

# Troy R. Munro

Associate Professor

Brigham Young University, Department of Mechanical Engineering

350E EB, Provo, UT 84602

E-mail: [troy.munro@byu.edu](mailto:troy.munro@byu.edu)

Phone: 801-422-6541

Lab website: [temp.byu.edu](http://temp.byu.edu)

## Education

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<b>Katholieke Universiteit (KU) Leuven, Leuven, Belgium</b>	<b>2016</b>
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<b>Utah State University (USU), Logan, UT, USA</b>	
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<i>Dual PhD, Mechanical Engineering and Physics</i>	
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<i>Thesis: "Thermal Property Measurement of Thin Fibers by Complementary Methods"</i>	
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Co-Advisor (KU Leuven): Prof. Christ Glorieux	
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Co-Advisor (USU): Prof. Heng Ban	
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<b>Utah State University</b>	<b>2012</b>
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<i>MS, Mechanical Engineering</i>	
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<i>Thesis: "Heater Geometry and Heat Flux Effects on Subcooled, Thin Wire, Nucleate Pool Boiling in Microgravity"</i>	
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Advisor: Prof. Heng Ban	
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<b>Utah State University</b>	<b>2012</b>
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<i>BS, Mechanical Engineering (Mathematics minor)</i>	
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<i>Capstone Project: "Collection of CO<sub>2</sub> from the Martian Atmosphere for use as a Propellant for a Radioisotope Powered Mars Research Vehicle"</i>	
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Advisor: Prof. Byard Wood	
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## Professional Experience

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<b>Brigham Young University, Provo, UT</b>	2016-present
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<i>Associate Professor, Mechanical Engineering</i>	2022-present
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<i>Assistant Professor, Mechanical Engineering</i>	2016-2022
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<b>Idaho National Laboratory, Idaho Falls, ID</b>	Summers 2017-2022
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<i>Academic Visitor</i>	
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<b>Utah State University, Logan, UT</b>	2012-2016
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<i>Graduate Researcher, Multiscale Thermophysics Laboratory</i>	
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<b>Katholieke Universiteit (KU) Leuven, Leuven, Belgium</b>	2013-2016
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<i>Doctoral Researcher, Laboratory for Soft Matter and Biophysics</i>	
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<b>Utah State University, Logan, UT</b>	2011-2013
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<i>GAS Undergraduate Research Team Director, Physics</i>	
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## Research Interests

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- Instrumentation for thermal measurements
  - Heat transfer in nuclear reactors
  - Developing methods for microscale sensing of materials
  - Thermal characterization of molten salts
  - Thermal control in biological systems
  - Heat transfer in manufacturing systems

## Honors and Awards

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### Awards

- C.F. Lucks Award, 33rd International Thermal Conductivity Conference (ITCC), 2017.
- College Graduate Researcher of the Year, USU, 2016.
- Department Graduate Researcher of the Year, USU, 2016.
- Outstanding Engineering Graduate Scholar, USU College of Engineering, 2015.
- Graduate Enhancement Award, USU, 2015.
- Utah State University Presidential Doctoral Research Fellowship, USU, 2012-2016.
  - Member of inaugural nine students
- AIAA Region VI Student Conference, 2nd place March 2011 and 3rd place March 2012.
- Best in Engineering Paper, Utah Academy of Sciences, Arts, and Letters, 2012.
- Rocky Mountain NASA Space Grant Consortium Fellowship, 2011-2012.
- Get Away Special Undergraduate Research Team Summer Fellowship, 2008.
- Nuclear Regulatory Commission Scholarship, 2009-2011.
- Utah State University Presidential Scholarship, 2007-2011.

## Teaching Experience

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### BYU

- ME Capstone Coach, ME EN 475/476 (Senior Required Course)
  - Fall 2017/Winter 2018: 6 students
  - Fall 2021/Winter 2022: 5 students
- Materials Science, ME EN 250 (Sophomore Required Course)
  - Winter 2017: 82 students
  - Fall 2017: 55 students
  - Spring 2018: 32 students
  - Fall 2018: 40 students
  - Winter 2019: 47 students
  - Spring 2019: 16 students
  - Fall 2019 (two sections): 84 students
  - Fall 2021: 74 students
  - Winter 2022: 52 students
  - Fall 2022: 74 students
- Engineering Measurements, ME EN 362 (Junior Required Course)
  - Fall 2016: 29 students
  - Winter 2018: 58 students
  - Winter 2019: 46 students
  - Winter 2020: 51 students
  - Winter 2021 (two sections): 96 students
- Materials in Extreme Environments (Graduate Course)
  - Fall 2020: 16 students

### USU

- Thermal Fluid Design, MAE 5410 (Senior Elective Course)
  - Spring 2015: 15 students
- Recitation Instructor for Heat and Mass Transfer, MAE 3440, Spring 2013

## Past, Current, and Pending Support

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### External Support

**Awarded – Total at BYU - \$2,243,698, (PI - \$2,005,070; Co-PI - \$238,628)**

1. PI for “3D printed, multi-material microfluidic calorimetry: Critical tools to study protein stability,” NIH NIGMS (R15) renewal, **\$405k**, for 3 years, 10/2022-9/2025, (T. Munro, G. Nordin, A. Woolley)
2. PI for “Center for Advanced Energy Studies (CAES) Collaboration Fund Proposal Program Development Activities,” INL, **\$32k** for 5 months, 4/2022-12/2022, (T. Munro).
3. PI for “Implementation of Diamond/Tungsten-based Transient Hot Wire Sensor,” INL, **\$72k** for 1 year, 10/2021-9/2022, (T. Munro).
4. PI for “EAGER: Parallelized Measurements of Kapitza Resistance,” NSF CBET, **\$150k** for 1 year, 8/2021-7/2022, (T. Munro).
5. PI for “Local thermal properties of fast reactor MOX fuels,” Nuclear Science User Facility – Rapid Turn-around Experiment, access to user-facility for 9 months (valued at no more than **\$50k**), 7/2021-4/2022, (T. Munro, T. Pavlov).
6. PI for “Development of a Diamond Substrate-based Hot-Wire Sensor for Irradiated Molten Salt Thermal Conductivity Measurements,” INL, **\$60k** for 1 year, 7/2020-7/2021, (T. Munro).
7. PI for “Improvement of Modeling Predictions in Friction Stir Welding by More Accurate Measurement of Heat Transfer Between Tooling and Workpiece,” NSF CMMI, **\$348k** for 3 years, 1/2020-12/2022, (T. Munro, M. Miles), with 3 REU supplements (**\$48k**)
8. Co-PI for “Validated, Multi-Scale Molecular Dynamics Simulations to Predict the Thermophysical Properties of Molten Salts Containing Fuel, Fission, and Corrosion Products,” DOE Nuclear Energy University Program (NEUP), **\$800k total** (as Co-PI **\$239k**) for 3 years, 10/2019-9/2022, (S. Nickerson, M. Memmott, T. Munro).
9. PI for “Faculty Development Program to Integrate New Faculty in Nuclear Engineering Research at Brigham Young University,” Nuclear Regulatory Commission Faculty Development Grant, **\$450k** for 3 years, 7/2019-6/2022, (D. Maynes, T. Munro).
10. PI for “3D temperature control to study biological processes,” NIH NIGMS (R15), **\$439k** for 3 years, 4/2019-3/2022, (T. Munro, G. Nordin, A. Woolley).
11. PI for “Improved Temperature Control for Accurate DNA Analysis with 3D Printed Microfluidic Devices” Utah NASA Space Grant Consortium, **\$8k** for 1 year, 3/2018-4/2019, (T. Munro, G. Nordin).
12. Co-PI for “GASPACS: Get Away Special Passive Attitude Control Satellite, A 1U CubeSat with an Inflatable Structure for Two Axis Aero-controlled Stabilization,” NASA CubeSat Launch Initiative Selection Decision (CSLI), **Flight aboard rocket, ~\$40,000**, Awarded Feb 2014 (PI: Jan Sojka, At USU).
13. Co-PI for “Follow-Up Nucleate Boiling on Flight Experiment (FUNBOE) 2.5,” NASA RGSFOP, **Flight aboard airplane, ~\$31,000**, Mar 2012-Jul 2013. (PI: Ryan Martineau, At USU).
14. PI for “Follow-Up Nucleate Boiling on Flight Experiment (FUNBOE) 2.0,” NASA RGSFOP, **Flight aboard airplane, ~\$28,000**, Dec 2010-June 2011. (At USU).
15. PI for “Follow-Up Nucleate Boiling on Flight Experiment (FUNBOE),” NASA Reduced Gravity Student Flight Opportunity Program (RGSFOP), **Flight aboard airplane, ~\$28,000**, Dec 2009-June 2010. (At USU).

## Internal Support

### Awarded

1. PI for “Development of a New Class of Neutron Detectors,” Ira A. Fulton College of Engineering SEED funding award, **\$12.5k** for 1 year, 11/2020-10/2021, (T. Munro).
2. PI for “A Novel Fiber Optic Probe to Improve Friction Stir Welding Process Modeling by Characterizing Thermal Interface Resistances,” Mentored Research Grant, **\$25k** for 2 years, 7/2018-6/2020, (T. Munro, M. Miles).
3. PI for “Making the Abstract Concrete: Mentoring Students by Hacking a Blu-ray Player into a Fluorescent Microscope,” Graduate Mentoring Award, **\$13k** for 1.5 years, 4/2018-8/2019, (T. Munro).
4. PI for “Blu-ray Based Scanning Thermal Microscope to Measure Spatial Distribution of Thermal Properties,” Undergraduate Mentoring Grant, **\$3.9k** for 1 year, May 2017, (T. Munro).
5. PI for “Idaho National Lab Research Initiation” College Research Initiation Travel Support, **\$1.4k** for summer 2017, (T. Munro).
6. PI for “Making the Abstract Concrete: Mentoring Students by Hacking a Blu-ray Player into a Fluorescent Microscope,” Office of Graduate Studies Graduate Mentoring Award, **\$13k** for 1 year, Feb 2017, (T. Munro).
7. Co-PI for “Get Away Special (GAS) Undergraduate Research Team,” Utah State University Research and Graduate Studies Office, **\$60k**, 02/01/13-01/31/18. (PI: J. Sojka).

## Publications

All BYU students are designated with ‡ (BYU undergraduate) and † (BYU graduate)

	Impact Factor (2021)	SJR Quartile (2021)	H-index (2021)	# of Articles
Polymer	4.432	Q1	268	1
Lab-on-a-chip	7.517	Q1	221	1
Journal of Applied Polymer Science	3.125	Q2	175	1
Journal of Manufacturing and Materials Processing	3.61	Q1	21	1
Microgravity Science and Technology	1.982	Q2	34	1
International Journal of Heat and Fluid Flow	2.789	Q1	116	1
International Journal of Thermophysics	2.416*	Q3	70	6
International Journal of Heat and Mass Transfer	5.584	Q1	224	2
Applied Thermal Engineering	6.465	Q1	173	3
Measurement Science & Technology	2.046	Q2	145	2
Review of Scientific Instruments	1.523	Q2	167	1
Journal of Applied Physics	2.546	Q2	331	2
Materials and Design	9.417	Q1	187	1

Macromolecular Materials and Engineering	4.402	Q1	104	1
Fibers and Polymers	2.360	Q2	58	1
Annals of Nuclear Energy	1.776	Q1	72	1
ACS Applied Nano Materials	5.097	Q1	44	1
Journal of Physical and Chemical Reference Data	5.048	Q2	94	1
Journal of the Utah Academy of Sciences Arts and Letters	N/A	N/A	N/A	2

\*Has doubled each year for the past 2 years

### Journals - Published

1. Thorum, A.<sup>†</sup>, Allred, D., Pitt, W., and **Munro, T.**, “Tuning the index of refraction of a polyvinyl toluene and polystyrene copolymer towards a heterogeneous, index-matched neutron detector,” *Journal of Applied Polymer Science*, **140(2)**, e53305, 2022. [Link](#).
2. Sanchez, D.<sup>†</sup>, Hawkins, G., <sup>‡</sup> Hinnen, H. <sup>‡</sup>, Day, A. <sup>‡</sup>, Woolley, A., Nordin, G., and **Munro, T.**, “3D Printing-Enabled Uniform Temperature Distributions in Microfluidic Devices,” *Lab-on-a-Chip*, **22**, pp. 4393-4408, 2022. [Link](#).
3. Kulberg, J.<sup>†</sup>, Colton, J.<sup>‡</sup>, Gregory, C.<sup>‡</sup>, Bay, A. <sup>‡</sup>, and **Munro, T.**, “Demonstration of Neural Networks to Reconstruct Temperatures from Simulated Fluorescent Data towards use in Bio-Microfluidics,” *International Journal of Thermophysics*, **43**:172, 2022. [Link](#)
4. Merritt, B.<sup>†</sup>, Seneca, M.<sup>‡</sup>, Wright, B.<sup>‡</sup>, Cahill, N.<sup>‡</sup>, Petersen, N.<sup>‡</sup>, Fleming, A., and **Munro, T.** “Thermal Conductivity Characterization of Fluoride and Chloride Molten Salts Using a Modified Transient Hot-wire Needle Probe,” *International Journal of Thermophysics*, **43**:149, 2022. [Link](#)
5. Merritt, B.<sup>†</sup>, Seneca, M.<sup>‡</sup>, Larson, S.<sup>‡</sup>, and **Munro, T.** “Measurements of the Thermal Conductivity of Reference Liquids Using a Modified Transient Hot-wire Needle Probe,” *International Journal of Heat and Mass Transfer*, **189**, pp. 122674, 2022. [Link](#).
6. Wright, A.<sup>†</sup>, **Munro, T.R.**, and Hovanski, Y., “Evaluating Temperature Control in Friction Stir Welding for Industrial Applications,” *Journal of Manufacturing and Materials Processing*, **5**(4), p, 124, 2021. [Link](#).
7. Hartvigsen, P.<sup>†</sup>, Merritt, B.<sup>‡</sup>, Fleming, A., Ban, H., and **Munro, T.**, “Assessment of Uncertainties in Using Raman Thermometry Techniques to Determine the Local Thermal Conductivity of Uranium Dioxide (UO<sub>2</sub>),” *International Journal of Thermophysics*, **84**(129), 2021. [Link](#).
8. Ellis, D.<sup>‡</sup>, Goodson, M.<sup>†</sup>, Miles, M., and **Munro, T.**, “Optimized Design for A Device to Measure Thermal Contact Conductance During Friction Stir Welding,” *International Journal of Thermophysics*, **42**(6), 2021. [Link](#)
9. **Munro, T.**, “Reviewing Thermophysical Properties of Silk Fibers: A Case Study for the Need for Complementary Measurement Techniques,” *International Journal of Thermophysics*, **41**(133), pp 1-18, 2020. [Link](#).
10. Magnusson, J.<sup>‡</sup>, Memmott, M., and **Munro, T.**, “Review of Thermophysical Property Methods Applied to Fueled and Un-Fueled Molten Salts”, *Annals of Nuclear Energy*, **146**, pp. 107608, 2020. [Link](#).

11. Lewis, C.<sup>‡</sup>, Erikson, J.W.<sup>‡</sup>, Sanchez, D.A.<sup>†</sup>, McClure, C.E.<sup>‡</sup>, Nordin, G.P, **Munro, T.R.**, Colton, J.S., “Use of Machine Learning with Temporal Photoluminescence Signals from CdTe Quantum Dots for Temperature Measurement in Microfluidic Devices,” *ACS Applied Nano Materials*, **3**(5), pp. 4045-4053, 2020. [Link](#).
12. Tasidou, K.A., Magnusson, J.<sup>‡</sup>, **Munro, T.**, and Assael, M.J., “Reference Correlations for the Viscosity of molten LiF-NaF-KF, LiF-BeF<sub>2</sub>, and Li<sub>2</sub>CO<sub>3</sub>-Na<sub>2</sub>CO<sub>3</sub>-K<sub>2</sub>CO<sub>3</sub>”, *J. Phys. Chem. Ref. Data*, **48**, pp. 043102, 2019. [Link](#).
13. Hayden, S.<sup>†</sup>, and **Munro, T.**, “Fluorescent Scanning Thermal Microscope based on a Blu-Ray Optical Head to Measure Thermal Diffusivity,” *Review of Scientific Instruments*, **90**, pp. 024903, 2019. [Link](#).
14. Gardner, L., **Munro, T.**, Villarreal, E., Harris, K., Fronk, T., and Ban, H., "Thermal Characterization of Alkali Treated Kenaf Fibers and Kenaf-Epoxy Composites," *Fibers and Polymers*, **19**, pp. 393-402, 2018. [Link](#).
15. Guillou, J., Lavadiya, D.N., **Munro, T.**, Fronk, T., and Ban, H. “From lignocellulose to biocomposite: Multi-level modelling and experimental investigation of the thermal properties of kenaf fiber reinforced composites based on constituent materials,” *Applied Thermal Engineering*, **128**, pp. 1372-1381, 2018. [Link](#).
16. **Munro, T.**, Liu, L., Ban, H., and Glorieux, C., “Thermophysical Properties of Thin Fibers via Photothermal Quantum Dot Fluorescence Spectral Shape-based Thermometry,” *International Journal of Heat and Mass Transfer*, **112**, pp. 1090-1097, 2017. [Link](#).
17. **Munro, T.**, Putzeys, T., Copeland, C., Xing, C., Lewis, R., Ban, H., Glorieux, C., and Wubbenhorst, M., “Investigation of synthetic spider silk crystallinity and alignment via electrothermal, pyroelectric, literature XRD, and tensile techniques,” *Macromolecular Materials and Engineering*, 302(4), pp. 1600480, 2017. [Link](#).
18. Xing, C., **Munro, T.**, Jensen, C., Ban, H., Copeland, C., and Lewis, R., “Thermal Characterization of Natural and Synthetic Spider Silks by Both the 3 $\omega$  and Transient Electrothermal Methods,” *Materials & Design*, **119**, 2017. [Link](#).
19. **Munro, T.**, Liu, L., Glorieux, C., and Ban, H., “CdSe/ZnS Quantum Dot Fluorescence Spectra Shape-based Thermometry via Neural Network Reconstruction,” *Journal of Applied Physics*, **119**(21), pp. 214903, 2016. [Link](#).
20. Liu, L., Zhong, K., **Munro, T.**, Alvarado, S., Côte, R., Creten, S., Fron, E., Ban, H., Van der Auweraer, M., Roozen, B., Matsuda, O., and Glorieux, C., “Wideband Fluorescence-based Thermometry by Neural Network Recognition: Photothermal Application in Frequency and Time Domain – from 10 Nanoseconds to DC,” *Journal of Applied Physics*, **118**(18), pp. 184906, 2015. [Link](#).
21. **Munro, T.R.**, Ban, H., “Flow and Heat Flux Behavior of Micro-bubble Jet Flows Observed in Thin, Twisted-Wire, Subcooled, Boiling in Microgravity,” *Microgravity Science and Technology*, **27**, pp. 49-60, 2015. [Link](#).
22. **Munro, T.R.**, Koeln, J.P., Fassmann, A.W., Barnett, R.J., and Ban, H., “Phase Change Heat Transfer and Bubble Behavior Observed on Twisted Wire Heater Geometries in Microgravity,” *International Journal of Heat and Fluid Flow*, **47**, pp. 21-30, 2014. [Link](#).
23. Xing, C., **Munro, T.**, Jensen, C., White, B., Ban, H., “Thermal Characterization of Fine Fibers Using an Improved Direct Electrical Heating Method,” *International Journal of Thermophysics*, **35**(8), pp. 1512-1525, 2014. [Link](#).



24. Xing, C., Jensen, C., **Munro, T.**, White, B., Ban, H., Chirtoc, M., “Accurate Thermal Property Measurement of Fine Fibers by the 3-omega Technique,” *Applied Thermal Engineering*, **73**(1), pp. 315-322, 2014. [Link](#).
25. Xing, C., Jensen, C., **Munro, T.**, White, B., Ban, H., Chirtoc, M., “Thermal Property Characterization by the 3-omega Technique,” *Applied Thermal Engineering*, **71**(1), pp. 589-595, 2014. [Link](#).
26. Xing, C., White, B., **Munro, T.**, Ban, H., Copeland, C., and Lewis, R., “Thermophysical Properties of the Dragline Silk of *Nephila clavipes* Spider,” *Polymer*, **55**(16), pp. 4226-4231, 2014. [Link](#).
27. Xing, C., **Munro, T.**, Jensen, C., White, B., Ban, H., Copeland, C., and Lewis, R., “Thermophysical Property Measurement of Electrically Nonconductive Fibers by the Electrothermal Technique,” *Measurement Science and Technology*, **25**(11), pp. 115604, 2014. [Link](#).
28. Xing, C., **Munro, T.**, Jensen, C., and Ban, H., “Analysis of the Electrothermal Technique for Thermal Property Characterization of Thin Fibers,” *Measurement Science and Technology*, **24**(10), pp. 105603, 2013. [Link](#).
29. **Munro, T.R.**, Ban, H., “Jet Flow Behavior Observed during Microgravity Boiling,” *The Journal of the Utah Academy of Sciences, Arts, and Letters*, **88**, 2013. [Link](#).
30. **Munro, T.**, Fassmann, A., and Ban, H., “Surface Geometry and Heat Flux Effect on Thin Wire Nucleate Pool Boiling of Subcooled Water in Microgravity,” *The Journal of the Utah Academy of Sciences, Arts, and Letters*, **87**, 2012. [Link](#).

#### **Journals – Accepted**

1. N/A.

#### **Journals – Under Review**

1. Goodman, M., Melander, R., Miles, M., and Munro, T., “Workpiece/tool heat transfer coefficient sensitivity and effect on simulated temperatures in a friction stir welding plunge,” *Science and Technology of Welding and Joining*, submitted December 14, 2022.

#### **Journals – In Preparation**

1. Sanchez, D.<sup>†</sup>, Wilkerson, M.<sup>‡</sup>, Seneca, M.<sup>‡</sup>, Nordin, G., and **Munro, T.**, “Temperature Control of 3D-printed Microfluidic Devices using a Multi-Material Approach,” *Biomicrofluidics*.

#### **Peer Reviewed Conference Proceedings**

1. Ruth, R.<sup>†</sup>, Merritt, B.<sup>†</sup>, and **Munro, T.**, “Further Development and Use of the Needle Probe,” *Transactions of the American Nuclear Society, ANS Winter Meeting, Phoenix, AZ, Nov 13-17, 2022*.
2. Kasper, P.<sup>†</sup>, Dromey, J.<sup>‡</sup>, Bolander, A.<sup>‡</sup>, Petersen, C. <sup>‡</sup>, Carson, T. <sup>‡</sup>, and **Munro, T.**, “Molten Salt Thermal Conductivity Hot Wire Sensor,” *Transactions of the American Nuclear Society, ANS Winter Meeting, Washington DC, Nov 30 – Dec 3, 2021*.
3. Merritt, B. <sup>†</sup>, Seneca, M. <sup>‡</sup>, and **Munro, T.**, “Needle Probe Measurements of the Thermal Conductivity of Reference Liquids,” *Transactions of the American Nuclear Society, ANS Winter Meeting, Washington DC, Nov 30 – Dec 3, 2021*.

4. Kasper, P.<sup>†</sup>, Last, C.<sup>‡</sup>, Thorum, A.<sup>†</sup>, Barbosa, E.<sup>‡</sup>, Bettinger, J.<sup>‡</sup>, Davis, J.<sup>‡</sup>, Steele, K.<sup>‡</sup>, and **Munro, T.**, “Molten Salt Thermal Conductivity Sensor,” Transactions of the American Nuclear Society, ANS Winter Meeting, Chicago (Virtual), November 16-19, 2020.
5. Hartvigsen, P.<sup>†</sup>, Wilkerson, M.<sup>†</sup>, Merritt, B.<sup>†</sup>, Davis, K., and **Munro, T.**, “Needle Probe for Measuring Thermal Conductivity of Molten Salts,” Transactions of the American Nuclear Society, ANS Winter Meeting, Chicago (Virtual), November 16-19, 2020.
6. Sanchez, D., Nordin, G., and **Munro, T.**, “Microfluidic Temperature Behavior in a Multi-Material 3D Printed Chip,” IMECE2019-11470, ASME IMECE, Salt Lake City, UT, November 11-14, 2019.
  - a. Awarded Best Paper, MEMS Engineering Division
7. Thorum, A., Page, L., **Munro, T.**, Allred, D., Hua, Z., and Hurley, D., “Thermal Properties of Thin Film Uranium Oxides and Thorium Oxides,” IMECE2019-11699, ASME IMECE, Salt Lake City, UT, November 11-14, 2019.
8. **Munro, T.**, “Breaking tradition: How complementary methods can extend thermal conductivity measurements into new applications,” Proceedings of the 34th International Thermal Conductivity Conference, DEStech Publications Inc., 2020.
9. Hayden, S.<sup>†</sup>, and **Munro, T.**, “Thermal Diffusivity Measurements with Fluorescent Scanning Microscope,” Transactions of the American Nuclear Society, ANS Winter Meeting, Orlando, Florida, November 11 - November 15, 2018.
10. Hayden, S.<sup>†</sup>, Haddock, R.<sup>‡</sup>, and **Munro, T.**, “Simulated Thermal Characterization of Materials via a Blu-ray Based Scanning Fluorescence Microscope,” Proceedings of the 33rd International Thermal Conductivity Conference, pp. 170-178, DEStech Publications Inc., 2018.
11. Gardner, L., **Munro, T.**, Villarreal, Z., Harris, K., Fronk, T., and Ban, H., “Laser Flash Measurements on Thermal Conductivity of Bio-Fiber (Kenaf) Reinforced Composites,” Proceedings of the 32nd International Thermal Conductivity Conference, pp. 61-68, DEStech Publications Inc., 2018.
12. Hayden, S.<sup>†</sup>, and **Munro, T.**, “Thermal Characterization of Materials Via a Blu-ray Based Scanning Fluorescence Microscope,” Transactions of the American Nuclear Society, ANS Winter Meeting, Washington D.C., October 29 - November 2, 2017.
13. **Munro, T.**, Xing, C., Harris, K., and Ban, H., “Thermal Conductivity and Diffusivity for SiC Fibers for use in ATF Cladding Composites,” Transactions of the American Nuclear Society, Vol. 115, ANS Winter Meeting, Las Vegas, Nevada, November 6-10, 2016.
14. **Munro, T.**, Xing, C., Ban, H., Copeland, C., Lewis, R., and Glorieux, C., “Thermal Property Measurement of Thin Fibers – A Direct Approach,” International Mechanical Engineering Congress and Exposition, Houston, Texas, November 15-21, 2015.
15. **Munro, T.**, Xing, C., Marquette, A., Ban, H., Copeland, C., and Lewis, R., “Description of Test Setup and Approach to Measure Thermal Properties of Natural and Synthetic Spider Silks at Cryogenic Temperatures,” International Mechanical Engineering Congress and Exposition, San Diego, California, November 15-21, 2013.
16. **Munro, T.**, Xing, C., Copeland, C., Ban, H., and Lewis, R., “Probing the Mysteries of Spider Silk’s Uncharacteristically High Thermal Diffusivity,” ASME Summer Heat Transfer Conference, Minneapolis, Minnesota, July 14-19, 2013.
17. Xing, C., **Munro, T.**, Jensen, C., And Ban, H., “Parametric Study on the Effect of Radiation Heat Loss and Nonconstant Heating in the Electrothermal Technique for Micro-



- to Nano-scale Fine Fiber Thermal Property Measurement,” MicroTech Conference, Gaylord National Harbor, Maryland, May 12-15, 2013.
18. **Munro, T.**, Xing, C., Jensen, C., Copeland, C., Ban, H., and Lewis, R., “Characterizing Thermal Diffusivity of Synthetic Spider Silk using Improved Transient Electrothermal Technique,” MicroTech Conference, Gaylord National Harbor, Maryland, May 12-15, 2013.
  19. **Munro, T.**, Ban, H., “Jet Flow Behavior Observed during Microgravity Boiling,” 18<sup>th</sup> Annual Rocky Mountain NASA Space Grant Consortium Fellowship Symposium, Utah State University, Logan, Uah, May 9, 2012.
  20. Martineau, R.J., Torres, E.M., Kullberg, J.G., and **Munro, T.R.**, “Analysis of a Thin-Wire Boiling Experiment for Application to Thermal Management Systems,” AIAA Region VI Student Conference, Seattle, Washington, March 29-31, 2012.
  21. **Munro, T.**, Fassmann, A., and Ban, H., “Surface Geometry and Heat Flux Effect on Thin Wire Nucleate Pool Boiling of Subcooled Water in Microgravity,” AIAA Region VI Student Conference, San Diego, California, March 24-26, 2011.

## Patents

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1. US202000011798A1 - Methods and Systems for Determining at Least One Thermal Property of a Sample, December 27, 2017.
2. Provisional – 63175317 – Index-Matched Neutron-Capture Detectors, Filed April 15, 2021.
3. Provisional – 63296197 - Diamond Encapsulated Sensor for High Temperature Measurements of Thermal Properties, Filed January 4, 2022.
4. US Patent Application, #US01-495273-83, Munro, T., Gomez Paz, S., and Hansen, A., “High Throughput, Thermo-Reflectance Microscopy to Measure Thermal Transport at the Microscopic Scale,” Filed April 25, 2022

## Invited Presentations

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1. **T. Munro**, “Understanding the Thermal Behavior of Materials,” High-temperature properties (HTPs) seminar series, virtual, hosted by INL, August 19, 2022.
2. **T. Munro**, “Investigation of Hot-cell Capable Thermal Conductivity Measurements for Ceramic Fuels,” TMS 2022, Anaheim, CA, February 27, 2022.
3. **T. Munro**, “Thermophysical Properties of Molten Salts for Use in Energy Systems,” North Carolina State University, Nuclear Engineering Graduate Seminar, February 3, 2022.
4. **T. Munro**, “Thermophysical Property Characterization Capabilities at BYU,” Workshop for the Molten Salt Thermal Properties Working Group, Online, July 15, 2020.
5. **T. Munro**, “Pitfalls and Plans for Molten Salt Thermal Conductivity,” INL Pyroprocessing seminar, Idaho National Laboratory, Idaho Falls, ID, July 7, 2020.
6. **T. Munro**, “The Role of Thermal Transport in Nuclear Energy,” Graduate Seminar at University of New Mexico, Albuquerque, NM, Feb 18, 2020.
7. **T. Munro**, “Nuclear Fuels: Materials in Extreme Environments,” Graduate Seminar, Dept. of Materials Science and Metallurgy, University of Utah, Salt Lake City, UT, Oct 23, 2019.
8. **T. Munro**, “Nuclear Fuels: Physics in Extreme Environments,” Physics Colloquium, Dept. of Physics, Utah State University, Logan, UT, Oct 29, 2019.

9. **T. Munro, *Plenary***, “Breaking Tradition: How complementary methods can extend thermal conductivity measurements into new applications,” 34<sup>th</sup> International Thermal Conductivity Conference (ITCC), Wilmington, DE, June 17-20, 2019.
10. **T. Munro**, “Nuclear Fuels: Physics in Extreme Environments,” Physics Colloquium, Provo, UT, Dec 3, 2018.
11. **T. Munro**, “Thermal Characterization of Materials for Nuclear Applications,” BYU-Idaho Physics Research Group, Rexburg, ID, July 2018.
12. **T. Munro**, “Characterizing the Thermal Behavior of Materials with Advanced Instrumentation,” CARAT Working Meeting, Pittsburg, PA, Oct 2017.
13. **T. Munro**, “Characterizing the Thermal Behavior of Materials with Advanced Instrumentation,” CAES MSI Working Meeting, Boise, ID, Aug 2017.
14. **T. Munro**, “Blu-Ray and Raman Instruments for Thermal Characterization of Materials,” Idaho National Lab, Materials and Fuels Complex, June 2017.
15. **T. Munro**, “Thermal Properties of Natural and Synthetic Spider Silk,” Brigham Young University, February 2016.

## Presentations

### *At BYU*

1. Goodson, M., Melander, R., Miles, M., and **Munro, T.**, “Measurement of heat transfer coefficient between a friction stir welding tool and workpiece during plunge using a 3 $\omega$  sensor,” TMS Annual Meeting and Exhibition, San Diego, CA, March 19-23, 2023.
2. Melander, R., Goodson, M., Miles, M., and **Munro, T.**, “The Influence of Heat Transfer and Friction Coefficients on 3D Modeling Predictions of Friction Stir Welding in AA 6061-T6,” TMS Annual Meeting and Exhibition, San Diego, CA, March 19-23, 2023.
3. Merritt, B., Wright, B., Cahill, N., Petersen, N., and **Munro, T.**, “Thermal Conductivity Measurements of FLiNaK, FMgNaK, and LiCl-KCl,” TMS Annual Meeting and Exhibition, San Diego, CA, March 19-23, 2023.
4. Ruth, R., Merritt, B., and **Munro, T.**, “Further Development and Use of the Needle Probe,” Transactions of the American Nuclear Society, ANS Winter Meeting, Phoenix, AZ, Nov 13-17, 2022.
5. Sanchez, D., and **Munro, T.**, “Adapting the Transient Hot Wire Method to Find the Thermal Conductivity of Stereolithographic 3D Printed PEGDA,” 34<sup>rd</sup> International Thermal Conductivity Conference (ITCC), Lowell, MA, September 25-28, 2022.
6. Goodson, M., and **Munro, T.**, “Validation of 3 $\omega$  measurement with plans to use during friction stir welding process,” 34<sup>rd</sup> International Thermal Conductivity Conference (ITCC), Lowell, MA, September 25-28, 2022.
7. Merritt, B., and **Munro, T.**, “Thermal Conductivity of Molten Halide Salts Below 750 °C,” 34<sup>rd</sup> International Thermal Conductivity Conference (ITCC), Lowell, MA, September 25-28, 2022.
8. Goodson, M., Williams, K., Melander, R. Miles, M., and **Munro, T.**, “Friction Law Comparison for 2D simulations of a Friction Stir Welding Plunge,” Intermountain Engineering, Technology, and Computing Conference (i-ETC), Orem, UT, May 13-14, 2022.
9. Melander, R. Goodson, M., Williams, K., **Munro, T.**, and Miles, M., “Temperature Matching of a Friction Stir Welding Plunge: 3D Simulation,” Intermountain Engineering,

Technology, and Computing Conference (i-ETC), Orem, UT, May 13-14, 2022. *1st place Student Poster.*

10. Kasper, P.<sup>†</sup>, Dromey, J.<sup>‡</sup>, Bolander, A.<sup>‡</sup>, Petersen, C.<sup>‡</sup>, Carson, T.<sup>‡</sup>, and **Munro, T.**, “Molten Salt Thermal Conductivity Hot Wire Sensor,” ANS Winter Meeting, Washington DC, Nov 30 – Dec 3, 2021.
11. Merritt, B.<sup>†</sup>, Seneca, M.<sup>‡</sup>, and **Munro, T.**, “Needle Probe Measurements of the Thermal Conductivity of Reference Liquids,” ANS Winter Meeting, Washington DC, Nov 30 – Dec 3, 2021.
12. **T. Munro**, “Thermal Conductivity Probes for Molten Salts,” Workshop for the Molten Salt Thermal Properties Working Group, Online, November 15-17, 2021.
13. Brian Merritt, Peter Hartvigsen, McKay Wilkerson, Kurt Davis, and **Troy Munro**, “Needle Probe for Measuring Thermal Conductivity of Molten Salts,” Twenty-First Symposium on Thermophysical Properties, Boulder, CO, June 20–25, 2021.
14. Peter Kasper, Kirsten Steele, Jay Bettinger, Jace Davis, Connor Last, Erik Barbosa, and **Troy Munro**, “Molten Salt Hot Wire Sensor for Thermal Conductivity,” Twenty-First Symposium on Thermophysical Properties, Boulder, CO, June 20–25, 2021.
15. Matthew Goodson, Michael Miles, and **Troy Munro**, “Quantitative Analysis of Heat Transfer Coefficient for Friction Stir Welding Temperature Profiles,” Twenty-First Symposium on Thermophysical Properties, Boulder, CO, June 20–25, 2021.
16. Daniel Ellis, Matthew Goodson, Michael Miles, and **Troy Munro**, “Heat Transfer Interface Guided Design for an Instrument to Measure the Heat Transfer Coefficient in Friction Stir Welding,” Twenty-First Symposium on Thermophysical Properties, Boulder, CO, June 20–25, 2021.
17. Conner Mantz, Derek Sanchez, Greg Nordin, and **Troy Munro**, “Adapting the Transient Hot-Wire Method to Find the Thermal Conductivity of Stereolithographic 3D,” Twenty-First Symposium on Thermophysical Properties, Boulder, CO, June 20–25, 2021.
18. Kasper, P., Last, C., Thorum, A., Barbosa, E., Bettinger, J., Davis, J., Steele, K., and **Munro, T.**, “Molten Salt Thermal Conductivity Sensor,” Transactions of the American Nuclear Society, ANS Winter Meeting, Chicago (Virtual), November 16-19, 2020.
19. Hartvigsen, P., Wilkerson, M., Merritt, B., Davis, K., and **Munro, T.**, “Needle Probe for Measuring Thermal Conductivity of Molten Salts,” Transactions of the American Nuclear Society, ANS Winter Meeting, Chicago (Virtual), November 16-19, 2020.
20. Ellis, D., Goodson, M., Miles, M., and **Munro, T.**, ASME IMECE, “Heat Transfer Interface Guided Design for an Instrument to Measure the Heat Transfer Coefficient in Friction Stir Welding,” online, poster presentation (IMECE2020-25392), Nov 16-19, 2020.
21. Goodson, M., Miles, M., and **Munro, T.**, ASME Summer Heat Transfer Conference, “Measuring Heat Transfer Coefficient for Friction Stir Welding with Thermal Waves,” online, oral presentation (SHTC2020-9111), July 13-15, 2020.
22. John Colton, James Erikson, Charles Lewis, Emma McClure, Derek Sanchez, and **Troy Munro**, American Physical Society March Meeting, “CdTe nanoparticles as non-invasive temperature sensors via machine learning of optical properties”, Denver, CO, March 2-6, 2020.
23. Magnussen, J., and **Munro, T.**, Utah Conference on Undergraduate Research (UCUR) 2020, “Thermophysical Property Measurements of Molten Salts for Nuclear Reactors,” February 22, 2019

24. Thorum, A., Page, L., **Munro, T.**, Allred, D., Hua, Z., and Hurley, D., International Mechanical Engineering Congress and Exposition, “Thermal Properties of Thin Film Uranium Oxides and Thorium Oxides,” Salt Lake City, UT, oral presentation, paper accepted (IMECE2019-11699), November 11-14, 2019.
25. Sanchez, D., Nordin, G., and **Munro, T.**, International Mechanical Engineering Congress and Exposition, “Microfluidic Temperature Behavior in a Multi-Material 3D Printed Chip,” Salt Lake City, UT, oral presentation, paper accepted (IMECE2019-11470), November 11-14, 2019.
26. C. Emma McClure, James Erikson, Heather Hogg, Katelyn Watson, **Troy Munro**, John Colton, American Physical Society Conference for Undergraduate Women in Physics (APS CUWiP), “Optical Properties of Rhodamine B as a Temperature Sensor,” Utah State University, Logan, UT, Jan 19, 2019.
27. Hayden, S., and **Munro, T.**, ANS Winter Meeting, “Thermal Diffusivity Measurements with Fluorescent Scanning Microscope,” Orlando, Florida, oral presentation, paper accepted (Transactions of the American Nuclear Society, Vol. 119), November 11 - November 15, 2018.
28. Hartvigsen, P., and **Munro, T.**, Joint ASME AIChE and NIST 20<sup>th</sup> Symposium on Thermophysical Properties, “Comparison of Raman Thermometry Techniques for Thermophysical Properties of Uranium Dioxide,” Boulder, CO, oral presentation (student), June 24-29, 2018.
29. Hayden, S., and **Munro, T.**, ANS Winter Meeting, “Thermal Characterization of Materials Via a Blu-ray Based Scanning Fluorescence Microscope,” Washington D.C., oral presentation, paper accepted (Transactions of the American Nuclear Society, Vol. 117), October 29 - November 2, 2017.
30. **Munro, T.**, CARAT Meeting, “Characterizing the thermal behavior of materials with new PIE techniques,” Cranberry, Pennsylvania, oral presentation, October 25-27, 2017.
31. Hayden, S., and **Munro, T.**, 33<sup>rd</sup> International Thermal Conductivity Conference (ITCC), “Thermal Characterization of Materials via a Blu-ray Based Scanning Fluorescence Microscope,” Logan, UT, oral presentation, May 16-18, 2017.
32. Hartvigsen, P., and **Munro, T.**, 33<sup>rd</sup> International Thermal Conductivity Conference (ITCC), “Mapping of the Thermal Properties and Molecular Bonding of Ceramic Materials via Complementary Raman Scanning Thermal Microscopy (CRSThM),” Logan, UT, oral presentation, May 16-18, 2017.

*Pre-BYU*

33. ANS Winter Meeting, “Thermal Conductivity and Diffusivity for SiC Fibers for Use in ATF Cladding Composites,” Las Vegas, NV, oral presentation, paper accepted (Transactions of the American Nuclear Society, Vol. 115), November 6-10, 2016.
34. International Mechanical Engineering Congress and Exposition, “Thermal Property Measurement of Thin Fibers – A Direct Approach,” Houston, Texas, oral presentation, paper accepted (IMECE2015-52056), November 13-19, 2015.
35. Joint ASME AIChE and NIST 19<sup>th</sup> Symposium on Thermophysical Properties, “Thermal Property Measurements of Spider Silks,” Boulder, Colorado, oral presentation, June 21-26, 2015.
36. Joint ASME AIChE and NIST 19<sup>th</sup> Symposium on Thermophysical Properties, “Photothermal Quantum Dot Fluorescence-Based Thermometry for Thermal Property Determination of Thin Fibers,” Boulder, Colorado, oral presentation, June 21-26, 2015.

37. General Scientific Meeting of the Belgian Physical Society 2014, “Thermal Properties of Synthetic Spider Silk by Photothermal Fluorescence,” Leuven, Belgium, poster presentation, May 28, 2014.
38. SPIE PhD Symposium on Optics, “Thermal Properties of Synthetic Spider Silk by Photothermal Fluorescence,” Leuven, Belgium, poster presentation, January 9-10, 2014.
39. Onderzoekseminarie Akoestiek en Thermische Fysica, “Exploring the Thermal Properties of Natural and Synthetic Spider Silks,” Leuven, Belgium, oral presentation (Invited) , December 12, 2013.
40. KU Leuven Department of Physics and Astronomy Research@Dept 2013, “Thermal Properties of Synthetic Spider Silk by Photothermal Fluorescence,” Leuven, Belgium, poster presentation, November 26, 2013.
41. Space Dynamics Laboratory IR&D Session, “Thermal Diffusivity of Spider Silks at Cryogenic Temperatures,” Logan, Utah, poster presentation (Invited), June 27, 2013.
42. International Mechanical Engineering Congress and Exposition, “Thermal Properties of Natural and Synthetic Spider Silks at Cryogenic Temperatures,” San Diego, California, oral presentation, November 15-21, 2013.
43. ASME Summer Heat Transfer Conference, “Probing the Mysteries of Spider Silk’s Uncharacteristically High Thermal Diffusivity,” Minneapolis, Minnesota, oral presentation, July 14-19, 2013.
44. MicroTech Conference, “Characterizing Thermal Diffusivity of Synthetic Spider Silk using Improved Transient Electrothermal Technique,” Gaylord National Harbor Maryland, poster presentation, May 12-15, 2013.
45. Intermountain Graduate Research Symposium, “Probing the Mysteries of Spider Silk’s Uncharacteristically High Thermal Diffusivity,” Utah State University, Logan, Utah, oral presentation, April 12, 2013.
46. Synthetic Biomanufacturing Institute Science and Technology Review Winter Meeting, “Thermal Properties of Natural and Synthetic Spider Silks,” Utah State University, Logan, Utah, poster presentation, January 29, 2013.
47. Institute of Biological Engineering Western Regional Conference, “Thermal Diffusivity of Natural and Synthetic Spider Silks,” Utah State University, Logan, Utah, poster presentation, October 26, 2012.
48. nanoUtah, “Thermal Diffusivity of Natural and Synthetic Spider Silks,” University of Utah, Salt Lake City, Utah, poster presentation, October 11-12, 2012.
49. Rocky Mountain NASA Space Grant Consortium Annual Symposium, “Jet Flow Behavior Observed during Microgravity Boiling,” Utah State University, Logan, Utah, oral presentation, May 9, 2012.
50. Intermountain Graduate Research Symposium, “Heater Geometry and Heat Flux Effects on Subcooled, Thin Wire, Nucleate Pool Boiling in Microgravity,” Utah State University, Logan, Utah, oral presentation, April 5-6, 2012.
51. USU Physics Department Colloquium, “Gravitational Effects on Thin-Wire Subcooled Nucleate Boiling Dynamics with Two Dimensional Applications,” Utah State University, Logan, Utah, oral presentation (Invited), September 6, 2011.
52. Rocky Mountain NASA Space Grant Consortium Annual Symposium, “Effects of Microgravity on Thin-Wire Subcooled Nucleate Boiling Dynamics,” Utah State University, Logan, Utah, poster presentation, May 7, 2011.



53. Department of Mechanical Engineering, "Collection of CO<sub>2</sub> from the Martian Atmosphere for use as a Propellant for a Radioisotope Powered Mars Research Vehicle," Utah State University, Logan, Utah, poster presentation, May 2, 2011.
54. Utah Academy of Sciences, Arts, and Letters 2011 Annual Conference, "Surface Geometry and Heat Flux Effect on Thin Wire Nucleate Pool Boiling of Subcooled Water in Microgravity," Salt Lake Community College, SLC, UT, oral presentation, April 8, 2011.
55. Utah State University Undergraduate Research Showcase, "Effects of Micro-gravity on Thin-Wire Subcooled Nucleate Boiling Dynamics," Utah State University, Logan, Utah, poster presentation, March 29, 2011.
56. AIAA Region VI Student Conference, "Surface Geometry and Heat Flux Effect on Thin Wire Nucleate Pool Boiling of Subcooled Water in Microgravity," San Diego State University San Diego, California, oral presentation, March 24-26, 2011.
57. AIAA Region VI Student Conference, "Boil, Boil, Toil, and Trouble - Connecting with the Community through Microgravity Boiling Experiments," San Diego State University San Diego, California, oral presentation, March 24-26, 2011.
58. Utah Conference on Undergraduate Research, "The Design and Construction of a Microgravity Boiling Experiment," Weber State University, Ogden, Utah, oral presentation, February 18, 2011.
59. Research on Capitol Hill, "Effects of Micro-gravity on Thin-Wire Subcooled Nucleate Boiling Dynamics," Utah State Capitol, SLC, UT, poster presentation, January 26, 2011.
60. Utah Section of the AIAA, "Gravitational Effects on Thin-Wire Subcooled Nucleate Boiling Dynamics," USU, Logan, Utah, oral presentation, January 20, 2011.
61. USU Physics Department Colloquium, "Gravitational Effects on Thin-Wire Subcooled Nucleate Boiling Dynamics," USU, Logan, Utah, oral presentation (Invited), October 19, 2010.
62. Rocky Mountain NASA Space Grant Consortium Annual Symposium, "Photoelectric Charging by Ultraviolet Light of a Lunar Dust Simulant in a Microgravity Environment," Utah State University, Logan, Utah, poster presentation, May 4, 2009.
63. Utah State University Undergraduate Research Showcase, "Photoelectric Charging by Ultraviolet Light of a Lunar Dust Simulant in a Microgravity Environment," Utah State University, Logan, Utah, poster presentation, March 31, 2009.
64. Weber State Physics Department Colloquium, "USU Microgravity Research Team CubeSat Project," Weber State University, Ogden, UT, oral presentation (Invited), March 27, 2008.

## **Professional Service**

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### *Associate Editor*

- International Journal of Thermophysics (2020-present)
  - Increased impact factor from 0.8 in 2019 to 1.608 in 2020, and 2.416 in 2021

### *Journal Reviewer*

- Applied Sciences (2022-present)
- Journal of Molecular Liquids (2022-present)
- Journal of Cleaner Production (2021-present)
- PLOS ONE (2021-present)
- ACS Materials Letters (2019-present)



- ACS Sustainable Chemistry and Engineering (2019-present)
- Journal of Nuclear Materials (2019-present)
- Acta Biomaterialia (2018-present)
- Review of Scientific Instruments (2017-present)
- Measurement Science and Technology (2017-present)
- Nuclear Technology (2017-present)
- Measurements (2017-present)
- International Journal of Heat and Mass Transfer (2017-present)
- Optical Letters (2016-present)
- Applied Thermal Engineering (2013)
- International Thermal Conductivity Conference – (2017, 2019)

#### *Funding Agency Reviewer*

- DOE Nuclear Energy SBIR (2019-present, 7 reviews)
- DOE NEUP – Nuclear Energy University Partnership (2017-present, 7 reviews)
- NSUF – Nuclear Science User Facility (2017-present, 2 reviews)
- NSF (2021-present, 1 review)

#### *Conference Service*

- Session Chair – ANS 2018, 2019, 2020, 2021
- Session Organizer – ASME IMECE 2019, 2020, 2021, 2022
- Biomedical Engineering Western Regional Conference, Session Moderator, Imaging and Optics Session, BYU, Provo, UT, Jan 19, 2017
- ANS Decommissioning, Decontamination & Reutilization Topical Meeting, Session Host, Idaho Falls, ID, September 2, 2010

#### *Misc*

- Graduate Student University Council Representative, USU 2015-2016.
- STEM outreach organizer for program that has visited over 74 classrooms, brought K-12 students to USU, and met with over 9,000 students and community members, 2008-2016.

#### *University Service*

- Deputy Director, BYU's Nuclear Research Group (NRG)
- Writing Group organizer
- ORCA reviewer
- Graduate Committee (member)
- ME EN 362 Course Committee (member)
- ME EN 250 Course Committee (member)

#### *Memberships*

- American Nuclear Society (ANS), 2016-present
- American Society of Mechanical Engineers (ASME), 2009-present
- Tau Beta Pi Engineering Honor Society, 2009-present
- American Chemical Society (ACS), 2019-2020
- Society of Photographic Instrumentation Engineers (SPIE), 2014-2019
- American Institute of Aeronautics and Astronautics (AIAA), 2010-2015
- Belgian Physics Society, 2014-2015

### *Professional Committees*

- Materials Science and Technology Division (ANS), 2018-present
  - Chair, June 2021-2022
  - Vice Chair, June 2020-2021
  - Treasurer/Secretary, June 2019-2020
  - Executive Committee, June 2018-2024
  - Standards Committee Liaison, 2018-present
- ASME K-7 Thermophysical Properties Division, 2018-present
  - Vice Chair, Nov 2018-Present
- Joint ASME-AIChE Committee on Thermophysical Properties, 2021-present
  - Secretary, 2021-present

### **Research Mentoring**

<b>Graduate Student Advisement</b>		<b>Lab Years</b>
Ryan Ruth	M.S./M.B.A., thesis in progress	2022-Current
Alex Hansen	M.S., thesis in progress	2022-Current
Justin Loose	M.S., thesis in progress	2020-Current
Derek Sanchez	Ph.D., dissertation in progress	2018-Current
Matthew Goodson	Ph.D., dissertation in progress	2018-Current

#### *Graduated/Completed*

Brian Merritt	M.S., graduate December 2022 - awarded national NEUP Fellowship, ANS Scholarship	2021-2022
Aaron Thorum	M.S., graduated June 2022	2020-2022
Peter Kasper	M.S., graduated June 2022	2020-2022
Peter Hartvigsen	M.S., graduated June 2020	2017-2020
Samuel Hayden	M.S., graduated December 2018	2017-2018
James Adams	Graduate Assistant	2021
McKay Wilkerson	Graduate Assistant	2020

### **Current Undergraduate Student Advisement**

### **Starting Year**

**Bolded** students have been authors on journal papers, and underlined students have been authors on conference papers, presentations, or patent submission.

90. Dallin Gariety	Volunteer	2022
89. Dean Fitzpatrick	Research Assistant	2022
88. Addison Omdahl	Volunteer	2022
87. Matthew Schwendiman	Research Assistant	2022
86. Robert Macdonald	Research Assistant	2022
85. David Reinhardt	Research Assistant	2022
84. David Leavitt	Research Assistant	2022
83. Jarron Gage	Research Assistant	2022

<b>82. Noah Petersen</b>	Research Assistant	2022
81. Sadie McGinn	Research Assistant	2022
80. Jefferson Santos di Silva	Research Assistant	2022
<b>79. Benjamin Wright</b>	Research Assistant	2021
<u>78. Santiago Gomez</u>	Research Assistant	2021
<b>77. Spencer Larsen</b>	Research Assistant	2021
<b>76. Alison Day</b>	Research Assistant	2021
<u>75. Crewse Petersen</u>	Research Assistant	2021
74. Brendan Mitchell	Research Assistant	2020

<b>Former Undergraduate Student Advisement</b>		<b>Starting Year</b>
73. Jonah Kendall	497R	2022
<b>72. Noah Cahill</b>	Volunteer	2022
<u>71. Kate Williams</u>	Research Assistant	2022
70. Adam Ith	Research Assistant	2022
69. Luke Zollinger	Volunteer	2022
68. Brayden Salisbury	Research Assistant	2021
<u>67. Alex Hansen</u>	Research Assistant	2021
<u>66. Tom Carson</u>	Research Assistant	2021
65. Samuel Lino	Research Assistant	2021
64. Yoshiya Sato	Research Assistant	2021
63. Bryce Hamilton	Research Assistant	2021
62. Evan Boekweg	Research Assistant	2021
61. Porter Nichols	Volunteer	2021
<b>60. Austin Bay</b>	Research Assistant	2021
<u>59. Ara Bolander</u>	Research Assistant	2021
58. Brayden Steimle	Research Assistant	2021
<u>57. Jonathan Dromey</u>	Research Assistant	2021
56. Alex Wonnacott	Research Assistant	2021
55. Maren Johnston	Research Assistant	2021
54. Kai Hicken	Volunteer	2021
<u>53. Ryan Ruth</u>	Research Assistant	2020
<u>52. Conner Mantz</u>	497R	2020
<u>51. Brent Edgerton</u>	Research Assistant	2020
50. Summer Scherer	Research Assistant	2020
49. Katelyn Peterson	Research Assistant	2020
48. Logan Hardy	497R	2020
47. Joseph Summerhays	Research Assistant	2020
<b>46. Tolex Gregory</b>	Research Assistant	2020
<u>45. Peter Kasper</u>	Research Assistant	2020

<b><u>44. Garrett Hawkins</u></b>	Research Assistant	2020
43. McKay Christensen	Research Assistant	2020
42. Joseph Erikson	Volunteer	2020
<u>41. Aaron Thorum</u>	Research Assistant	2019
<u>40. Connor Last</u>	Research Assistant	2019
<u>39. Jace Davis</u>	Research Assistant	2019
<u>38. Kirsten Steele</u>	Research Assistant	2019
<u>37. Erik Barbosa</u>	Research Assistant	2019
36. Rebecca Prymark	Research Assistant	2019
35. Zachary Broyles	Research Assistant	2019
34. Logan Page	Research Assistant	2019
<u>33. Jay Bettinger</u>	Research Assistant	2019
<b><u>32. Daniel Ellis</u></b>	Research Assistant	2019
31. McKell Miskin	Research Assistant	2019
30. Enqi Luo	Research Assistant	2019
29. Stuart Storheim	Research Assistant	2019
28. McKay Wilkerson	Research Assistant	2019
27. Kenan Fronk	Research Assistant	2019
26. Gabriel Bradford	Research Assistant	2019
25. Jacob Redd	Research Assistant	2019
24. Caelan Osman	Research Assistant	2019
23. Claire Bird	Research Assistant	2019
22. Samuel Olds	497R	2019
21. Zan Aslett	Volunteer	2019
<b><u>20. Michael Seneca</u></b>	Research Assistant	2018
19. Samantha Stabler	Research Assistant	2018
<u>18. Samuel Hales</u>	Research Assistant	2018
<u>17. Matthew Goodson</u>	Research Assistant	2018
<b><u>16. Brian Merritt</u></b>	Research Assistant	2018
15. Mike Eddington	497R	2018
<b><u>14. Jared Magnusson</u></b>	497R	2018
13. Kegasi Turbovsky	497R	2018
12. Colin White	Research Assistant	2018
11. Jonathan Wagstaff	Research Assistant	2017
10. Diana Bolanos	Research Assistant	2017
<b><u>9. Jack Colton</u></b>	Research Assistant	2017
8. Wade Smallwood	Volunteer	2017
<u>7. Derek Sanchez</u>	497R	2017
6. Greg Bird	Research Assistant	2017
5. Spencer Diehl	Research Assistant	2017

4. Turner Palombo	Research Assistant	2017
3. Kevin Roberts	497R	2017
2. Haden Heath	497R/Research Assistant	2016
1. <u>Ryker Haddock</u>	Research Assistant	2016

<b>Committee Advisement</b>	<b>Year Graduated</b>
Ryan Melander, M.S.	Current
Kennen Brooks, M.S.	Current
John Hunt, Ph.D.	Current
Jacob Kullberg, Ph.D.	Current
José Niño, Ph.D.	Current
Joshua Vawdrey, Ph.D.	Current
Shu Wang, Ph.D.	Current
Kent Hooper, M.S.	2022
Colton Inkley, M.S.	2022
Trent Bates, M.S.	2021
Nicholas Wallace, M.S.	2021
Arnold Wright, M.S.	2021
Sterling Voss, M.S.	2020
Christopher Brooks, M.S.	2019
Zachary Sadler, M.S.	2017

#### **Prior to BYU**

Nathaniel Scheelke (Graduate)	2014-2016
Levi Gardner (Graduate)	2015-2016
Luke Scoggins (Undergraduate)	2015-2016
Ben White (Undergraduate/Graduate)	2013-2014
Ty Henrie (Undergraduate)	2015
Jenica Hillyard ( <b>SWE Senora Region Collegiate Representative, 2013-2014</b> )	2011-2013
Ryan Martineau ( <b>AIAA The Twenty 20s Award, 2014</b> )	2010-2013
Jacob Singleton ( <b>Air Force Cadet Research Award, 2014, 1 student nationally</b> )	2011-2013