

JOHN RYTER

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EDUCATION	<div><div>Massachusetts Institute of Technology</div><div>Cambridge, MA</div><div><i>PhD. Department of Materials Science and Engineering</i>, anticipated May 2023. Thesis: Process and Supply Chain Efficiency for Sustainable Materials. GPA: 4.5 / 5.0</div></div> <div><div>Montana State University</div><div>Bozeman, MT</div><div><i>Bachelor of Science, Mechanical Engineering, Summa Cum Laude</i>, December 2017. Minors in mechatronics and German. Senior capstone project: Automated quality control filament winding apparatus for novel 3D printer materials. GPA: 3.98 / 4.0</div></div>
AWARDS	NSF Graduate Research Fellowship Program Honorable Mention (2018), Barry Goldwater Scholarship (2016), Montana State University Alumni Foundation Award for Excellence (2017), Montana Space Grant Consortium Undergraduate Student Achievement Award (2016), Los Alamos National Laboratory Student Symposium Award of Recognition (2016), DAAD University Summer Course Grant (2015), National Merit Scholarship (2013), U.S. Presidential Scholar Semi-Finalist (2013)
SCHOLARSHIPS	Montana State University Provost Scholarship (2013-2017), Governor’s Best and Brightest Scholarship (2013-2017), Mark A. Robinson Memorial Scholarship (2017), W. Paul Schmechel Engineering Scholarship (2015), John P. Herak Memorial Engineering Scholarship (2014), College of Engineering Parent/Family Association Engineering Scholarship (2014), Dean's Leadership Scholarship (2013), Montana State University Premier Scholarship (2013), First Security Bank Scholarship (2013)
GRANTS	Montana Space Grant Consortium Apprenticeship Research Grant (2015-2017), Undergraduate Scholars Program Research Grant (2014-2015)
RESEARCH EXPERIENCE	<div><div>Massachusetts Institute of Technology</div><div>Cambridge, MA</div><div>Department of Materials Science & Engineering September 2018 - present Advisor: Elsa Olivetti Currently developing supply chain models to evaluate recycling and other material efficiency strategy impacts on emissions and other environmental impacts. Coordinating a team of three graduate and undergraduate students to model the effects of corporate recycling policy. Methods include econometric time series analysis, material flow analysis, technoeconomic analysis, linear programming optimization modeling, process flow modeling, and life cycle analysis. Analyses and data visualization in R and Python.</div></div> <div><div>Montana State University</div><div>Bozeman, MT</div><div>Department of Mechanical & Industrial Engineering May 2014 - December 2017 Advisor: Roberta Amendola Utilized plasma vapor deposition techniques to develop and characterize novel thin films. Tested and analyzed high temperature corrosion for solid oxide fuel cell components, including the development and characterization of protective thin films. Mentored and collaborated with high school, undergraduate, and graduate students. Methods included field emission scanning electron microscopy, scanning Auger electron nanoprobe, plasma-enhanced chemical vapor deposition, energy-dispersive x-ray spectroscopy, magnetron sputtering, thermogravimetric analysis, polishing, etching, and optical microscopy.</div></div>

National Renewable Energy Laboratory

Golden, CO

Thin-Film Materials Science and Processing Division

May 2017 - July 2017

Advisor: Maikel van Hest

Developed scalable deposition parameters for SnO₂ electron transport layer in perovskite solar cells. Improved device uniformity and efficiency using scalable deposition methods. Collected and analyzed solar simulator and UV-visible spectroscopy data. Additional methods included UV-ozone cleaning, chemical vapor deposition, spin coating, and blade coating.

Los Alamos National Laboratory

Los Alamos, NM

Materials Synthesis and Integrated Devices Division

May 2016 - August 2016

Advisor: Eric Brosha

Developed hydrogen sensor exposure tests using LabVIEW Front Panel to determine sensor reliability, saturation behavior, and sensitivity for sensor deployment at commercial hydrogen vehicle fueling stations. Performed impedance spectroscopy on sensor electrodes using Gamry potentiometers to determine consistency and drift between sensors. Designed, prototyped, assembled, and tested sensor packaging elements using Inventor computer aided design software. Additional methods included Fourier transform infrared spectroscopy, circuit design, PTC Creo, and manipulation of LabView programs.

Weapons Test Engineering Division

May 2015 - August 2015

Advisor: Colin Haynes

Developed part drawings and simulations using PTC Creo Simulate, PTC Creo Parametric, and PTC Mathcad software to produce and analyze designs. Designed, analyzed, assembled, and tested novel locking mechanism prototype. Researched and designed optimized pressure vessel, producing a detailed report and cost analysis. Designed and 3-D printed model B61 weaponry. Methods included part design in PTC Creo, strength-weight-cost optimization, tensile testing, and strength calculations in PTC Mathcad. Received training in gas cylinder safety, electrical safety, advanced pressure safety, organic solvent safety, and other laboratory courses, including ladder and fire extinguisher safety and use. (May 2015 to August 2015)

TEACHING EXPERIENCE

Massachusetts Institute of Technology

Cambridge, MA

Department of Materials Science & Engineering

Introduction to Solid State Chemistry. Teaching Assistant.

Explored how to engage students, lead discussions, & provide feedback in an evidence-based teaching workshop, organized and graded with teams of undergraduate and graduate students, and developed and led virtual recitations and office hours.

Montana State University

Bozeman, MT

Department of Mechanical & Industrial Engineering

CAE II: Mechanical Engineering Computations. Teaching Assistant.

Supervised and assisted students individually with homework, programming syntax, and difficult concepts. Graded homework and exams.

CONFERENCES & PRESENTATIONS

Ryter J, Dou B, van Hest MFAM. Electron transport layer optimization for scalable perovskite solar cell production. National Renewable Energy Laboratory Science Undergraduate Laboratory Internship Research Celebration in Golden, CO. July 20, 2017.

Ryter J, Amendola R, McCleary M, Gannon P, Wei-Ja Shong WJ, Piccardo P, Spotorno R. 500 Hour Investigation of Electroless Ni-Plated AISI 441 Steel for Solid Oxide Fuel Cell Interconnect Applications Under Operating Conditions (poster). Electrochemical Society Pacific Rim Meeting on Electrochemical and Solid State Science in Honolulu, HI. October 2016.

Ryter J, Romero C, Ramaiyan K, Broscha E. Advanced Sensor Arrays and Packaging (poster). Los Alamos National Laboratory Science Undergraduate Laboratory Internship Research Celebration in Los Alamos, NM. August 4, 2016.

Ryter J, McCleary M, Dansereau S, Smialek J, Amendola R. Novel Nanostructured Ceramic Coatings for Extreme Aerospace Applications. Montana Space Grant Consortium Research Celebration in Bozeman, MT. April 16, 2016.

Ryter J, Zimny C, Amendola R. Investigating the Influence of Secondary Phases on the Dual Atmosphere Corrosion of Ferritic Stainless Steel 441. National Conference on Undergraduate Research in Cheney, WA. April 16, 2015.

Ryter J, Zimny C, Amendola R. Investigating the Influence of Secondary Phases on the Dual Atmosphere Corrosion of Ferritic Stainless Steel 441 (poster). Undergraduate Scholars Program Research Celebration in Bozeman, MT. April 10, 2015.

PUBLICATIONS

Ryter J, Fu X, Bhuwalka K, Roth R, Olivetti E. Environmental impacts of the China solid waste import ban and supply chain disruptions in the copper material system. Under review in *Nature Communications*.

Ryter J, Fu X, Bhuwalka K, Roth R, Olivetti E. Recycling, displacement, and environmental impacts using a copper econometric material system model. Under preparation for submission to the *Journal of Industrial Ecology*.

Dou B, Whitaker JB, Bruening K, Moore DT, Wheeler LM, **Ryter J**, Breslin NJ, Berry JJ, Garner SM, Barnes FS, Shaheen SE, Tassone C, Zhu K, van Hest MFAM. Roll-to-roll printing of perovskite solar cells. *ACS Energy Letters*. 2018 Sep 26;3(10):2558-65.

Ryter J, Amendola R, McCleary M, Shong WJ, Liu CK, Spotorno R, Piccardo P. Effect of electrical current on the oxidation behavior of electroless nickel-plated ferritic stainless steel in solid oxide fuel cell operating conditions. *International Journal of Hydrogen Energy*. 2018 Jan 4;43(1):426-34.

Aw LM, Amendola R, **Ryter JW**, McCleary MW, Gannon PE, Leonard ME, Smialek JL. Investigation of Na2SO4 deposit induced corrosion of Cr, Al, C binary and ternary thin film coatings on Ni-201. *Journal of The Electrochemical Society*. 2017 Mar 15;164(6):C218.

LEADERSHIP
ACTIVITIES

Graduate Materials Council Academic Chair, Massachusetts Institute of Technology, 2020-present. Member, Department of Materials Science and Engineering DEI Working Group, 2020-present. Graduate Materials Council Public Service Chair, Massachusetts Institute of Technology, 2019-2020.

MENTORSHIP
ACTIVITIES

Mentor Advocate Partnership Mentor, Office of Minority Education, 2019-present. Volunteer, Dept. of Materials Science & Engineering Application Assistance Program, 2020. NetPal, Cambridge School Volunteers, 2019-2020. Student Peer Tutor, Montana State University Center for Student Success, 2017. Engineering Peer Academic Leader – Peer Mentor, Montana State University, 2015-2017.

REFERENCES

Professor Elsa Olivetti
Department of Materials Science & Engineering, Massachusetts Institute of Technology
77 Massachusetts Ave, 8-403, Cambridge, MA 02139

Professor Roberta Amendola
Department of Mechanical & Industrial Engineering, Montana State University
220 Roberts Hall, P.O. Box 173800, Bozeman, MT 59717-3800

Dr. Maikel van Hest
National Renewable Energy Laboratory
15013 Denver West Parkway, Golden, CO 80401