SCOTT EGBERT

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SKILLS

Laser Scientist **Optomechanical Design** **Scientific Computing**

Optics: Optical Design (7 yrs), Fiber Lasers (5 yrs)
Programming: Python (7 yrs), MATLAB (4 yrs), GitHub (3 yrs)
DOD Security Clearance: Secret (June 2016, not currently active)
CAD: SolidWorks (5 yrs), CATIA (2 yrs), NX (2 yrs)
MS Office: Excel (10+ yrs), PowerPoint (10+ yrs), Word (10+ yrs)
Communication: Fluent in Spanish: Argentina (2 yrs)

EDUCATION

PhD Mechanical Engineering | University of Colorado, Boulder, CO — Defending March 14, 2024
- Enabling High-Temperature Measurements with Frequency Comb Laser and Spectral Database Development
- Advised by Dr. Greg Rieker in the Precision Laser Diagnostics Lab, funded by AFRL

MS Mechanical Engineering | Brigham Young University, Provo, UT — Aug 2019
- Pressurized Combustion Product Temperature Measurement Using Integrated Spectral Band Ratios
- Advised by Dr. Dale Tree, funded by Solar Turbines

BS Mechanical Engineering (Magna Cum Laude) | Brigham Young University, Provo, UT — June 2017
- Teaching Assistant (TA) for Mechanical Engineering Thermodynamics and Physics II (Thermodynamics and Optics)

RELEVANT WORK EXPERIENCE

UNIVERSITY OF COLORADO, BOULDER, CO | Research Assistant (RA) — Aug 2019 – Dec 2023
- Designed and built the first portable **mid-IR dual comb laser** spectrometer. **Reduced the footprint by 30 and 45%** in fiber and free space sections, respectively, from the previous iterations, to enclose in 19" rack-mountable case.
- Built and operated complex **FPGA** based real-time phase-correction data acquisition system for dual comb spectroscopy based on rough schematics from collaborators at NIST, Boulder.
- Developed **Python Interface and GUI** for a legacy database optimizer, **accelerating spectral database processing times from months to process hundreds of parameters to 2 weeks to process over 20,000**. My database **reduced measurement errors from 23 to 1%**, enabling the first ever single laser beam optical velocity calculations.

SANDIA NATIONAL LABS | R&D Graduate Summer Intern — Summer 2018
- **Independently learned Python** to process Raman laser measurements of LN_2 leak plumes, compared results to LH_2 releases, and communicated findings in a report that was later published.

BRIGHAM YOUNG UNIVERSITY, PROVO, UT | Research Assistant (RA) — Mar 2017 - Aug 2019
- Designed **fiber optic temperature probe** to measure gas engine combustor at over 1400 K (results).

LOCKHEED MARTIN AERONAUTICS | Aeronautical Design Engineer Intern — Summer 2015 and 2016
- Investigated design improvements to F-35 flaps at Edwards AFB, discussed solutions with manufacturing and design teams, and incorporated changes using **Product Data Management** software.

SELECTED PUBLICATIONS, PRESENTATIONS, PATENT

SELECTED PUBLICATIONS
- **S.C. Egbert**, K. Sung, S.C. Coburn, B.J. Drouin, G.B. Rieker, "High-Temperature Optimized H_2O Database from 6600 to 7650 cm^{-1} Part I: Pure Water and Part II: Air-Broadened H_2O," In Review, 2023.
- N. Hoghooghi, P. Chang, **S.C. Egbert**, M. Burch, R. Shaik, P. Lynch, S.A. Diddams, and G.B. Rieker, "Complete reactants-to-products observation of a gas-phase chemical reaction with broad, fast mid-infrared frequency combs," 2023.
- 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 and Radiative Spectroscopy, 2021.

SELECTED PRESENTATIONS
- **S.C. Egbert**, N. Hoghooghi, ... G.B. Rieker, "Broadband, High-resolution, Portable Dual Comb Spectrometer for Measuring Combustion in the Mid-IR," **(Invited - only student talk)**, Gordon Research Conference - Laser Diagnostics in Energy, 2023.
- **S.C. Egbert**, N. Hoghooghi, P. Chang, M. Burch, R. Shaik, P. Lynch, S.A. Diddams, G.B. Rieker, "Broadband, High-resolution Dual Comb Spectrometer for Measuring Chemical Reactions in a Shock Tube," QUADMART Conference, 2023.
- **S.C. Egbert**, S.C. Coburn, K. Sung, B.J. Drouin, G.B. Rieker, "High-resolution Dual Comb Spectroscopy to Validate High-temperature H_2O Absorption Models," Conf. on Lasers and Electro Optics (CLEO), 2023.
- **S.C. Egbert**, P. Chang, S. Diddams, G.B. Rieker, N. Hoghooghi, "High-Speed, High-Resolution, Broadband Dual-Comb Spectrometer From 3-5 μm," Int. Symposium on Molecular Spectroscopy (ISMS), 2022.

PATENT
"Optical Radiation Pyrometry Technique for Gas Turbine Engines", US Patent 11215508, 2022.