

JACK L. SKINNER, PH.D., P.E.

INTERIM DEAN
LANCE COLLEGE OF MINES AND ENGINEERING
MONTANA TECHNOLOGICAL UNIVERSITY
1300 WEST PARK ST.
BUTTE, MT 59701
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JSKINNER@MTECH.EDU

EDUCATION & LICENSING

Doctor of Philosophy in Mechanical Engineering (September 2004-December 2007)
Dissertation Title: Diffractive Optical MEMS Technology for Tunable Filters and Modulators
Advisor: David A. Horsley
Major: Dynamics and Control Systems / Microelectromechanical Systems (MEMS)
Minors: Materials Mechanics and Thermal Fluids
University of California, Davis, CA
GPA: 4.0/4.0

Master of Science in Mechanical Engineering (January 2001-December 2002)
Thesis Title: Characterization and Optimization of Piezoelectric Membrane Generators
Advisor: Robert F. Richards
Major: Thermal Fluids
Washington State University, Pullman, WA
GPA: 4.0/4.0

Bachelor of Science in General Engineering with a Mechanical Engineering Option (September 1996-December 2000)
Montana Tech of the University of Montana, Butte, MT
GPA: 3.98/4.0

Licensed Professional Engineer
Registration Number: PE 14963, WY (March 27, 2015-Present)

Licensed Engineer Intern
Registration Number: PEL-EI-LIC-14581, MT (October 28, 2000)

WORK EXPERIENCE

Interim Dean (Summer 2024-Present) Lance College of Mines and Engineering, Montana Tech, Butte, MT - Responsible for working with faculty, staff, students, administrators, alumni, and other benefactors to enhance the reputation and success of the University and College. I provide effective leadership for the teaching, creative activity, and outreach mission of the University with a focus on advancing student success and increasing student persistence and graduation rates for all students. I provide visionary leadership and oversee all management aspects of the College including staff and personnel, assistance with course assignments, and supporting students.

Department Head (Spring 2018-Summer 2024) Department of Mechanical Engineering, Montana Tech, Butte, MT - Responsible for departmental vision and direction and ensuring faculty, staff, and students have access to adequate resources to meet our vision.

Program Coordinator (Fall 2017-Spring 2018) Mechanical Engineering, Montana Tech, Butte, MT - Act as Mechanical Engineering Program Head until Mechanical Engineering Department is created. Responsible for departmental vision and direction and ensuring faculty, staff, and students have access to adequate resources to meet our vision.

Professor (Summer 2021-Present), *Associate Professor* (Summer 2016-Summer 2021), *Assistant Professor* (Summer 2012-Summer 2016) Department of Mechanical Engineering (2018-Present), Department of Mechanical and Civil (formerly General) Engineering (2012-2018), Montana Tech, Butte, MT - Teach engineering science, mechanical engineering, and interdisciplinary nanotechnology courses, conduct research relating to micro/nanotechnology with an emphasis on materials and sensing technologies, provide service to the department, school, and community. I also serve as a faculty member of the Electrical Engineering Department and the Montana Materials Science Ph.D. Program.

President (Fall 2014-Present) Alpha Technology, LLC - Responsible for technical direction for this technology-based company.

Advisory Board Member (Summer 2021-Present) KorganoTech Inc. - Provide technical, strategic, and business development advice for company focused on a nanotechnology-based pathogen filtration, deactivation, and neutralization system.

Technical Mentor (Winter 2013-Spring 2016) Sandia National Laboratories, Livermore, CA - Acted as technical mentor in the area of nanotechnology methods, materials, and equipment.

Principal Member of Technical Staff (Winter 2011-Spring 2012), *Senior Member of Technical Staff* (Spring 2008-Winter 2011), *Member of Technical Staff* (Spring 2003-Spring 2008) Sandia National Laboratories, Livermore, CA - Led and performed research and development in the area of microscale and nanoscale engineering and science.

- Acted as Principal Investigator and lead researcher for multiple projects (total budget >\$1M) including conductive carbon-nanotube-filled polymers for enhanced electrical and mechanical performance, nanopatterned plasmonic surfaces for enhanced solar energy conversion and optical cloaking, passive wireless sensor tags for security applications, MEMS switches for high voltage applications, and carbon nanotube transistors for infrared detection. These projects required coordination of and collaboration with interdisciplinary teams including mechanical engineers, electrical engineers, materials scientists, and chemists. Success in these projects was demonstrated by peer-reviewed publications, presentations, and continued funding.
- Acted as primary science and technology point of contact for a major National Security area within Sandia National Laboratories.
- Served as mentor to university students and new staff members in the design, fabrication, and testing of novel devices and metamaterials. I educated these individuals in both the theoretical and experimental aspects of microscale and nanoscale technology and devices.

- Served as recruiting team lead for the University of California, Davis. I was responsible for ensuring that our recruiting efforts attract the best students from UC Davis. This included organizing recruiting teams of engineers and scientists from Sandia National Laboratories to give technical presentations, attend career fairs, and sponsor student activities.
- Served as principal investigator of the Center for Critical Application Sensing (CCAS) at Sandia National Laboratories, Livermore, CA. This center provided sensing solutions through expertise in technology development and systems engineering for National Security applications.
- Led and performed research and development for multiple projects including design and nanofabrication of surface acoustic wave devices for ultra-low power wireless communication, electrical breakdown in high-voltage microsystems, and low-power non-contact voltage sensing with a MEMS device. These projects involved the design, fabrication, and characterization of devices and systems. Success was in large part demonstrated by peer reviewed publications and presentations.
- Acted as co-lead for the Microsystems and Engineering Sciences Applications (MESA), California, technical seminar series. I worked closely with my colleague to arrange monthly technical seminars from outside and inside researchers relevant to microsystems and National Security applications.

Graduate Student Researcher (Fall 2004–Fall 2007) Berkeley Sensor and Actuator Center, Berkeley, CA - Performed research in the area of diffractive optical microsystems for tunable filters and modulators.

- Developed optical modulator and filter with the use of nanofabrication and microfabrication. This research integrated a MEMS electrostatic transducer with a nanopatterned plasmonic surface to provide active control of the reflection of a narrow band of visible-wavelength light.
- Developed a nanopatterned optical metamaterial for use in refractive index measurement and biological and chemical detection.
- Developed optical modular and filter for infrared wavelengths. This research integrated a MEMS actuator with a micropatterned surface to control the transmission and reflection of infrared light.

Graduate Assistant (Summer 2001–Fall 2002) Washington State University, Pullman, WA - Characterized and optimized mechanical and electrical performance of piezoelectric membrane generators for use in a microelectromechanical (MEMS) micro heat engine.

- Developed a piezoelectric membrane generator to convert mechanical energy from a saturated liquid-vapor heat engine to electrical energy for a portable power system.
- Developed a pneumatic bulge tester to simulate heat engine performance for characterization of piezoelectric membrane generators.

Teaching Assistant (Spring 2001) Washington State University, Pullman, WA - Instructed students in a classroom and lab environment on the behavior and application of materials for engineering structures.

- Prepared lectures to convey in a clear and concise manner the fundamental behavior of materials in various static and dynamic loading conditions.

- Provided additional education to students on an individual basis outside of class hours to maximize each student's understanding of the subject matter.

Track Laborer (Summer 2000) Rarus Railway Company, Anaconda, MT - Repaired and installed railway track and associated hardware.

Engineering Tutor (Fall 1999-Spring 2000) Tech Learning Center, Montana Tech, Butte, MT - Tutored all undergraduate general engineering courses, as well as mathematics and physics as required.

Engineering Intern (Summer 1999) Burlington Resources, Farmington, NM - Increased natural gas production through daily planning, monitoring, and actions as field engineer.

HONORS & AWARDS

Rose and Anna Busch Teacher of the Year, Montana Tech (2015, 2018, 2021, 2024)
Merit Award for Excellence in Teaching, Research, and Service, Montana Tech (2014, 2017, 2023)

Micrograph Chosen as Cover Image for EIPBN Conference Collection Booklet (2021)
Built Mechanical Engineering BS Program at Montana Tech into 3rd ranked program (out of 393) in the United States, bestaccreditedcolleges.org (2021)

Grand Prize Winner in EIPBN Micrograph Contest (2021)
Most Bizarre in EIPBN Micrograph Contest (2021)
Honorable Mention in EIPBN Micrograph Contest (2021)

Distinguished Researcher Award, Montana Tech (2015, 2021)
Best Paper Award, EIPBN (2019)

Honorable Mention in EIPBN Micrograph Contest (2019)

Journal Article Featured as Cover Art, JVSTB (2019)

Honorable Mention in EIPBN Micrograph Contest (2018)

Best in Show, Montana Tech Expo (2018)

Best Materials Science PhD Poster, Montana Tech Expo (2018)

Best Materials Science PhD Booth, Montana Tech Expo (2018)

Best General Engineering Booth, Montana Tech Expo (2018)

Best Biology Booth, Montana Tech Expo (2018)

Honorable Mention in EIPBN Micrograph Contest (2017)

Best Metallurgical and Materials Engineering Poster, Montana Tech Expo (2017)

Best Biomedical Engineering IIP Poster, Montana Tech Expo (2017)

Best Materials Science PhD Poster, Montana Tech Expo (2017)

Best Mechanical Engineering Booth, Montana Tech Expo (2017)

Best Mechanical Engineering Poster, Montana Tech Expo (2017)

Best General Engineering Poster, Montana Tech Expo (2017)

Best in Show, Montana Tech Expo (2016)

Best Materials Science PhD Poster, Montana Tech Expo (2016)

Best in Show - High School Student Selected (2016)

Best Mechanical Engineering Booth, Montana Tech Expo (2016)

Best Mechanical Engineering Poster, Montana Tech Expo (2016)

Best Bioengineering IIP Poster, Montana Tech Expo (2016)

Best General Engineering Poster, Montana Tech Expo (2016)

Alumni Recognition Award, General Engineering, Montana Tech (2015)
Nominated for Montana Tech Homecoming Grand Marshal (2015)
Classified Intellectual Property Award (PI), Sandia National Laboratories (2015)
Honorable Mention in EIPBN Micrograph Contest (2015)
Best Mechanical Engineering Booth, Montana Tech Expo (2015)
Best Mechanical Engineering Poster, Montana Tech Expo (2015)
Best General Engineering Poster, Montana Tech Expo (2015)
Best Chemistry Poster, Montana Tech Expo (2015)
Best Electrical Engineering Poster, Montana Tech Expo (2015)
Winner of American Society of Microbiology Photo Contest (2015)
Top 5 Most Read September Paper for JVST-B (2014)
Faculty Advisor of the Year, Montana Tech (2014)
Best Chemistry Poster, Montana Tech Expo (2014)
Best Electrical Engineering Poster, Montana Tech Expo (2014)
Best General Engineering Poster, Montana Tech Expo (2014)
Best Mechanical Engineering Booth, Montana Tech Expo (2014)
Best General Engineering Booth, Montana Tech Expo (2014)
Top 25 Downloaded May Paper for IEEE Sensors Journal (2013)
Best General Engineering Senior Design Project, TechXpo, Montana Tech (2013)
Best Mechanical Engineering Senior Design Project, TechXpo, Montana Tech (2013)
Classified Intellectual Property Award (PI), Sandia National Laboratories (2012)
NSF travel grant for Bryan Loyola (UCD PhD student) to attend ASME IMECE (2011)
NSF travel grant for Heather Chiamori (UCB PhD student) to attend ASME IMECE (2011)
Outstanding Mentor Award Recipient, Sandia National Laboratories (2011)
Classified Intellectual Property Award (PI), Sandia National Laboratories (2011)
Spot Award for Outstanding Recruiting Efforts, Sandia National Laboratories (2010)
Outstanding Research Poster, Berkeley Sensor and Actuator Center Industrial Advisory Board Meeting, "Large, ordered 3D nanocup arrays for plasmonic applications," J. C. Lo, D. A. Horsley, and J. L. Skinner (2010)
Sandia Special Degree Program Doctoral Funding Award, University of California (2004-2007)
Alfred Suksdorf Graduate Fellowship, Washington State University (2001-2002)
Outstanding General Engineering Graduate, Montana Tech (2001)
R.V. Subramanian Graduate Fellowship, Washington State University (2001)
Selected for Who's Who Among Students in American Universities and Colleges, Montana Tech (1999-2000)
Selected for the National Dean's List, Montana Tech (1996-2000)
Nominated for All-USA Academic Team, Montana Tech (1997-1998)

SOCIETIES & SERVICE

Associate Editor, MRS Advances (2024-Present)
Member, EIPBN Steering Committee (2023-Present)
Member, Montana Nanotechnology Facility External Advisory Board (2023-Present)
Faculty Advisor, ASME, Montana Tech (2017-Present)
Faculty Advisor, Tau Beta Pi Engineering Honor Society, Montana Tech (2016-Present)
Faculty Advisor, SAE Baja Club, Montana Tech (2012-2018)
Member, Society of Automotive Engineers (2013-Present)
Member, American Society for Engineering Education (2011-Present)

Member, Materials Research Society (2011-Present)
Member, Institute of Electrical and Electronics Engineers (2007-Present)
Member, American Institute of Aeronautics and Astronautics (2002-Present)
Member, Tau Beta Pi Engineering Honor Society (1998-Present)
Member, American Society of Mechanical Engineers (ASME) (1996-Present)
Member, Butte-Silver Bow Building Board of Appeals (2018-Present)
Program Committee Member, International Conference on Electron, Ion, Photon Beam
Technology and Nanofabrication - EIPBN (2010, 2011, 2012, 2013, 2014, 2015, 2016,
2017, 2018, 2019, 2020, 2021, 2022, 2023)
Reviewer, Thin Solid Films Journal (2022)
Reviewer, Materials Journal (2020, 2021, 2022)
Reviewer, American Chemical Society Petroleum Research Fund (2014, 2021)
Reviewer, Polymers Journal (2019, 2021)
Reviewer, Materials Today Communications (2020)
Reviewer, Membranes Journal (2020)
Reviewer, Sensors Journal (2019)
Chair, Neuromorphic Hardware, International Conference on Electron, Ion, Photon Beam
Technology and Nanofabrication (2019)
Reviewer, Scientific Reports (2018)
Reviewer, Microelectronic Engineering (2016, 2017, 2018)
Program Advisor, International Conference on Electron, Ion, Photon Beam Technology and
Nanofabrication (2016, 2017, 2018, 2019)
Reviewer, Energy Journal (2017)
Member, Natural Resources Research Center Planning Committee, Montana Tech (2014-2017)
Chair, Research Awards Subcommittee, Montana Tech (2017)
Member, Research Awards Subcommittee, Montana Tech (2016)
Reviewer, IEEE Sensors Journal (2013, 2014, 2016)
Chair, Nanophotonics and Plasmonics Session, International Conference on Electron, Ion,
Photon Beam Technology and Nanofabrication (2017)
Member, Faculty Search Committee, Department of Electrical Engineering, Montana Tech
(2016)
Member, Faculty Search Committee, Department of General Engineering, Montana Tech
(2016)
Member, Montana Tech Science and Engineering Fair and Symposium Advisory Board (2016-
Present)
Chair, Nanophotonics Session, International Conference on Electron, Ion, Photon Beam
Technology and Nanofabrication (2016)
Chair, Two Faculty Search Committees, Department of General Engineering, Montana Tech
(2015)
Reviewer, Materials Research Society Communications (2015)
Reviewer, Materials Engineering and Processing, National Science Foundation (2015)
Judge, Montana Tech Regional Science and Engineering Fair (2013, 2014, 2015, 2016)
Presenter, 21st Century Community Learning Center High School Initiative, Montana Tech
(2014)
Reviewer, Partnerships for Innovation: Accelerating Innovation Research - Technology
Transfer - Sensing and Electronic Devices Panel, National Science Foundation (2014)
Chair, Faculty Search Committee, Department of General Engineering, Montana Tech (2014)
Chair, Research Subcommittee of Strategic Planning Committee, Montana Tech (2012-2013)

Senator, Faculty Senate of Montana Tech (2012-2014)
Member, Undergraduate Research Committee, Montana Tech (2013-Present)
Reviewer, Proposal Review Panel, National Science Foundation Partnerships for Innovation:
Accelerating Innovation Research (2014)
Co-Chair, Nanophotonics Session, International Conference on Electron, Ion, Photon Beam
Technology and Nanofabrication (2013)
Reviewer, Langmuir (2009, 2012, 2013, 2014, 2015)
Member, Faculty Search Committee, Department of Mathematical Sciences (2013)
Reviewer, Plasma Science and Technology (2013)
Reviewer, Journal of Microelectromechanical Systems (2012)
Chief Judge, Intel-Affiliated Contra Costa County Science and Engineering Fair, Pittsburg, CA
(2012)
Reviewer, Nano Letters (2011)
Reviewer, Journal of Materials Research (2011)
Judge, Sandia National Laboratories MEMS University Alliance Design Competition (2009,
2010, 2011)
Judge, Excelsior Middle School Science Fair, Byron, CA (2011)
Mentor, Livermore High School Green Engineering Academy, Livermore, CA (2011)
Volunteer, Mock Interview Event for Society of Women Engineers, University of California,
Davis (2010, 2011)
Volunteer, Society of Women Engineers Evening with Industry, University of California,
Davis (2010, 2011)
Reviewer, Journal of Vacuum Science and Technology B (2010)
Reviewer, Biomedical Engineering Society Annual Meeting (2010)
Reviewer, Journal of Nanoscience and Nanotechnology (2009)
Reviewer, Optics Letters (2008)
Reviewer, International Mechanical Engineering Congress and Exposition (2004, 2006)
Senator, Associated Students of Montana Tech (2000)
President, ASME Student Chapter of Montana Tech (1996-2000)
Prepared agenda and organized and oversaw activities for Region VIII Regional Student
Conference and Graduate Student Technical Conference, Montana Tech, Butte, MT
(1998)
Acted as liaison for Montana Tech section of ASME at Region VIII Regional Student
Leadership Seminar, Richland, WA (1997)
Competed in Micro-Baja car design and race competition, University of Washington, Seattle,
WA (1997)

PATENTS

US Pending Patent 17/725,251 - Precisely controlled fiber deposition by electrostatic fields
US Pending Patent 17/716,739 - Non-toxic nanomaterial for metals extraction from water
International Pending Patent PCT/US202035478 and EU 20812979.1 - Device for polymer
materials fabrication using gas flow and electrostatic fields.
US Provisional Patent SD10357 - Sensors and tunable optical elements
US Patent 11191721 - Particle delivery via small-scale morphology materials for antibacterial
applications
US Patent 10532070 - Antiviral composition and applications of iron-doped apatite
nanoparticles

US Pending Patent 16/402,881 - Hybrid electrospinner for core-shell fiber fabrication
US Pending Patent 15/610,014 - Method for the synthesis of hybrid organic-inorganic perovskites via melt electrospinning
US Pending Patent 14/879,924 - Thermal high-voltage extrusion apparatus with pneumatic polymer delivery
US Pending Patent 62/125,795 - Foldable food grade cooking surface and method of use
US Patent 11191721 – Particle delivery via small-scale morphology materials for antibacterial applications
US Patent 10532070 - Antiviral composition and applications of iron-doped apatite nanoparticles
US Patent 10392612 - Method of particulate transport via small-scale morphology materials
US Patent 9989355 - Method and apparatus for conducting real-time electrospinning diagnostics using laser extinction
US Patent 8986576B1 - Carbon nanotube composite materials
US Patent 8852998 - Method to fabricate micro and nano diamond devices
US Patent 20120114841/8728566B2 - Method of making carbon nanotube composite materials
US Patent 8339219 - Passive hybrid sensing tag with flexible substrate SAW device
US Patent 7030355 - Low power photomultiplier tube circuit and method therefor

ACQUIRED FUNDING

Acquisition of Hitachi HT7800 Electron Microscope, \$999,988, National Science Foundation Major Research Instrumentation.

Nanomaterials for Selective REE Extraction with Minimal Environmental Impact, \$657,365, U.S. Army Combat Capabilities Development Command Army Research Laboratory, Aberdeen Proving Grounds, MD.

Nanofabrication Methods Supporting Army Modernization, \$953,000, 2021, U.S. Army Combat Capabilities Development Command Army Research Laboratory, Aberdeen Proving Grounds, MD.

RII Track-1 Consortium for Research on Environmental Water Systems, \$20M, 2018-2023, National Science Foundation.

A Novel Portable Electrospinning Device for Functionalized Fiber Materials, \$105k, 2018-2021, Slater Family Research Trust.

Polymer Functional Materials by Design, \$2.7M, 2015-2020, Army Research Laboratory, Aberdeen Proving Grounds, MD.

MRI: Acquisition of a confocal microscope to enhance biological and materials research at Montana Tech, \$364,383, 2018, National Science Foundation.

Mechanical Enhancement of Para-aramid Fabrics with CNTs and Graphene, \$200k, 2016-2018, sp2nano, Butte, MT.

Electrospinning Equipment for Large-Area Production, \$100k, 2017, Sandia National Laboratories, Livermore, CA.

Electrospinning Hardware and Fixture Funds, \$20k, 2015, Capital Equipment Funds, Montana Tech.

Experimental and Modeling Methods in Electrospinning, \$108k, 2015, Sandia National Laboratories, Livermore, CA.

Materials Technology Science and Engineering Research for the Army (MT-SERA), \$1.164M, 2015, Army Research Laboratory, Aberdeen Proving Ground, MD.

Fabrication and Characterization Equipment, \$1M, Applied Materials, Kalispell, MT, 2015.

Reproducible Antibacterial Surfaces Using Thermal Imprint Technology, \$1502, AY 2014-2015, Undergraduate Research Committee, Montana Tech.

Utilization of Electrospinning Technique to Decorate Nanofibers for Biomedical Applications, \$2100, AY 2015-2015, Undergraduate Research Committee, Montana Tech.

Study of NANO Modified Moisture Cured Polyurethane Polymer Resins, \$2050, AY 2014-2015, Undergraduate Research Committee, Montana Tech.

Electrospinning Methods, Materials, and Hardware, \$75k, 2014, Sandia National Laboratories, Livermore, CA.

Excellence in Engineering Funds, \$20k, Spring 2014, School of Mines and Engineering, Montana Tech.

Melt Electrospinning Hardware Development, \$4k, Fall 2013, Sandia National Laboratories, Livermore, CA.

Nanoparticle-Mediated Increase in Viral Plaque Formation, \$99906, 2013-2015, CBET - Enviro Health & Safety of Nano, National Science Foundation.

A Study on the Fluorescent Properties of Nanoapatite Particles Under Externally Applied Magnetic Fields, \$2100, AY 2013-1014, Undergraduate Research Committee, Montana Tech.

Investigating the Formation of Hydroxyapatite Nanoparticle Copolymers, \$1935, AY 2013-1014, Undergraduate Research Committee, Montana Tech.

Fabrication and Characterization of Nanoscale Sensors Made Via Electrospinning, \$2099, AY 2013-1014, Undergraduate Research Committee, Montana Tech.

Nanotechnology Research Equipment – Near Field Scanning Optical Microscope, \$250k, Spring 2013, Research Office, Montana Tech.

Faculty Seed Grant - An Investment in Emerging Nanotechnology at Montana Tech, \$5k, Spring 2013, Research Office, Montana Tech.

Excellence in Engineering Funds, \$20k, Fall 2012 – Spring 2013, School of Mines and Engineering, Montana Tech.

Nanotechnology Equipment Funding, \$10k, Fall 2012, Department of General Engineering, Montana Tech.

Structural Health Monitoring with Composites and CNTs, \$12k, Summer 2011, National Science Foundation supplemental funding with Prof. La Saponara from University of California at Davis, co-author and Sandia National Laboratories mentor.

Chemical Delivery Through Nanopatterned Shape Memory Polymers, \$12k, Summer 2011, National Science Foundation supplemental funding with Prof. Zhang from University of Texas at Austin, co-author and Sandia National Laboratories mentor.

Integration of Plasmonics with Graphene, \$12k, Summer 2011, National Science Foundation supplemental funding with Prof. Lin from University of California at Berkeley, co-author and Sandia National Laboratories mentor.

Nanopatterning Optical Metasurfaces for Light Focusing and Control, \$15k, Summer 2010, National Science Foundation supplemental funding with Prof. Zhang from University of Texas at Austin, co-author and Sandia National Laboratories mentor.

Nanowire Based Energy Devices on Amorphous Substrates with Transparent and Flexible Electrodes, \$7.5k, Summer 2010, National Science Foundation supplemental funding with Prof. Islam from University of California at Davis, co-author and Sandia National Laboratories mentor.

Integration of Block-Copolymer with Nanoimprint Lithography: Pushing the Boundaries of Emerging Nanopatterning Technology, \$670k/year, FY2010-2012, National Institute for Nano Engineering (NINE) funding, co-author.

Carbon Nanotube Filled Polymers, \$465k/year, FY2008-2009, Laboratory Directed Research and Development (LDRD) grant, PI.

A MEMS Switch for High Voltage Applications, \$75k/year, FY2004-2006, Microsystems and Engineering Sciences Applications (MESA) Institute funding, PI.

UNIVERSITY STUDENTS MENTORED

Amos Taiswa (PhD EarthSci&Eng 2024, Montana Tech, Butte) - thesis advisor

Evan Griffiths (MS GE 2024, Montana Tech, Butte) - thesis advisor

Daniel Goettlich (PhD MatSci 2025, Montana Tech, Butte) - thesis committee

Sheikh Parvez (PhD MatSci 2024, Montana State University, Bozeman) - thesis committee

Adam Olivera (PhD MatSci 2024, Montana State University, Bozeman) - thesis committee

Harold Pearson-Nadal (MS GE 2022, Montana Tech, Butte) - thesis advisor

Isaac Gilfeather (MS GE 2022, Montana Tech, Butte) - thesis advisor

Ellie Ostermiller (BS ME 2023, Montana Tech, Butte) - research mentor
Amelia Stoner (BS ME 2023, Montana Tech, Butte) - research mentor
Luke Suttey (PhD MatSci 2022, Montana Tech, Butte) - thesis advisor
Isaac Gilfeather (MS GE 2022, Montana Tech, Butte) - thesis advisor
Xavier Vorhies (MS MSE 2022, Montana Tech, Butte) - thesis advisor
Lane Huston (MS GE 2020, Montana Tech, Butte) - thesis advisor
Molly Brockway (PhD MatSci 2021, Montana Tech, Butte) - thesis advisor
Sowmya Sudhakar (MS ME 2020, Montana Tech, Butte) - thesis advisor
McKenzie Joseph (MS GE 2020, Montana Tech, Butte) - thesis advisor
Emily Kooistra-Manning (MS GE 2020, Montana Tech, Butte) - thesis advisor
Sajia Afrin (PhD MatSci 2023, Montana State University, Bozeman) - thesis committee
Emma Carvo (BS ME 2022, Montana Tech, Butte) - research mentor
Harold Pearson-Nadal (BS ME 2020, Montana Tech, Butte) - research mentor
Isaac Gilfeather (BS ME 2020, Montana Tech, Butte) - research mentor
Riley McNabb (MS GE 2020, Montana Tech, Butte) - thesis committee
Prakash Gautam (MS GE 2020, Montana Tech, Butte) - thesis committee
John Murphy (PhD MatSci 2018, Montana Tech, Butte) - thesis advisor
Jessica Andriolo Gregory (PhD IIP 2017, Montana Tech, Butte) - thesis advisor
McKenzie Joseph (BS ME 2019, Montana Tech, Butte) - research advisor
Madisen Sickler (PhD MatSci 2019, Montana State University, Bozeman) - thesis committee
Julie Muretta (PhD MatSci 2018, Montana State University, Bozeman) - thesis committee
Andrew Hill (PhD MatSci 2018, Montana State University, Bozeman) - thesis committee
Robert West (MS IMS 2019, Montana Tech, Butte) - thesis advisor
Nathan Sutton (MS GE 2017, Montana Tech, Butte) - thesis advisor
Sowmya Sudhakar (BS ME 2019, Montana Tech, Butte) - research mentor
Zachary Burckhard (BS ME 2019, Montana Tech, Butte) - research mentor
Anthony Ottolini-Messuri (MS GE 2017, Montana Tech, Butte) - thesis advisor
Emily Kooistra-Manning (BS GE&Met 2017, Montana Tech, Butte) - research mentor
Bill Ryan (MS IMS 2017, Montana Tech, Butte) - thesis committee
Josh Beisel (MS EE 2016, Montana Tech, Butte) - thesis advisor
Brandon Ross (MS GE 2016, Montana Tech, Butte) - thesis advisor
Kelly Benton (MS EnvEng 2016, Montana Tech, Butte) - thesis committee
Ethan Wood (MS Met 2015, Montana Tech, Butte) - thesis committee
Dan Douglass (BS GE, 2015, Montana Tech, Butte) - research mentor
Ryan Hensleigh (BS Chemistry 2015, Montana Tech, Butte) - research mentor
Josh Beisel (BS EE 2015, Montana Tech, Butte) - research mentor
Heidi Reid (BS GE 2015, Montana Tech, Butte) - research mentor
Lance Purkett (MS GE 2015, Montana Tech, Butte) - thesis advisor
Jerry Kyeremateng (MS GE 2014, Montana Tech, Butte) - thesis advisor
Scott Kelleher (BS GE 2014, Montana Tech, Butte) - research mentor
Hank Pratte (BS GE 2014, Montana Tech, Butte) - research mentor
Andrew Erickson (BS GE 2014, Montana Tech, Butte) - research mentor
Brandon Ross (BS GE 2014, Montana Tech, Butte) - research mentor
Luke Carlson (MS GE 2013, Montana Tech, Butte) - thesis committee
Chance Wilson (BS GE 2013, Montana Tech, Butte) - research mentor
Bryan Loyola (PhD ME 2012, University of California, Davis) - research mentor, dissertation
committee
Heather Chiamori (PhD ME 2012, University of California, Berkeley) - research mentor

Jean Fakhoury (MS BME 2011, University of Texas, Austin) - research mentor
Heim Kirin Grewal (MS EE 2011, University of California, Davis) - research mentor
Ellen Blinka (BS BME 2010, University of Texas, Austin) - research mentor
Joanne Lo (MS EE 2010, University of California, Davis) - research mentor, thesis committee
Fabian Strong (PhD EE 2007, University of California, Davis) - research mentor

PUBLICATIONS

1. "Ultrafast charge injection in silver-modified graphitic carbon nitride," Emma K. Orcutt, Shelton J.P. Varapragasam, Zöe C. Peterson, Jessica M. Andriolo, Jack L. Skinner, and Erik M. Grumstrup, *ACS Applied Materials and Interfaces*, 2023.
2. "Polydopamine-copper spacers improve longevity and prevent biofouling in reverse osmosis," Amos Taiswa, Jessica M. Andriolo, Katherine R. Zodrow, Jack L. Skinner, *Water Supply*, 2022.
3. "Carbon nanoparticle-induced changes to lipid monolayer structure at water-air interfaces," N. Shaikh, J. M. Andriolo, J. L. Skinner, and R. A. Walker, *Journal of Physical Chemistry B*, 2022.
4. "Photocatalytic reduction of aqueous nitrate with hybrid Ag/g-C₃N₄ under ultraviolet and visible light," S. J. P. Varapragasam, J. M. Andriolo, J. L. Skinner, and E. M. Grumstrup, *ACS Omega*, 2021.
5. "Mixed mathematical and experimental modeling of electrospun metal oxide supercapacitor electrodes," M. C. Brockway, D. J. Moritz, J. J. Borkowski, and J. L. Skinner, *Journal of Vacuum Science and Technology B*, 2021.
6. "Electrospun Mn₂O₃ web electrodes: Influence of fabrication parameters on electrochemical performance," M. C. Brockway and J. L. Skinner, *Journal of Vacuum Science and Technology B*, 2020.
7. "Well-adhered copper nanocubes on electrospun polymeric fibers," T. Q. Aminu, M. C. Brockway, J. L. Skinner, and D. F. Bahr, *Nanomaterials*, 2020.
8. "Air driven electrospinning of CNT doped conductive polymer fibers for electronics," E. A. Kooistra-Manning, L. G. Huston, J. L. Skinner, and J. M. Andriolo, *MRS Advances*, 2020.
9. "Fiber creation and deposition on arbitrary surfaces with gas-modified electrospinning," E. A. Kooistra-Manning, L. G. Huston, J. L. Skinner, and J. M. Andriolo, *Proceedings of ASME International Mechanical Engineering Congress and Exposition*, 2019.
10. "Combined electrostatic and air driven electrospinning for biomedical applications," L. G. Huston, E. A. Kooistra-Manning, J. L. Skinner, and J. M. Andriolo, *Journal of Vacuum Science and Technology B*, 2019. (Featured by the American Society of Physics and Healthline, Editor's Pick for JVSTB, Most Read in JVSTB).
11. "Bulk and localized plasmonic heating in nanogold doped polymers," J. M. Andriolo, M. L. Joseph, M. H. Griep, and J. L. Skinner, *Journal of Vacuum Science and Technology B*, 2019. (Chosen for Journal Cover Art).

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PRESENTATIONS

1. "Electrospun fibers for controlled release of anti-quorum sensing molecules for biofouling mitigation in MCE membranes," Amos Taiswa, Jessica M. Andriolo, and Jack L. Skinner, IWA Membrane Technology Conference, St. Louis, MO, July 2023.
2. "Portable electrospinner with ionized airflow to improve performance across environments," Harold W. Pearson-Nadal, Isaac C. Gilfeather, Cody Baumstarck, Jessica M. Andriolo, and Jack L. Skinner, EIPBN Conference, San Francisco, CA, May 2023.
3. "Adhesion and excitation lifetime of perovskites on modified substrates," Xavier Vorhies, Jessica M. Andriolo, Erik M. Grumstrup, David F. Bahr, Jack L. Skinner, EIPBN Conference, San Francisco, CA, May 2023.
4. "Photocatalysis and light scattering by sensitized nanofibers for denitrification," Jessica M. Andriolo, Erik M. Grumstrup, A. Alec Talin, and Jack L. Skinner, EIPBN Conference, San Francisco, CA, 2023.
5. "Anti-biofouling electrospun surfaces functionalized by anti-quorum sensing molecules," Amos Taiswa, Jessica M. Andriolo, and Jack L. Skinner, EIPBN Conference, San Francisco, CA, May 2023.
6. "Conductive electrospun fibers for photovoltaic applications," Luke J. Suttley, Ellie L. Ostermiller, Dennis J. Moritz, John J. Borkowski, Jessica M. Andriolo, and Jack L. Skinner, EIPBN Conference, San Francisco, CA, May 2023.
7. "Self-healing polymer composites with enhanced strength for use in protective textiles," Evan A. Griffiths, Blaine M. Berrington, Jessica M. Andriolo, Scott Coguill, Brahmananda Pramanik, Richard LaDouceur, and Jack L. Skinner, Spring Materials Research Society Meeting, San Francisco, CA, April 2023.
8. "Conductive electrospun PCL fibers for use in electrospun photovoltaics," L. J. Suttley, Dennis J. Moritz, Ellie L. Ostermiller, John J. Borkowski, J. M. Andriolo, and J. L. Skinner, Spring Materials Research Society Meeting, San Francisco, CA, April 2023.

9. "Photocatalytic denitrification by sensitized electrospun filters," (Poster Presentation) Jessica M. Andriolo, Erik M. Grumstrup, A. Alec Talin, and Jack L. Skinner, Spring Materials Research Society Meeting, San Francisco, CA, April 2023.
10. "Polydopamine enhances longevity of copper (II) oxide nanoparticles on polypropylene spacers and enhances biofouling control in reverse osmosis," Amos Taiswa, Jessica M. Andriolo, and Jack L. Skinner, North American Membrane Society, Tempe, AZ, May 2022.
11. "Photo-activation of sensitized denitrification filters," Jessica M. Andriolo, Emma M. Carvo, Ellie L. Ostermiller, Shelton J.P. Varapragasam, A. Alec Talin, Erik M. Grumstrup, and Jack L. Skinner, EIPBN Conference, New Orleans, LA, June 2022.
12. "Nanoimprint lithography master stamps produced via morphologically controlled electrospun fibers," Luke J. Suttley, Harold Pearson-Nadal, Isaac C. Gilfeather, Jessica M. Andriolo, and Jack L. Skinner, EIPBN Conference, New Orleans, LA, June 2022.
13. "Physiological flow cell adapted for monitoring cardiac tissue damage under high pressures," Harold W. Pearson-Nadal, Jessica M. Andriolo, Sowmya Sudhakar, Amelia K. Stoner, Amos Taiswa, M. Katie Hailer, and Jack L. Skinner, EIPBN Conference, New Orleans, LA, June 2022.
14. "Multiplex electrospinning for polymer deposition and novel structures," Harold W. Pearson-Nadal, Isaac C. Gilfeather, Jessica M. Andriolo, and Jack L. Skinner, Spring Materials Research Society Meeting, Honolulu, HI, May 2022.
15. "Perovskite adhesion on rigid substrates coated with metallic thin films," Xavier T. Vorhies, Jessica M. Andriolo, David F. Bahr, and Jack L. Skinner, Spring Materials Research Society Meeting, Honolulu, HI, May 2022.
16. "Light activated drug delivery from electrospun bandages using plasmonic dopants," J. M. Andriolo, M. L. Joseph, M. H. Griep, and J. L. Skinner, EIPBN Conference, Virtual, June 2021.
17. "A mixed mathematical and experimental model for energy storage in electrospun Mn₂O₃ supercapacitor electrodes," M. C. Brockway and J. L. Skinner, EIPBN Conference, Virtual, June 2021.
18. "Highly controlled deposition with multiple electrode electrospinning," I. C. Gilfeather, H. W. Pearson-Nadal, J. M. Andriolo, and J. L. Skinner, EIPBN Conference, Virtual, June 2021.
19. "Nanotechnology: Biomedical applications of electrospinning," J. L. Skinner, University of Wyoming Materials Science Seminar (Invited), Virtual, 2020.
20. "Nanotechnology: People and places at Montana Tech," J. L. Skinner, Montana Tech Foundation Happy Hour (Invited), Virtual, 2020.
21. "Nanotechnology: Big solutions from small scale science and engineering," J. L. Skinner, Montana Tech Foundation Board Meeting (Invited), Houston, TX, February 2020.

22. "Physiological tissue model with electrospun scaffolds and fluid flow," S. Sudhakar, J. M. Andriolo, M. K. Hailer, and J. L. Skinner, American Society for Microbiology Microbe Conference, Virtual Presentation, August 2020, Conference Online Due to COVID-19.
23. "Topical drug delivery from electrospun bandages using photonic activation," M. L. Joseph, J. M. Andriolo, M. H. Griep, and J. L. Skinner, American Society for Microbiology Microbe Conference, Virtual Presentation, August 2020, Conference Online Due to COVID-19.
24. "Fabrication of freestanding Mn₂O₃ web electrode for supercapacitor applications," M. C. Brockway and J. L. Skinner, Spring Materials Research Society Meeting, New Orleans, LA, April 2020, Abstract Accepted, Presentation Postponed to Fall Meeting Due to COVID-19.
25. "Combined electrostatic and air driven electrospinning of CNT doped conductive polymer fibers," E.A. Kooistra-Manning, L.H. Huston, J.L. Skinner, and Jessica M. Andriolo, Spring Materials Research Society Meeting, New Orleans, LA, April 2020, Abstract Accepted, Presentation Postponed to Fall Meeting Due to COVID-19.
26. "Plasmonic response of light-activated nano-silver doped polymers for drug delivery," M.L. Joseph, J.M. Andriolo, M.H. Griep, and J.L. Skinner, Spring Materials Research Society Meeting, New Orleans, LA, April 2020, Abstract Accepted, Presentation Postponed to Fall Meeting Due to COVID-19.
27. "Fiber creation and deposition on arbitrary surfaces with gas-modified electrospinning," E. A. Kooistra-Manning, L. H. Huston, J. L. Skinner, and J. M. Andriolo, International Mechanical Engineering Congress and Exposition, Salt Lake City, UT, November 2019.
28. "Combined electrostatic and air driven electrospinning for biomedical applications," L. G. Huston, E. A. Kooistra-Manning, J. L. Skinner, and J. M. Andriolo, EIPBN Conference, Minneapolis, MN, May 2019.
29. "Enhanced plasmonic activity of polymer fibers through nanoparticle doping," J. M. Andriolo, M. L. Joseph, M. H. Griep, and J. L. Skinner, EIPBN Conference, Minneapolis, MN, May 2019.
30. "Hollow Mn₂O₃ nanoparticles for supercapacitor electrodes via solvothermal and high-temperature processing," M. C. Brockway and J. L. Skinner, EIPBN Conference, Minneapolis, MN, May 2019.
31. "Plasmonic response of light-activated, nano-gold doped polymers," J. M. Andriolo, M. L. Joseph, M. H. Griep, and J.L. Skinner, Spring Materials Research Society Meeting, Phoenix, AZ, April 2019.
32. "Tunable surface area and electrochemical capacitance of Mn₂O₃ nanofibers through controlled calcination," M. C. Brockway and J. L. Skinner, Spring Materials Research Society Meeting, Phoenix, AZ, April 2019.
33. "Iron-doped apatite nanoparticles significantly diminish HSV-1 infection of Vero and BEAS-2B cell lines and exhibit minimal cytotoxicity," J. M. Andriolo, R. F. West, M. L.

- Pedulla, M. K. Hailer, and J. L. Skinner, American Society for Microbiology Microbe Conference, Atlanta, GA, June 2018.
34. "Plasmonic enhanced burst release from electrospun fibers exposed to light," J. M. Andriolo, M. L. Joseph, J. P. Murphy, M. C. Brockway, and J. L. Skinner, EIPBN Conference, Rio Grande, PR, May 2018.
35. "Electrospun charge transport structures for hybrid perovskite solar cells," J. P. Murphy, M. C. Brockway, and J. L. Skinner, EIPBN Conference, Rio Grande, PR, May 2018.
36. "Fabrication of optically active fiber mats via melt electrospinning," J. P. Murphy, J. M. Andriolo, M. C. Brockway, N. Sutton, and J. L. Skinner, Spring Materials Research Society Meeting, Phoenix, AZ, April 2018.
37. "Electrospun fibers for controlled release of nanoparticle-assisted phage therapy treatment of topical wounds," J. M. Andriolo, N. Sutton, J. P. Murphy, L. Huston, M. L. Pedulla, M. K. Hailer, and J. L. Skinner, Spring Materials Research Society Meeting, Phoenix, AZ, April 2018.
38. "Mechanic and ballistic enhancement of para-aramid fabrics with covalently bonded CNTs," S. Mallin, C. Baker, R. Coguill, H. Craig, J. L. Skinner, D. Prieto, Spring Materials Research Society Meeting, Phoenix, AZ, April 2018.
39. "Graphene surface decorated with hybrid perovskite nanoparticles for radiation detection and photovoltaic applications," J. P. Murphy, J. M. Andriolo, M. C. Brockway, and J. L. Skinner, American Physical Society March Meeting, Los Angeles, CA, March 2018.
40. "Iron-doped apatite nanoparticle adjuvants for enhanced phage therapy delivered through electrospun fibers," J. M. Andriolo, J. P. Murphy, M. K. Hailer, M. L. Pedulla, and J. L. Skinner, EIPBN Conference, Orlando, FL, May 2017.
41. "Coaxial hybrid perovskite fibers: Synthesis and encapsulation in situ via electrospinning," J. P. Murphy, J. M. Andriolo, and J. L. Skinner, EIPBN Conference, Orlando, FL, May 2017.
42. "Nanomechanics and testing of core-shell composite ligaments for high strength, light weight foams," A. Yermembetova, R. M. Rahimi, C.-E. Kim, J. L. Skinner, J. M. Andriolo, J. P. Murphy, and D. F. Bahr, Spring Materials Research Society Meeting, Phoenix, AZ, April 2017.
43. "Loading dependent electrical properties of novel hybrid perovskite/polymer composite," J. P. Murphy, J. M. Andriolo, and J. L. Skinner, Spring Materials Research Society Meeting, Phoenix, AZ, April 2017.
44. "Iron-doped apatite nanoparticles delivered via electrospun fiber mesh for maximized bacterial killing by bacteriophage," J. M. Andriolo, J. P. Murphy, M. K. Hailer, M. L. Pedulla, and J. L. Skinner, Spring Materials Research Society Meeting, Phoenix, AZ, April 2017.
45. "Nanofabrication for plasmonic, electronic, photovoltaic, and drug delivery," J.L. Skinner, School of Mechanical and Materials Engineering Seminar Series, Washington State University (Invited), Pullman, WA, September 2016.

46. "Characterization of iron-doped apatite nanoparticle enhancement of phage infections using phage display and bioinformatic analysis," J.M. Andriolo, M.L. Pedulla, M.K. Hailer, J.P. Murphy, and J.L. Skinner, American Society for Microbiology - Microbe, Boston, MA, June 2016.
47. "Lithography via aligned electrospun fibers," J.D. Beisel, J.P. Murphy, E.A. Kooistra-Manning, S. Nicolaysen, O. Boese, J. Fleming, W. Nakagawa, and J.L. Skinner, EIPBN Conference, Pittsburgh, PA, May 2016.
48. "Melt electrospinning: Method for producing photo-converting nanocomposite materials," J.P. Murphy, J.M. Andriolo, and J.L. Skinner, EIPBN Conference, Pittsburgh, PA, May 2016.
49. "Lead halide perovskite/polymer composite material for improved moisture stability: Synthesis and characterization," J. P. Murphy, J. M. Andriolo, B. M. Ross, G. F. Wyss, N. E. Zander, and J. L. Skinner, Materials Research Society Spring Meeting and Exhibit, Phoenix, AZ, March 2016.
50. "Iron-doped apatite nanoparticles increase bacteriophage infectivity and macrophage bioactivity," K. L. Trout, J. M. Andriolo, A. Holian, M. L. Pedulla, M. K. Hailer, and J. L. Skinner, Society of Toxicology 55th Annual Meeting, New Orleans, LA, March, 2016.
51. "Using electric field manipulation to fabricate nanoscale fibers on large areas: A path to electronic and photonic devices," J. L. Skinner, SPIE OP110 Low-Dimensional Materials and Devices Conference (Invited), San Diego, CA, August 2015.
52. "Iron-doped nanoparticle enhancement of viral infection examined in prokaryotic and eukaryotic systems," J. M. Andriolo, C. McConnell, B. I. Connors, J. L. Skinner, M. Pedulla, K. Hailer, American Society for Microbiology Annual Meeting, New Orleans, LA, May 2015.
53. "Effect of iron-doped apatite nanoparticles on a eukaryotic host-virus system," J. M. Andriolo, C. A. McConnell, J. L. Skinner, M. L. Pedulla, K. Hailer, EIPBN Conference, San Diego, CA, May 2015.
54. "Nanofabrication for modified plasmonic and electronic properties: The convergence of need, expertise, and facilities," J. L. Skinner, Special Seminar - Advanced Materials and Structures (Invited), Department of Aeronautics and Astronautics, Stanford University, Stanford, CA, October 2014.
55. "Materials and devices from nanofabrication methods: Bringing nanotech to Montana Tech," J. L. Skinner, Materials Science Under the Big Sky, Montana University System Materials Science Ph.D. Program Annual Meeting (Invited), Fairmont Hot Springs, MT September 2014
56. "Synthesis and characterization of apatite nanoparticles for bioengineering applications," J. M. Andriolo, H. E. Reid, R. M Hensleigh, A. Nickel, M. Pedulla, K. Hailer, R. Kasinath, and J. L. Skinner, EIPBN Conference, Washington, DC, May 2014.
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