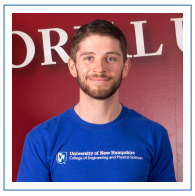

Drummond Biles

Resume

Education

2009-2013 **Bachelor of Science Cum Laude**, *University of New Hampshire*, Durham, NH, .

2013–(2019) **PhD - Thermal Fluid Sciences**, *University of New Hampshire*, Durham, NH, .
3.74/4.00

PhD Dissertation

Title: *Thermal Transport Dynamics in Non-Equilibrium Fluid Flow*

Advisor: Prof Chris White

Abstract: The goal of this dissertation work is to advance the fundamental understanding of thermal transport in engines. Results will lead to a robust predictive heat transfer model that accounts for rapid transients that will enable engine designs to be optimized for reduced heat loss, improved thermal efficiency, and reduced emissions. To accomplish these goals, a custom designed wind tunnel with a variably heated wall plate is used to fundamentally investigate unsteady near-wall heat transfer and its effects upon the thermal and the momentum boundary layers. These experiments along *insitu* engine measurements and model simulations will increase understanding of reciprocating effects on near-wall heat transfer in engines.

Experience

2013-2017 **Teaching Assistant**, *UNH, Mechanical Engineering Dept*, Durham, NH.

Taught lectures, labs and recitations for a range of classes in the mechanical engineering program.

- *Fall 2013 and Fall 2014*, Experimental Measurement and Modeling, Taught by Prof May-Win Thein
  - Setup and ran experimental laboratory assignments
  - Taught basics of performing experimental measurements
- *Fall 2015 and Fall 2016*, Computer Aided Engineering, Taught by Prof Yannis Korkolis
  - Taught simulation packages of Soldiworks
  - Developed a new design-build-test project for students
- *Spring 2016*, Heat Transfer, Taught by Prof John McHugh

Summer 2013 **Design Engineer and Machinist**, *Manufacturing, Mechanics, and Materials lab*, Durham, NH.

Researched, designed and fabricated new specimen grips for a biaxial sheet metal tension test.

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Summer 2012 **Researcher**, *A-P University Centre in Svalbard*, Svalbard, Norway.
Researched, designed and fabricated new optical calibration facility for all-sky cameras for the purpose of high resolution auroral measurements.

2009 - 2013 **Design Engineer**, *Magnetosphere Ionosphere Research Lab*, Durham.
At MIRL I conducted multiple research and full design/manufacture projects, all of which were performed on instrumentation studying the Magnetosphere and Iono- sphere.
Detailed achievements:
- Performed re-design and fabrication of magnetometer coil systems
- Analysis of cooling system for in flight imaging
- Design of remote unmanned observatory platform

Design/Experimental Work

Spring 2017 **Large scale PIV experiment**, *UNH Flow Physics Facility*, Durham, NH.
A Particle Image Velocitmetry (PIV) system was developed to perform near wall measurement at the worlds largest boundary layer wind tunnel, the Flow Physics Facility (FPF). .
Detailed achievements:
- Designed, developed and manufactured local particle seeding manifold
- Constructed adjustable optics system for a 532 Nd:YAG high speed laser and camera

2013 - 2017 **Non-equilibrium thermal wind tunnel**, *UNH NEAT boundary layer tunnel*, Durham, NH.
A boundary layer wind tunnel was re-designed to be able to produce controllable thermal and momentum boundary layers in a pulsatile flow field. .
Detailed achievements:
- Designed, developed and manufactured a thermal wall plate for controlling wind tunnel wall temperature
- Developed and constructed rotor-stator mechanism for producing pulsatile flow in a wind tunnel

Summer 2012 **All-sky camera calibration facility**, *Kjell Henrikson Observatory at UNIS*, Longyearben, Norway.
A camera calibration facility was developed for auroral imaging all-sky cameras .
Detailed achievements:
- Designed and built camera calibration system
- Performed validation study of facility

Fall 2012 **Thermal cooling loads on rocket based imager**, *UNH MIRL*, Durham, NH.
A heat sink was designed and tested to optimize the cooling rate of a rocket based imaging system. .
Detailed achievements:
- Performed thermal analysis
- Developed experimental setup to test simulations

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Computer skills

- SolidWorks
- Mastercam
- Python
- Labview
- DaVis
- Arduino
- Photron FASTCAM Viewer
- Latex
- Beamer

Instrumentation

- Particle Image Velocimetry system
- Hotwire anemometry
- Pitot-Static tubes
- Photron cameras
- Thermocouples
-

Publications

- Sigernes, Fred, SE Holmen, D. Biles, H. Bjoklund, X. Chen, M. Dyrland, DA Lorentzen, L. Baddeley, T. Trondsen, U. Brandstrom, E. Trondsen, B. Lybekk, J. Moen, S. Chernouss, and CS Deehr. Auroral All-sky Camera Calibration.Geoscientific Instrumentation, Methods and Data Systems 3.2 (2014): 241-245.
- In-prep: D. Biles, A. Ebadi, M. Allard, C.M. White. Validation of a Non-equilibrium thermal boundary layer facility. Measurement Science and Technology

Presentations

- Biles, Drummond, Lessard Marc, Sigernes Fred Development of an Optical Calibration Facility at an Auroral Research Station. IROP and SURF International Symposium , Durham, NH. 2012.
- Biles, Drummond, Alireza Ebadi, Allen Ma, and Chris White. Design and Validation of a Constant Wall Temperature Plate. Proc. of American Physical Society, Division of Fluid Dynamics, California, San Francisco. Vol. 59. N.p.: n.p., 2014.
- Biles, Drummond, Alireza Ebadi, Allen Ma, and Chris White, Design and Construction of a Temperature Plate. University of New Hampshire Annual Graduate Research Conference, Durham,NH, 2015.
- Biles, Drummond, Alireza Ebadi, Allen Ma, and Chris White. Construction of a Non- equilibrium Thermal Boundary Layer Facility. Proc. of American Physical Society, Division of Fluid Dynamics, Boston, MA. Vol. 60. N.p.: n.p., 2015.
- Biles, Drummond, Alireza Ebadi,and Chris White. Experimental measurements of a non-equilibrium thermal boundary layer flow. Proc. of American Physical Society, Division of Fluid Dynamics, Portland, OR. Vol. 61. N.p.: n.p., 2016.

Volunteer

- *2014 - Present*, Formula SAE Advisor
  - Work with a multi-disciplinary student project team to design, build and race a small scale formula 1 race car

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- *2015 - Present*, UNH Stembassador
  - Travel through the state of NH performing science outreach projects with middle and high school students
- *2015 - 2016*, UNH College of Engineering and Physical Science Tour Guide
  - Tour visiting high school and middle school students around the engineering building
- *2015 - 2016*, UNH Graduate Student Senate, Senator
  - Work with school administration and graduate students from all programs to improve graduate education
- *2016 - 2017*, UNH Graduate Student Senate, President

  Specific goals accomplished
  - Increased graduate student stipends
  - Decreased fee paid by full time graduate students
  - Funded and began planning of a graduate student center
  - Organized numerous informational events for graduate students

Interests

Summer 2013 **Design Engineer and Machinist**, *Manufacturing, Mechanics, and Materials lab*.
Researched, designed and fabricated new specimen grips for a biaxial sheet metal tension test.

References

- Available upon request

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