# VITA – TODD MATTHEW BANDHAUER

Rev. December 29, 2025

## PERSONAL INFORMATION

### Contact Information

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### Present Professional Appointments

1. August 2024 – Present — Professor
   Department of Mechanical Engineering
   Colorado State University, Fort Collins, CO

### Education

| *Degree* | *Date* | *School* |
|---|---|---|
| B.S.M.E | 1999 | Iowa State University, Ames, IA<br>Department of Mechanical Engineering |
| M.S.M.E | 2002 | Iowa State University, Ames, IA<br>Department of Mechanical Engineering |
| Ph.D. | 2011 | Georgia Institute of Technology, Atlanta, GA<br>George W. Woodruff School of Mechanical Engineering |

*Master's Thesis*

"Heat Transfer in Microchannel Geometries during Condensation of R-134a"
Adviser: Srinivas Garimella

*Doctoral Dissertation*

"Electrochemical-Thermal Modeling and Microscale Phase Change for Passive Internal Thermal Management of Lithium Ion Batteries"
Adviser: Srinivas Garimella
Co-Adviser: Thomas Fuller, School of Chemical and Biomolecular Engineering

### Past Professional Appointments

1. August 2019 – August 2024 — Associate Professor
   Department of Mechanical Engineering
   Colorado State University, Fort Collins, CO
2. August 2019 – August 2022 — Associate Department Head, Graduate Studies
   Department of Mechanical Engineering
   Colorado State University, Fort Collins, CO

| | | |
|---|---|---|
| 3. | August 2013 – August 2019 | Assistant Professor<br>Department of Mechanical Engineering<br>Colorado State University, Fort Collins, CO |
| 4. | June 2013 – August 2013 | Assistant Research Professor<br>Department of Mechanical Engineering<br>Colorado State University, Fort Collins, CO |
| 5. | January 2012 – June 2013 | Thermal Fluids Engineer<br>Engineering Directorate<br>Lawrence Livermore National Laboratory, Livermore, CA |
| 6. | January 2007 – December 2011 | Graduate Research Assistant<br>Woodruff School of Mechanical Engineering<br>Georgia Institute of Technology, Atlanta, GA |
| 7. | April 2005 – November 2006 | Sr. Research Engineer<br>Advanced Product Research<br>Modine Manufacturing Company, Racine, WI |
| 8. | September 2002 – April 2005 | Product Development Engineer<br>Fuel Cell Products Group<br>Modine Manufacturing Company, Racine, WI |
| 9. | January 2002 – May 2002 | Graduate Research Assistant<br>Department of Atmospheric and Oceanic Sciences<br>University of Wisconsin, Madison, WI |
| 10. | January 2000 – December 2001 | Graduate Research Assistant<br>Department of Mechanical Engineering<br>Iowa State University, Ames, IA |
| 11. | May 1997 – August 1999 | Technical Assistant (Summers Only)<br>J. L. Hall Engineering Services, Ames, IA |

### Start-up Affiliations

| | | |
|---|---|---|
| 1. | January 2022 – Present | Co-Founder, CTO<br>AtmosZero |
| | Summary of Activities: | $28.5M VC capital raised to date, $0.5M ARPA-e SEED project awarded, Pilot contract with New Belgium Brewing secured, $3.2M DOE grant awarded, total CSU subcontracts to date: $2.23M |
| 2. | June 2022 – Present | Co-Founder<br>Impact Cooling LLC |
| | Summary of Activities: | $0.275M VC capital raised, Former student David Hobby and Zach Gilvey Activate Fellows, $1.8M DARPA project awarded, $0.5M ARPA-e SEED project awarded, $0.25M Colorado OEDIT project awarded, $0.25M Alabama innovation project awarded, total CSU subcontracts to date: $0.15M |

### Honor Society Memberships

1. Pi Tau Sigma, 1998
2. Golden Key National Honor Society, 1998
3. Tau Beta Pi, 1998

### Honors and Awards

1. Time100 Climate 2025, one of 100 Most Influential Climate Leaders of 2025 identified by Time Magazine
2. George T. Abell Award for Outstanding Economic Development Contributions, Walter Scott Jr. College of Engineering, Colorado State University, 2024
3. Nelson Family Faculty Excellence Award, Walter Scott Jr. College of Engineering, Colorado State University, 2022
4. Monfort Professor nominee from Walter Scott Jr. College of Engineering, Colorado State University, 2021
5. Adviser of Best Student Paper, ASME Advanced Energy System Division, Energy Track, International Mechanical Engineering Congress and Exposition, 2017
6. George T. Abell Award for Outstanding Economic Development Contributions, Walter Scott Jr. College of Engineering, Colorado State University, 2017
7. Outstanding Technology Development Award, Federal Laboratory Consortium, 2016
8. LLNL Computational Engineering Division Award, 2012
9. Achievement Rewards for College Scientists Scholar, 2011
10. Sandia Graduate Research Fellowship, 2007- 2011
11. Department of Defense Fellowship Finalist, 2001
12. ASHRAE Grant-in-Aid Award, 2000
13. Iowa State University PACE Award, 2000
14. National Football Foundation and College Football Hall of Fame Scholar-Athlete Award, 1998
15. 3-year letter winner in football; 2-time team-elected captain; 4-time Academic All-Big 12, Iowa State University, 1995-1998

## RESEARCH ACTIVITIES

### Funded Research Activities

***Total funding as Institutional PI throughout career: $18,104,991.42 (CSU and LLNL, not including cost share)***

*Lawrence Livermore National Laboratory*
*Total funding as **LLNL PI**: $2,000,000 ($925,000 directly to LLNL)*

1. Title: Wireless Sensor System for Battery Packs
   Funding Organization: U.S. Department of Energy, Advanced Research Projects Agency – Energy (ARPA-e), DE-FOA-0000675
   Amount: $925,000 of $2,000,000 project total
   Submission Date: April, 2012
   Period of Performance: October, 2012, to October, 2015
   Role: Principal Investigator during employment at Lawrence Livermore National Laboratory from Oct. 1, 2012 to June 13, 2013
   Status: **Funded, Complete**

*Colorado State University*
*Total funding awarded to CSU (complete or active, not including cost share) as* ***CSU PI: $17,876,247***

2. Title: Research Support for AtmosZero Product Development
   Funding Organization: AtmosZero
   Amount: $39,482
   Submission Date: September, 2024
   Period of Performance: October, 2024, to present
   Role: PI
   Status: **Funded, Active**
3. Title: Front-End Engineering Design for a CO2 Capture System at Calpine's Delta Energy Center
   Funding Organization: DOE-US Department of Energy, National Energy Technology Laboratory
   Amount: $170,000
   Submission Date: July, 2023
   Period of Performance: February, 2024, to January, 2025
   Role: Principal Investigator at Colorado State University, with Jason Quinn (CSU) and Dan Herber (CSU)
   Status: **Funded, Complete**
4. Title: Flexible Industrial Heat Pump for Simultaneous Refrigeration
   Funding Organization: DOE-US Department of Energy, Industrial Decarbonization and Efficiency Office
   Amount: $1,545,534
   Submission Date: June, 2023
   Period of Performance: September, 2024, to September, 2027
   Role: Principal Investigator at Colorado State University
   Status: **Funded, Waiting for Budget Period 2 funds to be released**
5. Title: Toward Justice-Centered Carbon Management in Nevada
   Funding Organization: ClimateWorks, Fluxx Grant #G-2305-802318869 / Grant Number 23-2572
   Amount: $101,320
   Submission Date: June 2022
   Period of Performance: July, 2023, to November, 2024
   Role: co-Principal Investigator with Mauricia Baca (PI, The Nature Conservancy) and Peter

Psarras (co-PI, University of Pennsylvania)
Status: **Funded, Complete**

6. Title: Decarbonized District Energy System with Renewably Fueled Combined Heat, Power, and Cooling
   Funding Organization: U.S. Department of Energy, Advanced Manufacturing Office, DE-FOA-002573
   Amount: $2,193,685
   Submission Date: April 2022
   Period of Performance: January, 2023, to January, 2026
   Role: Principal Investigator
   Status: **Funded, Canceled October 2025 and under appeal**
7. Title: Transient Flow Boiling Model Development
   Funding Organization: Office Of Naval Research
   Amount: $296,320
   Submission Date: December, 2021
   Period of Performance: June, 2022, to June 2024
   Role: Principal Investigator
   Status: **Funded, Complete**
8. Title: Steam Heat Pump Testing and Evaluation
   Funding Organization: AtmosZero
   Amount: $532,660
   Submission Date: April, 2022
   Period of Performance: June, 2022, to May, 2024
   Role: PI
   Status: **Funded, Complete**
9. Title: Heat Pump to Decarbonize Industrial Heat
   Funding Organization: U.S. Department of Energy, Advanced Research Projects Agency-Energy, DE-FOA-001954
   Amount: $150,000
   Submission Date: April, 2022
   Period of Performance: August, 2022, to August, 2024
   Role: co-Principal Investigator with Ashwin Salvi (PI), AtmosZero
   Status: **Funded, Complete**
10. Title: High Density Cooling System for Ultra-Low PUE Data Centers
    Funding Organization: U.S. Department of Energy, Advanced Research Projects Agency-Energy, DE-FOA-001954
    Amount: $150,000
    Submission Date: April, 2022
    Period of Performance: November, 2022, to November, 2024
    Role: co-Principal Investigator with David Hobby (PI), Impact Cooling
    Status: **Funded, Complete**
11. Title: High Efficiency, Low Cost & Robust Hybrid SOFC/IC Engine Power Generator – Phase II
    Funding Organization: U.S. Department of Energy, Advanced Research Projects Agency-Energy, DE-FOA-001797
    Amount: $2,715,000

Submission Date: May, 2020
Period of Performance: January, 2021, to January, 2025
Role: co-Principal Investigator with Dr. Robert Braun (PI) and Dr. Neal Sullivan, Colorado School of Mines, Dr. Daniel Olsen and Dr. Bret Windom, Colorado State University, and Kohler Power Systems and Air Squared, Inc.
Status: **Funded, Complete**

12. Title: Synergistic Heat Pumped Thermal Storage and Flexible Carbon Capture System – Phase I
Funding Organization: U.S. Department of Energy, Advanced Research Projects Agency-Energy, DE-FOA-002220
Amount: $1,100,000
Submission Date: April, 2020
Period of Performance: March, 2021, to June, 2022
Role: Principal Investigator with Jason Quinn (co-PI), Dan Herber (co-PI), Ion Clean Energy, Storworks, University of Pennsylvania
Status: **Funded, Complete**
13. Title: Development of High Brightness Laser Diode Packages
Funding Organization: Lawrence Livermore National Laboratory
Amount: $611,256
Submission Date: November, 2020
Period of Performance: December, 2020, to October, 2023
Role: Principal Investigator at Colorado State University
Status: **Funded, Complete**
14. Title: Power Dense Turbo-Compression Cooling Driven by Waste Heat – Phase II
Funding Organization: Department of Defense, SBIR/STTR Program, Topic Number N19A-T013
Amount: $800,000
Submission Date: December, 2019
Period of Performance: July, 2020, to July, 2023
Role: Principal Investigator with Mike Cushman (co-PI), Mantel Technologies
Status: **Funded, Complete**
15. Title: Two-Phase Cooling of a Laser Diode Assembly
Funding Organization: Lasertel, Inc.
Amount: $29,335.03
Submission Date: December, 2019
Period of Performance: September, 2020, to December, 2020
Role: Principal Investigator at Colorado State University
Status: **Funded, Complete**
16. Title: Advanced Data Center Cooling System
Funding Organization: State of Colorado Office of Economic Development and International Trade, Advanced Industries Accelerator Programs
Amount: $150,000
Submission Date: April, 2020
Period of Performance: August, 2020, to August, 2022
Role: Principal Investigator
Status: **Funded, Complete**

17. Title: Analysis of High Brightness Laser Diode Packages
    Funding Organization: Lawrence Livermore National Laboratory
    Amount: $47,000
    Submission Date: February, 2020
    Period of Performance: April, 2020, to October, 2020
    Role: Principal Investigator at Colorado State University
    Status: **Funded, Complete**
18. Title: Power Dense Turbo-Compression Cooling Driven by Waste Heat – Phase I Option
    Funding Organization: Department of Defense, SBIR/STTR Program, Topic Number N19A-T013
    Amount: $60,000
    Submission Date: February, 2019
    Period of Performance: June, 2019, to December, 2020
    Role: Principal Investigator with Mike Cushman (co-PI), Mantel Technologies
    Status: **Funded, Complete**
19. Title: Power Dense Turbo-Compression Cooling Driven by Waste Heat – Phase 1
    Funding Organization: Department of Defense, SBIR/STTR Program, Topic Number N19A-T013
    Amount: $84,000
    Submission Date: February, 2019
    Period of Performance: June, 2019, to December, 2019
    Role: Principal Investigator with Mike Cushman (co-PI), Mantel Technologies
    Status: **Funded, Complete**
20. Title: Keysight Task Order 5 -- Task 1
    Funding Organization: Keysight Technologies
    Amount: $169,920
    Submission Date: November, 2018
    Period of Performance: March, 2019, to May, 2020
    Role: Principal Investigator at Colorado State University
    Status: **Funded, Complete**
21. Title: Impingement Cooling System Demonstration: Task Order 4 -- Task 1
    Funding Organization: Keysight Technologies
    Amount: $66,384
    Submission Dates: February, 2018
    Period of Performance: May, 2018, to March, 2019
    Role: Principal Investigator at Colorado State University
    Status: **Funded, Complete**
22. Title: High Efficiency, Low Cost & Robust Hybrid SOFC/IC Engine Power Generator
    Funding Organization: Colorado Energy Collaboratory
    Amount: $75,000
    Submission Date: April, 2018
    Period of Performance: June, 2018, to June, 2020
    Role: co-Principal Investigator with Dr. Robert Braun (PI) and Dr. Neal Sullivan, Colorado School of Mines, Dr. Daniel Olsen and Dr. Bret Windom, Colorado State University
    Status: **Funded, Complete**

23. Title: High Efficiency, Low Cost & Robust Hybrid SOFC/IC Engine Power Generator – Phase I
    Funding Organization: U.S. Department of Energy, Advanced Research Projects Agency-Energy, DE-FOA-001797
    Amount: $998,458
    Submission Date: December, 2017
    Period of Performance: September, 2018, to September, 2020
    Role: co-Principal Investigator with Dr. Robert Braun (PI) and Dr. Neal Sullivan, Colorado School of Mines, Dr. Daniel Olsen and Dr. Bret Windom, Colorado State University, and Kohler Power Systems and Air Squared, Inc.
    Status: **Funded, Complete**
24. Title: Low Cost and Efficient Distributed Power and $CO_2$ Sequestration Reformer-Engine System
    Funding Organization: Colorado Energy Collaboratory
    Amount: $25,000
    Submission Date: September, 2017
    Period of Performance: December, 2017, to December, 2018
    Role: Co-Principal Investigator with Dr. Jen Wilcox, Colorado School of Mines
    Status: **Funded, Complete**
25. Title: Turbo-Compression Cooling for Ultra Low Temperature Waste Heat Recovery
    Funding Organization: U.S. Department of Energy, Advanced Manufacturing Office, DE-FOA-001465
    Amount: $1,882,881
    Submission Date: June 2017
    Period of Performance: June, 2018, to June, 2022
    Role: Principal Investigator with Barber-Nichols Inc. and Modine Manufacturing Co.
    Status: **Funded, Complete**
26. Title: Two-phase Evaporator Reduced Order Model Development for Fiber-Coupled Laser Diode Systems
    Funding Organization: Office Of Naval Research
    Amount: $583,951
    Submission Date: November, 2017
    Period of Performance: March, 2018, to March, 2021
    Role: Principal Investigator
    Status: **Funded, Complete**
27. Title: High Efficiency Waste Heat Driven Cooling System
    Funding Organization: State of Colorado Office of Economic Development and International Trade, Advanced Industries Accelerator Programs
    Amount: $74,500
    Submission Date: November, 2017
    Period of Performance: February, 2018, to February, 2020
    Role: Principal Investigator
    Status: **Funded, Complete**
28. Title: 1 kW Natural Gas Reformer
    Funding Organization: Colorado School of Mines
    Amount: $43,208

Submission Date: June, 2017
Period of Performance: August, 2017, to August, 2018
Role: Principal Investigator at Colorado State University
Status: **Funded, Complete**

29. Title: Keysight Task Order 3 – Task 1
Funding Organization: Keysight Technologies
Amount: $40,000
Submission Dates: May, 2017
Period of Performance: May, 2017, to August, 2017
Role: Principal Investigator at Colorado State University
Status: **Funded, Complete**
30. Title: Thermal Management of High Heat Flux Laser Diodes using Liquid-Vapor Phase Change
Funding Organization: Lawrence Livermore National Laboratory
Amount: $225,000
Submission Date: March, 2017
Period of Performance: June, 2017, to October, 2018
Role: Principal Investigator at Colorado State University
Status: **Funded, Complete**
31. Title: Enhanced Cell Designs for Improved Internal Heat Transfer for High Rate and Power Capable, Large-Format Batteries
Funding Organization: U.S. Department of Defense (Navy)
Amount: $26,600
Submission Date: February, 2015
Period of Performance: June, 2015, to December, 2015
Role: Co-Principal Investigator at Colorado State University (SBIR subcontract from Mainstream Engineering, Rockledge, FL)
Status: **Funded, Complete**
32. Title: Advanced Cooling Methods for High Performance Modular Test Equipment – Year 2
Funding Organization: Keysight Technologies
Amount: $106,800
Submission Dates: April, 2016
Period of Performance: May, 2016, to April, 2017
Role: Principal Investigator at Colorado State University
Status: **Funded, Complete**
33. Title: Ultra-Efficient Turbo-Compression Cooling
Funding Organization: U.S. Department of Energy, Advanced Research Projects Agency – Energy (ARPA-e), DE-FOA-001197
Amount: $2,087,586
Submission Date: November 2014
Period of Performance: November, 2015, to November, 2018
Role: Principal Investigator with Barber-Nichols Inc. and Modine Manufacturing Co.
Status: **Funded, Complete**
34. Title: Advanced Cooling Methods for High Performance Modular Test Equipment
Funding Organization: Keysight Technologies
Amount: $106,800

Submission Dates: November, 2014
Period of Performance: May, 2015, to April, 2016
Role: Principal Investigator at Colorado State University
Status: **Funded, Complete**

35. Title: Refrigerated Intermodal Container Thermal Analysis and Testing
    Funding Organization: Fontaine Engineering Products
    Amount: $11,418
    Submission Date: February, 2014
    Period of Performance: February, 2014, to May, 2014
    Role: Principal Investigator at Colorado State University
    Status: **Funded, Complete**
36. Title: Thermal Management of Lithium-Ion Batteries using Passive Electrolyte Evaporation
    Funding Organization: State of Colorado Office of Economic Development and International Trade, Advanced Industries Accelerator Programs
    Amount: $59,958
    Submission Date: January, 2014
    Period of Performance: June, 2014, to September, 2016
    Role: Principal Investigator at Colorado State University
    Status: **Funded, Complete**
37. Title: Refrigerated Intermodal Container Thermal Analysis
    Funding Organization: Fontaine Engineering Products
    Amount: $10,259
    Submission Date: November, 2013
    Period of Performance: December, 2013, to February, 2014
    Role: Principal Investigator at Colorado State University
    Status: **Funded, Complete**
38. Title: Physical and Electrochemical Parameter Measurements on Commercial Lithium-Ion Cells
    Funding Organization: University of Colorado – Colorado Springs
    Amount: $51,779
    Submission Date: October, 2013
    Period of Performance: December, 2013, to July, 2015
    Role: Co-Principal Investigator at Colorado State University with Amy Prieto, Department of Chemistry, Colorado State University
    Status: **Funded, Complete**
39. Title: Thermal Management of High Heat Flux Laser Diodes using Liquid-Vapor Phase Change
    Funding Organization: Lawrence Livermore National Laboratory
    Amount: $430,117
    Submission Date: October, 2013
    Period of Performance: February, 2014, to October, 2016
    Role: Principal Investigator at Colorado State University
    Status: **Funded, Complete**
40. Title: Alternative Methods for Tritium Recovery from the LIFE Blanket
    Funding Organization: Lawrence Livermore National Laboratory
    Amount: $25,036

Submission Date: June, 2013
Period of Performance: July, 2013, to October, 2013
Role: Principal Investigator at Colorado State University
Status: **Funded, Complete**

**Externally-Funded Projects as Co-PI**
*Colorado State University*
*Total funding as Co-PI to Bandhauer Lab: $3,666,580*

41. Title: Collaborative Research: ECO-CBET: Solar-Driven Zero Liquid Discharge to Enable Inland Desalination for Climate-Adaptive Water Resilience
    Funding Organization: National Science Foundation
    Amount: $274,078 of $863,920 (This is amount to CSU)
    Submission Date: February, 2024
    Period of Performance: October, 2024, to October, 2028
    Role: co-Principal Investigator at Colorado State University, with Jason Quinn (CSU PI), Steve Conrad (CSU Co-PI), and Tiezheng Tong (ASU PI)
    Status: **Funded, Active**
42. Title: Flexible Hybrid SOFC CHP System Using Low-Carbon Fuels
    Funding Organization: DOE-US Department of Energy, National Energy Technology Laboratory
    Amount: $1,899,433.02 (This is amount to CSU, Bandhauer Lab Direct Report and Research Associate Shane Garland is CSU PI)
    Submission Date: July, 2023
    Period of Performance: August, 2024, to August, 2027
    Role: co-Principal Investigator at Colorado State University, with Shane Garland (CSU PI), Dan Olsen (CSU), Bret Windom (CSU), Colorado School of Mines, Kohler
    Status: **Funded, Active**
43. Title: Testing of Liquid-Fueled Gas Turbine with High EGR Fraction to Support Carbon Capture System Integration
    Funding Organization: Office of Naval Research
    Amount: $1,210,170.22 of $6,000,000
    Period of Performance: August, 2023, to July, 2026
    Role: co-Principal Investigator with Dr. Bret Windom (PI)
    Status: **Funded, Active**
44. Title: NAWI Task 5.6 – A Novel Electro-Dialytic Crystallizer (EDC) for Energy Efficient Zero-Liquid Discharge
    Funding Organization: Lawrence Berkeley National Laboratory
    Amount: $136,728 of $542,601 (total includes cost share from CHECRA)
    Period of Performance: September, 2021, to September, 2024
    Role: co-Principal Investigator with Dr. Tiezheng Tong (co-PI) and Dr. Jason Quinn (co-PI), Colorado State University, Vanderbilt University
    Status: **Funded, Complete**
45. Title: National Alliance for Water Innovation Roadmapping
    Funding Organization: Lawrence Berkeley National Laboratory
    Amount: $24,902.04 of $220,392 project total (cash funding, including internal funds of $76,000, which include waived overhead, all funding for Bandhauer lab cash cost share)

Submission Date: April, 2020
Period of Performance: May, 2020, to December, 2020
Role: co-Principal Investigator with Dr. Thomas Borch (PI) and Dr. Dan Herber (co-PI), Colorado State University,
Status: **Funded, Complete**

46. Title: SiC Thermal Management Strategies using Phase Change Materials
Funding Organization: Department of the Army, Materiel Command
Amount: $92,000 of $180,000 project total
Submission Date: June, 2019
Period of Performance: August, 2019, to August, 2020
Role: co-Principal Investigator with Dr. Chris Weinberger (PI), Colorado State University,
Status: **Funded, Complete**
47. Title: Heat Recovery & Mechanical Efficiency -- Phase 2
Funding Organization: Starbucks
Amount: $4,961.97 of $108,823.60 Project Total
Submission Date: August, 2015
Period of Performance: September, 2015, to August, 2016
Role: Co-Principal Investigator with Dr. Thomas Bradley and Stephanie Barr, Colorado State University
Status: **Funded, Complete**

**Internally-Funded Awards**

*Total internal funding to Bandhauer Lab: $54,241*

48. Title: Electric Motors for Aviation
Funding Organization: CSU Energy Institute
Amount: $5,000
Submission Date: November, 2019
Period of Performance: November, 2019, to November, 2020
Role: Principal Investigator at Colorado State University
Status: **Funded, Complete**
49. Title: Summer Undergraduate Research at the Water-Energy
Funding Organization: Office of the Vice President for Research, Colorado State University
Amount: $10,000
Submission Date: April, 2019
Period of Performance: May, 2019, to Devember, 2019
Role: co-Principal Investigator with Dr. Tiezheng Tong (PI), Colorado State University
Status: **Funded, Complete**
50. Title: Early Stage Assessment of Commercial Viability: Economic Feasibility of Waste Heat Recovery for Implementation of Dry Cooling for Power Plants
Funding Organization: CSU Ventures
Amount: $6,750 (of $13,500 project total)
Submission Date: February, 2017
Period of Performance: May, 2017 to November, 2017
Role: co-Principal Investigator with Dr. Jason Quinn, Colorado State University
Status: **Funded, Complete**
51. Title: Chemically Patterned Surfaces for Enhanced Condensation Heat Transfer
Funding Organization: Colorado State University Energy Institute
Amount: $10,000 of $20,000 project total

Submission Date: December, 2014
Period of Performance: June, 2015, to June, 2016
Role: co-Principal Investigator with Dr. Arun Kota, Department of Mechanical Engineering, Colorado State University
Status: **Funded, Complete**

52. Title: Fume Hood Installation
Funding Organization: Colorado State University Office of the Vice President for Research
Amount: $7,500
Submission Date: December, 2014
Period of Performance: N/A
Role: Principal Investigator at Colorado State University
Status: **Funded, Complete**
53. Title: Ultra-High Temperature Phase Change Coolant for Engine Waste Heat Recovery
Funding Organization: Colorado State University Energy Institute
Amount: $14,991
Submission Date: December, 2013
Period of Performance: March, 2014, to December, 2014
Role: Principal Investigator at Colorado State University
Status: **Funded, Complete**

## Refereed Journal Publications

1. *Mitchel, L. J.*, S. D. Garland, D. B. Olsen, B. C. Windom, R. J. Braun, and T. M. Bandhauer (2026). "Modeling and Experimental Validation of the Air Delivery System for Solid Oxide Fuel Cell Power Generation." International Journal of Energy for a Clean Environment, 27(1): 1-21.
2. *Platt, B.*, D. Young, and T. M. Bandhauer (2025). "Experimental validation of a hybrid electric organic Rankine vapor compression cooling system." Applied Energy, 392: 125956.
3. Stark, A. K., A. Salvi, and T. M. Bandhauer (2025). "Waste Heat is Mostly a Waste of Time." Joule, 9(11): 102157.
4. *Ryan, K. P.*, A. Odukomaiya, M. Setiya, N. R. Roberts, J. Milkie, J. Huyett, and T. M. Bandhauer (2025). "Transient modeling of an ambient-temperature-source centrifugal-compressor steam-generating heat pump." Applied Thermal Engineering, 274: 126812.
5. *Grauberger, B. M.*, G. M. Cole, T. Tong, S. Lin, J. C. Quinn, and T. M. Bandhauer (2025). "Targeting sustainable desalination solutions: A techno-economic and life cycle approach to guiding zero liquid discharge desalination." Journal of Cleaner Production, 504: 145445.
6. Pisciotta, M., H. Pilorge, L. Ndlovu, *M. Siegel*, J. Huyett, T. M., Bandhauer, P. Psarras, and J. Wilcox (2025). "Advancing geothermal energy utilization opportunities: potential and strategies for integrating direct air capture." Energy and Environmental Science, 18: 7146-7169.
7. *Platt, B.*, D. Young, and T. M. Bandhauer (2025). "Thermodynamic and Turbomachinery Analysis of a Hybrid Electric Organic Rankine Vapor Compression System." Applied Energy, 387: 125554.
8. *Stoll, T.*, D. Young, and T. M. Bandhauer (2025). "Data center sustainability: The role of flexible fuel CCHP in mitigating grid emissions and power constraints." Energy Conversion and Management, 326: 119455.

9. *Reyes-Flores, V.*, *Z. Swartwout*, S. Garland, D. B. Olsen, B. Windom, and T. M. Bandhauer (2025). "Operational Conditions for an Internal Combustion Engine in a SOFC-ICE Hybrid Power Generation System." Energies, 18(7): 1838.
10. *Amyx, I., C. Anderson, N. Cassada,* C. Lewinsohn*,* D. Funaro, C. Frye, S. Baxamusa, J. Kotovsky, K. Jackson, and T. M. Bandhauer (2024). "Thermal Management of Discretized Heaters using CuW Microchannel Heat Sinks and FC3283." IEEE Transactions on Components, Packaging and Manufacturing Technology, Article in Press.
11. *Markey, E.*, *R. Vecellino*, B. J. Limb, *M. Pisciotta*, J. Huyett, S. Garland, M. Abarr, P. Psarras, D. R. Herber, J. C. Quinn, and T. M. Bandhauer (2024). "Economic impact of thermal energy storage on natural gas power with carbon capture in future electricity markets." International Journal of Greenhouse Gas Control, 133: 104098
12. *Anderson, C.*, Z. Gao, M. Hanchak, and T. M. Bandhauer (2024). "Experimental and Computational Investigation of Flow Boiling in A 52 μm Hydraulic Diameter Microchannel Evaporator with Inlet Restrictions and Heat Spreading." ASME Journal of Heat and Mass Transfer, 1-43, Paper No: HT-23-1366.
13. Braun, R. J., G. Floerchinger, N. P. Sullivan, T. Vincent, R. Danforth, T. M. Bandhauer, S. Garland, D. Olsen (2023). "Development Progress of a 70% Efficient Hybrid SOFC-I.C. Engine Hybrid System for Stationary Applications up to 1 MW." ECS Transactions, 111(6): 669.
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16. *Grauberger, B. M.,* G. M. Cole*, C. A. Robbins,* J. C. Quinn, T. Tong, and T. M. Bandhauer (2023). "Viability of Waste Heat Capture, Storage, and Transportation for Decentralized Flowback and Produced Water Treatment." Applied Energy, 330: 120342.
17. *Cole, G. A.*, *C. A. Robbins*, *B. M. Grauberger*, S. Garland, T. Tong, T. M. Bandhauer, and J. C. Quinn (2022). "Optimization of Mobile Oil and Gas Produced Water Treatment Unit Deployment Logistics to Achieve Economic Feasibility." Resources, Conservation, and Recycling, 181: 106249.
18. Limb, B., *E. Markey*, *R. Vercellino*, S. Garland, *M. Pisciotta*, P. Psarras, D. R. Herber, T. Bandhauer, and J. C. Quinn (2022). "Economic Viability of Using Thermal Energy Storage for Flexible Carbon Capture on Natural Gas Power Plants." Journal of Energy Storage, 55(D): 105836.
19. *Grauberger, A.,* D. Young, and T. M. Bandhauer (2022). "Off-design performance of an organic Rankine-vapor compression cooling cycle using R1234ze(E)." Applied Energy, 321: 119421.
20. *Grauberger, A.,* D. Young, and T. M. Bandhauer (2022). "Experimental Validation of an Organic Rankine Cycle Directly Coupled to a Vapor Compression Cooling Cycle using Low GWP Refrigerant R1234ze(E)." Applied Energy, 307: 118242.
21. *Robbins*, *C.*, *X. Du*, T. H. Bradley, J. C. Quinn, T. M. Bandhauer, S. A. Conrad, K. H. Carlson, and T. Tong (2022). " Beyond Treatment Technology: Understanding Motivations

and Barriers for Wastewater Treatment and Reuse in Unconventional Energy Production." Resources, Conservation & Recycling, 177: 106011.

22. Hejase, C.; *K. Weitzel*, *S. Stokes*, *B. Grauberger*, R. Young, *M. Arias-Paic*, *M. Kong*, S. Chae, T. M. Bandhauer, T. Tong, D. Herber, S. Stout, A. Miara, S. Huang, A. Evans, P. Kurup, M. Talmadge, A. Kandt, J. Stokes-Draut, J. Macknick, T. Borch, D. Dionysiou (2022). "Opportunities for Treatment and Reuse of Agricultural Drainage in the U.S." ACS ES&T Engineering, Accepted.
23. Braun, R. J., G. Floerchinger, D. Wahlstrom, N. P. Sullivan, T. Vincent, R. Danforth, T. M. Bandhauer, D. Olsen, and B. Windom (2021). "Development of a High Efficiency, Low-Cost Hybrid SOFC/Internal Combustion Engine Power Generator." ECS Transactions, 103(1): 221.
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25. *Hollis, J.,* D. J. Sharar, and T. M. Bandhauer (2021). "Effect of Phase Change Material on Dynamic Thermal Management Performance for Power Electronics Packages." Journal of Electronics Packaging, 143(4): 041111.
26. *Anderson*, *C.*, *J. Richey*, M. Fish, and T. M. Bandhauer (2021). "Peak Temperature Mitigation of a Multi-Microchannel Evaporator Under Transient Heat Loads." Journal of Electronics Packaging, 143(4): 041104.
27. *Robbins, C. A.,* K. H. Carlson, *B. M. Grauberger,* T. M. Bandhauer, S. D. Garland, and T. Tong (2021). "Spatial Analysis of Membrane Distillation Powered by Waste Heat from Natural Gas Compressor Stations for Unconventional Oil and Gas Wastewater Treatment in Weld County, Colorado." ACS ES&T Engineering, 1,2, 192-203.
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29. *Robbins, C. A., B. M. Grauberger,* S. D. Garland, K. H. Carlson, S. Lin, T. M. Bandhauer, and T. Tong (2020). "On-Site Treatment Capacity of Membrane Distillation Powered by Waste Heat or Natural Gas for Unconventional Oil and Gas Wastewater in the Denver-Julesburg Basin." Environment International, 145: 106142.
30. *Hobby, D.*, *T. Walker*, A. Rattner, C. Jacobsen, D. Sherrer, and T.M Bandhauer (2020). "Comparison of Experimental and Computational Heat Transfer Characterization of Water Jet Impingement Array with Interspersed Fluid Extraction." Heat Transfer Engineering, 1-16.
31. Braun, R. J., E. Reznicek, C. Cadigan, N. P. Sullivan, R. Danforth, T. M. Bandhauer, S. Garland, D. Olsen, B. Windom, and B. Schaffer (2019). "Development of a Novel High Efficiency, Low Cost Hybrid SOFC/Internal Combustion Engine Power Generator." ECS Transactions, 91(1): 355-360.
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35. *Paudel, A.*, and T. M. Bandhauer (2018). "Technoeconomic analysis of waste heat recovery systems for Wet-Cooled Combined Cycle Power Plants." Applied Thermal Engineering, **143**: 746-758.
36. *Garland, S.*, J. Noall, and T. M. Bandhauer, (2018). "Experimentally Validated Model of a Turbo-Compression Cooling System for Power Plant Waste Heat Recovery." Energy, 156(1): 32-44.
37. *Adler, J.*, and T. M. Bandhauer (2017). "Performance of a High Temperature Diesel Engine." Journal of Energy Resources Technology, 139(6): 062203-1 to 062203-13.
38. *Westhoff, K.*, and T. M. Bandhauer (2016). "A Multi-Functional Electrolyte for Lithium-Ion Batteries: Part I. Non-Boiling Electrochemical Performance." Journal of the Electrochemical Society, **163**(9): A1903-A1913.
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40. Bandhauer, T. M., T. Fuller and S. Garimella (2015). "Electrochemical-Thermal Modeling to Evaluate Battery Thermal Management Strategies: Part I. Side Cooling." Journal of the Electrochemical Society, **162**(1): A125-A136.
41. Bandhauer, T. M., T. Fuller and S. Garimella (2015). "Electrochemical-Thermal Modeling to Evaluate Battery Thermal Management Strategies: Part II. Edge and Internally Cooling." Journal of the Electrochemical Society, **162**(1): A136-A148.
42. Bandhauer, T. M., S. Garimella , and T. F. Fuller (2014). "Temperature Dependent Electrochemical Heat Generation in a Commercial Lithium-Ion Battery." Journal of Power Sources, **247**(1): 618-628.
43. Bandhauer, T. M., and S. Garimella (2013). "Passive, Internal Thermal Management System for Batteries using Microscale Liquid-Vapor Phase Change." Applied Thermal Engineering, **61**: 756-769.
44. Bandhauer, T. M., T. F. Fuller, and S. Garimella (2011). "A Critical Review of Thermal Issues in Lithium-Ion Batteries." Journal of the Electrochemical Society, **158**(3): R1-R25.
45. Agarwal, A., T. M. Bandhauer, and S. Garimella (2010). "Measurement and Modeling of Condensation Heat Transfer in Non-Circular Microchannels." International Journal of Refrigeration, **33**(6): 1169-1179.
46. Bandhauer, T. M., A. Agarwal, and S. Garimella (2006). "Measurement and Modeling of Condensation Heat Transfer Coefficients in Circular Microchannels." Journal of Heat Transfer, **128**(10): 1050-1059

## Refereed Conference Publications

*CSU Research Publications – Student Authors Italicized*

1. Stoll, T., D. Young, and T. M. Bandhauer (2025). "Evaluating the Economic and Environmental Impact of Flexible Fuel CCHP and Grid Peak Shaving for Data Centers." Paper TFEC-2025-55684, Proceedings of the 10th Thermal and Fluid Engineering Conference, Washington, DC.

2. J. Huyett, *Z. Gulumjanli*, *R. Koldyke*, D. R. Herber, T. Bandhauer, C.S. Fernandez, S. F. Martin, J. M. Krupa, and A. R. Awtry (2024). "Engineering and Design of an Integrated Thermal Storage and Carbon Capture System on Calpine's Delta Energy Center." 17th International Conference on Greenhouse Gas Control Technologies, GHGT-17, 20th-24th, October 2024, Calgary, Canada.
3. *Amyx, I.*, *C. Anderson*, *N. Cassada*, D. Funaro, C. Frye, S. Baxamusa, J. Kotovsky, K. Jackson, and T. M. Bandhauer (2024). "High Heat Flux Thermal Managment using CuW Microchannel Heat Sinks and FC3283." 22nd IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems, May 28th – 31st, Denver, CO.
4. *Anderson, C.*, C. Lewinsohn, and T. M. Bandhauer (2024). "Transient Thermal Buffer for Microchannel Flow Boiling Using Gallium Phase Change Material." 22nd IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems, May 28th – 31st, Denver, CO.
5. *Siegel, M.*, *E. Malloy*, J. Huyett, T. M. Bandhauer, A. Salvi, and N. R. Roberts (2024). "Economic and Environmental Assessment of Heat Pump Technology for Greenhouse Gas Emissions Reduction in Steam Production." Paper TFEC-2024-50722, Proceedings of the 9th Thermal and Fluid Engineering Conference, Corvalis, OR.
6. *Mitchel, L.*, S. Garland, D. Olsen, B. Windom, and T. M. Bandhauer (2024). "High Efficiency Air Delivery System for Solid Oxide Fuel Cell Power Generation." 22nd Paper TFEC-2024-50390, Proceedings of the 9th Thermal and Fluid Engineering Conference, Corvalis, OR.
7. Salvi, A., T. M. Bandhauer, N. R. Roberts, E. Malloy, M. Siegl, J. Huyett, D. Joekes, and A. Stark (2024). "Technoeconomic analysis of electrified boiler technologies to decarbonize industrial steam." High-Temperature Heat Pump Symposium, January 23rd to 24th, Copenhagen, DE.
8. B. Limb, *E. Markey*, *R. Vercellino*, J. Huyett, S. Garland, *M. Pisciotta*, P. Psarras, E. Meuleman, N. Fine, M., Abarr, D. R. Herber, J. C. Quinn, and T. Bandhauer (2022). "Evaluating the Economic Viability of NGCC-SWITCC: Natural Gas Combined Cycle System with Integrated Thermal Storage and Carbon Capture." 16th International Conference on Greenhouse Gas Control Technologies, GHGT-16, 23rd-27th, October 2022, Lyon, France.
9. *R. Vercellino, E. Markey*, B. J. Limb, *M.D. Pisciotta*, J. Huyett, S. Garland, T. Bandhauer, J.C. Quinn, P. Psarras, and D.R. Herber (2022). "Control Co-Design Optimization of Natural Gas Power Plants With Carbon Capture and Thermal Storage." In ASME 2022 International Design Engineering Technical Conferences, DETC2022-90021, St. Louis, MO, USA, Aug 2022.
10. *Miguel Valles*, Daniel B. Olsen, Todd Bandhauer, *Zachary Swartwout*, and Bret Windom, "Simulation of a high-efficiency engine fueled by dilute anode tail-gas", Western States Section of the Combustion Institute Meeting, Stanford University, Stanford, CA, March 21–22, 2022.
11. *Zachary Swartwout*, Todd Bandhauer, Bret Windom, Shane Garland, Robert Braun, and Daniel B. Olsen, "Optimizing Efficiency of an SI Engine Fueled by Simulated Exhaust Anode Tail-gas", Western States Section of the Combustion Institute Meeting, Stanford University, Stanford, CA, March 21–22, 2022.

12. *Brandi M. Grauberger*, Garrett M. Cole, *Cristian A. Robbins*, Jason C. Quinn, Tiezheng Tong, and Todd M. Bandhauer1 (2022). "Feasibility of Waste Heat Capture, Storage, and Transportation for Utilization in Decentralized Produced Water Treatment", Paper TFEC-2022-41231, Proceedings of the 7th Thermal and Fluid Engineering Conference, Las Vegas, NV.
13. Braun, R. J., G. Floerchinger, D. Wahlstrom, N. P. Sullivan, T. Vincent, R. Danforth, T. M. Bandhauer, D. Olsen, and B. Windom (2021). "Development of a High Efficiency, Low Cost Hybrid SOFC/Internal Combustion Engine Power Generator." ECS Meeting Abstracts, Volume MA2021-03, 17th International Symposium on Solid Oxide Fuel Cells (SOFC-XVII) July 18, 2021 - July 23, 2021.
14. Garland, S., and T. M. Bandhauer, (2020). "Experimental Performance of a Turbo-Compression Cooling System Operating under Power Plant Conditions." Paper TFEC-2020-32367, Proceedings of the 5th Thermal and Fluid Engineering Conference, New Orleans, LA.
15. *Simon, J. R.,* and T. M. Bandhauer, (2020). "Optimization of Plate Frame Evaporator for a Standard Vapor Compression Cycle." Paper TFEC-2020-32428, Proceedings of the 5th Thermal and Fluid Engineering Conference, New Orleans, LA.
16. *Padhi, G., A. Balu,* A., S. Garland, T. M. Bandhauer, D. Olsen, and B. Windom, "Combustion Modelling and Simulation of Dilute Syngas Fuels in a CFR Engine", Western States Section of the Combustion Institute, Albuquerque, New Mexico, October 14–15, 2019.
17. *Balu, A.,* T. M. Bandhauer, B. Windom, S. Garland, R. Braun, D. Olsen, "Operation of a SI Engine Fueled by Simulated Exhaust Anode Tail-gas from a SOFC", Western States Section of the Combustion Institute, Albuquerque, New Mexico, October 14-15, 2019.
18. *Countie, M.*, B. Windom, T. Bandhauer, S. Garland, R. Braun, and D. Olsen, "Predictive Modeling of a Spark Ignition SOFC Anode Tailgas Engine", Western States Section of the Combustion Institute, Albuquerque, New Mexico, October 14-15, 2019.
19. *Balu, A.,* M. Castro, G. Padhi, T. M. Bandhauer, B. Windom, S. Garland, R. Braun, and D. Olsen, "Optimization and Simulation of a CFR Engine Fueled by Dilute Anode Tail-Gas." Paper ICEF2020, Proceedings of the ASME 2020 Internal Combustion Engine Division Fall Technical Conference, Denver, CO, November 1-4, 2020.
20. Young, D., *N. Roberts*, and T. M. Bandhauer, (2019). "Performance analysis and Optimization of a Waste Heat Driven Turbo-Compression System at Varying Heat Sink Temperatures." Paper PRTEC-24184, Extended Abstracts of The Second Pacific Rim Thermal Engineering Conference, Maui, HI.
21. S. Garland, D. Young, *J. Simon*, A. Rattner, and T. M. Bandhauer, (2019). "Performance Comparison between ORVC and Absorption Technologies over a Range of Ambient Conditions." Paper PRTEC-24185, Extended Abstracts of The Second Pacific Rim Thermal Engineering Conference, Maui, HI.
22. *Simon, J.*, and T. M. Bandhauer, (2019). "Evaluation of Heat Transfer Correlations for Compact Plate and Frame Heat Exchangers." Paper TFEC-2019-28123, Proceedings of the 4th Thermal and Fluid Engineering Conference, Las Vegas, NV.

23. *Grauberger, A.*, and T. M. Bandhauer, (2019). "Technoeconomic Analysis of Tri-Generation in Computer, Electronics, and Electrical Equipment Manufacturing" Paper TFEC-2019-28122, Proceedings of the 4th Thermal and Fluid Engineering Conference, Las Vegas, NV.
24. Garland, S., D. Young, and T. M. Bandhauer, (2019). "Comparison Technique for Thermodynamic Performance of Heat Activated Cooling Systems" Paper TFEC-2019-27594, Proceedings of the 4th Thermal and Fluid Engineering Conference, Las Vegas, NV.
25. *Hobby, D.*, *T. Walker*, A. Rattner, C. Jacobsen, D. Sherrer, and T. M. Bandhauer (2018). "Comparison of Experimental and Computational Heat Transfer Characterization of Water Jet Impingement Array with Interspersed Fluid Extraction." 16th Micro and Nano Flows Conference, Atlanta, GA.
26. *Hobby, D.*, D. Sherrer, C. Jacobsen, and T. M. Bandhauer, (2018). "Thermal Performance of Micro-Jet Impingement Device with Parallel Flow, Jet-Adjacent Fluid Removal." Paper ICNMM2018-7664. Proceedings of 16th International Conference on Nanochannels, Microchannels, and Minichannels, Dubrovnik, Croatia.
27. *Hoke, J.,* J. Kotovsky, P. Fontejon, J. Hamilton, and T. M. Bandhauer (2018). "Heat Transfer Enhancement in Compact Phase Change Microchannel Heat Exchangers for High Flux Laser Diodes." Paper ICNMM2018-7665. Proceedings of 16th International Conference on Nanochannels, Microchannels, and Minichannels, Dubrovnik, Croatia.
28. *Paudel, A.*, and T. M. Bandhauer, (2018). "Techno-economic Study of Waste Heat Recovery Strategies for Natural Gas Combined Cycle Power Plants." Paper TFEC-2018-21619, Proceedings of the 3rd Thermal and Fluid Engineering Conference, Fort Lauderdale, FL.
29. *Young, D.*, and T. M. Bandhauer, (2018). "Technoeconomic Optimization of Turbo-compression Cooling Systems Driven by Engine Coolant Waste Heat." Paper TFEC-2018-21605, Proceedings of the 3rd Thermal and Fluid Engineering Conference, Fort Lauderdale, FL.
30. *Paudel, A.*, *J. Richey*, and T. M. Bandhauer, (2018). "Determining the Apparent Cost of Water for Thermoelectric Power Plants." Paper TFEC-2018-21609, Proceedings of the 3rd Thermal and Fluid Engineering Conference, Fort Lauderdale, FL.
31. *Garland, S.*, *A. Grauberger*, *J. Simon*, *D. Young*, K. Eisemann, R. Fuller, J. Noall, J. Shull, R. Sami, M. Reinke, L. Gabbey, and T. M. Bandhauer, (2018). "Experimental Investigation of a Waste Heat Driven Turbo-Compression Chiller." Paper TFEC-2018-21617, Proceedings of the 3rd Thermal and Fluid Engineering Conference, Fort Lauderdale, FL.
32. *Gibson, S.*, *D. Young*, and T. M. Bandhauer (2017). "Technoeconomic Optimization of Turbocompression Cooling Systems." Paper IMECE2017-70934, International Mechanical Engineering Congress and Exposition, Tampa, FL.
33. *Garland, S.*, T. M. Bandhauer, and J. Noall (2017). "Dry Air Turbo-Compression Cooling." Paper TFEC-IWHT2017-18302, Proceedings of the 2nd Thermal and Fluid Engineering Conference, Las Vegas, NV.
34. *Paudel, A.*, and T. M. Bandhauer, (2017). "Simulation of NGCC Power Plant at Elevated Temperatures." Paper TFEC-IWHT2017-18345, Proceedings of the 2nd Thermal and Fluid Engineering Conference, Las Vegas, NV.

35. *Westhoff, K.*, and T. M. Bandhauer (2016). "Multi-Functional Electrolyte for Thermal Management of Lithium-Ion Batteries." Paper 2016-59460, Proceedings of the 14th Fuel Cell Science, Engineering, and Technology Conference, Charlotte, NC.
36. Bandhauer, T. M., and *S. Garland* (2016). "Dry Air Turbo-Compression Cooling." Paper 2016-59152, Proceedings of the ASME 2016 Power and Energy Conference, Charlotte, NC.
37. *Bevis, T.*, and T. M. Bandhauer (2016). "High Heat Flux Boiling Heat Transfer for Laser Diode Arrays." Paper ICNMM2016-7947, Proceedings of ICNMM2016.Washington, DC.

*Non-CSU Research Publications*

38. Bandhauer, T. M., A. Agarwal, and S. Garimella (2005). "Measurement and Modeling of Condensation Heat Transfer Coefficients in Circular Microchannels." Proceedings of ICMM2005 Toronto, ON.
39. Garimella, S., A. Agarwal, and T. M. Bandhauer (2005). "Channel Size Based Measurement Techniques for Condensation Heat Transfer Coefficients in Mini- and Micro-Channels." Proceedings of IMECE2005 Orlando, FL.
40. Garimella, S. and T. M. Bandhauer (2001). "Measurement of Condensation Heat Transfer Coefficients in Microchannel Tubes." Proceedings of IMECE2001 New York, NY.

## Conference Presentations without Papers

*CSU Research – Student Authors Italicized*

1. Salvi, A., T. M. Bandhauer, N. Roberts, *E. Malloy*, *M. Siegel*, J. Huyett, D. Joekes, and A. Stark (2024). "Technoeconomic analysis of electrified boiler technologies to decarbonize industrial steam." High Temperature Heat Pump Symposium, January 23rd-24th, Copenhagen, Denmark.
2. *Platt, B.*, and T. M. Bandhauer (2023). "Comparison Between Organic Rankine Vapor Compression Configurations With Variable Operating Conditions." ASME 17th International Conference on Energy Sustainability, July 10th - 12th , Washington, DC.
3. *R. Vercellino*, *E. J. Markey*, B. J. Limb, *M. D. Pisciotta*, J. Huyett, S. D. Garland, T. M. Bandhauer, J. C. Quinn, P. Psarras, D. R. Herber. 'Realizing profitable carbon capture on natural gas plants with thermal energy storage through optimization-based decision support.' 2022 International Symposium on Sustainable Systems and Technology (Poster), Pittsburgh, PA, USA, Jun 2022.
4. *E. J. Markey*, *R. Vercellino*, B. J. Limb, *M. D. Pisciotta*, J. Huyett, S. D. Garland, P. Psarras, D. R. Herber, J. C. Quinn, T. M. Bandhauer. 'Economic viability of natural gas power plants with carbon capture and electrically charged thermal energy storage.' 2022 International Symposium on Sustainable Systems and Technology, Pittsburgh, PA, USA, Jun 2022.
5. B. J. Limb, *E. J. Markey*, *R. Vercellino*, S. D. Garland, *M. D. Pisciotta*, P. Psarras, D. R. Herber, T. M. Bandhauer, J. C. Quinn. 'Economic viability of thermal energy storage to support flexible operation of natural gas power plants with carbon capture.' 2022 Thermal and Fluids Engineering Conference, Las Vegas, NV, USA, May 2022.
6. *M. D. Pisciotta*, B. J. Limb, *E. J. Markey*, *R. Vercellino*, S. D. Garland, P. Psarras, D. R. Herber, T. M. Bandhauer, J. C. Quinn. Flexible Carbon Capture via Thermal Energy Storage for Natural Gas Electricity Production.' 2022 Gordon Research Conference on Carbon Capture, Utilization and Storage (Poster), Ventura, CA, USA, April 2022.

7. *N. Cassada*, *C. Anderson*, *L. Kubicek*, *D. Hobby*, C. Frye, I. Ladner, S. Baxamusa, and J. Kotovsky, and T. M. Bandhauer (2022). "Immersion Cooling of Laser Diodes for High Brightness Applications." 2022 Annual Directed Energy Science and Technology Symposium, Mobile, AL, April 2022.
8. *C. Anderson*, M. Fish, K. McCarthy, J. Williams, and T. M. Bandhauer (2022). "Experimental and Computational Study of a Multi-microchannel Evaporator under Transient Heating Conditions." 2022 Annual Directed Energy Science and Technology Symposium, Mobile, AL, April 2022.
9. B. J. Limb, *E. Markey*, S. Garland, *R. Vercellino*, *M.D. Pisciotta*, P. Psarras, J. Wilcox, D.R. Herber, T. Bandhauer, and J.C. Quinn (2021). "Economic Viability of Flexible Carbon Capture for Natural Gas Power Plants." TechConnect World Innovation Conference & Expo, Washington, DC, October 2021.
10. T. Bandhauer, J.C. Quinn, D.R. Herber, B. J. Limb, S. Garland, *E. Markey*, *R. Vercellino*, E. Meuleman, N. Fine, T. Silverman, B. Dinsdale, P. Psarras, *M.D. Pisciotta*, M. Abarr, C. Little, and J. Kreuder (2021). "NGCC-SWITCC: Natural Gas Combined Cycle System With Integrated Thermal storage and Carbon Capture." TMECS Workshop, San Antonio, TX, August 2021.
11. B. J. Limb, *E. Markey*, S. Garland, *R. Vercellino*, *A. K. Sundarrajan*, *M. D. Pisciotta*, J. Wilcox, D. R. Herber, T. Bandhauer, and J. C. Quinn (2021). "The future of carbon capture: A story of the tortoise and the hare." International Symposium on Sustainable Systems and Technology, Virtual, June 2021.
12. *Richey, J., C. Anderson,* M. Fish, and T.M Bandhauer (2020). "Transient Heating Experiments on a Multi-Microchannel Evaporator." Annual Directed Energy Science and Technology Symposium, West Point, NY.
13. *Hobby, D., J. Hoke*, J. Fair, R. Deri, P. Leisher, J. Kotovsky, and T.M Bandhauer (2019). "Power and Thermal Management SWaP Analysis for Generic, Mobile Directed Energy Platforms." Annual Directed Energy Science and Technology Symposium, Destin, FL.
14. *Paudel, A.*, and T. M. Bandhauer, (2018). "Techno-economic Study of Waste Heat Recovery Strategies for Dry Cooled Combined Cycle Power Plants." ASME Power and Energy Conference, Lake Buena Vista, FL.
15. *Richey, J.*, *D. Young*, *A. Paudel*, T. M. Bandhauer (2018). "Steam-Driven Cooling for Peak Electricity Load Reduction." ASME Power and Energy Conference, Lake Buena Vista, FL.
16. *Garland, S.*, J. Noall, and T. M. Bandhauer, (2018). "Experimentally Validated Model for Waste Heat Driven Turbo-Compression Chilling Systems." ASME Power and Energy Conference, Lake Buena Vista, FL. *Hobby, D.*, and T. M. Bandhauer (2017). "Thermal Performance of Micro-Jet Impingement Device with Parallel Flow, Jet-Adjacent Fluid Removal." ASME Summer Heat Transfer Conference, Bellevue, WA.
17. *Hoke, J., T. Bevis*, J. Kotovsky, and T. M. Bandhauer (2017). "Compact Phase Change Microchannel Heat Exchanger for High Flux Laser Diode Systems." ASME Summer Heat Transfer Conference, Bellevue, WA.
18. *Burk, B.*, T. Grumstrup, *T. Bevis*, J. Kotovsky, and T. M. Bandhauer (2017). "Conjugate Heat Transfer Modeling in a Two-Phase Microchannel Array with Extreme Heat Fluxes." ASME International Mechanical Engineering Congress and Exposition, Tampa, FL.

19. *Adler, J.*, and T. M. Bandhauer (2015). "Performance of a High Temperature Diesel Engine." SAE International World Congress, Detroit, MI.

*Non-CSU Research*

20. Bandhauer, T. M., and S. Garimella (2012). "Passive, Internal Thermal Management System for Batteries using Microscale Liquid-Vapor Phase Change." ASME International Mechanical Engineering Congress & Exposition, Houston, TX.
21. Bandhauer, T. M., S. Garimella, and T. F. Fuller (2010). "A Coupled 3-D Electrochemical, Thermal, and Electrical Model for Spirally-Wound Lithium-Ion Batteries." 218th Electrochemical Society Meeting, Las Vegas, NV.
22. Bandhauer, T. M., S. Garimella, and T. F. Fuller (2008). "An Electrochemical-Thermal Model for Flat, Spirally-Wound Lithium-Ion Batteries." 214th Electrochemical Society Meeting, Honolulu, HI.

## Issued Patents

*CSU Research – Student Authors Italicized*

1. Roberts, N. R., T. M. Bandhauer, A. Salvi, A. Stark, Air source heat pump system and method of use for industrial steam generation, patent number 12,449,121, issued October 21, 2025.
2. Bandhauer, T. M., D. Herber, B. Limb, J. Quinn, S. Garland, *E. Markey*, and *R. Vercellino,* Synergistic heat pumped thermal storage and flexible carbon capture system, patent number 12,264,599, issued April 1, 2025.
3. Kotovsky, J., S. Baxamusa, C. Frye, I. Ladner, T. Spinka, D. Funaro, *D. Hobby*, *C. Anderson*, and T. M. Bandhauer, Systems and methods for laser diode array having integrated microchannel cooling, patent number 11,962,129, issued April 16, 2024.
4. Bandhauer, T. M., D. N. Young, S. D. Garland, *A. M. Grauberger*, *J. R. Simon*, *N. R. Roberts*, *S. Colosimo*, Ultra efficient turbo-compression cooling systems, patent number 11,466,907 B2, issued October 11, 2022.
5. Braun, R., T. Bandhauer, D. Olsen, B. Windom, High Efficiency Solid Oxide Fuel Cell – Internal Combustion Engine Hybrid Power System, patent number 11,145,880, issued October 12, 2021.
6. Sherrer, D. L., C. R Jacobsen., *D. R. Hobby*, and T. M. Bandhauer, Cooling apparatus and methods of use, patent number 10,533,809, issued January 14, 2020.
7. Bandhauer, T. M., and T. P. Grumstrup, Ultra-efficient turbo-compression cooling, patent number 10,294,826 , issued May 21, 2019.
8. Bandhauer, T. M., Multi-functional electrolyte for thermal management of lithium-ion batteries, patent number 10,128,530, April 16, 2018.
9. Bandhauer, T. M., Multi-functional electrolyte for thermal management of lithium-ion batteries, patent number 9,947,961, August 3, 2017.

*Non-CSU Research*

10. Baumann, T. F., J. H. Satcher, Jr., J. C. Farmer, T. Bandhauer, Adsorption cooling system using metal organic frameworks, patent number 11,786,883, issued October 17, 2023.

11. Baumann, T., J. H. Satcher Jr., J. C. Farmer, and T. M Bandhauer, Adsorption cooling system using carbon aerogel, patent number 11,000,823, issued May 11, 2021.
12. Baumann, T., J. H. Satcher Jr., J. C. Farmer, and T. M Bandhauer, Adsorption cooling system using metal organic frameworks, patent number 10,994,258, issued May 4, 2021.
13. Bandhauer, T. M., R. J. Deri, J. W. Elmer, J. Kotovsky, and S. Patra, High flux diode packaging using passive microscale liquid-vapor phase change, patent number 9,768,584, September 19, 2017.
14. Bandhauer, T. M., and J. C. Farmer, Battery management systems with thermally integrated fire suppression, patent number 9,704,384, July, 11 2017.
15. Bandhauer, T. M., and J. C. Farmer, Li-ion battery thermal runaway suppression system using microchannel coolers and refrigerant injections, patent number 9,490,507, November 8, 2016.
16. Bandhauer, T. M., M. J. Reinke, and J. Valensa, High temperature fuel cell system with integrated heat exchanger network, patent number 9,413,017, issued August 9, 2016.
17. Farmer, J. C., and T. M. Bandhauer, Battery management system with distributed wireless sensors, patent number 9,267,993, February 23, 2016.
18. Farmer, J. C., and T. M. Bandhauer, Energy storage management system with distributed wireless sensors, patent number 9,209,501, December 8, 2015.
19. Bandhauer, T. M., M. J. Reinke, and J. Valensa, High temperature fuel cell system with integrated heat exchanger network, patent number 8,691,462, issued April 4, 2014.
20. Krause, C. L., K. H. Nguyen, B. Balasubramanian, Y. Lin, J. Valensa, M. Reinke, M. G. Voss, and T. M. Bandhauer, Process and apparatus for thermally integrated hydrogen generation system, patent number 7,964,176, issued June 2, 2011.
21. Bandhauer, T. M., M. J. Reinke, and J. Valensa, High temperature fuel cell system with integrated heat exchanger network, patent number 7,858,256, issued December 28, 2010.
22. Reinke, M. J., J. Valensa, T. M. Bandhauer, N. Siler, M. G. Voss, M. McGregor, and D. C. Granetzke, Highly integrated fuel processor for distributed hydrogen production, patent number 7,520,908, issued April 21, 2009.
23. Reinke, M. J., J. Valensa, T. M. Bandhauer, N. Siler, M. G. Voss, M. McGregor, and D. C. Granetzke, Highly integrated fuel processor for distributed hydrogen production, patent number 7,520,907, issued April 21, 2009.
24. Reinke, M. J., J. Valensa, T. M. Bandhauer, N. Siler, M. G. Voss, M. McGregor, and D. C. Granetzke, Highly integrated fuel processor for distributed hydrogen production, patent number 7,494,516, issued February 24, 2009.
25. Reinke, M. J., J. Valensa, T. M. Bandhauer, N. Siler, M. G. Voss, M. McGregor, and D. C. Granetzke, Highly integrated fuel processor for distributed hydrogen production, patent numbers 7,494,518, issued February 24, 2009.

### Non-Provisional, Full Patent Applications

*CSU Research Publications – Student Authors Italicized*

1. Todd M Bandhauer, Daniel Herber, Braden Limb, Jason Quinn, Shane Garland, Ethan Markey, Roberto Vercellino, Miles Abarr, Joe Huyett (2025). Synergistic heat pumped thermal storage and flexible carbon capture system, patent application number: 18704419, April 17, 2025.
2. Bandhauer, T., D. R. Hobby, and Z. H. Gilvey (2025). Jet impingement cooling systems and related methods of cooling high heat flux devices, patent application number: 18843243, March 27, 2025.
3. Bandhauer, T., and N. Roberts (2024). Modular High-Performance Turbo-Compression Cooling, patent application number: 18691113, November 28, 2024.
4. Todd M Bandhauer, Nickolas Roberts, Ashwin Salvi, and Addison Stark, Air source heat pump system and method of use for industrial steam generation, patent application number: 18324066, September 21, 2023.
5. Todd M Bandhauer, Daniel Herber, Braden Limb, Jason Quinn, Shane Garland, Ethan Markey, Roberto Vercellino, Synergistic heat pumped thermal storage and flexible carbon capture system, patent application number: 18034469, December 7, 2023.
6. Todd M. Bandhauer, David R. Hobby, and Zachary H. Gilvey, Jet impingement cooling systems and related methods of cooling high heat flux devices, patent application number: 17759799, March 2, 2023.
7. Miles Abarr, Todd Bandhauer, Daniel Herber, Braden Limb, Joe Huyett, Jason Quinn, *Ethan Markey*, and *Roberto Vercellino*, Synergistic heat pumped thermal storage and flexible carbon capture system, patent application number: PCT/US2022/047763, October 25, 2022.
8. T. Bandhauer and N. Roberts, Modular High-Performance Turbo-Compression Cooling, patent application number: PCT/US2022/044325, September, 21, 2022.
9. Todd M. Bandhauer, Nickolas Roberts, Ashwin Salvi, and Addison Stark, Air source heat pump system and method of use for industrial steam generation, patent application number: PCT/US2022/072937, June 14, 2022.
10. Todd Bandhauer, Daniel Herber, Braden Limb, Jason Quinn, Shane Garland, *Ethan Markey*, *Athul Sundarrajan*, and *Roberto Vercellino*, Synergistic heat pumped thermal storage and flexible carbon capture system, patent application number: PCT/US2021/072129, October 29, 2021
11. Todd M. Bandhauer, David R. Hobby, and Zachary H. Gilvey, Jet impingement cooling devices, systems, and methods, patent application number: PCT/US2021/015521, January 28, 2021.
12. Kotovsky, J., S. H. Baxamusa, C. D. Frye, I. S. Ladner, T. M. Spinka, D. J. Funaro, *D. R. Hobby*, *C. D. Anderson*, T. Bandhauer, System and Method for Laser Diode Array Having Integrated Microchannel Cooling, patent application number: 20220329048, April 9, 2021.
13. Bandhauer, T. M., D. N. Young, S. D. Garland, *A. M. Grauberger*, *J. R. Simon*, *N. R. Roberts*, *S. Colosimo*, Ultra efficient turbo-compression cooling systems, Application number: 20210156597, May, 27, 2021.
14. Sherrer, D. L., C. R Jacobsen., *D. R. Hobby*, and T. M. Bandhauer, Cooling apparatus and methods of use, patent application 20200011620, January 9, 2020.

15. Bandhauer, T. M., Multi-functional electrolyte for thermal management of lithium-ion batteries, patent application 20180233774, August 16, 2018.
16. Bandhauer, T. M., Multi-functional electrolyte for thermal management of lithium-ion batteries, patent application 20170346134, November 30, 2017.
17. Bandhauer, T. M., T. P. Grumstrup, and *D. R. Hobby*, Method and Apparatus for Cooling Integrated Circuits, patent application 20170250123, August 31, 2017.
18. Bandhauer, T. M., and T. P. Grumstrup, Ultra-efficient turbo-compression cooling, patent application 20170045272, February 16, 2017.

*Non-CSU Research*

19. Milkie, J., T. M. Bandhauer, A. Salvi, A. Stark, N. Roberts, J. Paulman, E. Boyd, R. Fuller (2023). Flexible High-Temperature, High-Efficiency Industrial Steam Heat Pump. 63566-702.101. Submitted March 27, 2023.
20. Baumann, T. F., J. R. Satcher, J. C. Farmer, and T. M. Bandhauer, Adsorption cooling system using metal organic frameworks, patent application 20210299633, September 30, 2021.
21. Bandhauer, T. M., R. J. Deri, J. W. Elmer, J. Kotovsky, and S. Patra, High flux diode packaging using passive microscale liquid-vapor phase change, patent application 20160315445, October 27, 2016.
22. Bandhauer, T. M., Thermally integrated concentrating solar power system with a fluidized solid particle receiver, patent application 2015345480, March 4, 2014.
23. Bandhauer, T. M., M. J. Reinke, and J. Valensa, High temperature fuel cell system with integrated heat exchanger network, patent application 20140186729, July 3, 2014.
24. Bandhauer, T. M., and J. C. Farmer, Battery management systems with thermally integrated fire suppression, patent application 20130316198, November 28, 2013.
25. Farmer, J. C., and T. M. Bandhauer, Energy storage management system with distributed wireless sensors, patent application 20130314242, November 28, 2013.
26. Farmer, J. C., and T. M. Bandhauer, Battery management system with distributed wireless sensors, patent application 20130314094, November 28, 2013.
27. Bandhauer, T. M., and J. C. Farmer, Li-ion battery thermal runaway suppression system using microchannel coolers and refrigerant injections, patent application 20130312947, November 28, 2013.
28. Baumann, T. F., J. R. Satcher, J. C. Farmer, and T. M. Bandhauer, Adsorption cooling system using carbon aerogel, patent application 20130283847, October 31, 2013.
29. Baumann, T. F., J. R. Satcher, J. C. Farmer, and T. M. Bandhauer, Adsorption cooling system using metal organic frameworks, patent application 20130283846, October 31, 2013.
30. Yin, J., M. J. Wilson, S. B. Memory, S. J. Collier, and T. M. Bandhauer, Refrigeration system having heat pump and multiple modes of operation, patent application 20080302113, December, 11, 2008.

31. Wilson, M. J., S. B. Memory, J. Yin, J. P. Wattelet, S. J. Collier, K. Traeger, and T. M. Bandhauer, Heat exchange system for vehicles and method of operating the same, patent application 20080245503, October 9, 2008.
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33. Bandhauer, T. M., M. J. Reinke, and J. Valensa, High temperature fuel cell system with integrated heat exchanger network, patent application 20060251939, November 9, 2006.
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35. Bandhauer, T. M., M. J. Reinke, and J. Valensa, High temperature fuel cell system with integrated heat exchanger network, patent application 20060248799, November 9, 2006.
36. Reinke, M. J., J. Valensa, T. M. Bandhauer, N. Siler, M. G. Voss, M. McGregor, D. C. Granetzke, Highly integrated fuel processor for distributed hydrogen production, patent application 20050241232, November 3, 2005.
37. Bandhauer, T. M., M. G. Voss, N. Siler, M. McGregor, and M. J. Reinke, Fuel humidifier and pre-heater for use in a fuel cell system, patent application 20050221137, October 6, 2005.
38. Reinke, M. J., J. Valensa, T. M. Bandhauer, N. Siler, M. G. Voss, M. McGregor, D. C. Granetzke, Highly integrated fuel processor for distributed hydrogen production, patent application 20050217180, October 6, 2005.
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### CSU Invention Disclosures

1. Young, D., T. M. Bandhauer. *B. Platt*, and J. R. Simon (2025). Free spinning turbine in a motorized turbo-compressor in the Turbo-Compression Cooling System. Disclosure INV25-103. Submitted June 9, 2025.
2. Young, D., T. M. Bandhauer, N. R. Roberts, *A. Grauberger*, *B. Platt*, J. R. Simon (2025). Alternate configurations for power boosted turbo-compression cooling system with second compressor. Disclosure INV25-101. Submitted June 6, 2025.
3. Young, D., and T. M. Bandhauer (2025). Electrified Turbo-Compressor for Turbo-Compression Cooling. Disclosure INV25-100. Submitted June 6, 2025.
4. Young, D., T. M. Bandhauer, *T. Stoll*, and *B. Platt* (2025). Hybrid Turbo-Compression Cooling System for High Efficiency Data Centers. Disclosure INV25-075. Submitted April 7, 2025.
5. Huyett, J., *Ryan, K. P.*, and T. M. Bandhauer (2024). Liquid Ingestion Mitigation Strategy for Vapor Compression Cycles. Disclosure INV25-006. Submitted July 24, 2024.

6. Bandhauer T. M. (2024). Steam Generation using a Combined Heat and Power System with a Waste and Ambient Heat Driven Heat Pump. Disclosure INV24-079. Submitted May 16, 2024.
7. Lewinsohn, C., S. Garland, and T. M. Bandhauer (2023). Reactive Metal Energy Conversion System. Disclosure INV24-012. Submitted October 5, 2023.
8. Bandhauer, T. M., *E. Markey*, S. Garland, J. Huyett, M. Abarr, B. Limb, *R. Vercellino*, J. Quinn, D. Herber (2022). Electric Resistance Heated Thermal Energy Storage for Flexible Carbon Capture. Disclosure INV22-069. Submitted June 16, 2022.
9. Bandhauer, T. M., N. Roberts, A. Salvi, and A. Stark (2021). Industrial Steam Production with a High Efficiency Air Source Heat Pump. Disclosure INV22-042. Submitted December 3, 2021.
10. Bandhauer, T. M., and *B. Platt* (2021). Electrified Thermal Energy Storage Integrated with Turbo-Compression Cooling. Disclosure INV22-041. Submitted November 23, 2021.
11. Bandhauer, T. M., *Z. Gilvey*, *D. Hobby* (2021). Vertical through jet impingement cooling. Disclosure INV22-027. Submitted October 28, 2021.
12. Bandhauer, T. M., and N. Roberts (2021). Modular High-Performance Turbo-Compression Cooling. Disclosure INV22-019. Submitted September 20, 2021.
13. Bandhauer, T. M., and A. Stark (2021). Industrial Steam Production with a High Efficiency Air Source Heat Pump. Disclosure INV21-082. Submitted April 29, 2021.
14. *Anderson, C.*, T. M. Bandhauer, *D. R. Hobby* (2021). Integrated microchannel cooling system for laser diode array. Disclosure INV21-065. Submitted February 23, 2021.
15. Bandhauer, T. M., S. Garland, D. Herber, B. Limb, *E. Markey*, J. Quinn, *A. K. Sundarrajan*, *R. Vercellino* (2020). Thermal Storage Configurations for NGCC-SWITCC. Disclosure INV21-027. Submitted October 5, 2020.
16. Bandhauer, T. M., *Z. Gilvey*, *D. Hobby* (2019). Air manifold system. Disclosure INV20-056. Submitted December 3, 2019.
17. Bandhauer, T. M., *Z. Gilvey*, *D. Hobby* (2019). Advanced electronics cooling. Disclosure INV20-037. Submitted October 23, 2019.
18. Bandhauer, T. M., *S. Colosimo*, *A. Grauberger*, *N. Roberts*, *J. Simon III*, D. Young Young (2019). Waste heat driven system to enhance performance of vapor compression systems. Disclosure INV20-021. Submitted August 24, 2019.
19. Bandhauer, T. M., *S. Colosimo*, S. Garland, *A. Grauberger*, *N. Roberts*, *J. Simon III*, D. Young (2019). Power Dense Turbo-Compression Cooling Driven by Waste Heat. Disclosure INV20-020. Submitted August 23, 2019.
20. Bandhauer, T. M., *S. Colosimo*, S. Garland, *A. Grauberger*, *N. Roberts*, *J. Simon III*, D. Young (2019). Turbo-compression cooling for ultra low temperature waste heat recovery. Disclosure INV20-018. Submitted August 22, 2019.
21. Bandhauer, T. M., *D. Hobby*, C. Jacobsen, and D. Sherrer (2018). Proprietary Title. Submitted January 24, 2018.
22. Bandhauer, T. M., and *D. Hobby* (2017). Proprietary Title. Submitted March 27, 2017.

23. Bandhauer, T. M., and *D. Hobby* (2017). Proprietary Title. Submitted March 27, 2017.
24. Bandhauer, T. M., *D. Hobby*, and T. P. Grumstrup (2015). Proprietary Title. Submitted September 15, 2015.
25. Bandhauer, T. M., *D. Hobby*, and T. P. Grumstrup (2015). Proprietary Title. Submitted September 15, 2015.
26. Bandhauer, T. M., *D. Hobby*, and T. P. Grumstrup (2015). Proprietary Title. Submitted September 15, 2015.
27. Bandhauer, T. M., and T. P. Grumstrup (2015). "Ultra-efficient Turbo-compression Cooling System." Submitted August 6, 2015.
28. Bandhauer, T. M., T. H. Bradley, D. B. Olsen, T. B. Holland, *J. E. Adler* (2014). "Ultra-high temperature engine waste heat recovery system," ID 14-068. Submitted March 5, 2014.
29. Bandhauer, T. M. "Internal Cooling of Lithium-ion Batteries using a Volatile Electrolyte Component." Submitted August 19, 2013.
30. Bandhauer, T. M. "PEM Fuel Cell System with a Thermally Integrated Ethanol Reformer." Submitted August 19, 2013.

## Technical Reports

*CSU Research – Student Authors Italicized*

1. Joe Huyett, Braden J Limb, *Ethan J Markey*, *Roberto Vercellino*, Daniel R Herber, Jason C Quinn, Todd M Bandhauer, Shane Garland, Miles Abarr, Erik Meuleman, Nathan Fine, Peter Psarras, *Maxwell Pisciotta* (2023). "Synergistic Heat Pumped Thermal Storage and Flexible Carbon Capture System," DOE-CSU-01306-1.
2. Grumstrup, T. P., *T. Bevis, P. Harvey*, and T. M. Bandhauer (2015). "Thermal Management of High Heat Flux Laser Diodes using Liquid-Vapor Phase Change," Colorado State University, pp. 34.
3. *Adler, J., T. Bevis*, and T. M. Bandhauer (2014). "Refrigerated Intermodal Container Testing Summary," Colorado State University, pp. 54.
4. *Bevis, T., J. Adler*, T. M. Bandhauer (2014). "Refrigerated Intermodal Container Thermal Analysis," Colorado State University, pp. 47.
5. Bandhauer, T. M., and *J. Adler* (2013). "Alternative Methods for Tritium Recovery from the LIFE Lithium Blanket – FY13 Final Report," Colorado State University, project 53-5370730, pp. 26.

*Non-CSU Research*

1. Farmer, J., J. Chang, J. Zumstein, J. Kovotsky, F. Puglia, A. Dobley, G. Moore, S. Osswald, K. Wolf, J. Kaschmitter, S. Eaves, and T. M. Bandhauer (2013). "Distributed Arrays of Wireless Sensors for High-Capacity Lithium-Ion Battery Packs," Lawrence Livermore National Laboratory, pp. 20.
2. Bandhauer, T. M, S. Garimella, and T. F. Fuller (2012). "Electrochemical-Thermal Modeling and Microscale Phase Change for Passive Internal Thermal Management of Lithium Ion Batteries," Sandia National Laboratories, SAND2012-0074, pp. 324.

## Invited Seminars

1. Energy Impact Partners Industrial Decarbonization Summit, Electrifying Heat Showcase, Invited Seminar, March 2025.
2. Decarbonization Research Consortium Meeting, "Turbocompression Cooling," Invited Seminar, December 2024.
3. The National Summit on Combined Heat and Power, "Clean Hydrogen and CHP's Role in Decarbonization," Invited Panelist, November, 2022.
4. iTherm 2022, "Challenges and Mitigation Strategies for High Flux Transient Boiling in Microchannels," San Diego, CA, June, 2022.
5. TMECS Workshop, "NGCC-SWITCC: Natural Gas Combined Cycle System With Integrated Thermal storage and Carbon Capture," San Antonio, TX, August 11, 2021.
6. 21st Century Energy Transition Symposium, "Decarbonizing Industrial Heat," Virtual, May 14, 2021.
7. University of Arizona Department of Mechanical and Aerospace Engineering Seminar, "Developing Realizable Energy Systems by Focusing Innovation on Critical Barriers to Adoption." October 11, 2019.
8. DOE Flexible CHP Portfolio Meeting, "Turbo-Compression Cooling System for Ultra Low Temperature Waste Heat Recovery," Clemson University, Charleston, SC, October, 2019.
9. U.S. Army Research Lab, "High Flux Cooling with Two-Phase Microchannel Evaporation." Adelphi, MD, July 17, 2018.
10. USCAR - Innovations for Manufacturing Efficiency, "Waste Heat Recovery and Cooling in Manufacturing." Webinar, October 25, 2017.
11. Advances in Thermal Management, "High Flux Flow Boiling Heat Exchanger for Compact Electronic Systems." Denver, CO, August 9, 2017.
12. Department of Energy, "Utilizing Waste Heat to Improve Power Plant Performance and Reduce Water Consumption." Pittsburg, PA, June 7, 2017.
13. Pennsylvania State University Department of Mechanical Engineering Seminar, "Using Liquid-Vapor Phase Change Processes to Address Interdisciplinary Energy System Challenges." June 6, 2017.
14. ARPA-e Lower Grade Waste Heat Recovery Workshop, "Mechanical Energy Systems for Low Grade Waste Heat Recovery." December 14, 2016.
15. Colorado School of Mines Department of Mechanical Engineering Seminar Series, Golden, CO, "Using Liquid-Vapor Phase Change Processes to Address Interdisciplinary Energy System Challenges." October 25, 2016.
16. 6th Annual 21st Century Energy Transition Symposium, panelist on CSU energy solutions, September 29, 2016.
17. CSU Society of Senior Scholars and Osher Lifelong Learning Institute, Fort Collins, CO, "The Thermal Instability of Lithium-Ion Batteries: Causes, Effects, and Potential Solutions." January 26, 2015.

18. Naval Post Graduate School, Monterey, CA, "The Thermal Instability of Lithium-Ion Batteries: Causes, Effects, and Potential Solutions." April 4, 2014.
19. University of California-Davis, Davis, CA, "From Microscale Phase Change Cooling to Electrochemical-Thermal Modeling of Lithium-Ion Batteries." April 4, 2013.
20. National Renewable Energy Laboratories, Golden, CO, "An Electrochemical-Thermal Model for Flat, Spirally-Wound Lithium-Ion Batteries." July 9, 2009.
21. Sandia National Laboratories, Albuquerque, NM, "An Electrochemical-Thermal Model for Flat, Spirally-Wound Lithium-Ion Batteries." April 16, 2009.
22. ASME Milwaukee Chapter, Milwaukee, WI, "A Fuel Cell APU/$CO_2$ Heat Pump for Non-Idling Heavy-Duty Trucks." November 8, 2006.

## CSU EDUCATIONAL ACTIVITIES

### Ph.D. Students Supervised

1. Nicole Cassada
   Tentative Dissertation Title: High Flux Immersion Cooling System for Laser Diodes
   PhD Candidacy Exam Completion: Summer, 2022
   PhD Preliminary Exam Completion: September 10, 2024
   Expected Graduation: Spring 2026
   Funding: GRA, Spring 2021 to Fall 2023 (Now Full Time at LLNL)

2. Ben Platt
   Dissertation Title: Development of a Hybrid Electric Organic Rankine Vapor Compression Cooling System for Energy System Resiliency
   PhD Candidacy Exam Completion: June 23, 2021
   PhD Preliminary Exam Completion: April 17, 2024
   **Graduation: Summer 2025**
   Funding: GRA, Fall 2020 to Spring 2025

3. Brandi Grauberger
   Dissertation Title: Viability and Sustainability of Desalinating Produced Water in the Oil and Gas Industry
   PhD Candidacy Exam Completion: January 4, 2022
   PhD Preliminary Exam Completion: March 31, 2023
   **Graduation: Summer 2025**
   Funding: GRA, Fall 2020 to Fall 2024

4. Caleb Anderson
   Dissertation Title: Prediction and Mitigation Strategies for Transient Thermal Performance of Low Thermal Resistance Microchannel Evaporators
   PhD Candidacy Exam Completion: June 12, 2020
   PhD Preliminary Exam Completion: January 31, 2022
   **Graduation: Summer, 2024**

Funding: GRA, Summer 2018 to Summer 2025

5. David Hobby
   Dissertation Title: Impingement Cooling of High Flux Electronics
   PhD Candidacy Exam Completion: Fall 2017
   PhD Preliminary Exam Completion: August 5, 2019
   **Graduation: Spring, 2022**
   Funding: GRA, Summer 2016 to Spring 2022
6. Alex Grauberger
   Dissertation Title: Techno-economic Optimization of Turbo-Compression Cooling Systems for Food Processing Operations
   PhD Candidacy Exam Completion: Summer 2019
   PhD Preliminary Exam Completion: March 6, 2020
   **Graduation: Spring, 2022**
   Funding: GRA, Summer 2018 to Fall 2019, GTA Spring 2020, GRA Summer 2020 to Summer 2021

### M.S. Students Supervised

1. Matias Valencia Delgado
   Thesis Title: TBD
   Expected Graduation: Spring, 2027
   Funding: GRA, Summer 2025 to Present
2. Hugo Mettes
   Thesis Title: Optimization of a Pressurized SOFC-ICE-TURBO Hybrid Generation System
   Expected Graduation: Spring, 2026
   Funding: GRA, Fall 2024 to Spring 2026
3. Dalton Moore
   Thesis Title: Techno-economic Analysis and Life Cycle Assessment of a Novel Air-Sourced High-Temperature Heat Pump with Hourly Resolution
   Expected Graduation: Spring, 2026
   Funding: GRA, Fall 2024 to Spring 2026
4. Cyrus Johnston
   Thesis Title: Digital Twin Modeling of an Ambient Air Source Steam Generating Heat Pump for Refrigerant Transition Planning
   Expected Graduation: Spring, 2026
   Funding: GRA, Fall 2024 to Spring 2026
5. Sofia Ananieva
   Tentative Thesis Title: TBD
   Expected Graduation: Summer, 2026
   Funding: GRA, Fall 2024 to present
6. Joy St. Clair
   Tentative Thesis Title: TBD
   Expected Graduation: Fall, 2026
   Funding: GRA, Spring2025 to present
7. Taylor Stoll
   M.S. Plan B Student

**Graduation: Spring 2025**
Funding: GRA, Fall 2022 to Spring 2025

7. Lars Mitchel
   Thesis Title: High Efficiency Air Delivery System for Solid Oxide Fuel Cell Power Generation
   **Graduation: Fall, 2024**
   Funding: GRA, Summer 2023 to Summer 2024
8. Kelly Ryan
   Thesis Title: Transient Modeling of an Ambient Temperature Source Centrifugal Compressor Steam Generating Heat Pump
   **Graduation: Fall, 2024**
   Funding: GRA, Summer 2023 to Summer 2024
9. Madeleine Siegel
   Thesis Title: Evaluating Thermal Efficiency and Economic Impacts in Supplying Energy Demands for Direct Air Capture
   **Graduation: Fall, 2024**
   Funding: GRA, Fall 2022 to Fall 2024
10. Victor Reyes-Flores
    Thesis Title: Operation Conditions for an Internal Combustion Engine in a SOFC-ICE Hybrid Power Generation System
    **Graduation: Spring, 2025**
    Funding: GRA, Fall 2022 to Fall 2024
11. Isabella Amyx
    Thesis Title: Thermal Management of Discrete Heaters using CuW Microchannel Heat Sinks and FC3283 for Laser Diode Applications
    **Graduation: Fall, 2024**
    Funding: GRA, Fall 2022 to present
12. Ethan Markey
    Thesis Title: Economic Impact of Thermal Energy Storage on Natural Gas Power with Carbon Capture in Future Electricity Markets
    **Graduation: Summer, 2022**
    Funding: GRA, Summer 2020 to Summer 2022
13. Roberto Vercellino (Co-Advisor with Dr. Daniel Herber, Systems Engineering)
    Thesis Title: Analysis and Control Co-Design Optimization of Natural Gas Power Plants with Carbon Capture and Thermal Energy Storage
    **Graduation: Summer, 2022**
    Funding: GRA, Fall 2020 to Summer 2022
14. Justin Hollis
    Thesis Title: Effect of Phase Change Material on Dynamic Thermal Management Performance for Power Electronics Packages
    **Graduation: Fall, 2021**
    Funding: GRA, Summer 2020, GTA Fall 2020 to Spring 2021, GRA Summer 2021
15. Sam Colosimo
    Thesis Title: Waste Heat Driven Cooling at Beef Processing Facilities

**Graduation: Fall, 2021**
Funding: GRA, Fall 2018 to Fall 2019, GTA, Spring 2020

16. Zach Gilvey
    Thesis Title: Investigation of Liquid Cooling on an M9506A High Density Keysight AXiE Chassis
    **Graduation: Fall, 2021**
    Funding: GRA, Summer 2018 to Fall 2021

17. Nick Roberts
    Tentative Thesis Title: Modeling and Design of a Power Boosted Turbo-Compression Cooling System for Naval Ships
    **Graduation: Summer, 2021**
    Funding: GRA, Summer 2019 to Spring 2021

18. Josh Richey
    Thesis Title: Experimental Validation of Transient Convective Boiling in a Microchannel Heat Sink
    **Graduation: Spring, 2020**
    Funding: GRA, Summer 2017 to Fall 2020

19. John Simon
    Thesis Title: Novel Heat Transfer Enhancement in Two-Phase Microchannel Heat Exchangers for High Heat Flux Electronics
    **Graduation: Spring 2020**
    Funding: GRA, Summer 2016 to Fall 2016, and Fall 2017 to Summer 2018; GTA, Spring 2017

20. Jensen Hoke
    Thesis Title: Novel Heat Transfer Enhancement in Two-Phase Microchannel Heat Exchangers for High Heat Flux Electronics
    **Graduation: Spring 2020**
    Funding: GRA, Summer 2016 to Fall 2016, and Fall 2017 to Summer 2018; GTA, Spring 2017

21. Luke Giugliano
    Thesis Title: Technoeconomic Analysis of Steam Generation with Carbon Dioxide Capture via Steam Methane Reforming in a Membrane Reactor
    **Graduation: Fall 2019**
    Funding: GRA, Fall 2017 to Fall 2019

22. Bryan Burk
    Thesis Title: Multi-dimensional Heat Transport in a Silicon High Flux Microchannel Cooler
    **Graduation: Fall, 2018**
    Funding: GRA, Spring 2014 to Fall 2016 and Fall 2017 to Fall 2018; GTA Spring 2017

23. Achyut Paudel
    Thesis Title: A Techno-economic Study on Waste Heat Recovery Options for Wet Cooled Natural Gas Combined Cycle Power Plants
    **Graduation: Summer, 2018**
    Funding: GRA, Fall 2015 to Summer 2018

24. Derek Young
    Thesis Title: Working Fluid Selection and Techno-Economic Optimization of a Turbo-Compression Cooling System
    **Summer: Summer, 2018**
    Funding: GRA, Fall 2015 to Summer 2018
25. Shane Garland
    Thesis Title: Waste Heat Driven Turbo-Compression Cooling
    **Graduation: Spring, 2018**
    Funding: GRA, Fall 2015 to Spring 2018
26. Jonas Adler
    Thesis Title: Waste Heat Recovery from a High Temperature Diesel Engine
    **Graduation: Fall, 2017**
    Funding: GRA, Fall 2013 to Fall 2015
27. Kevin Westhoff
    Thesis Title: Thermal Management of Lithium Ion Batteries using Passive Electrolyte Evaporation
    **Graduation: Summer, 2016**
    Funding: GRA, Summer 2014 to Spring, 2016
28. Taylor Bevis
    Thesis Title: High Heat Flux Phase Change Thermal Management of Laser Diode Arrays
    **Graduation: Spring, 2016**
    Funding: GRA, Summer 2014 to Fall 2015

### Research Engineers and Scientists Supervised

1. Shane Garland, MS
   Primary Research Focus: Turbo-Compression Cooling Systems and High Efficiency Hybrid SOFC-Engine Systems
   May 2018 – Present
2. Derek Young, MS
   Primary Research Focus: Turbo-Compression Cooling Systems
   June 2018 – Present
3. Joe Huyett, MS
   Primary Research Focus: Carbon Capture and Steam Heat Pumps
   October 2021 – Present
4. Toluwalase, Fosudo, PhD
   Primary Research Focus: Gas turbine EGR
   August 2024 – February 2025
5. Charles Lewinsohn, PhD
   Primary Research Focus: Impingement Cooling
   August 2023 – March 2025
6. Nick Roberts, MS
   Primary Research Focus: Turbo-Compression Cooling Systems
   June 2021 – June 2022

7. Zach Gilvey, MS
   Primary Research Focus: Impingement Cooling (50% time)
   January 2022 – June 2022
8. John Simon, MS
   Primary Research Focus: Turbo-Compression Cooling Systems
   January 2020 – June 2020
9. Dr. Torben Grumstrup
   Primary Research Focus: Thermal Management of Laser Diode Arrays and Turbo-Compression Cooling Systems
   June 2014 – May 2016

### Undergraduate Research Design Practicum (MECH 498) Supervised

1. Gavin Geer, Fall 2025 to Spring 2026
   Project Title: Transient Modeling of a Centrifugal Steam Compressor integrated into a high temperature heat pump
2. Cyrus Johnston, Fall 2024 to Spring 2025
   Project Title: Modeling Dynamic Operation of a Steam Heat Pump
3. Lars Mitchel, Fall 2022 to Spring 2023
   Project Title: Lars Mitchel, Fall 2022 to present
4. Kelly Ryan, Fall 2022 to Spring 2023
   Project Title: Modeling Dynamic Operation of a Steam Heat Pump
5. Frederic Schmid, Fall 2022 to Spring 2023
   Project Title: Flexible Hydrogen CCHP with Waste Heat Recovery and Renewable Energy Integration
6. Eduardo Malloy, Fall 2022 to Spring 2023
   Project Title: Decarbonizing Industrial Steam
7. Alex Yohe, Fall 2022 to Spring 2023
   Project Title: Jet Impingement for data center cooling
8. Rustin Jensen, Fall 2020 to Spring 2021
   Project Title: High Efficiency Hybrid SOFC-IC Engine
9. Roman Yoder, Fall 2020 to Spring 2021
   Project Title: Advanced Data Center Cooling System
10. Justin Hollis, Fall 2019 to Spring 2020
    Project Title: Thermal Management SWaP Analysis for Generic HEVs
11. Ethan Markey, Fall 2019 to Spring 2020
    Project Title: Variable Power Generation with Carbon Capture and Storage
12. Brandi Grauberger, Fall 2019 to Spring 2020
    Project Title: A Techno-Economic Analysis of On-Site Produced Water Treatment
13. Nick Roberts, Fall 2018 to Spring 2019
    Project Title: Techno-economic Optimization of Turbo-Compression Cooling Systems

14. Tom Walker, Fall 2017 to Spring 2018
    Project Title: Return Jet Impingement Cooling for High Heat Flux Electronics.
15. John Finke, Fall 2017 to Spring 2018
    Project Title: Brayton Thermal Energy Storage System.
16. John Simon, Fall 2017 to Spring 2018
    Project Title: Experimentally Validated Modeling of Compact Aluminum Brazed Heat Exchangers
17. Alex Grauberger, Fall 2017 to Spring 2018
    Project Title: Experimentally Validated Modeling of Air-Coupled Microchannel Heat Exchangers
18. Katelyn Johnson, Fall 2016 to Spring 2017
    Project Title: Waste Heat Recovery from Gas Turbines
19. Marie Dutton, Fall 2016 to Spring 2017
    Project Title: Miniature Refrigeration System for Electronics Cooling Cabinets
20. Sean Moser, Fall 2016 to Spring 2017
    Project Title: Low Cost Supercritical $CO_2$ Recuperator for Power Generation Systems
21. Spencer Gibson, Fall 2016 to Spring 2017
    Project Title: Waste Heat Recovery from Large Marine Diesel Engines
22. David Hobby, Summer 2015 to Spring 2016
    Project Title: Impingement Cooling of Microprocessors
23. Matt Todd, Fall 2015 to Spring 2016
    Project Title: Thermal Management of Laser Diode Arrays
24. James Duvall, Fall 2014 to Spring 2015
    Project Title: Sulfur Tolerant Liquid Fuel Hydrogen Reformer
25. Patrick Harvey, Fall 2014 to Spring 2015
    Project Title: Thermal Management of Laser Diode Arrays
26. Trevor Vernon, Fall 2014 to Spring 2015
    Project Title: High Vapor Pressure Electrolytes for Thermal Control of Li-ion Batteries

### Undergraduate Senior Design Practicum (MECH 486) Supervised

1. Powerhouse Energy Efficiency, Fall 2018 to Spring 2019
2. John Deere Battery Containment, Fall 2018 to Spring 2019
3. High Temperature Spark Ignition Engine, Fall 2016 to Spring 2017 (Co-adviser with Tom Bradley)
4. Enhanced Condensation Heat Transfer Test Facility, Fall 2015 to Spring 2016 (Co-adviser with Arun Kota)
5. EcoCAR 3 Emissions Team, Fall 2014 to Spring 2015 (Co-adviser with Tom Bradley)
6. Continuous Electric Field Assisted Sintering Team, Fall 2014 to Spring 2015 (Co-adviser with Troy Holland)

7. Formula SAE Electric Vehicle Team, Fall 2014 to Spring 2015 (Co-adviser with Patrick Fitzhorn)

### Undergraduate Independent Study MECH 495 Supervised

1. Joseph Sernett, Spring 2014
   Project Title: Thermally Integrated Liquid Fuel Steam Reforming

### Undergraduate Students Supervised

1. Dylan Cutone-Dion, Summer 2024 to Fall 2025
2. Matias Valencia Delgado, Summer 2024 to Spring 2025
3. Joy St. Clair, Summer 2024
4. Teagan Bailey, Summer 2023 to Summer 2024
5. Mason Mollenhauer, Summer 2023 to Spring 2024
6. Kobe Douglas, Summer 2023 to Spring 2024
7. Grant Willsie, Summer 2023
8. Sam Smith, Fall 2023 to Summer 2024
9. Seth Schripsema, Fall 2023 to Fall 2024
10. Dalton Moore, Summer 2023
11. Katie Plese, Spring 2020 to Fall 2022
12. Scott King, Summer 2022 to Spring 2023
13. Cyrus Johnston, Summer 2022 to Spring 2025
14. Tyler Avey, Fall 2022 to Spring 2023
15. Cali Clark, Summer 2022
16. Heather Walker, Summer 2022
17. Kyle Morehead, Summer 2021 to Fall 2021
18. Bryce Barsnick, Spring 2019 to Spring 2022
19. Devin Funaro, Spring 2019 to Spring 2021
20. Victor Reyes, Summer 2021
21. Taylor Stoll, Summer 2021
22. Madeleine Siegel, Summer 2021
23. Ben Platt, Fall 2019 to Summer 2020
24. Alexa Aulicino, Summer 2020
25. Kaitlyn Baker, Fall 2019 to Spring 2020
26. Kyle Conrad, Spring 2019 to Spring 2021
27. Nick Roberts, Fall 2018 to Spring 2019

28. Katie Jordan, Fall 2018 to Spring 2019
29. Tom Walker, Fall 2017 to Spring 2018
30. John Finke, Summer 2017 to Spring 2018
31. Alex Grauberger, Summer 2016 to Spring 2018
32. John Simon, Summer 2016 to Spring 2018
33. Kyle Forrester, Summer 2016
34. Sean Moser, January 2016 to Spring 2016
35. Spencer Gibson, Summer 2015 to Spring 2016
36. Copeland Green, Fall 2014 to Spring 2015
37. Tim Schollenberger, Fall 2013 – Spring 2014
38. Laura Kelly Banta, Fall 2013 – Spring 2014
39. Fernando Mansilla, Fall 2013

### Active Graduate Student Committee Assignments

1. Reid Maynard, PhD, Mechanical Engineering, Summer 2025
2. Liam Fisher, PhD, Mechanical Engineering, Fall 2024
3. Dan Windsor, PhD, Chemistry, Fall 2024
4. Kingsley Atomboh, MS, Mechanical Engineering, Spring 2025
5. Bianca Jeremiah, MS, Mechanical Engineering, Fall 2025

### Undergraduate Courses Taught

1. Heat and Mass Transfer (Mech 344), Colorado State University, Spring 2015 (140 students)
2. Thermodynamics (Mech 337), Colorado State University, Spring 2016 (104 students)
3. Heat and Mass Transfer (Mech 344), Colorado State University, Spring 2017 (160 students)
4. Heat and Mass Transfer (Mech 344), Colorado State University, Spring 2018 (176 students)
5. Heat and Mass Transfer (Mech 344), Colorado State University, Spring 2019 (163 students)
6. Heat and Mass Transfer (Mech 344), Colorado State University, Spring 2021 (54 students)
7. Heat and Mass Transfer (Mech 344), Colorado State University, Spring 2022 (40 students)

### Graduate Courses Taught

1. Thermal Energy Systems Design and Analysis (Mech 695b), Colorado State University, Fall 2015 – New Course (9 students)
2. Turbomachinery (Mech 557), Colorado State University, Fall 2016 (19 students)
3. Thermal Energy Systems Design and Analysis (Mech 581a7), Colorado State University, Fall 2017 (18 students)
4. Turbomachinery (Mech 557), Colorado State University, Fall 2019 (15 students)

### Tutorials and Lectures

1. Guest Lecturer, Colorado State University, lectured on graduate school experience to prospective graduate students at Pi Tau Sigma, December, 2016
2. Guest Lecturer, Colorado State University, lectured on graduate school experience to prospective graduate students, November, 2015
3. Guest Lecturer, Colorado State University, lectured on fuel cell technology for a undergraduate energy course, October, 2015
4. Guest Lecturer, Colorado State University, lectured on graduate school experience to prospective graduate students, April, 2015
5. Guest Lecturer, Colorado State University, lectured on graduate school experience to prospective graduate students, April, 2014
6. Guest Lecturer, Colorado State University, lectured on lithium-ion battery fundamentals to a senior undergraduate energy course, December, 2013
7. Guest Lecturer, Georgia Institute of Technology, lectured on fuel cells and battery technology for a graduate renewable energy course, April, 2010
8. Guest Lecturer, Georgia Institute of Technology, lectured on Advanced Steam Methane Reformer concept for a graduate transport processes course for chemical engineers, November, 2007
9. Guest Lecturer, Georgia Institute of Technology, conducted tutorial on *Engineering Equation Solver* software for a graduate transport processes course for chemical engineers, January, 2008

## PROFESSIONAL SERVICE

### Conference Organizing Activities

1. ITherm 2023, Emerging Technologies and Fundamentals, Special Topics Session Chair, Orlando, FL.
2. ITherm 2022, Additive Manufacturing and Two Phase Cooling Session Chair, San Diego, CA.
3. ASTFE 2022, Session Chair and Organizer, Energy Storage Systems, 7$^{th}$ Thermal and Fluids Engineering Conference, Las Vegas, Nevada.
4. ASTFE 2021, Session Chair and Organizer, Energy Storage Systems, Fuel Cells, 5$^{th}$ -6$^{th}$ Thermal and Fluids Engineering Conference, Virtual.
5. ASTFE 2020, Session Chair and Organizer, Energy Storage Systems - I, Fuel Cells, 5$^{th}$ Thermal and Fluids Engineering Conference, New Orleans, LA.
6. InterPACK 2019, Session Organizer, System Level Thermal Design I, International Technical Conference on Packaging and Integration of Electronic and Photonic Microsystems Conference, Anaheim, CA.
7. ASTFE 2019, Session Chair and Organizer, Flow Instability and Refrigerants, AC and Refrigeration – II, 4$^{th}$ Thermal and Fluids Engineering Conference, Las Vegas, NV.

8. ASTFE 2018, Session Chair and Organizer, Techno-economic Analysis, 3rd Thermal and Fluids Engineering Conference, Fort Lauderdale, FL.
9. ASME Power and Energy 2017, Track Co-Organizer, Batteries and Electrochemical Energy Storage, Charlotte, NC.
10. ASTFE, Session Chair and Co-Chair, 2nd Thermal and Fluids Engineering Conference, Las Vegas, NV.
11. ASME International Conference on Nanochannels, Microchannels, and Minichannels, 2016, Session Chair, Washington, DC.
12. ASME Power and Energy 2016, Track Co-Organizer, Batteries and Electrochemical Energy Storage, Charlotte, NC.

## Referee Activities

### Journal Publications

1. Technical Reviewer, ASME Journal of Heat and Mass Transfer, June, 2023.
2. Technical Reviewer, Energy, July, 2022.
3. Technical Reviewer, Journal of Solar Energy Engineering, August, 2021.
4. Technical Reviewer, Journal of Electronics Packaging, July, 2021.
5. Technical Reviewer, Journal of the Electrochemical Society, July, 2017.
6. Technical Reviewer, Journal of Heat Transfer, July, 2017.
7. Technical Reviewer, Journal of Electrochemical Energy Conversion and Storage, July, 2017.
8. Technical Reviewer, Journal of Electrochemical Energy Conversion and Storage, November, 2016
9. Technical Reviewer, Applied Thermal Engineering, September, 2016
10. Technical Reviewer, Journal of Electrochemical Energy Conversion and Storage, August, 2016
11. Technical Reviewer, Journal of the Electrochemical Society, July, 2016
12. Technical Reviewer, Proceedings of the Institution of Mechanical Engineers, Part D: Journal of Automobile Engineering, May, 2016
13. Technical Reviewer, Electrochimica Acta, September, 2015
14. Technical Reviewer, Electrochimica Acta, June, 2015
15. Technical Reviewer, Journal of the Electrochemical Society, June, 2015
16. Technical Reviewer, Proceedings of the Institution of Mechanical Engineers, Part D: Journal of Automobile Engineering, September, 2014
17. Technical Reviewer, International Journal of Thermal Sciences, August, 2014
18. Technical Reviewer, Heat Transfer Engineering, August, 2014
19. Technical Reviewer, Electrochimica Acta, August, 2014

20. Technical Reviewer, American Chemical Society: Sustainable Chemistry and Engineering, July 2014
21. Technical Reviewer, Electrochimica Acta, Date Unknown
22. Technical Reviewer, Journal of the Electrochemical Society, Date Unknown
23. Technical Reviewer, ASME Journal of Heat Transfer, December, 2008
24. Technical Reviewer, ASHRAE HVAC&R Research, January, 2007

### Conference Publications

1. Technical Reviewer, ITherm 2023, Orlando, FL
2. Technical Reviewer, ITherm 2022, San Diego, CA
3. Technical Reviewer, ASTFE 7th Thermal and Fluids Engineering Conference, November, 2021
4. Technical Reviewer, ASTFE 6th Thermal and Fluids Engineering Conference, November, 2020
5. Technical Reviewer, ASTFE 5th Thermal and Fluids Engineering Conference, April, 2019
6. Technical Reviewer, ASTFE 4th Thermal and Fluids Engineering Conference, April, 2019
7. Technical Reviewer, ASME 15th International Conference on Nanochannels, Microchannels and Minichannels, December, 2017
8. Technical Reviewer, ASME Power and Energy Conference, January, 2017
9. Technical Reviewer, ASME Turbo Exposition, January, 2017
10. Technical Reviewer, American Society of Thermal Fluids Engineers, November, 2016
11. Technical Reviewer, ASME Power and Energy Conference, February, 2016
12. Technical Reviewer, Proceedings of the 5th International Conference on Nanochannels, Microchannels and Minichannels, June, 2007
13. Technical Reviewer, ASME International Mechanical Engineering Congress and Exhibition, Date Unknown

### Grants

1. Technical Reviewer, NSF SBIR program, 2016.
2. Technical Reviewer, Department of Energy SBIR-STTR (DE-FOA-0000880), 2013
3. Technical Reviewer, Department of Energy SBIR-STTR (DE-FOA-0000628), 2012

## UNIVERSITY SERVICE

1. VPR search committee, Colorado State University, Summer 2023 to Fall 2023.
2. Engineering Student-Athlete Group Advisor, Colorado State University, Spring 2022 to present
3. Graduate Studies Committee, Department of Mechanical Engineering, Colorado State University, Fall 2013 to present

4. Vice President of Research search committee, Colorado State University, Summer 2023 to Fall 2023
5. Faculty Council Committee on Scholarship, Research and Graduate Education, Colorado State University, Fall 2022 to Summer 2023.
6. Vice President for Research Advisory Committee, Colorado State University, Fall 2021 to Summer 2023.
7. Associate Department Head for Graduate Studies, Department of Mechanical Engineering, Colorado State University, Fall 2019 to Fall 2022.
8. Chair of Energy Decarbonization faculty search committee, Department of Mechanical Engineering, Colorado State University, Fall 2021 to Spring 2022
9. Powerhouse Users Group Chair, Energy Institute, Colorado State University, July 2017 to July 2019.
10. ASME Student Section Faculty Adviser, Department of Mechanical Engineering, Colorado State University, Fall 2014 to Fall 2017
11. Faculty search committee, Department of Mechanical Engineering, Colorado State University, Fall 2013 to Spring 2014
12. Powerhouse Users Group Chair, Energy Institute, Colorado State University, July 2017 to present
13. ASME Student Section Faculty Adviser, Department of Mechanical Engineering, Colorado State University, Fall 2014 to Fall 2017
14. Graduate Studies Committee, Department of Mechanical Engineering, Colorado State University, Fall 2013 to present
15. Faculty search committee, Department of Mechanical Engineering, Colorado State University, Fall 2013 to Spring 2014

## OTHER ACTIVITIES

1. Football coach, Fort Collins High School, September 2023 to present
2. Youth Baseball Liason, Pro Swing Hitting, February 2017 – July 2017
3. Youth Coach, Fort Collins Baseball and Basketball Leagues, May 2015 – July 2016, Summer 2020
4. Volunteer Referee, Fort Collins Soccer Club, March 2013 – May 2016
5. Quarterback Coach, Lutheran High School, Racine, WI, August, 2003, to October, 2005
6. Offensive Coordinator, Lutheran High School, Racine, WI, August, 2004, to October, 2005
7. Mechanical Engineering Undergraduate Mentor, Iowa State University, Ames, IA, August, 1999, to December, 2000