Douglas Keller Jr.

Phone: 1-907-342-2070
Email: dkeller12@alaska.edu; dg.kllr.jr@gmail.com
Address: 2752 Midway Placer Rd. #10, Fairbanks, Alaska, 99709 USA

EDUCATION

Master's of Science: Mechanical Engineering
University of Alaska, Fairbanks, *Fairbanks, Alaska, USA*
Fall 2017 – Fall 2018
GPA: 4.0/4.0

Bachelor's of Science: Mechanical Engineering
University of Alaska, Fairbanks, *Fairbanks, Alaska, USA*
Fall 2014 – Fall 2018
GPA: 3.83/4.0

RESEARCH

Alaska Space Grant Program Undergraduate Research Fellowship *Fall 2017 – Present*
Geophysical Institute, University of Alaska, Fairbanks, *Fairbanks, Alaska, USA*

- Using NASA MPLNET and Radiosonde data to determine the intraday variability of the high latitude atmospheric boundary layer
- Developing algorithms to determine atmospheric boundary layer structural parameters from Micro Pulse Laser Radars (Lidar)
- Compare and contrast collocated Lidar and Radiosonde retrievals of ABL parameters
- Produce statistical estimates of ABL parameters and compute diurnal and seasonal variations
- Analysis of high latitude ABL with MPLNET, RAOBS, and GPSRO

Master of Science Research Thesis *Fall 2017 – Present*
College of Engineering and Mines, University of Alaska, Fairbanks, *Fairbanks, Alaska, USA*
NASA Armstrong Flight Research Center, *Edwards Air Force Base, California, USA*

- Using NASA Fiber Optic Sensing System (FOSS) and conventional strain gauge systems in high electromagnetic interference environments found in aviation
- Developed a load cell designed around the FOSS to measure thrust from an electric motor coupled with a 3-blade propeller to develop future electric propulsion systems
- Analyze and compare data retrieved using FOSS and conventional strain gauges
- Determined the effect of electromagnetic interference on the thrust loading measurements
- Determined the effect of mechanical interference/vibration with both systems in same application

PUBLICATIONS

IN PROGRESS

D. Keller, D. R. Eagan, G. J. Fochesatto, R. Peterson. “Advantages of Fiber Bragg Gratings over Resistance-Based Strain Gauges in the Presence of Electromagnetic Interference Emitted from an Electric Motor for Aerospace Application.”

D. Keller, G. J. Fochesatto. “A New Wavelet to Determine the Planetary Boundary Layer Height from Micro Pulse Lidar Backscatter.”

CONFERENCE PROCEEDINGS

Fochesatto G. J., O. Galvez, P. Ristori, D. Keller and E. L. Fochesatto. “Lidar to Determine the Fractions of Ice, Liquid and Water Vapor in Polar Tropospheric Cloud.” *Proceedings of the 28th International Laser Radar Conference,* Bucharest, Romania. 25-30 June 2017.

CONFERENCE POSTER PRESENTATIONS

D. Keller, G. J. Fochesatto. “RAOBs and Micro Pulse Lidar Determination of the Atmospheric Boundary Layer.” *Alaska Space Grant Program Annual Symposium*, Anchorage, Alaska, USA. April 20, 2018.

D. Keller, D. Eagan. “FOSS Load Cell.” *Undergraduate Research and Scholarly Activity Research Day*, Fairbanks, Alaska, USA. April 10, 2018.

WORK EXPERIENCE

NASA Mechanical Engineering Intern *Summer 2017*
(funded by the Alaska Space Grant Program)
NASA Armstrong Flight Research Center, *Edwards Air Force Base, California, USA*

- Tested thermodynamics and heat transfer of the initial Fiber Optic Sensing System (FOSS) enclosure concept for the Quiet Supersonic Technology (QueSST) X-Plane (now the X-59)
- Researched heat transfer technologies for FOSS enclosure flight testing application such as heat pipes and thermoelectric coolers
- Analyzed heat transfer methods for FOSS enclosure application including foam insulation
- Designed prototype enclosure for FOSS components, utilizing analyzed methods; features foam insulation and heat pipes for improved high temperature environment survivability

Engineering Intern *Summer 2015*
Alaska Department of Transportation, *Fairbanks, Alaska, USA*

- Measured state maintained pedestrian facilities such as sidewalks and ramps
- Determined pedestrian facility requirements for American Disability Act compliance including required slope accommodation for disabled pedestrians
- Compiled measurement data from multiple interns for coordinator review

PROFESSIONAL PROJECTS

Raman Spectroscopy Lidar Project *Fall 2016*
(funded by the National Science Foundation)
Geophysical Institute, University of Alaska, Fairbanks, *Fairbanks, Alaska, USA*

- Gained experience in optomechanical design for Lidar development
- Developed simulation of Lidar signals to condition instrument design for 532 nm, N_2, and H_2O Raman vibrational bands
- Implemented multichannel Lidar receiver

Golf Swing Replicator Prototype *Summer 2016*
Project Aisle, *Spokane, Washington, USA*

- Designed the golf swing replicator prototype in SolidWorks 2014 with adjustable stand, ball holder, and swinging mechanism
- Fabricated the golf swing replicator prototype, utilizing the mill, lathe, and MIG welder
- Tested and analyzed golf swing replicator prototype

Ice Arch Build *Fall 2014 – Spring 2015*
College of Engineering and Mines, University of Alaska, Fairbanks, *Fairbanks, Alaska, USA*

- Ice Arch construction team member
- Assisted with the construction and setup of the wooden ice molds
- Assisted with the transportation of water to form the arch
- Assisted with the erection of the dual ice arch design

HONORS AND AWARDS

Chancellor's List: *Spring 2017, Fall 2016, Spring 2016*
Dean's List: *Fall 2015, Spring 2015*
University of Alaska Scholars Award: *Fall 2014 – Spring 2018*
Alaska Performance Scholarship: *Fall 2014 – Spring 2018*
NACE International Alaska Section / BP Scholarship: *Fall 2016 – Spring 2017*
Undergraduate Research and Scholarly Activity Award: *Spring 2018*

COMPUTER SKILLS

PROGRAMMING LANGUAGES

MATLAB, Python, Julia, Fortran, C

HOBBIES

MARTIAL ARTS / SPORTS

Krav Maga Instructor *Winter 2017 – Winter 2018*
Alaska Krav Maga & Fitness, *Fairbanks, Alaska, USA*

Krav Maga, Muay Thai, Brazilian Jiu Jitsu, Hockey, Powerlifting

PERSONAL PROJECTS

2W Blue LED Laser Driver

OTHER INTERESTS

Programming, Mathematics, Physics, Chemistry, Optics, Biomedical Engineering, Aerospace, Artificial Intelligence, Quantum Communication, Game Development, Aviation, Music, Language Learning

REFERENCES

Javier Fochesatto PhD, *Associate Professor of Atmospheric Sciences*
317 Akasofu Building, 930 Koyukuk Dr., University of Alaska, Fairbanks, Fairbanks, AK 99775
907-474-7602 | gjfochesatto@alaska.edu

Paul Bean, *Aerospace Technology Engineer*
FOSS Lab, NASA Armstrong Flight Research Center, Edwards Air Force Base, CA 93523
661-276-2451 | paul.bean@nasa.gov

Cheng-fu Chen PhD, *Professor of Mechanical Engineering*
Duckering 349D, 1760 Tanana Lp., University of Alaska, Fairbanks, Fairbanks, AK 99775
907-474-7265 | cf.chen@alaska.edu