Scott Egbert

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EDUCATION

University of Colorado Boulder

PhD in Mechanical Engineering advised by Dr. Greg Rieker enrolled August 2019

Research Focus: Mode-locked, erbium-doped frequency comb laser measurements for ultra-broadband, high temperature water database development and hypersonic engine mass-flux quantification

Mid-Infrared frequency comb development using intra-pulse difference frequency generation

Brigham Young University

MS in Mechanical Engineering advised by Dr. Dale Tree August 2019

Thesis: Pressurized Combustion Product Temperature Measurement using Integrated Spectral Band Ratios

BS in Mechanical Engineering Magna Cum Laude (3.97) June 2017

RESEARCH

University of Colorado Boulder

Precision Laser Diagnostics Lab August 2019 - Present

- Experimental frequency comb measurements of ramjets, wildfire combustion, and database quality water vapor
- Developed Python scripts to automate processing and validation of over 20,000 water absorption features

Sandia National Laboratories Combustion Research Facility

R&D Graduate Intern - Liquid Natural Gas Leak Safety, Livermore, CA Summer 2018

- Processed Raman concentration measurements from experimental releases of liquid natural gas
- Compared results to those of compressed natural gas and hydrogen in a formal report

Brigham Young University

Optical Temperature Measurements in Gas Turbine Engines March 2017 - August 2019

- Coordinated and conducted three test campaigns at Solar Turbines (San Diego, CA) to optically measure gas temperature using water vapor emission from combustion products at turbine rotor inlet
- Developed MATLAB data processing and validation algorithms to calculate temperature using FTIR scans

Clean Burning Cookstoves Emission Quantification October 2015 - August 2016

- Designed and integrated optical and chemical sensors for mobile cookstove emissions research

Multi-user CAD Development August 2014 - January 2016

- Evaluated part structure optimization metrics to improve modeling efficiency using multi-user CAD

INDUSTRY

Lockheed Martin Aeronautics Company

Design Engineer Intern - F-35 Control Surfaces and Edges, Palmdale, CA Summer 2016

- Investigated design improvements, proposed solutions, and incorporated design changes to the F-35

Aeronautical Engineer Intern - F-35 Flight Test, Fort Worth, TX Summer 2015

- Designed satellite transmitter/receiver assembly, coordinated manufacture and installation in F-35 flying test bed

SKILLS

Programing - Python (5 years), MATLAB (4 years), LabVIEW (1 year, Certified Associate Developer 2017)

CAD - Solid Works, CATIA, Siemens NX, Autodesk Inventor

Fluent in Spanish (Argentina, 2012 - 2014)

PUBLICATIONS

Peer Reviewed Publications

N. A. Malarich, D. Yun. K. Sung. **S. C. Egbert**, S. C. Coburn, B. J. Drouin. G. B. Rieker. "Dual frequency comb absorption spectroscopy of CH_4 up to 1000 Kelvin from 6770 to 7570 cm^{-1}," Journal of Quantitative Spectroscopy and Radiative Transfer, 2021

S. C. Egbert, D. Zeltner, M. Rezasoltani, D. R. Tree, "High-Pressure Optical Measurement of Temperature at Turbine Rotor Inlet Conditions," Journal of Engineering for Gas Turbines and Power, 2020.

D. R. Tree, J. T. Tobiasson, **S. C. Egbert**, B. R. Adams, "Measurement of radiative gas and particle emissions in biomass flames," Proceedings of the Combustion Institute, 2019.

B. R. Adams, J. T. Tobiasson, **S. C. Egbert**, D. R. Tree, "Determining Total Radiative Intensity in Combustion Gases Using an Optical Measurement," Energy & Fuels, 2018.

J. T. Tobiasson, **S. C. Egbert**, D. R. Tree, B. R. Adams, "An Optical Method for the Measurement of Combustion Gas Temperature in Particle Laden Flows," Experimental Thermal and Fluid Science, 2018.

Conference Presentations

S. C. Egbert, N. A. Malarich, D. Yun, K. Sung, S. C. Coburn, B. J. Drouin, G. B. Rieker, "Speed Dependent Voigt Database using Dual Comb Absorption of H_2O from 6650-7540 cm^{-1} and up to 1100 K," International Symposium on Molecular Spectroscopy, Virtual, 2021.

N. A. Malarich, D. Yun, K. Sung, **S. C. Egbert**, S. C. Coburn, B. J. Drouin, G. B. Rieker, "Updating CH_4 Spectroscopic Models from 6670-7630 cm^{-1} with Dual Frequency Comb Absorption Spectroscopy up to 1000 K," International Symposium on Molecular Spectroscopy, Virtual, 2021.

S. C. Egbert, D. Zeltner, M. Rezasoltani, D. R. Tree, "High-Pressure Optical Measurement of Temperature at Turbine Rotor Inlet Conditions," Turbo Expo, Virtual, 2020.

D. R. Tree, J. T. Tobiasson, **S. C. Egbert**, B. R. Adams, "Measurement of radiative gas and particle emissions in biomass flames," International Symposium on Combustion, Dublin, Ireland, 2019.

Other Publications

S. C. Egbert, X. F. Li, M. L. Blaylock, and E. S. Hecht, "Mixing of Liquid Methane Releases," Sandia Report, SAND2018-13757 R, 2018.

PATENT

D. Zeltner, D, R. Tree, M. Rezasoltani, **S. C. Egbert**, "Temperature Measuring System", Radiation Pyrometry in Turbines, United States Patent 20200249093A1 (pending), submitted February 1, 2019.

TEACHING

Brigham Young University

Teaching Assistant - Thermodynamics I August - December 2015

- Presented and explained course content to students individually and in groups

Teaching Assistant - Physics II: Thermodynamics and Optics January - May 2012

- Prepared and facilitated hour long recitation 3 times weekly in addition to grading and providing individual help

ACTIVITIES

Global Engineering Outreach Humanitarian Engineering - Mechanized Tea Packager 2016 - 2017

BYU Supermileage Vehicle Team - 1709 mpg gasoline ICE at Shell Eco-marathon Americas 2016 - 2017