
Education	Doctor of Philosophy in Mechanical Engineering University of Tennessee, Knoxville TN	December 2023
	Master of Science in Mechanical Engineering University of Tennessee, Knoxville TN	May 2022
	Bachelor of Science in Mechanical Engineering University of Florida, Gainesville FL	May 2017
Experience	Oak Ridge National Laboratory <i>R&D Associate Staff, Advanced Machining and Machine Tool Research</i> <i>R&D Assistant Staff, Advanced Machining and Machine Tool Research</i> Leverage a strong background in mechanical design, precision engineering, traditional manufacturing, and hybrid manufacturing to develop creative and practical solutions to a diverse set of engineering challenges under compressed timelines. Projects range from designing and testing an innovative CNC machine tool, to creating a novel metrology platform for measuring cutting force at elevated temperatures, to developing a low-cost method to reduce residual stress in additively manufactured components. Each project involves significant collaboration and communication with internal groups, industry partners, and government sponsors.	October 2019 to Present <i>April 2023 – Present</i> <i>October 2019 – April 2023</i>
	Research Limited constraint additive base plates <ul style="list-style-type: none">Developed novel base plate architectures to reduce part distortion and residual stress.Low-cost solution to an industry wide problem.Thermo-mechanical finite element simulation and component testing. Modeling of elevated temperature milling for hybrid manufacturing <ul style="list-style-type: none">Developed an elevated temperature cutting force dynamometer for hybrid manufacturing.Developed a novel high stiffness thermal protection system, USPTO 6354576.Developed a cutting force model to predict changes in cutting force with temperature.Thermal and dynamic simulation, testing, and characterization of the metrology system. Concrete machine tool <ul style="list-style-type: none">Lead designer for novel concrete base machining center manufactured with a 3D printed polymer form.Static and dynamic simulation of component and assembly stiffness and vibration modes.Design for manufacturability and assembly.Accelerated design and manufacturing schedule, 6 months from project initiation to first test cut.Featured at the International Manufacturing Technology Show in 2020 and 2022. Large parts on small format machines <ul style="list-style-type: none">Developed a method for machining large, high-aspect ratio parts on a small format machine.Successfully completed a full-scale demonstration part that was 5x larger than the machine work volume.Developed relationships with industry partners for further research. Powder damping rods design and testing <ul style="list-style-type: none">Designed test samples to evaluate the effect of captured powder on component dynamics.Use a characteristic of the manufacturing process to improve dynamic stiffness.Measured samples with CT and impact testing. Covid charge box <ul style="list-style-type: none">Design review for manufacturability.Manufacturing of components for N-95 fiber charging box. GKN large format titanium additive <ul style="list-style-type: none">Fixture design and machining for first of its kind large scale titanium additive component.	
	Project management IMTS 2022 <ul style="list-style-type: none">Defined project roles and responsibilities and created a project plan to fit stakeholder needs.Performed project tracking through MS Project, communicated status to management.Coordination with technical staff and outside vendors for machine shipping and set-up.Coordination with leadership, communications groups, and the Association for Manufacturing Technology to develop themes and graphics for display at IMTS. Concrete machine tool <ul style="list-style-type: none">Managed a team of internal and external manufacturing, electrical, and mechanical engineers and technicians to build a large electro-mechanical assembly (machining center) on an accelerated timeline.Defined project roles and responsibilities and created project plan to fit timeline and budget.Managed the integration, procurement, and assembly of over 900 components.	

Safety

- Developed Standard Operating Procedure (SOPs) for industrial equipment.
- Worked closely with operations support for documentation and approval for various projects.
- Principal investigator for the R&D machining and assembly shop

Business development

- Fairmount Technologies CRADA
- Bourn & Koch (InCompass) CRADA
- IMTS 2022 discussions with industry partners ranging from small shops to Fortune 500 companies.

Oak Ridge Institute for Science and Education

May 2019 to October 2019

ORISE HERE Intern, Machining and Machine Tool Research group, Dr. Scott Smith

- Supported the production of high priority additively manufactured components, including a first of its kind hypersonic rocket component. Worked closely with the main campus shop consulting on manufacturing strategies and component designers on identifying critical part features.
- Supported the transformational challenge reactor (TCR) project by solving the issue of poor build plate surface finish and long lead times.
- Investigated part geometries that aid the additive and machining processes, such as sacrificial stiffening structures, dynamic absorbers, and creative tool path to control start/stop defects and heat buildup.

University of North Carolina, Charlotte

August 2018 to May 2019

Graduate Research Assistant, Machine Tool Research Center, Dr. Tony Schmitz

- Designed and implemented an affordable hybrid manufacturing platform for aluminum and magnesium alloys using a wire arc additive process.
- Implemented structured light scanning to better understand printed part geometry variation and reduce the overbuild required for a viable final part.
- Compared the dynamic variability between nominally identical additively manufactured parts.

Okuma America Corporation

May 2018 to August 2018

Manufacturing Engineering Intern

- Designed and implemented modular and expandable sub-assembly workspaces.
- Collaborated with production and engineering to create an improved engineering change order process.
- Performed a trade study for the outsourcing of common electrical assembly components.
- Assisted applications engineering with IMTS preparations.

University of Florida

February 2015 to January 2018

Teaching Assistant for Design and Manufacturing / Design Realization Labs

- Mentored sophomore (DML) and senior (Design Realization) engineering students in logical decision-making, effective resource and team management, design for manufacturing / assembly principles, and design and manufacturing process documentation.
- Taught fundamentals of practical and cost-efficient part design, prototyping, assembly, and testing.
- Performed design reviews with professors and industry leaders evaluating designs and drawings for function, manufacturability, and tolerancing.
- Educated and trained students on traditional manufacturing processes and equipment, including milling, turning, drilling, sheet metal forming, welding, and plasma cutting, and associated safety protocols.
- Designed and manufactured facility improvement projects requiring advanced manual machine knowledge and CAD/CAM/CNC experience using milling machines and lathes.
- Designed and fabricated carbon fiber composite flexure hinges.

MAE Student/Faculty Machine Shop

- Assisted students, design teams, and research labs in manufacturing parts of various complexity.
- Evaluated parts and performed design reviews to achieve functional targets, increase manufacturability, and increase reliability.
- Created standard operating procedures for safe and effective allocation and operation of facility resources.

Honors

SME 30 Under 30

- 2024 30 Under 30 by SME

Special Event Award ORNL

- Covid-19 N-95 fiber charging box, 2020

Tennessee Top 100 Graduate Fellowship

- University of Tennessee, Knoxville, 2019

- Publications** **Design and evaluation of an elevated temperature cutting force dynamometer for hybrid manufacturing**, Justin L. West, doctoral dissertation, University of Tennessee, Knoxville, 2023
- Limited-constraint WAAM fixture for hybrid manufacturing**, Justin L. West, Emma D. Betters, Tony L. Schmitz; *Manufacturing Letters*, Volume 37, 2023
- Rethinking production of machine tool bases: Polymer additive manufacturing and concrete**, Justin L. West, Emma D. Betters, Tony L. Schmitz, Scott Smith, Alex Roschli, David Nuttall, John Lindahl, Lonnie Love; *Manufacturing Letters*, Volume 31, 2022
- Joining technique for in-oven/autoclave molds manufactured by large scale polymer additive manufacturing**, Ahmed Arabi Hassen, Emma Betters, Nikolaos Tsiamis, Justin West, Tyler Smith, Kazi Md Masum Billah, David Nuttall, Vipin Kumar, Scott Smith, Vlastimil Kunc; *Manufacturing Letters*, Volume 32, 2022
- Polymer, Additives, and Processing Effects on N95 Filter Performance**, Gregory S. Larsen, Yongqiang Cheng, Luke L. Daemen, Tej N. Lamichhane, Dale K. Hensley, Kunlun Hong, Harry M. Meyer III, Steven J. Monaco, Alan M. Levine, Richard J. Lee, Emma Betters, Kim Sitzlar, Jesse Heineman, Justin West, Peter Lloyd, Vlastimil Kunc, Lonnie Love, Merlin Theodore, and Mariappan Parans Paranthaman, *ACS Applied Polymer Materials* 2021 3 (2), 1022-1031
- Accelerating large-format metal additive manufacturing: How controls R&D is driving speed, scale, and efficiency**, Brian T. Gibson, Paritosh Mhatre, Michael C. Borish, Justin L. West, Emma D. Betters, Scott S. Smith, Bradley S. Richardson, Lonnie J. Love, International Mechanical Engineering Conference and Exposition, 2020
- Dynamic stiffness modification by internal features in additive manufacturing**, Emma D. Betters, Justin West, Mark Noakes, Andrzej Nycz, Scott Smith, Tony L. Schmitz; *Precision Engineering*, Volume 66, 2020
- Platform for affordable hybrid manufacturing of light metals**, Justin West, Emma Betters, Tony Schmitz (University of Tennessee, Knoxville, TN), 2019 ASPE Annual Meeting, October 28- November 1, Pittsburg, PA
- Dynamic repeatability for hybrid manufactured structures**, Tony Schmitz, Justin West, Emma Betters (University of Tennessee, USA), S. Smith (Oak Ridge National Laboratory, USA), 69th CIRP General Assembly, August 18-24, 2019, Birmingham, UK
- Popular Press** **IMTS 2022 AMT Emerging Technology Center Annex**
Justin West, Emma Betters, Scott Smith, AMT, 2022
- Inside Oak Ridge's 3D-Printed Machine Tool Moonshot**
Brent Donaldson, Modern Machine Shop, 2020
- Chasing Gold in A&D Manufacturing**
Ed Sinkora, SME Media, 2021
- The Building Blocks of Directed Energy Deposition Design**
Laura Ely, Metal 3D Printing, 2021
- IMT 2020 ETC Talks – Moonshot**
Tony Schmitz, Scott Smith, Justin West, Emma Betters, 2020
- Skills** Team and project management; identifying new areas for research and collaboration; creative problem solving; quick learner; self-starter; strong graphical, oral, and written communication; technical documentation; highly motivated to learn new things. Mechanical design, precision design, system design and integration, design for manufacturing and assembly, finite element analysis, drafting and evaluating technical drawings using TD&T and GD&T, CNC mill & lathe programming and operation, conventional milling and turning, MIG & TIG welding, wire arc additive manufacturing, hybrid manufacturing.
- SolidWorks, Fusion 360, Abaqus, MATLAB, nTopology, HyperMILL, G&M Code, MS Office

Affiliations Rabbit Hole Racing, 2023
SME, 2020
American Society of Mechanical Engineers, 2019
American Society of Precision Engineering, 2018

Web Sites <https://www.ornl.gov/staff-profile/justin-west>
<https://www.linkedin.com/in/west-ornl>
<https://rabbitholeracing.com/pages/about-us>