2024-2025 Annual Report

DEPARTMENT OF MECHANICAL ENGINEERING

SAGINAW VALLEY STATE UNIVERSITY

Table of Contents

01	A Year of Innovation and Growth
02	Hallmarks of our Program
03	Why ME at Saginaw Valley State University
04	Strategic Planning & Curriculum Enhancement
05	Experiential Learning in Action
09	Undergraduate Research and Honors
11	Student Engagement & Professional Development
14	Capstone Projects 2024-25
22	Faculty Accomplishments
31	Student Accomplishments

SAGINAW VALLEY STATE UNIVERSITY

A Year of Innovation and Growth

Aneesha Gogineni, Ph.D.

Chair,
Dept. of Mechanical Engineering

Welcome to the 2024-2025 Annual Report for the Department of Mechanical Engineering at Saginaw Valley State University. This has been a remarkable year defined by our commitment to hands-on learning, strategic growth, and the incredible achievements of our students, faculty, and alumni.

Our department is a vibrant community of tinkerers, inventors, and problem-solvers. We pride ourselves on creating an environment where theoretical knowledge is immediately applied to real-world challenges. From our modern laboratories to our deep-rooted industry partnerships, we provide an education that is both rigorous and relevant. This year, we have focused on enhancing our curriculum to reflect the rapid pace of technological change, expanding our undergraduate research opportunities, and strengthening the pathways for our students toward successful careers and advanced studies. As you explore this report, you will see countless examples of our program in action: innovative course projects, impactful client-based capstone designs, and student research. We are incredibly proud of what we have accomplished together and are excited for the future we are building.

Hallmarks of our Program

Hands-on Labs and Modern Facilities: Out students have access to 14 mechanical engineering laboratories that supports teaching, research, and extracurricular projects. From solid prototyping to Industry 4.0, our facilities provide a working knowledge of research and design with a variety of materials.

Small Class Sizes: We believe in a personalized education. Our small class sizes (maximum 25) ensure that students receive individual attention from our expert faculty.

ABET Accreditation: The Bachelor of Science in the Mechanical Engineering program is accredited by the Engineering Accreditation Commission of ABET, https://www.abet.org, under the General Criteria and Program Criteria for Mechanical and Similarly Named Engineering Programs. This accreditation is a testament to the quality and rigor of our program.

Why ME at Saginaw Valley State University

Your Pathway to a Successful Engineering Career

At Saginaw Valley State University, we are dedicated to providing a comprehensive and practical education that prepares you for the challenges of the real world.

Real-world Problem-Solving: Our curriculum is designed to go beyond theory, equipping students with the critical thinking and analytical skills needed to tackle complex engineering problems. Examples include case studies, display models, and class projects.

Co-ops and Internships - Industry Partnerships: We have strong relationships with leading companies, providing our students with invaluable co-op and internship opportunities where they can apply their knowledge in a professional setting.

Practical Experience through Labs, Capstone Projects, and Internships: From students first year to their final year, they will engage in hands-on learning that reinforces classroom concepts and builds a strong foundation of practical skills.

Excellent Foundation for Graduate School - Research Grants and Honors Thesis: For those aspiring to pursue advanced degrees, our program offers undergraduate research opportunities and a challenging Honors Thesis track to prepare you for the rigors of graduate-level study.

Strategic Planning & Curriculum Enhancement

Evolving Technology, Focused on the Future

Our department is committed to continuous improvement and ensuring our curriculum remains at the forefront of engineering education.

Curriculum Enhancement

Expanded Elective Offerings: We are constantly updating our elective courses to reflect the latest advancements in technology, allowing students to specialize in areas of interest.

Industry-Relevant Skills: Our curriculum integrates essential software tools that are widely used in the industry, including:

MATLAB, EXCEL, LABVIEW, ANSYS FLUENT, ANSYS EDUPACK, SOLIDWORKS

Integrating Advanced Technology into Engineering Education

To modernize its learning environment and align with Industry 4.0, the program has introduced Vibe S1 Smart Whiteboards in engineering labs to support interactive, application-integrated instruction. The Metallography Lab received significant upgrades with a new Axiomat Microscope Camera, Zeiss “Zen” software, and enhanced computing for advanced material analysis. Additionally, the curriculum now features hands-on training with an UltiMaker S7 industrial 3D printer, and an industrial robot providing students with essential skills in advanced manufacturing and automation.

Experiential Learning in Action

Hands-On Projects, Real-World Scenarios

Our courses are designed to be immersive and project-based, allowing students to apply theoretical knowledge to practical challenges.

ME 250 Principles of Engineering Materials: In addition to weekly experiments using industry standard test methods, students examine fractured components and do hands-on homework including making and testing ice composites, determining the fracture behavior of marshmallow treats, and measuring the grain size of a galvanized object.

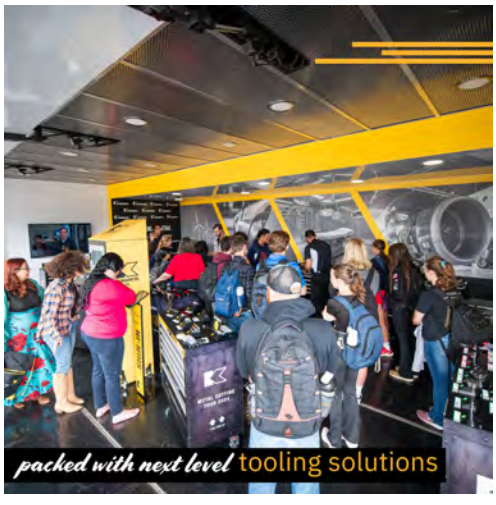
ME 202 Engineering Data Analysis: In our "Mystery Beams" activity, students collect force-deflection data in the solids lab. They then use MATLAB to solve classical beam bending equations to identify the metal of their beam, generating and analyzing their own data.

ME 450 Material Selection and Specif: This capstone-level course integrates knowledge from multiple prerequisite courses. Students select a real-world product and develop a comprehensive material and process selection plan. This includes creating a DFMEA (Design Failure Mode and Effects Analysis), performing necessary calculations, and recommending inspection procedures. A recent project focus was on materials for Electric Vehicle (EV) battery cases.

ME 306 Engineering Cost Analysis: Case study assignments were introduced that challenge students to research and analyze the implementation of new technologies from cost perspective. Reports include Bill of Materials, Integration of 3 C's (Creating Value, Connection, Curiosity), Return on Investment, and Breakeven Analysis.

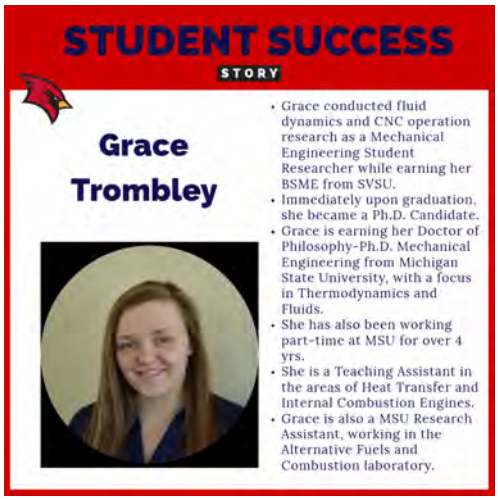
Student Experience

Career Readiness & Professional Growth: We are dedicated to preparing our students for successful careers through professional development workshops and networking opportunities.



ME Alumni Events: Our strong alumni network provides current students with mentorship and career connections.

Pathway for Masters and PhD Programs: We are developing clear pathways for our students to seamlessly transition into graduate-level studies. Our students succeed in graduate programs at major universities including University of Iowa, Michigan State University, Trine University, University of Akron, Oakland University, and Central Michigan University.



Undergraduate Research and Honors

We believe that engaging in research is one of the most powerful learning experiences a student can have. Our Honors Thesis program and faculty-led research projects provide a platform for students to make original contributions to the field.

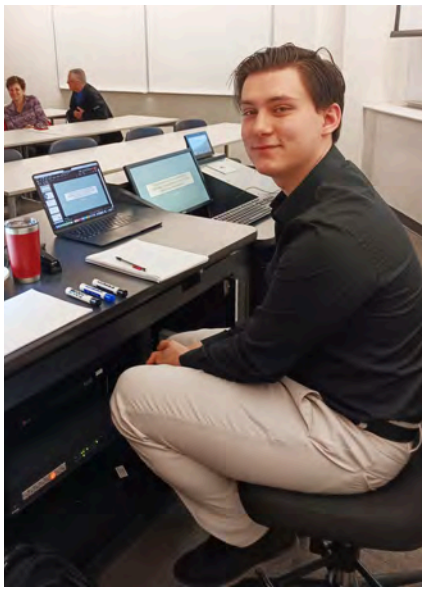
Honors Thesis

Our most dedicated students have the opportunity to complete an Honors Thesis. This rigorous undertaking requires the completion of a 30-page thesis and a 45-minute presentation, followed by a 15-minute question and answer session.

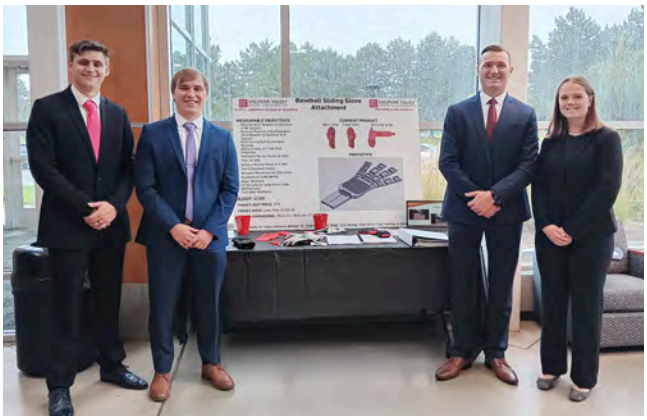
Recent Honor's Thesis Submissions

The Effects of Biochar Substitution on the Flexural Strength of Concrete: This research explores sustainable alternatives in construction materials by **Mitchell Neumann**.

DOE Analysis of 3D Printer Variables and Their Effect on Material Properties: An investigation into optimizing the quality and strength of 3D printed objects through Design of Experiments by **Anthony Hagarty**.



Undergraduate Research Opportunities: We actively encourage students to participate in research, providing them with the chance to work alongside faculty on innovative projects.



Student Engagement & Professional Development

Building a Community of Future Leaders

Learning at Saginaw Valley State University extends far beyond the lecture hall. Our active Registered Student Organizations (RSOs) provide opportunities for leadership, networking, competition, and community service.

Get Involved with our RSOs

Cardinal Formula Racing (CFR) (SAE): Design, build, and race a formula-style car in international competition.

The American Society of Mechanical Engineers (ASME): Connect with the global mechanical engineering community through projects and professional development.

Society of Women Engineers (SWE): A network for support, professional growth, and outreach.

American Society for Quality (ASQ): Learn the principles of quality control and process improvement.

Engineering Society of Detroit (ESD): Network with professionals across all engineering disciplines in the region. Scholarship and internship opportunities available.

American Foundry Society (AFS): Explore the world of metal casting and materials. Scholarship and internship opportunities available.

These RSO groups are a foundation of the student experience, helping to build the teamwork and communication skills essential for a successful career.

Capstone Projects 2024-25

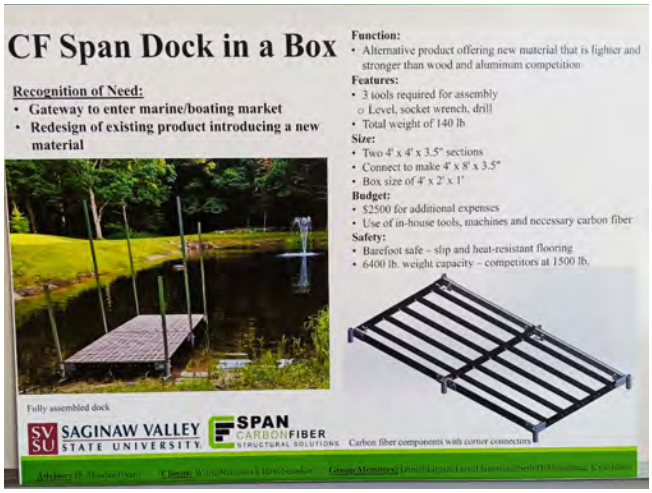
Partnering with Industry to Solve Real-World Challenges

Our senior capstone design projects are a cornerstone of the Mechanical Engineering experience at Saginaw Valley State University. Students work in teams on client-based projects, tackling real engineering challenges faced by our industry partners.

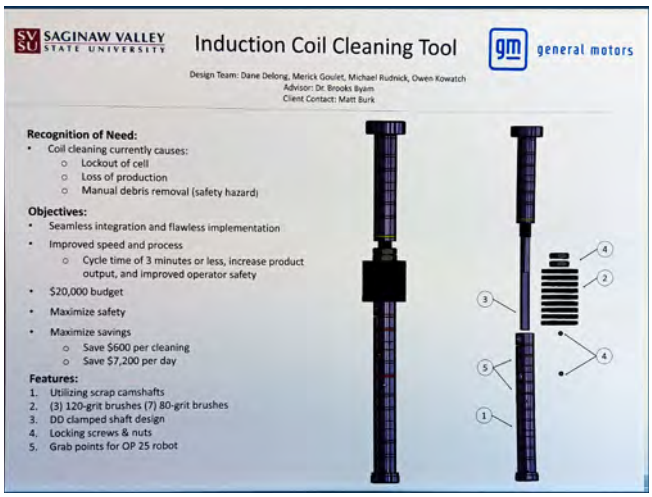
Our Valued 2024-25 Capstone Partners:

These partnerships not only provide our students with invaluable real-world experience but also serve as a direct pipeline to future employment opportunities.

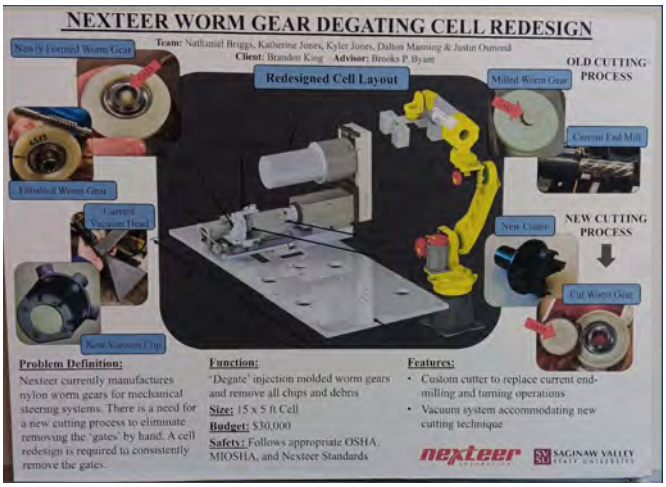
CF Span Dock-in-a-Box by David Garascia, Seth Hollingshead, Kyle Kulin, Dan Logan



GM Bay City Induction Coil Cleaning Tool by Dane Delong, Merick Goulet, Owen Kowatch, Mike Rudnick

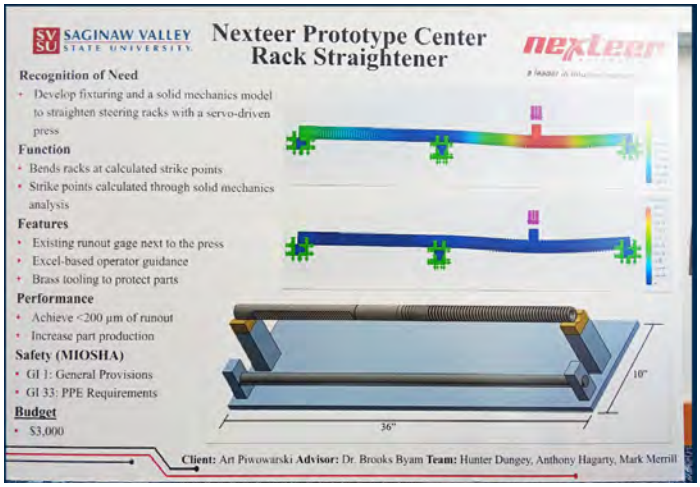


Nexteer Auto Molded Gear Degate Cell Redesign by Nathan Briggs, Katherine Jones, Kyler Jones, Dalton Manning, Justin Osmond



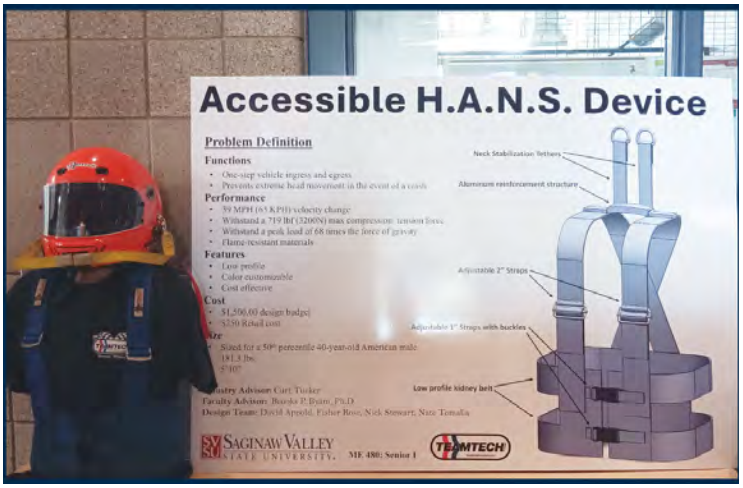
Nexteer Prototype Center Ball Screw Backdrive Test Cell by Zachary Dollman, Evan Miller, Noble Singer

Nexteer Prototype Center Rack Straightener by Hunter Dungey, Anthony Hagarty, Mark Merrill



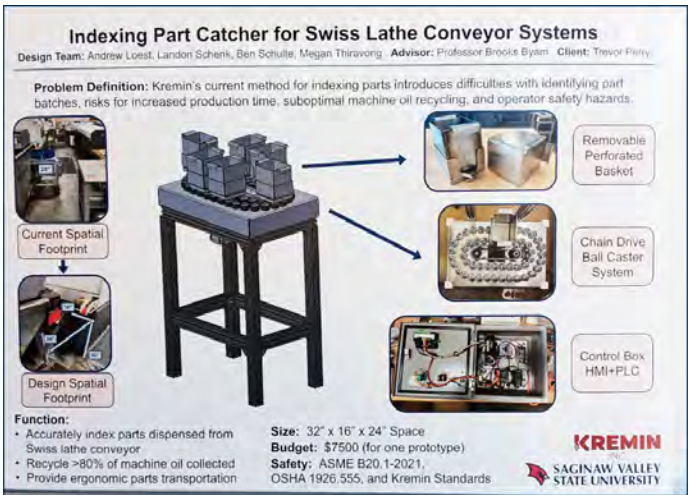
Savant Group Cup Chiller by Abraham Cerda, Adam Thomas, Kyle Uren, Aiden Watson

Teamtech Accessible H.A.N.S. Device by David Appold, Fisher Rose, Nick Stewart, Nate Tomalia

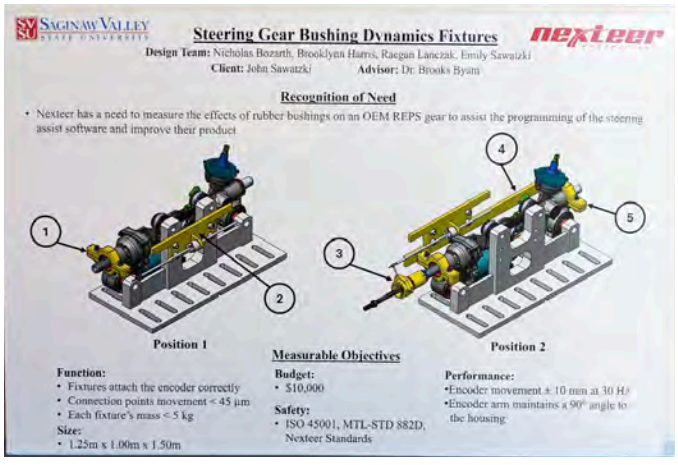


DuPont Automated Syringe Inspection System by Brenden Fleming, Dezirae Hayes, Allison Walz

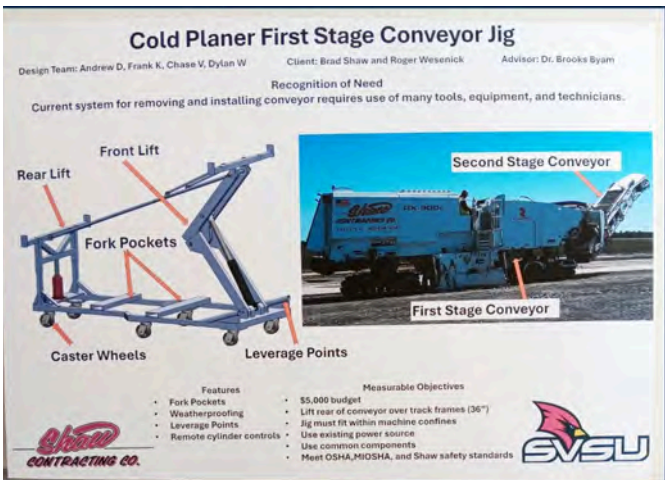
Kremin Indexing Part Catcher for Swiss Lathe Conveyors by Andrew Loest, Landon Schenk, Ben Schulte, Megan Thiravong



Nexteer Steering Gear Bushing Dynamics Fixtures by Nick Bozarth, Brooklyn Harris, Reagan Lanczak, Emily Sawatzki

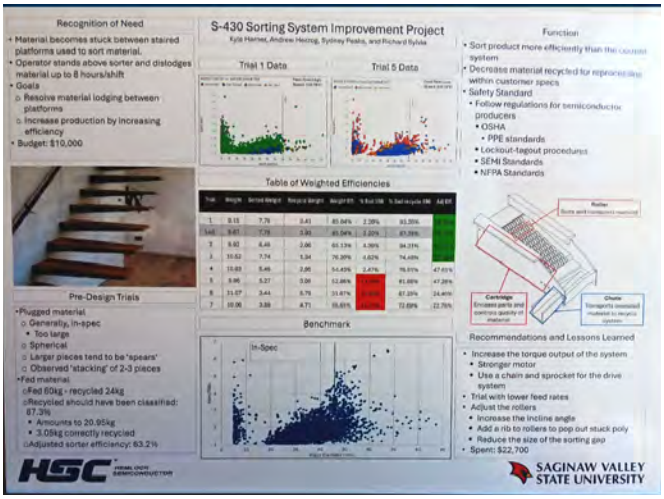


Shaw Contracting Roadtec RX-700E/RX-900E Cold Planer First Stage Conveyor Removal Jig by Andrew Drake, Frank Koscica, Chase Vollmer, Dylan Wesenick

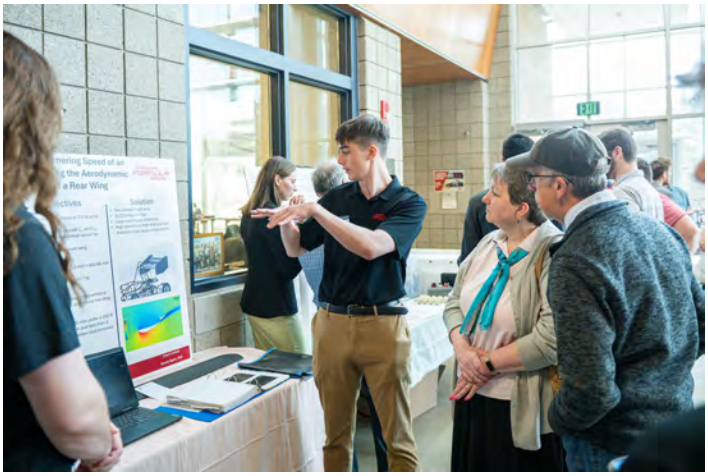


Vantage Plastics Fluid Cooled Thermoforming Clamps by Zachary Leslie, Mark Niedecken, Shelbee Simanskey, Hunter Patrick

Hemlock Semiconductor Design and Development of a Sorting System by Kyle Harner, Andrew Herzog, Sydney Peake, Richard Sylvia



Increasing the Cornering Speed of an FSAE Race Car Using the Aerodynamic Downforce of a Rear Wing by Matteo Capotosti, Tobin Pfeiffer, and Ethan Schroeder



Faculty Accomplishments

Brooks Byam

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2025 Formula SAE Michigan IC competition this year 15MAY25 to 17MAY25-15 students attended

Faculty Advisor: Cardinal Formula Racing (CFR) Society of Automotive Engineers (SAE)

Capstone Project Advisor:

CF Span Dock-in-a-Box by David Garascia, Seth Hollingshead, Kyle Kulin, Dan Logan

GM Bay City Induction Coil Cleaning Tool by Dane Delong, Merick Goulet, Owen Kowatch, Mike Rudnick

Nexteer Auto Molded Gear Degate Cell Redesign by Nathan Briggs, Katy Jones, Kyler Jones, Dalton Manning, Justin Osmond

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Shaw Contracting Roadtec RX-700E/RX-900E Cold Planer First Stage Conveyor Removal Jig by Andrew Drake, Frank Koscica, Chase Vollmer, Dylan Wesenick

Aneesha Gogineni, Chair

agoginen@svsu.edu 989.964.2737 P-209

Received Teaching with Heart Program External Grant 24-25

FLC member and facilitator for Digital Literacy Team 24-25

Revolutionizing Learning: The Power of VR and AR, Poster Presentation, CETL Symposium, SVSU, 2024.

Received Rural Pathway Career Readiness FLC grant

Panelist-Women in ME: ASME – Your Career Path! From early career though ASME President & Beyond!, IMECE Conference, Portland, OR, 2024.

Capstone Project Advisor: Vantage Plastics Fluid Cooled Thermoforming Clamps by Zachary Leslie, Mark Niedecken, Shelbee Simanskey, Hunter Patrick

Co-Faculty Advisor: Society of Women Engineers (SWE) SVSU Student Chapter

Peggy Jones

pejones@svsu.edu 989.964.4154 P-215

Wang, Q., Wang, A., Coryell, J., et al. Application of Integrated Computational Materials Engineering (ICME) in Aluminum Casting Development, International Journal of Metal Casting (2025), https://doi.org/10.1007/s40962-025-01632-5.

Peggy E. Jones, "Active learning approaches to grains, solid solution alloys, and two phase systems u®ing Lego bricks", poster presentation at the North American Materials Education Symposium, Ann Arbor, MI, Aug. 8-9, 2024.

Received Rural Pathways grant to redesign ME202 course

Received Faculty-led research grant to update the metallographic image capture and analysis system

Ph.D. Committee for Hayden Furcolo at Worcester Polytechnic Institute.

Faculty Mentorship: 2025 Braun University Writing Award for the College of Science, Engineering, and Technology (SET) was given to Joshua Koester for his ME250 lab report on the effects of annealing on the tensile properties of 7075-T6 aluminum.

Faculty Mentorship: Honor's Thesis: Mitchell Neumann, "The Effects of Biochar Substitution on the Flexural Strength of Concrete", March 2025, Advisory Dr. Peggy Jones.

Faculty Advisor: American Foundry Society (AFS) SVSU Student Chapter

Faculty Advisor: Engineering Society of Detroit (ESD) SVSU Student Chapter

John Herman

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Faculty Mentorship: Honor's Thesis: Anthony Hagarty, "DOE Analysis of 3D Printer Variables and Their Effect on Material Properties", March 2025, Advisor Dr. John Herman

Capstone Project Advisor: Hemlock Semiconductor: Design and Development of a Sorting System by Kyle Harner, Andrew Herzog, Sydney Peake, Richard Sylvia

Enayat Mahajerin

mahajeri@svsu.edu 989.964.4188 P-205

Presentations:

Moisture-Induced Stresses in an Orthotropic Wood Log, To be presented at the "2025 Summer Heat Transfer Conference (SHTC), ASME", July 8-10, 2025, Westminster, CO.

The Residue Theorem Solution of the Longitudinal Impact and Vibration of a Bar Carrying an End Mass, To be presented at the "2025 International Design Engineering Technical Conference & Computers and Information Conference in Engineering (IDETC/CIE), ASME", August 17-20, 2025, Anaheim, CA.

Faculty Advisor: The American Society of Mechanical Engineers (ASME) SVSU Student Chapter

Thomas Mahank

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Mahank, T. A., "ASEE Campus Representative Member Recruitment Award," ASEE Annual Conference, Portland, OR, June 23–26, 2024.

Mahank, T. A., "Ansys CFD Structured Grid Model of NACA 6412 Airfoil," Cardinal Formula Racing, Saginaw Valley State University, University Center, MI, 2025.

Mahank, T. A., "Academic Program Assessment & Departmental Planning Report AY 2023-2024," Saginaw Valley State University, University Center, MI, 2024.

Mahank, T. A., "Engineering Technology Management Program Manual of Assessment," Saginaw Valley State University, University Center, MI, 2024.

Capstone Project Advisor: Increasing the Cornering Speed of an FSAE Race Car Using the Aerodynamic Downforce of a Rear Wing by Matteo Capotosti, Tobin Pfeiffer, Ethan Schroeder

Monayem Mazumder

ahmazumd@svsu.edu 989.964.7007 P-217

Presentations:

Mazumder, A. K. M. M. H., Capotosti, M. and Herzog, A., "Study on a Two-Stage EHD Gas Pump with One-inch-wide Grounded Electrode by Experiment," 2025 Joint Conference on Electrostatics, Brook University, St. Catharines, Ontario, CA June 2025.

Mazumder, A. K. M. M. H., Capotosti, M. and Herzog, A., "Characteristics of Flow Operated by a Single Stage Corona Wind Generator," 10th Thermal and Fluids Engineering Conference, George Washington University, Washington, DC, March 2025.

Mazumder, A. K. M. M. H., "Analysis of Heat Transfer by a Single Stage EHD Gas Pump," 10th Thermal and Fluids Engineering Conference, George Washington University, Washington, DC, March 2025.

Mazumder, A. K. M. M. H., "Numerical Study of a Corona Wind Generator," Proceedings of the ASME International Mechanical Engineering Congress and Exposition, Portland, OR, November 2024.

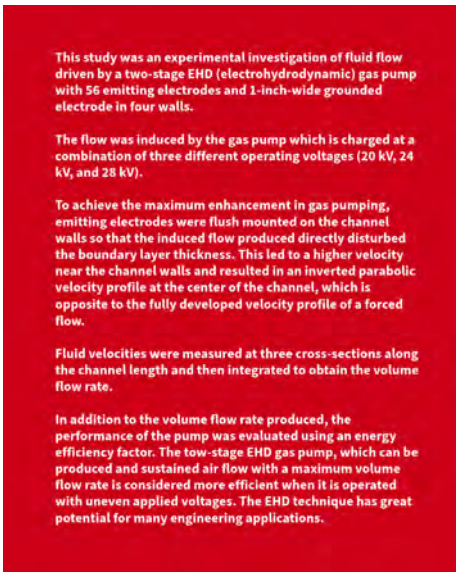
Mazumder, A. K. M. M. H., "Heat Transfer Enhancement by a Single Stage Corona Wind Generator," Proceedings of the ASME International Mechanical Engineering Congress and Exposition, Portland, OR, November 2024.

Mazumder, A. K. M. M. H., "Experimental Study of a Corona Wind Generator," 2024 Annual Meeting of Electrostatics Society of America, University of Ottawa, Ontario, CA, June 2024.

Mazumder, A. K. M. M. H., Capotosti, M. and Herzog, A., "Performance of a Single Stage Corona Wind Generator," 9th Thermal and Fluids Engineering Conference, Oregon State University, Corvallis, OR, April 2024.

Poster Presentations:

Mazumder, A. K. M. M. H., Capotosti, M., Herzog, A., and Kraus, J., "Grounded Electrode Effect on a Two-Stage EHD Gas Pump by Experiment," SVSU Student Showcase, Undergraduate Research Program (UGRP), Saginaw Valley State University, University Center, MI, April 2025.



Mazumder, A. K. M. M. H., Capotosti, M., and Herzog, A., "A Single Stage Corona Wind Generator," SVSU Student Showcase, Undergraduate Research Program (UGRP), Saginaw Valley State University, University Center, MI, April 2024.

Annamalai Pandian

apandian@svsu.edu 989.964.4127 P-219

Review of 3D Printing vs Injection Molding vs CNC Machining Processes: Simulation and Fabrication.

Proceedings of the 7th European International Conference on Industrial Engineering and Operations Management, Augsburg, Germany, July 16-18, 2024.

Reviewed ETM Assessment Manual (and made changes to a total of 9 revisions!) to "Engineering Technology Management Program Manual of Assessment", Saginaw Valley State University, University Center, MI, 2024

Attended HAAS DEMO days on 05/07/2025 at Gero Tech, Flatrock, MI to review the latest CNC machinery and automation.

Faculty Advisor: American Society for Quality (ASQ) SVSU Student Chapter

Student Accomplishments

Our Community

200 dedicated students in the Mechanical Engineering (ME) program

35-40 students in our Engineering Technology Management (ETM) program

Mechanical Engineering Faculty Scholarship Award

Given to Matteo Capotosti, Rory Kauffman, Joshua Koester, Nicholas Trombley, and Sam Dersa. Funds for the faculty scholarships are contributed by the mechanical engineering faculty to recognize outstanding mechanical engineering students.

Honor's Theses

DOE Analysis of 3D Printer Variables and Their Effect on Material Properties by Anthony Hagarty

The Effects of Biochar Substitution on the Flexural Strength of Concrete by Mitchell Neumann

2025 Braun University Writing Award for SET

Given to Joshua Koester for his ME250 lab report on the effects of annealing on the tensile properties of 7075-T6 aluminum.

2 students attended the Foundry Educational Foundation's College-Industry Conference in Chicago

This was a great networking opportunity for jobs in the metal casting industry. One student received a plant trip interview as a result of connections made. (Adam Klump, Andrew Loest)

3 students won $6500 in scholarships from the Detroit-Windsor chapter of the American Foundry Society

(Emma Rutkiewicz, Riley Newbold, Gabe Gransden)

STAND OUT ENGINEERING

SAGINAW VALLEY STATE UNIVERSITY

DEPARTMENT OF MECHANICAL ENGINEERING

PIONEER HALL

7400 BAY ROAD UNIVERSITY CENTER, MI 48710

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