

Samarjith Biswas

Ph.D. candidate, Mechanical & Aerospace Engineering

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SUMMARY

Versatile Mechanical & Aerospace Engineer with expertise in acoustic and thermoacoustic metamaterials, solid and structural dynamics, advanced composite materials, and machine design. Actively leading an avant-garde project in partnership with NASA's Langley Research Center on pioneering Thermoacoustic Metastructures (TAMS) for optimized noise reduction. Proficient in an array of technical software including AutoCAD, SolidWorks, MATLAB, and FEA. Distinguished for analytical acumen, proficient project management, and the ability to guide cross-functional teams. A doctoral candidate with a potent blend of hands-on research and mentoring experience. Poised to leverage my skills and insights in diverse technical roles and industries.

EDUCATION

Doctor of Philosophy in Mechanical & Aerospace Engineering 2024 (Expected)
Oklahoma State University | Stillwater, Oklahoma

Master of Science in Mechanical Engineering 2019
Northern Arizona University | Flagstaff, Arizona

Bachelor of Science in Mechanical Engineering 2016
Rajshahi University of Engineering & Technology | Bangladesh

RESEARCH EXPERIENCE

Graduate Research Associate August 2019 – Present
Oklahoma State University | Stillwater, Oklahoma

- Devised Thermoacoustic Metastructure (TAMS) to harvest energy and mitigate noise, achieving a notable 5.28 dB sound reduction.
- Achieved a peak voltage of 33 mV with an output power of 19.8 μ W using an acoustic-thermoelectric transduction scheme.
- Led simulation-based studies to predict TAMS performance, informing design iterations and optimization strategies.
- Introduced modular TAMS designs for scalable noise barriers with energy capture.
- Investigated parameters to balance acoustic absorption and thermal gradients, providing insights into multifunctional application.

Graduate Research Assistant August 2017 - July 2019
Northern Arizona University | Flagstaff, Arizona

- Led the development and optimization of structural supercapacitors (SSCs) aiming to integrate power storage.
- Optimized SSC components, achieving a power density of 32.06 W/Kg and energy density of 53.58 mWh/kg at 2V.
- Improved electrode functionalization techniques, yielding a specific capacitance of 57.82 mF/g with operating voltage of 2.4V
- Collaborated with interdisciplinary teams to innovate energy-efficient materials and fabrication methods.

TEACHING EXPERIENCE

Instructor - Summer Bridge Program July 2023
Oklahoma State University | Stillwater, Oklahoma

- Instructed two sections (30-40 students each) in the Summer Bridge Program, aiding their university transition.
- Led engineering design and fabrication projects, empowering students to apply theoretical knowledge in practical scenarios.

Instructor of Record January 2023 - May 2023
Oklahoma State University | Stillwater, Oklahoma

- Served as primary instructor of a 4000-level Machine Elements course within the Mechanical Engineering Technology department.
- Provided individualized support, graded assignments and exams, and held regular office hours for student consultations.

Graduate Teaching Associate August 2019 – December 2022
Oklahoma State University | Stillwater, Oklahoma

- Taught Elementary Dynamics in two discussion sections with 25-30 students each, employing interactive methods.
- Independently led Honors discussions, promoting critical thinking and advanced problem-solving.
- Designed and supervised honors projects, enhancing student understanding and promoting collaboration.

Graduate Teaching Assistant August 2017 - July 2019
Northern Arizona University | Flagstaff, Arizona

- Instructed advanced thermodynamics projects across four lab sections, enhancing students' grasp of key concepts.
- Oversaw equipment usage in the Thermo-fluids lab and Machine shop and timely procurement of essential supplies.
- Assisted in the design and implementation of lab experiments that bridged the gap between theory and practical applications.

PROFESSIONAL EXPERIENCE

Engineer (R&D) December 2016 - July 2017
B-Trac Engineering Ltd | Dhaka, Bangladesh

- Led key projects (e.g., mobile watch tower) and supervised a team of technicians and professionals.
- Determined the most economical and practical electrical installation layout while ensuring high productivity in assigned tasks.
- Collaborated closely with cross-functional teams to streamline R&D processes, leading to enhanced product innovation.

SKILLS

- **Technical Skills:** CATIA, AutoCAD, SolidWorks, LabVIEW, ANSYS, DeltaEC, FEA, CFD, CAM, Python, C, C++, MATLAB
- **Equipment Knowledge:** Anechoic test chamber, NI-DAQ, CNCs, Mills, Lathes, Material Handling
- **Areas of Expertise:** Acoustic analysis, Failure analysis, Metallurgy, Manufacturing processes, Automatic control, Automobiles, Stress analysis, Statics and dynamics, Shock and vibration
- **Soft Skills:** Project management, Teamwork

CERTIFICATIONS

- **Six Sigma Green Belt | Coursera, Kennesaw State University** June 2023
Completed four advanced courses in Six Sigma, including Six Sigma and the Organization, Six Sigma Advanced Define and Measure Phases, Six Sigma Advanced Analyze Phase, and Six Sigma Advanced Improve and Control Phases.
- **Engineering Project Management Specialization | Coursera, Rice University** June 2023
Completed three advanced courses Engineering Project Management. Acquired skills in planning, scheduling, Earned Value Management (EVM), project management, and procurement.

SELECTED PROJECTS

- **Parametric Characterization of a Thermoacoustic Liner (2023):** Collaborated with NASA to optimize thermoacoustic liners, achieving a 9.5°C peak temperature gradient at 790 Hz.
- **Modeling Dispersion and Energy Harvesting in a Vibro-Thermal Metamaterial (2023):** Investigated the role of friction in metamaterials and demonstrated vibro-thermal energy harvesting potential.
- **Feasibility of a Thermoacoustic Metastructure for Energy Harvesting and Noise Mitigation (2022):** Explored ceramic and polymeric stack designs, achieving sound level reduction and energy harvesting via acousto-thermo-electric transduction.
- **Strategic Analysis of Thermoacoustic Metastructure Components (2022):** Directed a detailed study to refine critical components, optimizing thermoacoustic performance.
- **Optimized Structural Power Storage Composite (2019):** Conducted research on a Structural Supercapacitor (SSC), integrating energy storage with structural functionality, aiming to minimize electric vehicle weight and boost efficiency. Assessed multiple polymer electrolyte formulations, achieving an energy density of 53.58 mWh/kg at 2V and a flexural modulus of 6.9 GPa.

AWARDS & SCHOLARSHIPS

- Best Oral Presentation, 4th Annual Mechanical and Aerospace Engineering Graduate Research Symposium, OSU 2022
- International Excellence Award, NAU, Flagstaff, Arizona 2017 - 2019
- Technical Scholarship from Rajshahi University of Engineering & Technology (RUET), Bangladesh 2011 - 2016

LEADERSHIP & PROFESSIONAL INVOLVEMENT

- Judge, 5th Annual MAE Graduate Research Symposium, OSU 2023
- Judge, Oklahoma State Science and Engineering Fair, OSU 2022-2023
- Judge, 27th Annual OK-LSAMP Research Symposium 2022
- Lab Manager, Solid & Structural Dynamics Lab, OSU 2020-2023
- Participant, OK Catalyst Roadmap, Spring 2022 Cohort 2022
- Student A/V Room Monitor, ASA 182nd Meeting 2022
- Vice President, Bangladesh Student Association, OSU 2019-2021
- Peer Reviewer for Technical Manuscripts: Provided feedback on manuscripts centered around acoustics and thermoacoustics, aiding in the elevation of research standards in the field.

SELECTED PUBLICATIONS

- Biswas, S., & Manimala, J. M. (2022). Exploring the Feasibility of a Thermoacoustic Metastructure for Energy Harvesting and Noise Mitigation. In Proceedings of Meetings on Acoustics.
- Biswas, S., & Manimala, J. M. (2022). Quiet power: Exploring the feasibility of a noise-mitigating, thermoacoustic energy harvester. The Journal of the Acoustical Society of America.
- Biswas, S., Krawczyk, Z., & Manimala, J. M. (2021). Evaluation of additively manufactured stacks for thermo-acoustic devices. In INTER-NOISE and NOISE-CON Congress and Conference Proceedings.

COURSEWORK

- edX.Inc (MOOC Platform) August 2014 - July 2016
- Underactuated Robotics - MIT, USA
- Autonomous Navigation for Flying Robots - TUM, Germany
- Cyber-Physical Systems - UC Berkeley, USA
- Future Cities - ETH Zurich, Switzerland
- Technology for Bio-based Products - TU Delft, Netherlands
- Age of Globalization - UT Austin, USA
- Ideas of the 20th Century - UT Austin, USA
- Solar Energy - TU Delft, Netherlands
- Robot Mechanics and Control - SNU, South Korea

PROFESSIONAL MEMBERSHIP

- Acoustical Society of America (ASA)** August 2021 -Present
Student Member

LANGUAGE PROFICIENCY

- English (Fluent), Bengali (Native language), Hindi (Working Knowledge)