AYUSH SUBEDI

San Marcos, Texas
(585) 406 – 9016
ayush.rajsubedi@gmail.com
LinkedIn | Google Scholar

Ph.D. in Materials Science, Engineering, and Commercialization with expertise in advanced materials manufacturing, processing innovation, and mechanical systems. Research experience spans metal, ceramic, composite, and semiconductor materials, with emphasis on fabrication, characterization, and reliability engineering. Skilled in additive manufacturing, high-temperature sintering, thin films, and nanostructures, with extensive use of SEM, TEM, AFM, XRD, DSC, TGA, and Raman spectroscopy. Demonstrated success in mentoring students, interdisciplinary collaboration, and externally visible research contributions. Dedicated to advancing research in manufacturing while providing inclusive, practice-oriented engineering education.

EDUCATION

Doctor of Philosophy in Materials Science, Engineering, and Commercialization (MSEC) **2025**
Texas State University, San Marcos, Texas

Masters in Materials Science and Engineering **2022**
Hefei University, Hefei, China

Bachelor of Science in Physics **2017**
Tribhuvan University, Kathmandu, Nepal

EXPERIENCE

Teaching Experience

Adjunct Instructor & Teaching Assistant – Texas State University **2023- 2024, 2025- Present**

- Taught and assisted in Thermodynamics, Materials Science, Applied Physics, and Manufacturing Systems.
- Delivered hands-on labs in instrumentation, machining, and industrial processes.
- Developed controls and mechatronics modules, integrating fault detection, process optimization, and quality assurance.
- Applied MATLAB, Python, COMSOL, SolidWorks, and AutoCAD in curriculum to strengthen computational, modeling, and design skills.
- Advised and mentored undergraduates, promoting inclusive, student-centered learning environments.

Teaching Assistant – Hefei University **2019- 2022**

- Assisted instruction in Mechanics, Statics, Thermodynamics, and Manufacturing Science.
- Supervised lab modules and problem-solving sessions in materials processing and instrumentation design.
- Guided students in applying AutoCAD and SolidWorks to engineering problems.

Research Experience

Texas State University

❖ **Optical and Electronic Materials.** **2022- Present**

- Studied light-matter interactions in ZBLAN fibers and AlGaN films using spectroscopy, thin-film optics, and electrical/optical testing to assess crystallization, interfaces, and device reliability.
- Designed and modified optical and mechanical testing setups using precision alignment and CAD-based modeling.
- Conducted advanced material and interface characterization using SEM, TEM, EDS, XRD, AFM, and implemented DOE/SPC methods to optimize reproducibility and process control.

- Modeled optical and thermomechanical behavior of multifunctional composites and semiconductors using COMSOL Multiphysics.
- Demonstrated processing property relationships, including achieving a 30% crystallinity change in ZBLAN fibers through controlled vibrational frequencies, linking mechanical perturbations to structural phase transitions.

Hefei University **2019-2022**

❖ **Tribological Performances of Nickel-Based Composites with Rice Husk Ceramic Particles.**

- Developed novel Ni-based composite materials incorporating Al, Cu, and Ni compositions using precise high-temperature sintering techniques.
- Optimized microstructural properties to significantly enhance mechanical performance and wear resistance.
- Conducted advanced friction and wear testing, achieving a remarkable 15% reduction in wear rate through superior material design.
- Employed SEM, XRD, FTIR, DSC, and TGA for an in-depth failure analysis, leading to a deeper understanding of material durability.
- Enhanced composite lifespan by refining processing techniques, ensuring greater resilience under extreme operational conditions.

Research Intern

Jiashan APM Industrial Bushing Co. Ltd., China **June-Aug. 2020**

- Developed high-temperature carbon fiber composites for automotive applications, optimizing performance and reliability.
- Implemented CAD-driven process design improvements, achieving an 18% reduction in wear loss.
- Collaborated with R&D teams on next-gen composite materials for high-performance automotive environments.

CORE SKILLS

Advanced Manufacturing
Powder metallurgy, additive manufacturing, sintering, thin-film deposition, machining, composite fabrication.

Characterization & Metrology
SEM, TEM, AFM, XRD, XPS, Raman, FTIR, DSC, TGA, tribological testing.

Modeling & Simulation
COMSOL Multiphysics, MATLAB, Python, DOE/SPC, CAD-based design.

Teaching & Mentorship
Curriculum design, experiential learning, inclusive pedagogy.

CERTIFICATION

- Atomic Force Microscopy (AFM) Summer School, Texas State University **July 17-19, 2024**
- 35 Hours of Project Management Education, Texas State University **May 2024**

PRESENTATIONS

- USSF Consortium Symposium, Albuquerque New Mexico **June 5-6, 2024**
- APS March Meeting, Minneapolis Minnesota **March 4-8, 2024**
- USSF University Consortium Symposium, Boulder Colorado **Aug. 8-10, 2023**

- 13th National Youth Academic Conference on Surface Engineering, Yangzhou China **May 14-16, 2021**

HONORS AND AWARDS

- Doctoral Retention Scholarship, Texas State University **2024-2025**
- Graduate College Scholarship, Dean of Students Office- Texas State University **2024-2025**
- Student Government Scholarship, Dean of Students Office- Texas State University **2024-2025**
- Best Presentation Award, at STAR Showcase Presentation, Texas State University **2023**
- University Presidential Scholarship for graduate studies, Hefei University **2019-2022**

LEADERSHIP

President

- Materials Research Society (MRS) Texas State Chapter, Texas State University **2025- Present**

Treasurer

- Materials Research Society (MRS) Texas State Chapter, Texas State University **2024- 2025**
- MSEC Student Club, Texas State University **2023- 2024**

Founding Co-President

- Nepalese Student Association, Texas State University **2023 - 2024**

SELECTED PUBLICATIONS

[1] Fei, X., Liu, S., **Subedi, A**., et al. (2025). Investigate on preparation and dry tribological behaviors of onion-like carbon/MoS_2 polymide coatings. Applied surface science, 161846.

[2] Hu, E., Su, E., **Subedi, A**., et al. (2023). Investigate on the dry friction tribological behaviors and mechanism of carbon quantum dot/polyimide composite coating. Wear, 530, 205048.

[3] Hu, E., Yu, X., Liu, S., Su, E., **Subedi, A**., et al. (2023). Preparation and tribological behavior of a self-assemble copper base carbon quantum dot films. Wear, 524, 204673.

[4] **Subedi, A**., Hu, E., et al. (2022). Effects of Metal and Inorganic Additives on the Tribological Performances of Nickel-Based Composites with Rice Husk Ceramic Particles. Transactions of the Indian Institute of Metals, 1-21.

[5] Hu, E., Su, E., Chen, Y., **Subedi, A**., et al. (2022). Preparation and Tribological Behaviors of Modified Rice Husk Carbon/MoS_2 Composite Particles as a Functional Additive in Polyethylene Glycol. Tribology Transactions, 65(3), 564- 577.

[6] Chen, Y., Hu, E., Zhong, H., Wang, **Subedi, A**., et al. (2021). Characterization and tribological performances of graphene and fluorinated graphene particles in PAO. Nanomaterials, 11(8), 2126.

[7] **Subedi, A**., Adhikari, B., et al. (2017). Variation of solar wind parameters during intense geomagnetic storms. Himalayan physics, 80-85.