing, Characterization, Performance and Analysis* **TMS (2022)** Anaheim CA, United States
15. T. Dolmetsch, K. Orikasa, **T. Paul**, C. Zhang, B. Boesl, A. Agarwal. "Real-Time Deformation Mechanisms of Hierarchically Structured Nanocomposites using High-Resolution *In-Situ* Testing" **TMS (2022)** Anaheim CA, United States
16. T. Dolmetsch, **T. Paul**, B. Boesl, A. Agarwal. "Deformation Mechanisms of Hierarchically Structured 2D Single-Crystal Materials Revealed by Real-time High-resolution In-situ Nanomechanical Testing" **Nanomechanical Testing in Materials Research and Development VIII (2022)** Split, Croatia
17. A. Nisar, T. Dolmetsch, **T. Paul**, C. Zhang, B. Boesl, A. Agarwal. "Multi-Component High Entropy Ultra-High Temperature Carbides: Solid-Solution to High-Entropy Phase Formation" **MS&T (2021)** Pittsburgh, PA, United States
18. **T. Paul**, C. Zhang, D. John, A. Agarwal. "Multi-component and High Strength Aluminum Coatings by Cold Spray" *Science and Technology* **CSAT Cold Spray Action Team (2021)** Leominster MA, United States
19. **T. Paul**, C. Zhang, B. Boesl, A. Agarwal. "Microstructure and Nanomechanical Properties of Cold Sprayed Tantalum Coatings" *Cold Spray Metals, Ceramics and Metal Matrix Composite Coatings II-b* **International Thermal Spray Conference and Exposition (2021)** United States
20. C. Zhang, **T. Paul** B. Boesl, A. Agarwal. "Effect of Carrier Gas and Heat Treatment on the Dynamic Behavior of Cold Sprayed Aluminum Coatings" *Cold Spray Metals, Ceramics and Metal Matrix Composite Coatings I* **International Thermal Spray Conference and Exposition (2021)** United States

21. **T. Paul**, C. Zhang, B. Boesl, A. Agarwal. "Functional Relationships Between Treatment Time, Microstructure and Mechanical Properties of Ultrasonically Cast Metal Matrix Nanocomposites" *Light Metal and Composites Technology* **MS&T (2020)** Pittsburgh PA, United States
22. **T. Paul**, S.P. Harimkar. "A Mathematical Approach to Spark Plasma Sintering of Metallic Glasses" *Field Assisted Sintering Technologies* **MS&T (2018)** Columbus OH, United States
23. **T. Paul**, A. Loganathan, A. Agarwal, S.P. Harimkar. "Isochronal Crystallization Kinetics of Fe-based Amorphous Alloy Powder" *Bulk Metallic Glasses XV* **TMS (2018)** Phoenix AZ, United States
24. **T. Paul**, S.P. Harimkar. "Effect of Density and Crystallization on the Hardness of Spark Plasma Sintered Fe-based Bulk Amorphous Alloy" *Processing and Performance of Materials Using Microwaves, Electric and Magnetic Fields, Ultrasound Lasers and Mechanical Work-Rustum Roy Symposium* **MS&T (2017)** Pittsburgh PA, United States
25. **T. Paul**, A. Singh, S.P. Harimkar. "Thermal Stability of Spark Plasma Sintered Fe-based Bulk Amorphous Alloys" *Chemical and Engineering Materials* **Joint Nanoscience and Neutron Scattering User Meeting (2017)** Oak Ridge National Laboratory, Oak Ridge TN, United States
26. **T. Paul**, S.H. Alavi, S. Biswas, S.P. Harimkar. "Microstructure and Wear Behavior of Laser Clad Multi-layered Fe-based Amorphous Coatings on Steel Substrates" *Bulk Metallic Glasses XIII* **TMS (2016)** Nashville TN, United States

Posters

1. **T. Paul**, C. Zhang, B. Boesl, A. Agarwal. "Ultrasonic Casting of 3D, 2D and 1D Nanoparticle Reinforced Aluminum Matrix Composites" **9th Nano Conference (2020)**
2. **T. Paul**, S.P. Harimkar. "Viscous Flow Densification During Spark Plasma Sintering of Fe-based Amorphous Alloy Powder" *Bulk Metallic Glasses XIV* **TMS (2017)** San Diego CA, United States
3. H. Kasturi, **T. Paul**, S.P. Harimkar. "Spark Plasma Sintering of Ni reinforced Fe based Bulk Metallic Glass Composites" *Bulk Metallic Glasses XIV* **TMS (2018)** Phoenix AZ, United States
4. Esakkiraja N., **T. Paul**, V. Jayaram, A. Paul. "Interdiffusion Studies Between Co and Pt Modified Bond Coat and Superalloys" **Advances in Refractory and Reactive Metals and Alloys (2016)** Mumbai, India

REVIEWING

75 reviews for 18 journals

Scripta Materialia, Journal of Alloys and Compounds, Surface and Coatings Technology, Materials Science and Engineering A, Journal of the American Ceramic Society, Journal of Applied Physics, Computational Materials Science, Metallurgical and Materials Transactions A, Philosophical Magazine Letters, Composite Interfaces, Materials Research Express, International Journal of Materials Research, Vacuum, International Journal of Materials and Product Technology, JOM, Journal of Physics D: Applied Physics, International Journal of Cast Metals Research, Frontiers in Bioengineering

MENTORING

Doctoral

1. **Denny John**
   Dissertation: Cold Spray Additive Manufacturing of High Strength Aluminum Alloy Coating and Deposits

2. **Blanca Palacios**
   Dissertation: Structure, Mechanics, and Electrochemical Behavior of Wire Arc Additive Manufactured Titanium

3. **Anil Lama**
   Dissertation: Cold Sprayed Coatings of Rare Earth Rich Aluminum Alloys

4. **Riddhi Joshi**
   Dissertation: Modeling of Structure and Multi-scale Mechanics During High Deposition Rate Additive Manufacturing

Masters

1. **Himabindu Kasturi**
   Thesis: Electrochemical and Wear Behavior of Sintered Metallic Glass Composites and Coatings
2. **Shubhankar Padwal**
   Thesis: Spark Plasma Sintering of Metallic Glass Composites
3. **Soumya Mandal**
   Thesis: Additive Manufacturing of Stainless Steel

Undergraduate

1. **Carlos Andres Maribona**

2. **Nicole Bacca**
3. **Brandon Aguiar**
4. **Noemi Denis**
5. **James Gruich** (NSF REU)
6. **Matthew Dieterle** (NSF REU)

Awards won by Mentees

1. **3rd Place, Blanca Palacios**. International Metallography Contest, 2022. Light Microscopy Category. "Discovering the Deformation Mechanism of Additively Manufactured HCP Metals Using Polarized and Differential Interference Contrast Techniques".
2. **People's Choice Award, Denny John**. Poster Presentation, Cold Spray Action Team, 2022. "Harnessing Entropy and Ductility for Cold Spray Additive Manufacturing of High Strength Aluminum Deposits"

TEACHING

Florida International University, Miami FL, United States
Department of Mechanical and Materials Engineering

Courses Taught

1. **Analytical Techniques in Materials Science**
2. **Fundamentals of Materials Processing**
3. **Nanomechanics and Nanotribology**
4. **Materials in Engineering**

SERVICE

- **Symposium Co-organizer**, Cold Spray Additive Manufacturing: Part Quality and Performance, TMS 2024 Annual Meeting and Exhibition
- **Symposium Co-organizer**, Advances in Surface Engineering II, TMS 2020 Annual Meeting and Exhibition
- **Session Chair**, Advanced Real Time Imaging - Joint Session: Mechanical Response of Materials Investigated through Novel In-situ Experiments and Modeling, TMS 2023 Annual Meeting and Exhibition
- **Session Chair**, Development in Lightweight Alloys and Composites: Microstructure, Processing, and Mechanical Properties, MS&T 2022 Annual Meeting and Exhibition
- **Session Chair**, Advanced Real Time Imaging: Energy and Biomaterials, TMS 2022 Annual Meeting and Exhibition

PROFESSIONAL ASSOCIATIONS

The Minerals, Metals and Materials Society (TMS), The American Ceramic Society (ACerS) Global Graduate Research Network (GGRN), The Association for Iron and Steel Technology (AIST) ASM International