Kyle J. LeBlanc
Mechanical Engineering
kylejleblanc@ufl.edu (863) 243-1952
288 Corry Village Apt. 21, Gainesville, FL 32603

Research Interests Human space exploration, additive manufacturing, creativity in design, human-centered design

Education

University of Florida (UF) Gainesville, FL

May 2016 Bachelor of Science in Mechanical Engineering with Honors Major GPA: 3.737/4.000*

- *Magna Cum Laude* Cum GPA: 3.499/4.000

Research Experience

UF Department of Mechanical and Aerospace Engineering Gainesville, FL

May 2015 to present

Design and Fabrication of a Soft Matter 3D Printer
Advisor: Dr. Curtis Taylor
Currently designing and testing a 3D printer to develop a method of soft matter printing in a granular gel medium. Immediate applications of the technology include the replication of full size human brains from patient magnetic resonance scan data to aid in surgery planning/practice and the training of neurosurgeons. Patient specific vasculature, brain matter, and other objects such as tumors will be printed using tissue simulant soft materials.

Aug 2014 to May 2015

Coupled Thermal and Structural Finite-Element Analysis of a Disc Brake Rotor
Advisor: Michael Braddock
Developed a method of calculating heat transfer boundary conditions from empirical data and applied this method to the design and analysis of reduced-mass brake rotors for the UF Society of Automotive Engineers' Formula vehicle. Rotors designed using this method were manufactured and tested on the vehicle. The work was presented multiple times and submitted to the Journal of Undergraduate Research at the University of Florida (currently awaiting selection decision). The research was funded through a scholarship awarded by the University Scholars Program at UF and industry sponsors.

Technical Experience

Thermal Dynamics Intern, Space Exploration Technologies Corp. (SpaceX) Hawthorne, CA

May 2016 to Aug 2016

Accepted a summer internship to work with the Dragon 2 thermal dynamics and life support system teams.

May 2014 to Dec 2014

Designed a 3D printed valve manifold for use on the Dragon 2 manned spacecraft's thermal control system. The design leveraged selective laser melting's unique manufacturing capabilities to create a part with a 90% reduction in fluid connections and a 60% reduction in part mass over the traditional individual valve body design. The structural response to a vibrational driven loads environment was analyzed and used to effectively and safely reduce part mass. The thermal response during predicted operating conditions was analyzed using ANSYS CFX thermal-fluid analysis to determine thermal leakage across internal channels of different temperature. Throughout the design process, many design reviews were held in which cross departmental experts were invited to draw on a variety of knowledge bases and ideas. Two prototypes were manufactured using the selective laser melting process.

*GPA in Mechanical and Aerospace Engineering courses, course prefixes: EML, EGM, EGN

Technical Experience Continued

Designed and implemented test plans for components on the Dragon 2 thermal control system. Tests performed include thermal contact resistance testing of flight computer coldplates in a thermal vacuum chamber, bonded and mechanical fluid connection testing in a variety of conditions including temperature cycling and mechanical loading, and the development of a dissimilar metal orbital tube weld. Helium leakage testing was used extensively during the testing of fluid transfer components.

Jan 2013 to May 2013 **Product Engineering Intern, Deere & Company (John Deere)** Augusta, GA

Designed solutions for non-conformance issues in current production equipment. A focus was placed on cost-effectiveness and simplicity of integration into the equipment. One case led to the development of a novel prototype hydraulic cruise control that added improved functionality and safety to the equipment over previous designs. Other current production improvement projects focused on commonizing parts across different equipment platforms to improve profitability and reliability.

Collaborated with other interns to design an LED lighting kit for next generation equipment. The addition of a microcontroller added improved functionality to the lighting system.

Aug 2011 to May 2014 **Brake System Leader, UF Society of Automotive Engineers (SAE)** Gainesville, FL

Designed reduced-mass brake rotors using ANSYS thermal and structural finite element models, empirically derived boundary conditions, and a cycle counting algorithm applied to a full season of testing data to evaluate life cycle fatigue. The heat treatment process for the 4340 low alloy steel rotors was designed and performed in a lab on UF's campus. After heat treatment the material was tensile tested using ASTM E8 testing procedures to validate material properties. The rotors were manufactured and tested on the vehicle. Results of some aspects of the design process are presented in a paper that was submitted to UF's *Journal of Undergraduate Research*.

Designed a vehicle anti-lock brake system (first Formula SAE team in North America to do so) through a partnership with Bosch Motorsports. Testing sessions were held with Bosch Motorsports engineers to facilitate tuning of the system. The addition of an anti-lock brake system allowed for increased driving consistency, reduced lap time, and improved safety.

Designed, assembled, and tested all components of a high performance vehicle braking system including the sizing and selection of hydraulic components, fluid transfer components, and sensor hardware.

Teaching Experience **Teaching Assistant, UF Design and Manufacturing Lab** Gainesville, FL

Aug 2013 to May 2015 Taught students practical engineering skills including manual machining, sheetmetal fabrication, welding, budgeting, scheduling, design selection, engineering drawing creation, and design prototyping. These skills were then used by the students to design a remotely operated vehicle to compete with during the class's end-of-the-semester competition.

May 2014 to present **Brakes System Mentor, UF Society of Automotive Engineers** Gainesville, FL

Provide advice and design feedback to the current brake system leader for the UF Society of Automotive Engineers formula team. They placed 2nd in the world for the 2014-2015 competition year at the Michigan competition!

Skills

Software:
Siemens NX (1000+ hours), Pro/ENGINEER (400+ hours), SolidWorks, ANSYS Workbench (Structural/Thermal/Fluids-CFX), MATLAB, LabVIEW

Manufacturing Methods:
3D metal printing (Selective Laser Melting), soft matter 3D printing, orbital tube welding, CNC milling, manual mills/lathes, heat treatment of metals, welding and sheetmetal fabrication, composite manufacturing and vacuum bagging

Testing Methods:
Helium leakage testing, tensile testing

Publications

Coupled Thermal and Structural Finite Element Analysis of a Disc Brake Rotor, K. LeBlanc and M. Braddock, *Journal of Undergraduate Research,* Gainesville, FL, USA, (submitted May 2015, awaiting publication decision).

Presentations

Kyle LeBlanc, *Coupled Thermal and Structural Finite Element Analysis of a Disc Brake Rotor*, Pi Tau Sigma MAE Undergraduate Research Symposium, April 2015.

Kyle LeBlanc, *Coupled Thermal and Structural Finite Element Analysis of a Disc Brake Rotor*, UF Undergraduate Research Symposium, March 2015.

References

Michael Braddock
Senior Lecturer in Mechanical and Aerospace Engineering, University of Florida
Director of the Design and Manufacturing Lab, University of Florida
mjb@ufl.edu
(352) 392-3496

Dr. Curtis Taylor
Associate Dean for Student Affairs, Herbert Wertheim College of Engineering
Associate Professor of Mechanical and Aerospace Engineering, University of Florida
curtis.taylor@ufl.edu
(352) 392-4440