David Feng

Work address
700 East Ave.
Livermore, CA 94550

Personal
Google Scholar
ORCID

EDUCATION

Princeton University 2021
Doctor of Philosophy, Mechanical & Aerospace Engineering
Master of Fine Arts, Mechanical & Aerospace Engineering

University of California, Irvine 2015
Bachelor of Science, Mechanical Engineering

EXPERTISE

Laser diagnostics of high-speed flows, gases, and plasmas. Laser absorption, emission, ionization, scattering, and spectroscopy. Solid-state, gas, liquid, and fiber laser physics. Aerospace measurement technologies.

PRIMARY EXPERIENCE

Lawrence Livermore National Laboratory 2022 – Present
National Ignition Facility & Photon Sciences
Research Scientist/Postdoctorate Fellow
Nonlinear pre-pulse cleaning methods of high-peak power fiber lasers for laser wakefield acceleration. Fiber laser development for hyperfine spectroscopy. Raman gain and open cavity development. Plenoptic camera modeling and analysis for lightfield imaging.

Metrolaser, Inc. 2020 – 2022
Research Scientist
Laser Rayleigh scattering of density in a tightly confined space. Filtered Rayleigh scattering for the volumetric measurement of density and three-dimensional velocity of supersonic flows. Development of Rayleigh scattering lineshape model for signal prediction and post-processing.

University of Tokyo 2019 – 2020
Kobayashi Lab, Institute of Solid State Physics
Visiting Researcher
Mid-infrared absorption spectroscopy of complex molecules using mid-infrared fiber lasers. Long-wave infrared fiber laser development and pulse characterization.

Princeton University 2015 – 2020
Department of Mechanical & Aerospace Engineering
PhD Candidate
Laser diagnostics for pressure, temperature, and velocity measurements: scattering, absorption, fluorescence, schlieren, molecular tagging, nonlinear optics. Pulse-burst high-energy laser development.
Thesis: Advancements in light scattering diagnostics for selected gas properties

University of California, Irvine 2012 – 2015
Department of Mechanical & Aerospace Engineering; Department of Chemistry
Undergraduate Researcher
Laser diagnostics of combustion products. Methane hydrate formation & characterization. Fourier transform spectroscopy of acetaldehyde-water clusters. Absorption spectroscopy of Criegee intermediates.

REFEREED PUBLICATIONS

A.1 D. Feng, T. P. Jenkins, and J. George, "Investigation of the wake region behind a hemispherical turret via laser Rayleigh scattering, *Appl. Opt.*, vol. 62, no. 30, Oct. 2023.

A.2 S. Tani, K. Sugiyama, T. Sukegawa, T. Sato, D. Feng et al., "Real-time high-spectral-resolution mid-infrared spectroscopy with a signal-to-noise ratio of ten thousand, *Opt. Express*, vol. 30, no. 20, Sep. 2022.

A.3 D. Feng, Ahmed Diallo, and M. N. Shneider, "Two-color scattering for the measurement of neutrals at the edge of nuclear fusion devices," *Review of Scientific Instruments*, vol. 92, no. 6, June 2021.

A.4 L. Hansen, B. M. Goldberg, D. Feng et al., "Energy transfer in interaction of a cold atmospheric pressure plasma jet with substrates," *Plasma Sources Science and Technology*, vol. 30, no. 4, Aug. 2020.

A.5 D. Feng, B. M. Goldberg, M. N. Shneider, and R. B. Miles, "Optimization of filtered Rayleigh scattering for the measurement of pressure and temperature," *Combustion Science and Technology*, pp. 1-19, Sept. 2020.

A.6 D. Feng, B. M. Goldberg, M. N. Shneider, and R. B. Miles, "Filtered Rayleigh Scattering for Pressure Measurement Applications," *AIAA Journal*, vol. 57, no. 12, Aug. 2019.

A.7 E. S. Foreman, K. Kapnas, Y. Jou, D. Feng et al., "High resolution absolute absorption cross sections of the B_1A - X_1A transition of the CH_2OO biradical," *Physical Chemistry Chemical Physics*, vol. 17, no. 48, Nov. 2015.

CONFERENCE PROCEEDINGS (PAPER REQUIRED)

B.1 D. Feng, T. Jenkins, J. George, "Towards Simultaneous Density and Flow Velocity Measurements of High-speed Flows Using Filtered Rayleigh Scattering" in AIAA Aviation 2021 Forum, *American Institute of Aeronautics and Astronautics*, 2021.

B.2 A. Rekhy, A. Gerakis, D. Feng, M. N. Shneider, A. Dogariu, and R. B. Miles, "Temperature Profiling of the Atmosphere from an Airborne Lidar by Dispersed Filtered Rayleigh Scattering in Atomic and Molecular Vapors," in AIAA Aviation 2019 Forum, *American Institute of Aeronautics and Astronautics*, 2019.

B.3 D. Feng, B. M. Goldberg, M. N. Shneider, and R. B. Miles, "Progress of Pressure-Sensitive Measurements Via Filtered Rayleigh Scattering," in AIAA Scitech 2019 Forum, *American Institute of Aeronautics and Astronautics*, 2019.

B.4 T. P. Jenkins, J. George, D. Feng, and R. B. Miles, "Filtered Rayleigh Scattering for Instantaneous Measurements of Pressure and Temperature in Gaseous Flows," in AIAA Scitech 2019 Forum, *American Institute of Aeronautics and Astronautics*, 2019.

B.5 D. Feng, B. M. Goldberg, M. Naphade, M. N. Shneider, and R. B. Miles, "A Model Study of Filtered Rayleigh Scattering Sensitivity to Pressure and Temperature," in 2018 AIAA Aerospace Sciences Meeting, *American Institute of Aeronautics and Astronautics*, 2018.

CONFERENCE PROCEEDINGS (ABSTRACT ONLY)

C.1 D. Feng, L. Kiani, P. Pax, M. Messerly, "Towards a Pre-Pulse Cleaning Method In Ultrafast Fiber Lasers," Advanced Accelerator Concepts, 2022.

C.2 T. Sato, D. Feng, S. Tani, O. Komeda, H. Suto, Y. Umetani, S. Mori, A. Yasuda, H. Otsuki, and Y. Kobayashi, "Development of a high sensitivity mid-IR spectrometer for the detection of mixed gases," Japan Society of Applied Physics (JSAP) Spring Meeting, *JSAP*, 2020. (Cancelled due to CO-VID19 pandemic.)

C.3 D. Feng, B. M. Goldberg, M. N. Shneider, and R. B. Miles, "Pressure Field Measurements Using Light Scattering Diagnostics," in 2019 Laser Diagnostics in Energy and Combustion Science, *Gordon Research Conferences*, 2019.

C.4 L. Hansen, S. Reuter, K. Reck, B. M. Goldberg, D. Feng et al., "Energy transfer in interaction of non-equilibrium atmospheric pressure plasmas with substrates," in XXXIV International Conference on Phenomena in Ionized Gases & 10th International Conference on Reactive Plasmas, 2019.

C.5 D. Feng, B. M. Goldberg, M. N. Shneider, and R. B. Miles, "Towards Pressure Measurements Using Filtered Rayleigh Scattering," in 71st Annual Meeting of the APS Division of Fluid Dynamics, *American Physical Society*, vol. Volume 63, Number 13, 2018.

C.6 D. Feng, M. N. Shneider, and R. B. Miles, "Sensitivity Model of Pressure, Temperature, and Velocity Using Filtered Rayleigh Scattering" in International OSA Network of Students (IONS) Paris Conference, *Optical Society of America*, 2017.

C.7 D. Feng, E. Foreman, and C. Murray, "Spectroscopic Study of the Simplest Criegee Intermediate" in 249th ACS National Meeting, *American Chemical Society*, 2015.

C.8 D. Feng, I. Finneran, and G. Blake, "Analysis of $CH_3CHO-(H_2O)$ Using Chirped Pulse Fourier Transform Microwave Spectroscopy" in Southern California Conferences for Undergraduate Research, 2014.

C.9 D. Feng, J. Kar, V. Mojica, and D. Dunn-Rankin, "Methane Hydrate Formation and Generation" in University of California, Irvine (UCI) Undergraduate Research Symposium, 2014.

C.10 D. Feng, D. Escorfet-Martin, and D. Dunn-Rankin, "2D-OH Planar Laser Induced Fluorescence" in UCI Undergraduate Research Symposium, 2013.

FUNDED PROPOSALS (CO-AUTHOR)

D.1 DOE Phase IV: A Novel Coherent Combining Approach Towards High Peak and High Average Power Ultrafast Lasers (2023 – Present)

D.2 SBIR Phase II: Three-Dimensional Density Imaging by Rayleigh Scattering (2019 – 2021)

D.3 SBIR Phase II: Laser Diagnostic for Multiple Properties in Unseeded High-Speed Flows (2018 – 2021)

PATENTS

E.1 T. P. Jenkins, David Feng et al. (2023) "A system and a method for measuring spatially resolved velocity and density simultaneously," *U.S. Patent and Trademark Office, U.S. Department of Commerce.*

TEACHING EXPERIENCE

SAGE Camp, Lawrence Livermore National Laboratory 2022 – Present
Teaching Instructor

- Teach professional growth and development to a class of high school students.
- Develop the class outline with program organizers.
- Assist in SAGE Camp activities such as lunch, tours, & seminars.

National Association of Rocketry 2022 – 2025
Rocketry Mentor

- Mentor to local school teams for the American Rocketry Challenge.
- Advice and consultation on how to model and optimize model rockets based on competition guidelines.
- Instruct student groups on the fundamentals of rocketry and the competition.

Princeton University 2017 – 2019
Teaching Assistant (Mechanical & Aerospace Engineering)
Courses: Engineering Thermodynamics (lecture); Fluid Dynamics (lecture); Fluid Mechanics (laboratory)

- Lead weekly discussion classes to better understand course material.
- Assist students on homework course sets.
- Hold office hours and prepare students for quizzes, projects, and upcoming exams.

University of California, UC Irvine 2013 – 2015
Academic Peer Tutor
Courses: Single-variable Calculus; Introduction to Physics; Classical Physics

- Lead weekly discussion classes separate from main course to better understand course material.
- Develop curriculum for discussion; assist students on main course homework sets.
- Prepare students for quizzes, projects, and upcoming exams.

ORGANIZATION EXPERIENCE

Asian Pacific American Committee 2022 – 2025
Lawrence Livermore National Laboratory
T-shirt & Media Committee Chair

Department of Mechanical & Aerospace Engineering 2018 – 2019
Princeton University
Environmental Sustainability Chair

Metrolaser, Inc. 2018
Laguna Hills, CA
Consultant

Princeton University Graduate Student Government 2017 – 2019
Princeton University
Photographer

Hyperloop Pod Design Competition 2016 – 2017
OpenLoop, Princeton University
Pod Analysis Member

Princeton American Chemical Society 2016
Princeton University
Mentor

COSMOS Summer School For Math & Science 2012 – 2014
University of California, Irvine
Student Volunteer

PROFESSIONAL ORGANIZATIONS

American Institute of Aeronautics & Astronautics (AIAA)

- Session Chair for AIAA SciTech 2024 Conference
- Peer reviewer for AIAA Journal

Gordon Research Conference

- Session Chair for Laser Diagnostics for Energy & Combustion 2019

Optica (Optical Society of America)

- Peer reviewer for Applied Optics Journal

The Combustion Institute

- Peer reviewer for 15th Asia-Pacific Conference on Combustion

AWARDS & HONORS

Japan Student Services Organization Scholarship	2019 – 2020
National Defense Science Engineering Graduate (NDSEG) Fellowship	2017 – 2021
Science, Mathematics, & Research For Transformation (SMART) Fellowship	2017
American Society of Mechanical Engineers (ASME) Scholarship	2015
Howard Hughes Medical Institute Grant Fellowship	2014
Great Lakes National STEM Scholarship	2014 – 2015
Society of American Military Engineers (SAME) Scholarship	2013 – 2015
Undergraduate Research Opportunity Program Grant	2012 – 2015
Asian Pacific Islander American Scholarship Foundation Scholarship	2011 – 2015