

Derek Young

dny530@gmail.com

Education

Colorado State University

Fort Collins, CO

Master of Science, Mechanical Engineering; GPA: 3.95/4.00

05/2018

- M.S. Thesis: *Technoeconomic Optimization of a Liquid-Coupled Turbo-Compression Cooling System for Marine Diesel Waste Heat Recovery*
- Relevant coursework: Advanced Thermodynamics, Advanced Heat Transfer, Turbomachinery, Advanced Fluid Mechanics, Materials Issues in Mechanical Design

Bridgewater College

Bridgewater, VA

Bachelor of Science, Physics; Minor in Mathematics; GPA: 3.72/4.00

05/2015

- *Magna cum laude*, Dean's List, Philomathes Honor Society, President and Vice President of Student Body
- Relevant Coursework: Differential Equations, Calculus I-IV, Electricity and Magnetism, Modern Physics, Quantum Mechanics, Experimental Physics, Linear Algebra

Professional and Research Experience

Colorado State University

Fort Collins, CO

Research Associate II, Interdisciplinary Thermal Science Laboratory

06/2018 to Present

Turbo-compression Cooling for Ultra Low Temperature Waste Heat Recovery; funded by DOE AMO

- Project lead for development, design, fabrication, and testing on \$2.3 million DOE-funded effort
- Coordinated with external team partners to ensure achievement of all project milestones
- Wrote quarterly update reports for review from DOE and presented at quarterly update meetings
- Managed budget, purchasing, and acquisition of equipment, materials, and supplies

Interdisciplinary Thermal Science Laboratory General Duties

- Made significant writing contributions to 3 proposals, including 1 that was awarded
- Managed two undergraduate senior design teams through a year-long capstone design project

Colorado State University

Fort Collins, CO

Graduate Research Assistant, Interdisciplinary Thermal Science Lab

08/2015 to 05/2018

Turbo-Compression Cooling System for Waste Heat Recovery; funded by ARPA-e

M.S. Thesis: Technoeconomic Optimization of a Liquid-Coupled Turbo-Compression Cooling System for Marine Diesel Waste Heat Recovery

- Developed high fidelity thermodynamic, heat transfer, and cost models for a liquid coupled Turbo-Compression Cooling System in Engineering Equation Solver
- Performed detailed technoeconomic analysis and working fluid study of the Turbo-Compression Cooling System for different applications
- Peer-reviewed journal paper published, conference paper published

Prototype System Construction and Implementation

- Collaborated with team to construct 250 kW_{th} air coupled Ultra Efficient Turbo-Compression Cooling System at the Powerhouse Energy Campus
- Extensive CAD modeling in Solidworks, including individual components and full system model
- Assisted with assembly and troubleshooting of system components (piping, fittings, heat exchangers, instrumentation, electrical)
- Met project deliverables for system performance

Continuous Electric Field Assisted Sintering Machine for Scalable Production of Ceramics

Design and Development

- Developed CAD models in Solidworks and assisted with thermal modeling in COMSOL Multiphysics

- Made significant design contributions based on fabrication insight
Prototype System Construction and Implementation

- Extensive fabrication of custom components according to GD&T specifications
 - Graphite roller wheels, stainless steel axles, steel pillow blocks, aluminum frame blocks
- Significant experience in high precision machining with tolerances down to 0.001”
- Developed proof-of-concept device using less than \$150 in materials

University of Colorado’s Research Experience for Undergraduates

Boulder, CO

Space Weather Prediction Center – National Oceanic and Atmospheric Administration Summer 2014

Space Weather Data Sets for NOAA’s Science on a Sphere®; *sponsored by National Science Foundation*

- Created high resolution and high framerate space weather data sets for Science on a Sphere®
- Built image processing code to map full disk solar images from the SDO/AIA satellite and stitch the images together to produce high cadence movies of solar activity
- Presented work and poster to the University of Colorado’s Laboratory for Atmospheric and Space Physics
- Datasets from this research effort are now available on Science on a Sphere® centers around the world and can be seen here: <https://sos.noaa.gov/datasets/sun-helium-wavelength-aia-304/> and <https://sos.noaa.gov/datasets/sun-iron-wavelength-aia-193/>

Publications

D. Young, S.C. Gibson, T.M. Bandhauer, “Working Fluid Selection and Technoeconomic Optimization of Turbo-Compression Cooling Systems,” in *Journal of Thermal Science and Engineering Applications*, 2018

D. Young, T.M. Bandhauer, “Technoeconomic Optimization of Turbo-Compression Cooling Systems Driven by Engine Coolant Waste Heat,” in *Proceedings of 3rd Thermal and Fluid Engineering Conference*, 2018

S. C. Gibson, **D. Young**, and T. M. Bandhauer, “Technoeconomic Optimization of Turbo-Compression Cooling Systems,” in *International Mechanical Engineering Congress and Exposition*, 2017.

Leadership Experience

Bridgewater College

President of the Student Body

2014-2015

- Facilitated discussion and presided over meetings of the Bridgewater College Student Senate
- Collaborated with a team of diverse students, faculty, and administrators to fairly and efficiently distribute funds to clubs and organizations
- Streamlined and improved fund request process for clubs and organizations
- Regular meetings with Dean of Students and College President to provide link between student body and administration
- Student representative on Conduct Hearing Board

Vice President of the Student Body

2013-2014

- Served as chair of the Finance Committee: provided recommendations to Student Senate regarding funding requests from clubs and organizations
- Served as chair of the Clubs and Organizations Committee: worked with potential clubs to draft constitutions and mission statements
- Student representative on Conduct Hearing Board

Skills and Interests

Computer: Engineering Equation Solver, Solidworks, Microsoft Word, Microsoft PowerPoint, Microsoft Excel, Microsoft Visio

Technical: Machining on lathe and vertical mill

Interests: Snow sports, mountain biking, rock climbing, ultimate frisbee