Adeline N. Ripberger

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EDUCATION

Purdue University, PhD Candidate - Materials Engineering, Advisor: Dr. Jan-Anders Mansson
Presidential Doctoral Excellence Award, 2023; Purdue Doctoral Fellowship, 2023-2025

Rutgers University, Engineering Honors Academy, B.S. May 2023 - Mechanical Engineering, Minor in Mathematics
James J. Slade Scholar, Thesis: *Multiplexed 3D Printing of Thermoplastics*, Advisor: Dr. Rajiv Malhotra

Merton D. and Sylvia Levey Scholarship, 2022; E. Wayne Kay Scholarship, 2022; School of Engineering Auchter 1912 Scholarship Award, 2021, 2020; Engineering Class of 1979 Scholarship, 2019

RESEARCH APPOINTMENTS

Ray Ewry Sports Engineering Center (RESEC), Graduate Researcher, August 2023 – present

- designed and implemented test procedure to measure and analyze vibrational response of tennis rackets
- mentor undergraduate student research projects and teach associated skills
- developed method to visualize tennis racket "sweet spot" and quantify its size
- wrote human testing protocol to quantify relationships between in-situ racket properties and player perception

Advanced Manufacturing Sciences Laboratory, Undergraduate Researcher, September 2021 – May 2023

- conducted experiments to optimize print characteristics
- designed and developed setup for multiplexed direct ink writing of epoxies
- performed throughput calculations to compare 3-D printing techniques

TEACHING/ADVISING

Teaching Assistant, MSE574 – **Sports Engineering and Entrepreneurship**, Fall 2025

- Coordinated 20+ guest lecturers
- Gave a lecture about research in sports engineering
- Created rubric for course assignment to provide students with clearer feedback

Teaching Assistant, MSE230 – **Structure and Properties of Materials (two sections)**, Spring 2025

- Developed and delivered weekly course material for two recitation sections (80 students, ~40 students each)
- Wrote questions for bi-weekly quizzes and course exams

Undergraduate Student Researchers, MSE499 (8 students, 6 projects; 2023 - present)

The Effect of Tennis Racket Customization on Feel Parameters – Yagmur Onder '24, Owen Plunkett '24
(co-authors on peer-reviewed publication, 2025)

Design of a Tuned Vibration Damper for Tennis Rackets – Lucas Goretta '25, Andrew Liu '25, Colin Reilly '25
(awarded 2nd place Virtual Presentation at Purdue Office of Undergraduate Research Spring Conference)

Development of Inertia Measurement Device for Tennis Rackets – Lucas Goretta ‘25, Andrew Liu ‘25, Colin Reilly ‘25

Feel Parameters of Tennis Rackets, A Historical Perspective – Lucas Goretta ‘25, Megan Magee ‘26, Ozan Borowiak ‘27

Differences in Tennis Racket String Construction – Megan Magee ‘26, Ozan Borowiak ‘27

Relationship Between On-Court Athlete Perception and In-Situ Feel Parameters – Megan Magee ’26, Kyle Friedrich ‘28

Programming for Undergraduate Researchers

- co-developed and implemented undergraduate research syllabus
- met weekly with all undergraduate student researchers to discuss projects and advise
- wrote and ran workshop on statistical analysis methods for research
- co-facilitated workshop on Overleaf online LaTeX editor
- offered lecture on data visualization best practices

Advisor for Senior Design Projects (17 students, 3 projects; 2024 – present)

Mechanical Engineering Student Team, Automatic Braking System for Crew Boat, Spring 2026

Mechanical Engineering Student Team, Vibration Analysis of Bicycle Handlebars, Spring, 2025
(awarded 2nd place research team at the Mechanical Engineering Design Expo, April 2025)

Mechanical Engineering Student Team, SmartServe Instrumented Tennis Racket, Spring, 2024

Mentor for Society of Women Engineers Graduate Mentorship Program, Fall 2024, Spring 2024

Community Outreach for K-12
Crew Life Foundation, MSE Graduate Student Association, Water Filtration Systems, September 13, 2025
Carnival at Klondike Elementary, MSE Graduate Student Association, Sand Casting Medallions, April, 2025 & 2024
Purdue University Homecoming, MSE Graduate Student Association, Thermoset Resin Keychains, Fall 2023 – 2025
Purdue Space Day, MSE Graduate Student Association, Solar Sails & Satellites, October 2024 & 2023

PEER-REVIEWED PUBLICATIONS AND PRESENTATIONS

Journal Articles

Ripberger, A., Onder, Y., Plunkett, O., Reilly, C., Mansson, JA. (2025). Correlation of Feel-Related Impact Parameters of Tennis Rackets, Sports Engineering, https://doi.org/10.1007/s12283-025-00502-x

Cleeman, J., Bogut, A., Mangrolia, B., Ripberger, A., Kate, K., Zou, Q., & Malhotra, R. (2022). Scalable, flexible and resilient parallelization of fused filament fabrication: Breaking endemic tradeoffs in material extrusion additive manufacturing, Additive Manufacturing, 56, https://doi.org/10.1016/j.addma.2022.102926

Conference Papers

Ripberger, A., Mansson, JA. (July 2026). Effect of Weighted Tape on the Tennis Racket Sweet Spot. Proceedings from the 16th International Conference on the Engineering of Sport, Washington State University, Pullman, Washington [Accepted]

Ripberger, A., Onder, Y., Plunkett, O., Reilly, C., Mansson, JA. (July, 2024). A Method of Parameterizing Feel and Control of Tennis Rackets. Proceedings from the 15th International Conference on the Engineering of Sport, Loughborough University, Loughborough, United Kingdom. https://doi.org/10.17028/rd.lboro.27051769

Cleeman, J., Bogut, A., Mangrolia, B., Ripberger, A., Maghouli, A., Kate, K., & Malhotra, R. (2022). Multiplexed 3D Printing of Thermoplastics, Conference Proceedings - ASME 17th International Manufacturing Science and Engineering Conference, West Lafayette, Indiana. https://doi.org/10.1115/MSEC2022-80882

Presentations

Ripberger, A., Mansson, J-A., Feel Parameters of Tennis Rackets: Trends across Racket Development, International Conference on Sports Engineering, New Delhi, India (October 2025)

Ripberger, A., Onder, Y., Plunkett, O., Reilly, C., and Mansson, JA., Feel and Control of Tennis Rackets: quantifying the athlete-equipment interaction, Human Factors and Ergonomics Society (HFES) Midwest Regional Meeting, West Lafayette IN (April 2025)

Castro, D., Ripberger, A., Beyond the Bracket: Insights into fan affinity and loyalty for increased engagement in NCAA March Madness, [Case Competition Finalist] MIT Sloan Sports Analytics Conference, Boston MA (March 2025)

Ripberger, A., Onder, Y., Plunkett, O., Reilly, C., Mansson, JA. A Method of Parameterizing Feel and Control of Tennis Rackets. 15th International Conference on the Engineering of Sport, Loughborough University, Loughborough, United Kingdom (July 2024)

Ripberger, A., Onder, Y., Plunkett, O., Reilly, C., Mansson, JA. Tennis Racket Feel Parameters: Inter- and Intra- Racket Correlations. 2nd Annual Materials at Purdue Symposium, Purdue University, West Lafayette, Indiana (May 2024)

Ripberger, A. Automated Toolpath Generation for Multiplexed 3D Printing [Poster presentation]. 19th Annual Undergraduate Research Symposium, Rutgers Aresty Research Center, New Brunswick, New Jersey (April 2023)

Ripberger, A. Semi-Automated Toolpath Generation for Infill Patterns with Multiplexed 3D Printing [Poster presentation]. James J. Slade Research Symposium, Rutgers School of Engineering, Piscataway, New Jersey (April 2023)

SERVICE ACTIVITIES

Professional

International Sports Engineering Association, 2023 – present

Executive Board, Student Representative, 2025 - present

- reviewed Engaging Sports Engineering grant applications

Purdue University

Purdue Materials Engineering Graduate Student Association, 2023 - present

Vice President, May, 2025 – present

- develop programming for campus outreach events targeting elementary to middle school students
- coordinate student leadership team for various graduate student social events

Secretary, May 2024 – May 2025

- diligently documented meetings with the association executive board
- planned outreach events to teach elementary and middle school students materials engineering fundamentals

Judge, Purdue University Undergraduate Research Symposium, Poster Session, Spring 2025

Rutgers University

Ambassador, Rutgers School of Engineering, June, 2020 – May, 2023

- lead department liaison committee focused on improving communication and providing feedback
- completed strategic planning process to develop new program goals and initiatives
- lead panel discussions and hosted events for prospective and incoming students
- created a new initiative to recruit underrepresented and underserved students

SELECTED AWARDS

MIT Sloan Sports Analytics Conference, Case Study, Finalist, March 2025

International Sports Engineering Association FIFA Research Competition, Runner-up, July 2024

PRIOR WORK EXPERIENCES

Rawlings Sporting Goods, Product Development Intern, St. Louis, MO, May, 2022 – August, 2022

- wrote and implemented Python script to analyze and characterize impact sound data
- performed modal analysis on baseball and softball bats
- conducted material property, quality, and durability testing using various instrumentation
- created visual data representations in Minitab based on statistical process and quality control principles
- utilized athletic experience to provide product feedback

Cubic Nuvotronics, Design Engineering Intern, Durham, NC, June, 2021 – May, 2022

- designed tooling for test and assembly applications and housings for component modules
- applied geometric dimensioning and tolerancing (GD&T) to drawings
- conducted Failure Mode Effects Analysis
- created JMP script to analyze SemDex measurement data and output necessary plots
- responsible for maintaining and updating documentation including ECNs, SCDs, and BOMs

Trenton-Mercer Airport, Operations Intern, Ewing, NJ, January, 2020, July – August, 2019

- used AutoCAD to create drawings for Mercer County's engineering division
- ensured that all aspects of the airport met national standards and regulations
- completed level 3 certification of the Airport Training and Safety Institute

Rutgers Formula Racing, Data Acquisition and Testing Team Member, September, 2019 – September, 2023

- developed MATLAB code to analyze driver data to improve driver performance
- machined aluminum car components using a mill and lathe
- used a load frame to test tensile strength of welds