

CURRICULUM VITAE

Yu-Chien Chien

1/31/2024

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CURRENT OCCUPATION

Director of Lasers, Flames and Aerosols (LFA) LAB/Research Group
Keck Foundation Deep Ocean Power Science Laboratory (DOPSL)
Mechanical and Aerospace Engineering
University of California, Irvine

Project Scientist
July 2023 – present

Associate Project Scientist
July 2019 – June 2023

Assistant Project Scientist
January 2015 – June 2019

EDUCATION

University of California, Irvine
Doctor of Philosophy in **Mechanical and Aerospace Engineering**
Thermal Science (Combustion), Mar 2015 conferral

Sep 2009 – Dec 2014, Ph.D.

National Cheng Kung University (NCKU), Taiwan
Department of Aeronautics and Astronautics (DAA)
Master of Science in **Aeronautics and Astronautics**

Sep 2005 – Jun 2007, M.S.

Tamkang University (TKU), Taipei, Taiwan
Department of Aerospace Engineering
Bachelor of Engineering in **Aerospace Engineering**
With high honors

Sep 2001 – Jun 2005, B.E.

RESEARCH EXPERIENCE

Director, Lasers, Flames & Aerosols Research Group - Current

NASA – Advanced Combustion via Microgravity Experiments (ACME)

The research includes Electric-Field Effects on Laminar Diffusion Flames (E-FIELD Flames) experiments conducted in the International Space Station (ISS) starting from March 14th, 2018. The flame experiment requires detailed plans of the test matrix and the procedures during operations. The purpose of this research is to gain an improved understanding of flame ion production and to investigate how the ions can be used to control non-premixed flames. The experiment includes both a coflow and a gas-jet flame burner. An electric field is generated by creating a high voltage differential between the burner and a flat circular mesh suspended above the burner. Measurements, as a function of field strength and fuel dilution, are made of the ion current through the flame and the flame's response time to electric forcing. Besides the role of space operation experimentalist at UCI, the current effort includes data processing, data mining/analysis from the Physical Science Informatics system (PSI) .

Laboratory-wide coordinator, Lasers, Flames & Aerosols Research Group

Supervision of a wide range of undergraduate student, M.S. student, visiting scholar, and Ph.D. student projects in terms of scientific integrity, experiment design, analysis methods, and presentation training.

Other project supervision/ongoing research not listed:

Hot air balloon burner combustion and emission analysis; Methane hydrate combustion emission measurement; CO₂/CH₄ hydrate dissociation sequestration; Wildfire ember transport and its impact to

home/buildings; Hydrogen/Methane detection; Particle Imaging Velocimetry (PIV). Past recent projects: Aerosols particles and face masks study; UVC disinfection design for medical device; Flue gas emission optical measurement within mid-IR using ECQCL.

Keck Foundation Deep Ocean Power Science Laboratory

The major research in DOPSL is to studying methane hydrate formation and combustion at high pressure, especially with the complexity of phase changes at pressure up to 200 atm (3000 psi). The project includes design and use of an optically accessible high-pressure combustion chamber. Methane hydrate is a solid clathrate compound of methane captured within a crystal structure of water; the hydrate studies range from physical property assessment to ignition and combustion behavior. In-situ measurements are underway, including emission sampling, infrared imaging, thin filament pyrometry (TFP) for temperature, emission spectroscopy, fluorescence.

Ph.D. project experience at Lasers, Flames & Aerosols Group, University of California, Irvine

Electric field effects on flames, in-situ optical measurements, carbon monoxide generation from impinging flames, sponsored by NASA (Fall 2010 – Fall 2014); Absorption spectroscopy analysis using tomography with Hitran database in mid-IR range, sponsored by General Electric (GE) (Winter 2009 – Summer 2010)

M.S. project experience at Combustion Laboratory, NCKU, Taiwan

Developing high resolution optical measurement using Schmidt-Cassegrain lens for natural chemiluminescence species (2006-2007); Improvement on the design of the natural gas burner of an in-house water heater with lean and high efficiency combustion for Sakura Corp. (July 2005 – June 2006)

B.E. project experience at Thermal Fluids Laboratory, TKU, Taiwan

Flow simulation using Fire Dynamics Simulator (FDS) (2004 – 2005); Unmanned Aerial Vehicle (UAV) Laboratory (2002-2003)

EDUCATION PROGRAM EXPERIENCE

Graduate program

- a. Chair, UCI International Combustion Institute Summer School (UCI CI-SS) 2023, “Experimental Combustion: Past, Present, and Future,” by the Combustion Institute (CI); A week-long program with 20+ research professionals and 40 participants; activities includes lectures and 12 parallel stations for hands-on experiments; Aug 20-25, 2023.
- b. Manufacturing process in engineering for Women doctoral researchers, Empowering Women for Experimental Research with Fabrication Skills, Diverse Educational Community and Doctoral Experience (DECADE) program via Mechanical and Aerospace Engineering, University of California, Irvine.
Main instructor; Summer 2013 (Phase II, 6 weeks, 32 hours, 8 students, 1 TA)
Participant: Meagan Sung, Samboroth Kong, Analy Castillo Muñoz, Alexandra Efimovskaya, Mahshid Fardadi, Ghazal Razeghi, Ankita Raturi, Ling Kong
Teaching Assistant; Summer 2012 (Phase I, 10 weeks)

Undergraduate classes

Individual Study (MAE 199); Mentor (2018-Current)

Methane Gas Solidify Experiment Design

Mufan Zhang (2023 Fall-Current)

Particle Imaging Velocimetry (PIV) measurement

Aaron Jin, Minas Minasym (2023 Winter, Spring)

Fire Extinguishment: CO₂ Hydrate

Shahin Jamshidi, Jun Ku, Andrew Bellisch (2020 Winter)

Gurpreet Singh Tahim, Edward Sungho Jeon (2022 Winter, Spring)

Senior Design Projects (MAE189); Mentor (2016-Current)

Advanced Combustion: Hot Air Balloon – Academic Year 2017-2020

Payton Albert, Adam Duforest, Rohit Gupte, Jordan Kelly, Dylan Moberly, Peter Bustamante, Robert Dukes (2020)

Lily Nguyen, Ivan Macias, Anthony Graback, Ibraheem Mohammed Alseikh, Morgan Elizabeth Ericksen, Dibiha Nitin Mamania (2019)

Candy Hernandez, Fahd Mohamad Albalawi, Christopher Vuong, Michelle Tananka (2018)

Nicolas James Auwajjan, Leo Sr. Salgado, Alec Ryan Carruthers (2017)

Advanced Combustion: Geothermal Energy Utilization – Academic Year 2020 (Fall)

Derek M. Watie, Heriberto N. Garza
 Advanced Combustion Technology: Methane Hydrate Combustion Analysis Device – Academic Year 2017
 Dania Alfeerawi, Manuel Cid Cardoso, Michael Lejeune Hu, Patricia Martinez
 Advanced Combustion: Low Emission 50 c.c engine Scooter – Academic Year 2018 (Fall)
 Manuel Cid Cardoso, Nicholas Adem Ciling, Tony C. Huang, Erik Fabian Lopez, Caleb Pan
 Advanced Combustion Technology: Firebrand Optical Analysis – Academic Year 2016

Mechanical Engineering Design (MAE151); Instructor, Summer 2017 (Session 1)
 Rock Crawler Retrofit Design Project: Stair Climbing and Water Traversing

Teaching assistant (TA)
 UCI: Fluid Thermal Science Laboratory – 2010, 2014; Thermodynamics – 2011; Mechanical Engineering Design (2 quarters) – 2012, 2013. NCKU: Thermodynamics – 2005; Avionics – 2005

Pre-College program

California State Summer School for Mathematics and Science (COSMOS), University of California, Irvine
 Guest Lecture for Cluster 1: Engineering for Land, Air and Space — [Team, Project and Design](#), July 16th, 2018
 Senior Personnel, Summer 2012
 Teaching Assistant, Summer 2011

PROFESSIONAL ACTIVITIES

White Paper Development for the U.S. Combustion in Space — The Decadal Survey on Biological and Physical Sciences (BPS) Research in Space 2023-2032 (BPS2023) conducted by the National Academies of Sciences, Engineering and Medicine.

- Yu-Chien Chien, Derek Dunn-Rankin, David L. Urban, Daniel L. Dietrich, Rosa E. Padilla, “Ground-based incubator,” topical white paper, [Submitted and made available on 10/31/2021](#) (lead author)
- “Flame and Vortex Interactions,” topical white paper (participated)
- David L. Urban, Yu-Chien Chien, Derek Dunn-Rankin, Ulf Israelsson, Michael P. Sansoucie, Suman Sinha Ray, Jeffrey W. Sowards, “Research Campaign White Paper: Physical Sciences Ground-Based Research Campaign,” campaign white paper, [Submitted and made available on 12/23/2021](#) (coauthor)

Board Roles

- Institute for Dynamics of Explosions and Reactive Systems (IDERS) – Board Director (as of July 2023)
- Western States Section Combustion Institute (WSSCI) – Board Member at Large (as of March 2023)
- American Society for Gravitational and Space Research (ASGSR) – Annual meeting planning team (as of May 2023)
- Society of Women Engineers-Orange County (SWE-OC) – UCI Collegiate Counselor (May 2022-current); Professional Development Conference Chair (FY24)
- American Institute of Aeronautics and Astronautics-Orange County (AIAA-OC) – Board Member at Large (as of July 2023)

Memberships — Combustion Institute (CI) Member (2010-present); American Society for Gravitational and Space Research (ASGSR) Member (2014, 2018-present); Society of Women Engineers (SWE) Professional Member (2021-Present); American Association for the Advancement of Science (AAAS) Professional Member (Current); American Institute of Aeronautics and Astronautics (AIAA) Professional Member (Current).

Editorial Activities

- Editor, Combustion Science and Technology (CST, Taylor & Francis) Special Issue “The 29th International Colloquium on the Dynamics of Explosions and Reactive Systems (ICDERS 2023).” (collecting)
- Co-editor, Combustion Science and Technology (CST, Taylor & Francis) Special Issue “The 28th International Colloquium on the Dynamics of Explosions and Reactive Systems (ICDERS 2022),” 23 articles were collected.
doi: [10.1080/00102202.2023.2182206](#) (Preface, Feb, 2023)
- Co-guest editor, Special Issue “Cleaner Combustion” of Energies; 13 papers were collected and published.
doi: [10.3390/books978-3-03921-478-5](#)

Journal Reviews — Combustion and Flame, Elsevier; Combustion Science and Technology (CST), Taylor & Francis; Proceedings of the Combustion Institute (PROCI), Elsevier; International Combustion Symposium Manuscript Reviews; Aeronautics and Aerospace Open Access Journal (AAOAJ); Energies, MDPI; Fuel, Elsevier; Chemical Physics Letters (CPLETT), Elsevier; Processes, MDPI; ACS Omega; United States Department of Agriculture (USDA, proposal review)

Other Voluntary Reviews

- a. National SWE Scholarship review for candidates over the world (10 candidates in undergraduate and graduate, March 2022; 5 upper division candidates from ABET universities, March 2023 (the full SWE scholarship dispersed about 300 new and renewed scholarships valued at over \$1,500,000).
- b. National SWE Individual Award review (9 professional candidates, April 2022; 11 professional candidates, April 2023).

Session Chair Service — Western States Section of Combustion Institute Fall Meeting – 2017 (WSSCI - Laminar flames); US National Combustion Spring Meeting – 2019 (USNCM - Laminar flames); International Conference on Liquid Atomization and Spray Systems Meeting – 2021 (ICLASS - Diagnostic Techniques); International Colloquium on the Dynamics of Explosions and Reactive Systems – 2023, 2022 (ICDERS - Laminar Flame Velocity; Fire Dynamics); International Symposium on Combustion – 2022 (ISOC - Diagnostics); US National Combustion Spring Meeting – 2023 (USNCM - Laminar flames).

Poster Judge

- a. American Association for the Advancement of Science (AAAS) 2022 Annual Meeting, Physical Sciences, 11 E-poster presentations for the first stage (Nov. 2021), and 6 presentations for finalist (Jan. 2022).
- b. American Society for Gravitational and Space Research (ASGSR) Annual Meeting 2021, 4 posters for graduate students.
- c. California Alliance for Minority Participation (CAMP) in Science, Engineering and Mathematics Statewide Research Symposium – 2017 (UCI), 2018 (UCI), 2021 (UCI), 2022 (Virtual), 2023 (UCR), 2024 (4 presentations, UCR).
- d. Senior Design Review (SDR) every quarter on the 10th week for the school of engineering at UCI, 2016-2020.

Synergistic Activities and Roles

- a. “Academic Salon for Doctoral Research Staff in Mechanical and Aerospace Engineering”, originator and host of the series (Jan, 2019)
- b. “Fabrication training” for the new graduate student and summer scholars in Lasers, Flames & Aerosols (LFA) research group, lead and the main instructor. Participants:
Neil Abdelaziz, Antoine Chedin, Jules Constant, Leo Distelzwey, Leopold Dru, Eugene Laporte, Robin Deu Morel, Santiago Rabec, Paul Renault, Kerian Jeanne Rose (2023 summer)
Alexis Rouault, Antoine Guilleminot, Dianalaura Cueto Duenas, Maxime Donzeau, Thomas Ristor, Zhuoye (Mark) Yang (2022 summer, 5 weeks, 10 hrs)
Brandon Esquivias, Dianalaura Cueto Duenas, Lily Nguyen, Candy Hernandez, Julia Reny, Elenore Moinet, Baptiste Campenon, Florent Cathary, Navid Saeidi (2019 summer, 6 weeks, 12 hrs)
- c. “Journal Club” for graduate students and summer scholars in Lasers, Flames & Aerosols (LFA) research group, lead host. Participants:
Neil Abdelaziz, Antoine Chedin, Jules Constant, Dianalaura Cueto Duenas, Leo Distelzwey, Brandon Esquivias Rodriguez, Leopold Dru, Eugene Laporte, Robin Deu Morel, Santiago Rabec, Paul Renault, Kerian Jeanne Rose (2023 summer)
Aaron Jin, Alexis Rouault, Antoine Guilleminot, Dianalaura Cueto Duenas, Maxime Donzeau, Navid Saeidi, Thomas Ristor, Zhuoye Yang (2022 summer)
Brandon Esquivias Rodriguez, Dianalaura Cueto Duenas, Navid Saeidi, Gurpreet Singh Tahim (Fall 21, Winter 22)
Brandon Esquivias Rodriguez, Dianalaura Cueto Duenas, Navid Saeidi, Hugo Girodon (2021 summer)
Brandon Esquivias Rodriguez, Dianalaura Cueto Duenas, Navid Saeidi, Dorsa Shirazi (2020 summer, 7 weeks)
Brandon Esquivias Rodriguez, Dianalaura Cueto Duenas, Julia Reny, Elenore Moinet, Baptiste Campenon, Florent Cathary, Navid Saeidi (2019 summer, 5 weeks)
- d. Society of Women Engineers (SWE)
 - i. On campus:
UCI SWE Advisor (May 2022 - Present) with joining activities SWE-UCI general meetings
 - ii. Regional:
SWE-OC (see Board Roles section above) with activities: OC monthly planning meetings (May 2022 – present); Collegiate trainings (May 21st 2022, Oct 1st 2022, upcoming Oct 7th 2023); SWE-OC Professional Development Conference, volunteer (April 8th, 2023).
 - iii. National level:
* Academic Leadership Women Engineers (ALWE) year-round Program (Aug 2022 – April 2023) with monthly professional meetings, discussions, and training assignments
* Reviewer for SWE Scholarships 2022, 2023(see Other Reviews section above)
* Reviewer for SWE Awards 2022, 2023(see Other Reviews section above)

* We21, We22, and We23 annual conference (Oct 21 – 23 2021, virtual; Oct 20 – 22 2022 hybrid, Oct 25-27, 2023 in-person)

- e. California Alliance for Minority Participation (CAMP)
 - ii. Faculty Partner (Present)
 - iii. Science Technology Education Workgroup (STEW), School of Eng & Edu (2021 - Present)
 Activities: CAMP scholar project supervision (since 2013); CAMP Statewide symposium (2017 - Present); LSAMP-NICE Annual Meeting, Washington D.C. (Sep 28 – 30 2022); CAMP Alumni Roundtable (April 7th, 2023).
- f. NASA Transform to Open Science (TOPS) Community (May 2022 – present), monthly scientist training meeting
- g. NASA SMD Bridge Program Workshop (Oct 17-22 2022), attended.

Proposal Development Contribution — ISS: Reduced Carbon Emission from Solidified Methane — Gas Hydrate Flames, ISS National Lab Feasibility Review, (CASIS, NSF), 2024; Solidified Natural Gas: Methane Emission Capture and Conversion (CSM/CF/UCI/DoC-NIST), 2023 (awarded); Reactive Direct Air Capture of CO₂ for Green Urea Fertilizer Production Utilizing Retired Coal Power Plant Dry Desulfurization Processes (FERCo/DoE), 2023 (awarded); E-FIELD Flames Science Data Learning Module for STEM Graduate Students (CASIS), 2023; Physical Science Informatics (PSI) system Science Data Tool for ACME E-FIELD Flames (SMD/NASA), 2023; Experiments for carbon capturing (FERCo/DoE), 2023; Experimental Combustion: Past, Present, and Future, National Science Foundation (NSF), 2023 (selected for award); Experimental Combustion: Past, Present, and Future, Combustion Institute (CI), 2023 (awarded); Femtosecond Digital Holography: Seeing through the Fog, W.M. Keck Foundation (Keck), UCI Campus first stage, 2022; Fuel Component Sensor for Online Measurement of Hydrogen-Natural Gas Mixtures (Metrolaser/DoE) 2022; Hydrate-based Clean Energy and Long Term Storage of CO₂ Proposal for the Petroleum Research Fund (ACS PRF), 2021; Desalination of High Salinity Water Coupled with Carbon Dioxide Capture A Using Hydrate-Based Technology (CSM/DoI), 2021; Clathrate Hydrate Desalination Technology Coupled with Carbon Dioxide Capture (CSM/DoE), 2021; Gas sensing at power plants using Mid-IR lasers and Real-time Analysis with Pseudo In-situ Detection (RAPID) techniques (OKSI/DoE), 2021; Low Pressure Measurements of Sulfur Oxides and Water Interference Using Distributed Feedback (DFB) Laser (OKSI/DoE), 2021 (awarded); ISS: Phase Transport in Methane Hydrate Flames and Low-Carbon Emission (MH-LCE) (CASIS, NSF), 2021; FIERY ICE – Advanced Studies Institute in Hydrate Science for Energy and the Environment (IRES, NSF), 2020; PeleLM CFD of Ion-Driven Winds from Diffusion Flames (PSI, NASA), 2020 (awarded); The Efficacy of Homemade Masks to Prevent Aerosol Transmission from Cough, Emergency COVID-19 Research Seed Funding (Emergency Rapid Response COVID-19, UC), 2020; Relationship between SO₃ and H₂SO₄ in Power Plant Flue Gas Additional Lab Studies for SO₃, SO₂, H₂O Spectral Libraries, Electric Power Research Institute (EPRI), 2020 (awarded); PARTNERS- PARTnership and Training for NNSA Engineering and Relevant Sciences, National Nuclear Security Administration (NNSA), 2020; Gas Hydrate Science and Technology for Energy and the Environment, HSSoE MERI, 2020; Developing Technology for In Situ Wildfire Experiments, HSSoE MERI, 2020 (awarded); Expanding the Zone of Proximal Development for Underrepresented STEM Students, Broadening Participation in Engineering (BPE, NSF), 2020; Acquisition of a Tomographic High-Speed Particle Image Velocimetry System for Aeronautical, Biomedical, Environmental and Chemical Engineering Applications, Major Research of Instrumentation Program (MRI, NSF), 2020 (selected); High-Energy Density Portable Power Systems, W.M. Keck Foundation (Keck), UCI Campus, 2020; Ultra-short Pulsed Off-axis Digital Holography for 3D Imaging of Aerosol Evolution, 2020, in collaboration with Metrolaser, Inc. (DTRA, DoD); E-Cigarette Induced Respiratory Distress and Cardiopulmonary Dysfunction in an Inhalation Model, Tobacco-related Disease Research Program (TRDRP), 2020; Multidisciplinary Design Program (UCI MDP) - Optical Measurement System for Characterizing Vaping Smoke, 2019-2020 (selected); Preparing STEM Graduate Students for Global Opportunities, Innovations in Graduate Education Program (IGE, NSF) - NSF Program Solicitation NSF 17-585, HSSoE, 2019; Energy Efficiency and Renewable Energy (EERE, DoE), 2019; Wildfire: Assessing and Preparing for Risks under Climate Change, Funding Opportunities for the Electric Program Investment Charge Program, California Energy Commission (EPIC-CEC), 2019; National Science Foundation and US-Israel Binational Science Foundation Collaborative Research Opportunities (NSF-BSF), 2019; Single-shot Ultra-Short Pulse Holographic Imaging of Dense Fuel Sprays, Army Research Office (ARO), 2018 (awarded); Interfacial Control of Energy-Rich Hydrocarbon Hydrates Observatory (ICE-H₂O), U.S. Department of Energy (DoE) - Energy Frontier Research Centers (EFRCs), 2018; Mid IR Laser Sensor for Continuous SO₃ Monitoring to Improve Coal-Fired Power Plant Performance during Flexible Operations, U.S. Department of Energy (DOE), 2018 (awarded); Watery Fuel Diffusion Flames, supplement for REU and Non-Academic Internship, Chemical, Bioengineering, Environmental and Transport Systems Program (CEBET, NSF), 2018 (awarded); FIERY-ICE, Partnerships for International Research and Education (PIRE, NSF), 2017; Hydrate Science for Super-Saline Fluid Remediation, Chemical, Bioengineering, Environmental and Transport Systems Program (CEBET, NSF), 2017; Watery Fuel Diffusion Flames, Chemical, Bioengineering, Environmental and Transport Systems Program (CBET, NSF), 2016 (awarded); Relationship between SO₃ and H₂SO₄ in Power Plant Flue Gas, Electric Power Research Institute (EPRI), 2016 (awarded); Hydrate-based Remediation of Supersaline Brine, ACS Petroleum Research Fund (PRF, ACS), 2016.

Awards Received

- a. Women in Technology (WiT) at UCI 2023 Applause Recipient for faculty and staff open nomination and

recognition.

- b. American Society for Gravitational and Space Research Thora W. Halstead Young Investigator's Award, Nov. 6th, 2021.
- c. Early Career Researcher Award, North America Taiwanese Professors' Association – Southern California Club (NATPA-SCC) Spring Meeting, San Marcos, CA, April 26th, 2018.

Other student era awards/fellowships: Combustion Institute Student Travel Award: 34th International Combustion Symposium, Warsaw, Poland, July 30-August 3, 2012; 8th US National Combustion Meeting, Utah, May 19-22, 2013; International Colloquium on the Dynamics of Explosions and Reactive Systems, Taipei, Taiwan, July 28- August 02, 2013; Spring Meeting of the Western States Section/The Combustion Institute, Pasadena, CA, March 23-25, 2014; 35th International Combustion Symposium, San Francisco, CA, August 3–8, 2014. The department of Aeronautics and Astronautics of NCKU fellowship, 2006.

Conference/Workshop Participant — Energy and Combustion Meeting, Taiwan (2005, 2006); 23rd, 24th, and 28th International Colloquium on the Dynamics of Explosions and Reactive Systems (ICDERS) (2011, 2013, 2022, 2023); Western States Section of Combustion Institute Fall/Spring Meeting (2011, 2014, 2017, 2022); 34th, 35th, 37th, 38th and 39th International Combustion Symposium (2012, 2014, 2018, 2021, 2022); Pacific Rim Workshop on Deep Ocean Power Science (2014); Combustion Energy Frontier Research Center Combustion Summer School, Princeton (2013, 2014); U.S. National Combustion Meeting (2013, 2015, 2017, 2019, 2021, 2023); Gas Hydrate Workshop, Taiwan (2015); Mini-Workshop on Hydrates, Aoyama Gakuin University, Sagami-hara Campus, Japan (2015); Gordon Research Conference - Laser Diagnostics in Combustion (2015, 2021) virtual with the separated Zoom seminar via Purdue; 3rd UCI Annual Symposium on Emerging Issues in Environmental Law Practice - Desalination (2015); 10th Fiery Ice (2016); United States-Japanese Research Institute Week (USJI) (2016); 9th International Conference on Gas Hydrates (2017); Post-Combustion-Meeting NSF Workshop – Future Combustion Research to Mitigate Carbon Emissions (April, 2017); Gordon Research Conference – Natural Gas Hydrate System (2018); Multi-Agency Coordinate Committee for Combustion Research (MACCCR) — Fuel and Combustion Research Review (2018) at Sandia National Laboratories; Asia-Pacific Conference on Combustion (2019); Annual Meeting of the American Society for Gravitational and Space Research (2014, 2018-2021, 2023); Annual Conference on Liquid Atomization and Spray Systems (ILASS-Americas) (2021); International Conference on Liquid Atomization and Spray Systems (ICLASS) (2021); SWE Annual Conference (2021, 2022, 2023); American Association for the Advancement of Science Annual Meeting (AAAS) (2022).

CONTRACT AND GRANTS

Awarded Contracts and Grants

- a. Developing Technology and Experiments for Wildfire, HSSoE MERI, 2020. (co-PI)
- b. Low Pressure Measurements of Sulfur Oxides and Water Interference Using Distributed Feedback (DFB) Laser, U.S. Dept. of Energy (DoE), sub-award from Opto-Knowledge Systems, \$6K, 3/1/2021-3/31/2021. (PI)
- c. PeleLM CFD of Ion-Driven Winds from Diffusion Flames, Physical Science Informatics (PSI), National Aeronautics and Space Administration (NASA), \$200K, 2022-2025. (PI)
- d. UCI Combustion Institute Summer School (UCI CI-SS) "Experimental Combustion: Past, Present, and Future," National Science Foundation, \$25K, 7/1/2023-6/31/2024. (PI)
Other solicitations via UCI Foundation (\$67.5K): Combustion Institute (CI); National Aeronautics and Space Administration (NASA), SoCalGas, Exponent, Solar Turbines, Photron, FERCo
- e. Reactive Direct Air Capture of CO₂ for Green Urea Fertilizer Production Utilizing Retired Coal Power Plant Dry Desulfurization Processes, U.S. Dept. of Energy (DoE), sub-award from Fossil Energy Research Corporation (FERCo), \$50K, 7/10/2023-7/09/2024. (PI)
- f. Solidified Natural Gas: Methane Emission Capture and Conversion, National Institute of Standards and Technology (NIST), U.S. Dept. of Commerce (DoC) (a total of 1.15M award), sub-award from Colorado School of Mines (CSM), \$250K, 10/01/2023-9/30/2024. (PI)

GRADUATE STUDENTS

Ph.D. DISSERTATION

- A.1 Biasioli, A. (2021) "Optical Absorption for Continuously Monitoring Sulfur Oxides and Sulfuric Acid in Flue Gas Conditions." <https://escholarship.org/uc/item/6gr9d9s8>
- A.2 Saeiei, N. (2022) "Fundamental Studies of CO₂ Substitution in Methane Hydrate." <https://escholarship.org/uc/item/45b7173x>
- A.3 Cueto Duenas, D. (In-Progress) "CO₂ Substitution in Methane Hydrate using Molecular Dynamics Simulation."
- A.4 Santamaria, J. (In-Progress) "Direct Air CO₂ Capture and Storage."

M.S. THESIS/PROJECTS

- B.1 Shirazi, D. (2020) "Wake Simulation of the Multirotor Test Bed and Validation of CHARM Software." <https://escholarship.org/uc/item/2d78x5rv>
- B.2 Cueto Duenas, D. (2021) "Molecular Dynamics Simulation of Gas Hydrates Formation and Dissociation." <https://escholarship.org/uc/item/7xz930bg>
- B.3 Esquivias Rodriguez, B. (2021) "Emissions of a Water Vapor Diluted Diffusion Flames in High Pressures." <https://escholarship.org/uc/item/4474s0v6>
- B.4 Gellerman, K. (2023) "Modeling Ember Behavior and Accumulation Patterns on and Around Sample Homes During a Wildfire." <https://escholarship.org/uc/item/2zz0j0ts>
- B.5 Rubi Vergara, M. (2024) (In-Progress) "Capture and Conversion: High Pressure Methane Emission Solidification."
- B.6 To, A. (2024) (In-Progress) "Capture and Conversion: High Pressure Methane Emission Solidification."

Project Mentoring (Day-to-day supervision)

- C.01 *Maribel Jaquez*, University of California Irvine, Undergraduate Individual Study (MAE199), 2011/2012; Emission measurement from a coflow methane flame near quenching.
- C.02 *Mishal Francis*, University of Glasgow, Intern scholar, 2011/2012; IR detection of electrical effects on small diffusion flames.
- C.03 *Joshua Jacobs*, University of Glasgow, Intern scholar, 2011/2012; Soot imaging in small diffusion flames.
- C.04 *Koji Yamashita*, Aoyama Gakuin University, Visitor/volunteer, 2012; The influence of Electric Field Power Systems on flame behavior prepared for microgravity space experiment.
- C.05 *Samboroth Kong*, University of California Irvine, M.S. Project, 2013; Studying the Temperature Profile of a Flame-Heated Plate using Solidworks.
- C.06 *Jordan Bilbault*, ENSMA, Intern scholar, 2015; High pressure combustion flow panel design and thermal analysis.
- C.07 *Gaetan Crouzy*, ENSMA, Intern scholar, 2015; High pressure CARS calibration cell.
- C.08 *Andre Nodem*, University of California Irvine, M.S. student, 2015; Volume and Flow Rate Measurements using a Custom-Made Flowmeter.
- C.09 *Alexandre Schwartz*, ENSMA, Intern scholar, 2016; Measurement and calculation of sulfur species in simulated power plant flue gas.
- C.10 *Thibault Pecoul*, ENSMA, Intern scholar, 2016; High temperature test cell for sulfur species simulating emission from a power plant flue.
- C.11 *Romain Bouyer*, Ecole des Mines d'Alès, Intern scholar, 2016; Characterization of controlled conversion efficiency of SO₂ to SO₃ over a catalyst.
- C.12 *Julia Reny*, ENSMA, Intern scholar, 2019 (M.S. Project); SO₂ to SO₃ Conversion with a vanadium-based catalyst.
- C.13 *Florent Cathary*, Aix Marseilles, Intern scholar, 2019 (M.S. Project); Emissions from methane hydrate combustion.
- C.14 *Hugo Girodon*, ENSMA, Intern scholar, 2021 (Virtual, M.S. Project with final oral exam and thesis report); Water addition and high pressure combustion using PeleLM.
- C.15 *Maxime Donzeau*, ENSMA, Intern scholar, 2022 (M.S. Project); NASA PeleLM E-Field Flames simulation.
- C.16 *Antoine Guillemenot*, ENSMA, Intern scholar, 2022 (M.S. Project); Hydrogen and methane high pressure calibration for optics diagnostics.
- C.17 *Thomas Ristor*, ENSMA, Intern scholar, 2022 (M.S. Project); Carbon dioxide hydrate fire extinguishment.
- C.18 *Alexis Rouault*, ENSMA, Intern scholar, 2022; (M.S. Project) Water addition and high pressure combustion.
- C.19 *Zhuoye (Mark) Yang*, MEng, University of California Irvine, 2022; Particle imaging velocimetry technique for large scale pipe flow.
- C.20 *Kerian Jeanne Rose*, ENSMA, Intern scholar, 2023 (M.S. Project); Particle imaging velocimetry technique for large scale pipe flow.
- C.21 *Antoine Chedin*, ENSMA, Intern scholar, 2023 (M.S. Project); Hot Air Balloon project.
- C.22 *Eugene Laporte*, ENSMA, Intern scholar, 2023 (M.S. Project); Elevated Pressure and Temperature Hydrogen and Methane Blend project.
- C.23 *Leo Distelzwey*, ENSMA, Intern scholar, 2023 (M.S. Project); Particle imaging velocimetry technique for large scale pipe flow – Phase II.
- C.24 *Leopold Dru*, ENSMA, Intern scholar, 2023 (M.S. Project); NASA E-FIELD Flames project (1g).
- C.25 *Neil Abdelaziz*, ENSMA, Intern scholar, 2023 (M.S. Project); High Pressure Water Addition to Coflow Flames.
- C.26 *Paul Renault*, ENSMA, Intern scholar, 2023 (M.S. Project); Gas Hydrate Combustion project.
- C.27 *Robin Deu Morel*, ENSMA, Intern scholar, 2023 (M.S. Project); NASA E-FIELD Flames project (0g).
- C.28 *Santiago Rabec*, ENSMA, Intern scholar, 2023 (M.S. Project); Gas Hydrate Fire Extinguishment project.
- C.29 *Jules Constant*, ENSMA, Intern scholar, 2023 (M.S. Project); Holography Imaging project.
- C.30 *Kevin Gellerman*, University of California Irvine, M.S. Project, 2023 (M.S. Report); Modeling Ember Transport and Accumulation Patterns During Wildfires.
- C.31 *Jose Alejandro Santamaria Rodriguez*, University of California Irvine, Individual Research (MAE299), 2023 (In-Progress); CO₂ capture and storage.
- C.32 *Kyle Yasuo Horiuchi*, University of California Irvine, Individual Research (MAE299), 2023; Methane capture and

storage.

C.33 *Louis Modrin*, 2024 (M.S. Project); TBD.

C.34 *Gaetan Semmelbeck*, 2024 (M.S. Project); TBD.

C.35 *Karol Grabon*, 2024 (M.S. Project); TBD.

C.36 *Noe Krouk*, 2024 (M.S. Project); TBD.

C.37 *Pierre Ribiere*, 2024 (M.S. Project); TBD.

LFA Research Supervision and Collaboration

PH.D. RESEARCHERS

Vicariotto, Michela (2019); Minniti, Marco (2019); Escofet-Martin, David (2018)

M.S. RESEARCHERS

Foster, Stuart (2015) (project); Gomez, Antonio (2015) (project); Nodem, Andre (2015) (project); Adriana Llado Gambin (2016); Ricchuiti, Valentina (2016); Bryant, Michael (2016); Kim, Song Uk (2018); Sanchez, Joseph Alex (2018) (project); Mojica, Verence (2018) (project); Kim, Soung Uk (2018)

SENIOR SCHOLARS/RESEARCHERS

Daijin Li – Researcher 2014/2015; Chaobo Yang – Researcher 2015/2016; Dr. Young Choi, KIMM (Korea Institute of Machinery & Materials) – Researcher 2016/2017

VISITING RESEARCHERS (Thesis Study)

Jaume Felip Escol'a, Tecnica Superior d'Enginyeries Industrial i Aeronutica de Terrassa (ETSEIAT), Engineering Degree student 2015; Claudia Lopez Camara, Escola Tecnica Superior d'Enginyeria Qumica, Universitat Rovira i Virgili, Tarragona, visiting M.Sc. student 2014/2015; Albert Aguilera Roman, Universitat Politecnica de Catalunya, Terrassa, Engineering Degree student 2014/2015; Andrea Biasoli, Polytecnico Milano – Engineering Degree student 2014/2015; Adriana Llado Gambin, Universitat Politecnica de Catalunya, Terrassa, Engineering Degree student 2014/2015; Filippo Colagrande, Politecnico Milano – Engineering Degree student 2015/2016; Alex Torredemer Serra, Universitat Politecnica de Catalunya – Engineering Degree student 2016

VISITING SCHOLAR INTERNSHIP (with reports)

Antony Delavois, ENSMA, 2015; Adrien Ruas, ENSMA, 2015; Remy Petit, ENSMA, 2015; Guillaume Eplenier, ENSMA, 2015; Sarah Benhaddou, ENSMA, 2016; Louise Autef, ENSMA, 2016; Mohamed Azri, ENSMA, 2016; Gaetan Ruscade, ENSMA, 2016; Flavien Bart, ENSMA, 2016 (senior project); Quentin Dupuis, ENSMA, 2016; Guillaume Bernard, ENSMA, 2016; Romain Bouyer, Ecole des Mines d'Alès, 2016; Marion Lallemand, EPE Graduate School of Engineering, France, 2017; Samuel Perceval, ENSMA, 2017; Thomas Guedon, ENSMA, 2017; Guillaume Coden, ENSMA, 2018; Valentin Michaud, ENSMA, 2018; Valentin Morin, ENSMA, 2018; Eleonore Moinet, ENSMA, 2019; Baptiste Campenon, 2019; Julia Reny, ENSMA, 2019 (Project); Florent Cathary, Aix Marseille, 2019 (Project); Hugo Girodon, ENSMA, 2021.

UNDERGRADUATE STUDENTS

Laboratory Researchers (grant funded or research units):

Jose Torres (Summer 2020); Katie Maze (Summer 2019); Connor Watson (Summer 2019); 2017-2018 – Harshil Dadhaniya, George Hatem, Hieu Nguyen; 2016-2017 – Siddharth Baranwal, Jagdeep Batther, Lewis Liao, Dustin Hall, Dorsa Shirazi, Harshil Dadhaniya, Jungdong Hu; 2014-2015 – Adam Farsheed, Verence Mojica, Salvador Badillo-Rios, S. Rouzbeh Kazemian, Shirin Ghaffarkhan; 2012-2013 – Verence Mojica, Siva Udayamurthy; 2011-2012 – Maribel Jaquez, Alexander Kindel

External Programs:

Mirella Cruz – CAMP Summer Scholar (2018); Edward Torres - CAMP Summer Scholar (2016); Jason Owusu - CAMP Summer Scholar (2016); Patricia Martinez - CAMP Summer Scholar (2016); Vinicius Paolo - Brazil Science without Borders Scholar (2016); Igor Alves - Brazil Science without Borders Scholar (2016); Marisela Miramontes - UC-LEADS Scholar (2015); Andres Vargas - UC-LEADS Scholar (2015); Pedro Munoz - CAMP Summer Scholar (2015); Ahmed Alharbi, Muath Askar - SAU Summer Program (2015); Saad Almuhanha - SAU Summer Program (2015); Samuel Cabrera - CAMP Summer Scholar (2015); Joseph Sanchez - CAMP Summer Scholar (2015); Kaio Paes - Brazil Science Without Borders Scholar (2015); Andre da Silva - Brazil Science Without Borders Scholar (2015)

List of professional visitors hosted — Dr. Chiping Li (Sept 26th, 2022, AFOSR); MAE candidates for positions (March, 2021); 9 candidates for MAE Fluid dynamics and Aerospace positions (February - March, 2020); Prof. Jonathan Freund (Feb 7th, 2020 from the University of Illinois at Urbana-Champaign); Prof. Sébastien Candel (Sep 5th, 2019 from University professor emeritus at CentraleSupélec, University Paris-Saclay and an honorary professor at Institut Universitaire de France); Prof. Robert Pitz (March 9th, 2018 from Vanderbilt Univ.); Prof. Steven Chu (March 09, 2016 former U.S. Secretary of Energy/ Nobel Prize Winner from Stanford University); Dr. Claas and Dr. Mostafa Agour (Feb 22, 2016 from BIAS, Bremen, Germany); Dr. Daniel Berg and Dr. James M. Tien (Feb 10, 2016 from University of Miami); Prof. Dick Miles (Jan 21, 2016 from Princeton University); Richard Himes (Jan 20, 2016 from Electric Power Research Institute); Prof. Akiko Matsuo and Mr. Hiroaki Watanabe (Jan 8, 2016 from Keio University, Japan); Chris

Carstens and Leonard Devanna (Nov 23, 2015 visited Professor Taborek and Keck facilities); Prof. Ahmed Ghoniem (Nov 13, 2015 from MIT); Prof. Steve Masutani (Oct 19, 2015 from University of Hawaii); Prof. Fokion Egolfopoulos, Christodoulos Xiouris and Jagannath (Jagan) Jayachandran (Oct 13, 2015 from USC); Dr. William J. Pitz (Sep 14, 2015 from Lawrence Livermore National Laboratory); Fang-Hsien Wu, ph.D. student from National Cheng Kung University (April 30 – May 16, 2015); Prof. Yei-Chin Chao (May 13, 2015 from National Cheng Kung University).

INVITED TECHNICAL TALKS/LECTURES

Independent presentations

- T-I.01 National Academies of Sciences Speaker, “Sustainability & ADEI – Research Scientist in Higher Education Academic Setting,” and Early-Career Panelist for the [Committee on Biological and Physical Sciences in Space](#) (CBPSS), Space Science Week 2023, Washington D.C., March 29th, 2023. (Meeting Materials 08)
- T-I.02 Technical talk and dinner at SWE Holiday Soirée (Society of Women Engineer – Orange County), Microgravity E-FIELD Flames Aboard the International Space Station (ISS): Research, Education and Embracing Diversity,” Irvine, California. December 8th, 2022.
- T-I.03 Seminar in Institute Pprime - CNRS/ISAE-ENSMA (Centre national de la recherche scientifique - Institut P', Université de Poitiers – ISAE-ENSMA), Microgravity E-FIELD Flames on the ISS and Gas Hydrates for Combustion Research, November 24, 2022.
- T-I.04 Seminar in ICARE - CNRS Orléans Campus (Centre national de la recherche scientifique - Institut de Combustion, Aérothermique, Réactivité et Environnement), Microgravity E-FIELD Flames on the ISS and Gas Hydrates for Combustion Research, Orléans, France, November 18, 2022.
- T-I.05 Seminar for SIRiPods (Samueli Interdisciplinary Research in Pods) Junior Engineering Students at University of California, Irvine, hosted by Christine King — My Research Experience for E-FIELD Flames: Experiment Operation on the ISS from Earth, August 10, 2021.
- T-I.06 Guest Speaker for the EXpanding Communities and Encouraging Leadership (EXCEL) students, 1st and 2nd year STEM undergrads in Bio/Chem at University of California, Irvine, hosted by Dr. Harris, the Director of CAMP, February 16, 2021.
- T-I.07 36th Annual Meeting of the American Society for Gravitational and Space Research (ASGSR), Online, Physical Sciences Informatics Plenary – ACME E-FIELD Flames experiment - new data in PSI Nov. 5, 2020.
- T-I.08 Invited talk at North America Taiwanese Professors' Association (NATPA) – Southern California (SoCal) Spring Meeting, CSU San Marcos — Microgravity Electric-Field Flames on International Space Station (ISS), April 28th, 2018.
- T-I.09 Invited talk in Mechanical Engineering, National Cheng Kung University, Tainan, Taiwan — Electric Aspects of Impinging Flames/ Hydrate and Keck Laboratory, March 28, 2016.
- T-I.10 Seminar at Department of Aeronautics and Astronautics, National Cheng Kung University, Tainan, Taiwan — Electric Aspects of Impinging Flames/ Hydrate and Keck Laboratory, March 29, 2016.
- T-I.11 Mini-Workshop on Hydrates, Aoyama Gakuin University, Sagamihara Campus, Japan — Hydrate Study at University of California Irvine, April 16, 2015.

Collaborative presentations

- T-C.1 36th Annual Meeting of the American Society for Gravitational and Space Research (ASGSR), Online, Physical Sciences Informatics Plenary — Electric Field Effects on Laminar Diffusion Flames,” Nov 5, 2020. (presented by Dunn-Rankin, D.)
- T-C.2 University, Mechanical and Aerospace Engineering Seminar - Electric Field Effects on Laminar Diffusion Flames, February 8, 2019. (presented by Dunn-Rankin, D.)
- T-C.3 ME Graduate Student Association Research Symposium (MEGSA), University of California, Riverside, Invited Keynote - Electrical Aspects of Flames: Experiments on the International Space Station, May 25, 2018. (presented by Dunn-Rankin, D.)
- T-C.4 Multi-Agency Coordinate Committee for Combustion Research (MACCCR), Sandia National Laboratories, Microgravity Combustion Session — Electric Field Effects on Laminar Diffusion Flames, April 11th, 2018. (presented by Dunn-Rankin, D.)
- T-C.5 Gordon Research Conference on Natural Gas Hydrate Systems, invited - Combustion of Gas Hydrates, February 28, 2018. (presented by Dunn-Rankin, D.)
- T-C.6 USJI, US-Japan Institute, Research Week, Washington D.C., Panel Discussion — Clathrate Hydrates from Resource Development to Novel Energy/Environment Technologies, Environmental Opportunities using Clathrate Hydrates, September 16, 2016. (presented by Dunn-Rankin, D.)

PUBLICATIONS

Journal Papers

- A.1 Chien, Y.-C., Escofet-Martin D., Dunn-Rankin, D. (2016), "CO Emission from an Impinging Non-Premixed Flame," *Combustion and Flame*, Vol. 174 pp. 16-24.
doi:[10.1016/j.combustflame.2016.09.004](https://doi.org/10.1016/j.combustflame.2016.09.004)
- A.2 Yang, C., Escofet-Martin, D., Dunn-Rankin, D., Chien, Y.-C., Yu, X., Mukamel, S. (2017), "Hybrid femtosecond/picosecond pure-rotational coherent anti-Stokes Raman scattering with chirped probe pulses," *Journal of Raman Spectroscopy*, Vol. 48 iss. 12 pp. 1881-1886.
doi:[10.1002/jrs.5262](https://doi.org/10.1002/jrs.5262)
- A.3 Muzio, L., Bogseth, S., Himes, R., Chien, Y.-C., Dunn-Rankin, D. (2017), "Ammonium Bisulfate Formation and Reduced Load SCR Operation," *Journal of Fuel*, Vol. 206 pp. 180-189.
doi:[10.1016/j.fuel.2017.05.081](https://doi.org/10.1016/j.fuel.2017.05.081)
- A.4 Chien, Y.-C., D. and Dunn-Rankin, D. (2018) "Electric Field Induced Changes of a Diffusion Flame and Heat Transfer near an Impinging Surface," *Electric Fields in Energy & Process Engineering, Special Issue of Energies*, Vol. 11 Iss. 5 pp. 1235. doi:[10.3390/en11051235](https://doi.org/10.3390/en11051235)
- A.5 Chien, Y.-C., Escofet-Martin, D., Dunn-Rankin, D. (2019), "Ion Current and Carbon Monoxide Release from an Impinging Methane/Air Coflow Flame in an Electric Field," *Combustion and Flame*, Vol. 204 pp. 250-259.
doi:[10.1016/j.combustflame.2019.03.022](https://doi.org/10.1016/j.combustflame.2019.03.022)
- A.6 Escofet-Martin, D., Chien, Y.-C., Dunn-Rankin, D., Dzieminska E., Hayashi A. K., Hanada S. (2019), "Flame Propagation in a Narrow Closed Channel: Effects of Aspect Ratios, Blockage Ratio and Mixture Reactivity on Flame Speed and Pressure Dynamics," *Combustion Science and Technology*.
- A.7 Chien, Y.-C., D. and Dunn-Rankin, D. (2019) "Combustion Characteristics of Methane Hydrate Flames," *Cleaner Combustion, Special Issue of Energies*, Vol. 12 Iss. 10 pp. 1939.
doi:[10.3390/en12101939](https://doi.org/10.3390/en12101939)
- A.8 Kvamme, B., Coffin, R., Wei, N., Zhou, S.W., Zhao, J.Z., Li, Q.P., Saeidi, N., Chien, Y.-C., D., Dunn-Rankin, D., Sun, W.T. and Zarifi, M. (2019) "Stages in Dynamics of Hydrate Formation and Consequences for Design of Experiments for Hydrate Formation in Sediments," *Energy and Environment, Energies*, Vol. 12 Iss. 17 pp. 3399.
doi:[10.3390/en12173399](https://doi.org/10.3390/en12173399)
- A.9 Saeidi, N., Dunn-Rankin, D., Kvamme, B. and Chien, Y.-C. (2021), "Experimental studies on combined production of CH₄ and safe long-term storage of CO₂ in the form of solid hydrate in sediment," *Physical Chemistry Chemical Physics (PCCP)*, Vol. 23 Iss. 40 pp. 23313-23324.
doi:[10.1039/D1CP03239A](https://doi.org/10.1039/D1CP03239A)
- A.10 Minniti, M., Dunn-Rankin, D. and Chien, Y.-C. (2021), "Long-range microscopy of optically dense spray structures using Ultra-Short Pulse Off-Axis Digital Holography," *Virus-Related and Medical Sprays, Special Issue of Atomization and Sprays (AAS)*, Vol. 31 Iss. 11 pp. 47-59.
doi:[10.1615/AtomizSpr.2021039404](https://doi.org/10.1615/AtomizSpr.2021039404)
- A.11 Escofet-Martin, D., Chien, Y.-C., Dunn-Rankin, D. (2022), "PLIF and Chemiluminescence in a Small Laminar Coflow Methane-Air Diffusion Flame at Elevated Pressures," *Special Issue for Katharina Kohse-Höinghaus, Combustion and Flame*, Vol. 243.
doi:[10.1016/j.combustflame.2022.112067](https://doi.org/10.1016/j.combustflame.2022.112067)
- A.12 Chien, Y.-C., Stocker, D., Hegde, U. and Dunn-Rankin, D. (2022), "Electric-Field Effects on Methane Coflow Flames Aboard the International Space Station (ISS): ACME E-FIELD Flames," *Combustion and Flame*, Vol. 246.
doi: [10.1016/j.combustflame.2022.112443](https://doi.org/10.1016/j.combustflame.2022.112443)
- A.13 Chien, Y.-C., Girodon, H. and Esquivias Rodriguez, B. (2023), "Modeling of elevated pressure diffusion flames with water addition," *The 28th International Colloquium on the Dynamics of Explosions and Reactive Systems Special Issue, Combustion Science and Technology*.
doi: [10.1080/00102202.2023.2182205](https://doi.org/10.1080/00102202.2023.2182205)
- A.14 Dunayeskiy, I., Biasioli, A., Chien, Y.-C., Dunn-Rankin, D., Muzio, L., Himes, R. (2023), "Dataset for SO₂, SO₃, H₂SO₄ and H₂O infrared absorption spectra at 300°C and 350°C temperatures," *Data in Brief*, Vol. 48.
doi: [10.1016/j.dib.2023.109066](https://doi.org/10.1016/j.dib.2023.109066)

A.15 Dunn-Rankin, D., Chien, Y.-C., Ryo, O., Ueda, T. (2024), "A Detailed Review of Methane Hydrate Combustion," Progress in Energy and Combustion Science (PECS).
doi: [10.1016/j.pecs.2023.101111](https://doi.org/10.1016/j.pecs.2023.101111)

A.16 Cueto Duenas, D., Dunn-Rankin, D., Chien, Y.-C. (2024), "Precedent study for CO₂ sequestration: Methane hydrate structure I dissociation process and free surface analysis," Virtual Special Issue: Recent Advances in Gas Hydrate Technologies: An Update from ICGH10, Energy & Fuels. (submitted)

Esquivias Rodriguez, B., Girodon, H. and Chien, Y.-C., (2024), "A comparison between water addition and CO₂ addition to a diffusion jet flame," The 29th International Colloquium on the Dynamics of Explosions and Reactive Systems Special Issue, Combustion Science and Technology. (in-preparation)

Ulises Torres, J. lead authors (2024), "Digital hologram construction and reconstruction optimization for spray using optical software," Optics Express. (in-preparation).

N. Saeidi lead author (2024), NFM and methanol work from dissertation, Physical Chemistry Chemical Physics (PCCP). (In-preparation)

Conference Papers (full papers, acceptance based on abstract or extended abstract only)

B.1 Chen, C.-P., Chao, Y.-C., Wu, C.Y. Lien, Y.-S., Chien, Y.-C., and Cheng, T.-S. (2006), "Structure and Stabilization Mechanism of a Microjet Methane Diffusion Flame Near Extinction," The 16th Energy and Combustion Meeting, Keelung, Taiwan, March.

B.2 Cheng, T.-S., Chien, Y.-C., Chao, Y.-C., Li, Y.-H., Wu, C.-Y., and Cheng, Y.-Y. (2008), "Development of Chemiluminescence Sensor for Combustion Measurements," The 18th Energy and Combustion Meeting, Yunlin, Taiwan, March.

B.3 Chien, Y.-C., Garman, J., and Dunn-Rankin, D. (2011), "Tomographic Analysis of Quantum Cascade Laser Absorption by Carbon Monoxide," Paper 11F-41, Fall Technical Meeting of the Western States Section/The Combustion Institute, Riverside, CA, October 17-18.

B.4 Yamashita, K., Chien, Y.-C., Karnani, S., Dunn-Rankin, D. (2013), "The influence of Electric Field Power Systems on flame behavior," 8th US National Combustion Meeting, Utah, May 19-22.

B.5 Chien, Y.-C., and Dunn-Rankin, D. (2013), "Electric Field Effects on Carbon Monoxide Release from Impinging Flames," 8th US National Combustion Meeting, Utah, May 19-22.

B.6 Chien, Y.-C., Yamashita, K., and Dunn-Rankin, D. (2013), "Electric Aspects of Impinging Flames," International Colloquium on the Dynamics of Explosions and Reactive Systems, Taipei, Taiwan, July 28- August 02.

B.7 Chien, Y.-C., and Dunn-Rankin, D. (2014), "Temperature measurement over a quenching plate with electric field flames," Paper 87LF-0060, Spring Meeting of the Western States Section/The Combustion Institute, Pasadena, CA, March 23-25.

B.8 Escofet-Martin D., Chien, Y.-C., and Dunn-Rankin, D. (2014), "OH PLIF of an impinging flame," Paper 87DI-0032, Spring Meeting of the Western States Section/The Combustion Institute, Pasadena, CA, March 23-25.

B.9 Escofet-Martin, D., Chien, Y.-C., Dunn-Rankin, D. (2015) "Two-photon CO PLIF of flames near a quenching plate," 9th U.S. National Combustion Meeting, Cincinnati, Ohio, May 17-20.

B.10 Chien, Y.-C., Escofet-Martin, D., and Dunn-Rankin, D. (2015) "CO Emission from an Impinging Non-Premixed Flame under the Influence of an Electric Field," 9th U.S. National Combustion Meeting, Cincinnati, OH, May 17-20.

B.11 Chien, Y.-C., Escofet-Martin, D., and Dunn-Rankin, D. (2015) "Non-Premixed Impinging Flames and CO Release under the Influence of an Electric Field," 25th International Colloquium on the Dynamics of Explosions and Reactive Systems, Leeds University, England, August 2-7.

B.12 Escofet-Martin, D., Chien, Y.-C., and Dunn-Rankin, D. (2015) "Two-Line OH PLIF Temperature Measurements of Flames Near a Quenching Plate," 25th International Colloquium on the Dynamics of Explosions and Reactive Systems, Leeds University, England, August 2-7.

- B.13 Escofet-Martin, D., Chien, Y.C., Dunn-Rankin, D. (2017) "High pressure effects on PLIF of a nonpremixed coflow flame," 10th U.S. National Combustion Meeting, Maryland, April 23-26.
- B.14 Chien, Y.-C. and Dunn-Rankin, D. (2017) "The visualization and combustion characteristics of artificial methane hydrate flames," 10th U.S. National Combustion Meeting, Maryland, April 23-26.
- B.15 Biasioli, A., Chien, Y.-C., and Dunn-Rankin, D. (2017) "Exploring Continuous Monitoring Methods for SO₃ in Flue Gas Conditions," Fall Meeting of the Western States Section/The Combustion Institute, Wyoming, Laramie, October 2-3.
- B.16 Escofet-Martin, D., Torredemer, A., Chien, Y.-C., and Dunn-Rankin, D. (2017) "Direct comparison of simulated OH fluorescence and experimental results in a non-premixed laminar diffusion coflow flame at high pressure conditions," Fall Meeting of the Western States Section/The Combustion Institute, Wyoming, Laramie, October 2-3.
- B.17 Chien, Y.-C., Tinajero, J., Stocker, D., Hegde, U. and Dunn-Rankin, D. (2018) "Electrical Field Effects on Flames in Microgravity on the International Space Station," Central States Section Combustion Institute Spring meeting, Minneapolis, May 20-22.
- B.18 Hernandez C., Albalawi, F., Vuong, C., Tanaka, M., Chien, Y.-C., and Dunn-Rankin, D. (2019) "Investigation of Combustion Behavior of a Hot Air Balloon Burner," Other topics session, 11th U.S. National Combustion Meeting, Pasadena, March 25-27.
- B.19 Chien, Y.-C., Tinajero, J., Stocker, D., Hegde, U. and Dunn-Rankin, D. (2019) "Ion Current and Flame Changes with Electric Fields in Microgravity," Laminar Flames, 11th U.S. National Combustion Meeting, Pasadena, March 25-27.
- B.20 Biasioli, A., Chien, Y.-C., and Dunn-Rankin, D. (2019) "Exploring Continuous Monitoring Methods for SO₃ and H₂SO₄ in Flue Gas Conditions," Coal, Biomass Combustion, and Gasification, 11th U.S. National Combustion Meeting, Pasadena, March 25-27.
- B.21 Chien, Y.-C., Stocker, D., Hegde, U. and Dunn-Rankin, D. (2019) "Microgravity Experiments with Methane Jet Flames under Electric Field Influence on-board the International Space Station (ISS)," Laminar Flames, 12th ASIA-Pacific Conference on Combustion, Fukuoka, July 1st-5th.
- B.22 Minniti, M., Chien, Y.-C., Ziaee, A. and Dunn-Rankin, D. (2020) "Long-range microscopy of primary atomization fluid structures in diesel sprays using Ultra-Short Pulse Off-Axis Digital Holography," Advances in Spray Diagnostics of Technical Sessions - Track 1, ILASS-Americas 31st Annual Conference on Liquid Atomization and Spray Systems (ILASS), Madison, Wisconsin (Virtual), USA, May 17-20.
- B23 Torres, J., Dunn-Rankin, D., Chien, Y.-C. (2021) "Digital Hologram Construction and Reconstruction Optimization for Sprays using Optical Software," 15th International Conference on Liquid Atomization and Spray Systems (ICLASS), Edinburgh, UK, August 29 – September 2.
- B.24 Esquivias, B., Dunn-Rankin, D. and Chien, Y.-C. (2021) "Numerical simulation of water-vapor addition into a methane diffusion flame at high pressures," Laminar Flames, 12th U.S. National Combustion Meeting, Texas A&M(Virtual), May 24-26.
- B.25 Girodon, H., Dunn-Rankin, D. and Chien, Y.-C. (2022), "CFD Modeling of pressurized laminar coflow (non-premixed) diffusion flames with water addition," paper 162, International Colloquium on the Dynamics of Explosions and Reactive Systems, Naples, Italy, June 19- 22. (Extended abstract)
- B.26 Jeon, Edward, Tahim, Gurpreet Singh, Saeiei, Navid and Chien, Y.-C. (2022) "Initial Investigation of Carbon Dioxide Hydrate Fire Extinguishment," Paper 1A13, Spring Meeting of the Western States Section/The Combustion Institute, Stanford, California, March 21-22. (Extended abstract)
- B.27 Donzeau, M., Esclapez, L., Day, M. S. and Chien, Y.-C., "Recent Progress on Numerical Modeling for Microgravity Electric Field Flames Results," paper 1D04, 13th U.S. National Combustion Meeting, March 19-22, 2023, College Station, Texas.
- B28 Esquivias, B., Girodon, H. and Chien, Y.-C. (2023), "A comparison between water addition and CO₂ addition to a

diffusion jet flame,” Paper Poster P-29, International Colloquium on the Dynamics of Explosions and Reactive Systems, Siheung, Korea, July 23- 28.

B29 Biasioli, A., Dunayevskiy, I., Krisel, J., Himes, R., Muzio, L., Santamaria, J., Dunn-Rankin, D. and Chien, Y.-C. (2024), “Experimental observation of the SO₃/H₂SO₄ equilibrium in flue gas conditions with continuous monitoring methods for SO₃,” Paper# TBD, Spring Meeting of the Western States Section/The Combustion Institute, Salt Lake City, Utah, March 4-5. (in-preparation)

B30 Gellerman, K., Banerjee, T. and Chien, Y.-C. (2024), “Modeling Ember Transport and Accumulation Patterns During Wildfires,” Paper# TBD, Spring Meeting of the Western States Section/The Combustion Institute, Salt Lake City, Utah, March 4-5. (in-preparation)

Conference Papers (only abstract required)

C.1 Chien, Y.-C., Jaquez-Nunez, M., Francis, M., Jacobs, J., Karnani, S., and Dunn-Rankin, D. (2012), “Recent Progress in Studying Emissions from Electric Field Effects on Flames,” W5P040- Work-in-Progress Poster, 34th International Combustion Symposium, Warsaw, Poland, July 30-August 3.

C.2 Chien, Y.-C., and Dunn-Rankin, D. (2014), “Electric Field Controlled Diffusion Flames,” Poster session, Pacific Rim Workshop on Deep Ocean Power Science, Honolulu, Hawaii, February 23-26.

C.3 Chien, Y.-C., Escofet-Martin, D., and Dunn-Rankin, D. (2014) “Electric Field Effects on CO Emission from Non-Premixed Quenching Flames,” Work-in-Progress Poster W1P011, 35th International Combustion Symposium, San Francisco, CA, August 3–8.

C.4 Escofet-Martin, D., Chien, Y.-C., Dunn-Rankin, D. (2015) “Two-photon CO PLIF of flames near a quenching plate,” Poster session, Brazilian Combustion Summer School, Rio de Janeiro, Brazil, June 8-12.

C.5 Chien, Y.-C., Escofet-Martin, D., Dunn-Rankin, D. (2015) “Electric field effects on CO emission from a non-premixed quenching flames,” Poster session, Gordon Research Conference (GRC), Waterville Valley, NH, August 8-14.

C.6 Biasioli, A., Chien, Y.-C., Dunn-Rankin, D. (2016) “Manipulation and Control of Artificial Hydrate Formation,” Presentation, Fiery Ice – International Workshop on Methane Hydrate Research & Development, Honolulu, Hawaii, June 15-17.

C.7 Chien, Y.-C., Biasioli, A., Dunn-Rankin, D. (2016) “Behavior of methane hydrate during combustion,” Presentation, Fiery Ice – International Workshop on Methane Hydrate Research & Development, Honolulu, Hawaii, June 15-17.

C.8 Escofet-Martin, D., Chien, Y.-C., and Dunn-Rankin, D. (2016) “Two-photon CO fluorescence thermometry and concentration,” Work-in-Progress Poster 4P046, 36th International Symposium on Combustion, Seoul, Korea, July 31 - August 5.

C.9 Chien, Y.-C., and Dunn-Rankin, D. (2017). “An overview of burning gas hydrate flame color during combustion,” Poster session, 9th International Conference on Gas Hydrates (ICGH9), Denver, Colorado, June 25-30.

C.10 Mason, E., Chien, Y.-C., and Dunn-Rankin, D. (2017). “Surfactant Enhanced Methane Hydrate Growth in Quiescent Sodium Chloride Solutions,” Poster session, 9th International Conference on Gas Hydrates (ICGH9), Denver, Colorado, June 25-30.

C.11 Chien, Y.-C., Biasioli, A., and Dunn-Rankin, D. (2017), “Testing methods for continuous monitoring of SO₃ and H₂SO₄ at flue gas conditions,” Work-in-Progress Poster WIP-5, 26th International Colloquium on the Dynamics of Explosions and Reactive Systems, Boston, USA, July 30- August 04.

C.12 Chien, Y.-C., Tinajero, J., Stocker, D., Hegde, U. and Dunn-Rankin, D. (2018) “Small Diffusion Flames under the influences of Electric-Field: Microgravity and Gravity,” Work-in-Progress poster 1P065, 37th International Symposium on Combustion, Dublin, Ireland.

C.13 Escofet-Martin, D., Chien, Y.-C., and Dunn-Rankin, D. (2018) “Direct comparison of simulated and experimental OH fluorescence in a non-premixed laminar diffusion coflow flame at high pressure,” Work-in-Progress poster 1P065, 37th International Symposium on Combustion, Dublin, Ireland.

C.14 Chien, Y.-C., Saeidi N., Kvamme B., and Dunn-Rankin, D. (2018) “Natural Combustion of Methane Hydrates and its Emissions,” Poster, Fiery Ice – International Workshop on Methane Hydrate Research & Development,

Chengdu, China, October 29-31.

- C.15 Chien, Y.-C., Tinajero, J., Stocker, D., Hegde, U. and Dunn-Rankin, D. (2018) "Microgravity Experiments of Electric Field Effects on Laminar Ethylene/Air Diffusion Flames," Presentation, American Society for Gravitational and Space Research Annual Meeting 2018, Oct. 31 – Nov. 3rd, Washington DC.
- C.16 Chien, Y.-C., Stocker, D., Hegde, U. and Dunn-Rankin, D. (2019) "Microgravity Experiments Examining Electric Field Effects on Laminar Methane Gas-Jet Diffusion Flames," Presentation, American Society for Gravitational and Space Research Annual Meeting 2019, Nov. 20 – Nov. 23, Denver, Colorado.
- C.17 Saeidi, N., Dunn-Rankin, D., Kvamme, B., and Chien, Y.-C. (2020). "Zero Emission Energy Generation from in situ CH₄ Hydrates by Substitution with CO₂," Poster, 10th International Conference on Gas Hydrates (ICGH10), Singapore, June 21-26. (accepted)
- C.18 Kvamme, B., Wei, N., Coffin, R.B., Zhou, S.W., Zhao, J.Z., Li, Q.P., Saeidi, N., Chien, Y.-C., and Dunn-Rankin, D., Sun, W.T., Zarifi, M. (2020). "Impact of Hydrate Film in Delays of Induction Times for Hydrate Formation," Poster, 10th International Conference on Gas Hydrates (ICGH10), Singapore, June 21-26. (accepted)
- C.19 Kriesel, J., Dunayevskiy, I., Biasioli, A., Dunn-Rankin, D., Chien, Y.-C., Muzio, L., Spang, B., Shiimoto, G. and Himes, R. (2021). "SO₃/H₂SO₄ continuous real-time sensor demonstration at a power plant," 38th International Pittsburgh Coal Conference (IPCC), Pittsburgh, September 21-23. (Virtual)
- C.20 Cueto Duenas, D. and Chien, Y.-C. (2022). "MD Simulations of Methane Hydrate Dissociation Under Temperature Step and Ramping," E-poster recorded and online presentation, American Association for the Advancement of Science Annual Meeting (AAAS), Philadelphia, and online, February 17-20.
- C.21 Chien, Y.-C. and Dunn-Rankin, D. (2021) "Recent Progress in Preparation for PeleLM CFD of Ion-Driven Winds from Diffusion Flames (selected PSI project)," Combustion 3 short talk, American Society for Gravitational and Space Research Annual Meeting 2021, Nov. 3 – Nov. 6th, Baltimore, Maryland.
- C.22 Chien, Y.-C., Stocker, D., Hegde, U. and Dunn-Rankin, D. (2022) "Microgravity E-FIELD Flames Results on CH₄/air Coflow Burner," Work-in-Progress poster 2P091, 39th International Symposium on Combustion, July 26th, Vancouver, Canada.
- C.23 Esquivias Rodriguez, B., Girodon, H. and Chien, Y.-C. (2022) "Numerical simulation of water-vapor addition into a laminar diffusion methane/air flame at elevated pressures using PeleLM," Work-in-Progress poster 2P092, 39th International Symposium on Combustion, July 26th, Vancouver, Canada.
- C.24 Chien, Y.-C., Cathary, F. and Cueto Duenas, D. (2023). "Emission Characteristics from CH₄ Hydrate Combustion," Poster presentation P33/AbstractID 733, 10th International Conference on Gas Hydrates (ICGH10), Singapore, July 9-14.
- C.25 Cueto Duenas, D. and Chien, Y.-C. (2023). "Inhibition effects of surfactant addition at the methane hydrate-CO₂ interface: A molecular dynamics study," Poster presentation P39/AbstractID 564, 10th International Conference on Gas Hydrates (ICGH10), Singapore, July 9-14.
- C.26 Chien, Y.-C. and Donzeau, M. (2023). "Recent Progress on Microgravity E-Field Flames and Simulation," Oral presentation, 19th Annual AIAA Orange County Southern California Aerospace Systems and Technology Conference (ASAT), Irvine, May 20.
- C.27 Chedin, A. and Chien, Y.-C. (2023). "Hot Air Balloon Burner Emissions & Efficiency," Poster session, UCI Combustion Institute Summer School (UCI CI-SS), Irvine, August 21st.
- C.28 Laporte, E. and Chien, Y.-C. (2023). "Hydrogen and methane mixture study at elevated temperature and pressure," Poster session, UCI Combustion Institute Summer School (UCI CI-SS), Irvine, August 21st.
- C.29 Constant, J. and Chien, Y.-C. (2023). "Off-axis holography imaging technique for a fuel injector," Poster session, UCI Combustion Institute Summer School (UCI CI-SS), Irvine, August 21st.
- C.30 Distelzwey, L., Apelian, T., Ponce, G. and Chien, Y.-C. (2023). "Particle Imaging Velocimetry for a Large Scale Flow System," Poster session, UCI Combustion Institute Summer School (UCI CI-SS), Irvine, August 21st.

- C.31 Dru, L. and Chien, Y.-C. (2023). "Electric Field Flames 1g Experiment Validation for Simulation," Poster session, UCI Combustion Institute Summer School (UCI CI-SS), Irvine, August 21st.
- C.32 Abdelaziz, N. and Chien, Y.-C. (2023). "Water addition into methane diffusion flames for elevated pressure," Poster session, UCI Combustion Institute Summer School (UCI CI-SS), Irvine, August 21st.
- C.33 Renault, P. and Chien, Y.-C. (2023). "Combustion Emission for Methane Hydrate Flames," Poster session, UCI Combustion Institute Summer School (UCI CI-SS), Irvine, August 21st.
- C.34 Deu Morel, R., Day, M. and Chien, Y.-C. (2023). "E-Field Flames simulation in Microgravity," Poster session, UCI Combustion Institute Summer School (UCI CI-SS), Irvine, August 21st.
- C.35 Rabec, S., Ristor, T. and Chien, Y.-C. (2023). "Fire Extinguishing Experiment Using CO₂ Hdydrates," Poster session, UCI Combustion Institute Summer School (UCI CI-SS), Irvine, August 21st.
- C.36 Gellerman, K., Chien, Y.-C., Banerjee, T. (2023). "Modeling Ember Transport and Accumulation Patterns During Wildfires," Poster session, UCI Combustion Institute Summer School (UCI CI-SS), Irvine, August 21st.
- C.37 Deu Morel, R., Day, M. and Chien, Y.-C. (2023) "Investigation of mechanisms for microgravity ion-driven wind using simulation," Presentation, American Society for Gravitational and Space Research Annual Meeting 2023, Nov. 14 –18, Washington DC.
- C.38 Dru, L., Day, M. and Chien, Y.-C. (2023) "Electric Field Coflow Flames and Simulation," Presentation, American Society for Gravitational and Space Research Annual Meeting 2023, Nov. 14 – 18, Washington DC.

Thesis/Dissertation

- D.1 Chien, Y.-C. (2007), "Development of a Chemiluminescence Diagnose system for Combustion Measurements" Thesis of Master degree of Department Aeronautics and Astronautics, National Cheng Kung University.
- D.2 Chien, Y.-C. (2014), "Electrical Aspects of Impinging Flames" Dissertation of Ph.D. degree of Mechanical and Aerospace Engineering, University of California Irvine.

OTHER

Press/media Articles

- E.1 Pacific Times News, "[North America Taiwanese Professors' Association \(NATPA\)- Southern California \(SCC\) Spring Meeting in San Marcos](#)," edited by Dennis Chen, May 3rd, 2018,
- E.2 Space Flames, facebook page of NASA, "[SOOT](#)," edited by NASA Glenn Project Scientist Dennis Stocker, posted on June 15th, 2018.
- "SOOT - The May 17 testing for the Electric-Field Effects on Laminar Diffusion Flames (E-FIELD Flames) experiment resulted in significant soot deposition on the coflow burner. The composite image (prepared by Dr. Alice Chien, UC Irvine) below shows the difference before and after the soot accumulation, where it is especially evident on the fuel tube which protrudes above the annual coflow outlet...."*
- E.3 Samueli School of Engineering News article, UC Irvine "[UCI Conducts Combustion Research aboard the International Space Station](#)," edited by UCI campus writer Anna Lynn Spitzer, posted on June 18th, 2018.

"Mechanical and aerospace engineering professor Derek Dunn-Rankin and project scientist Yu-Chien (Alice) Chien watched as their gear headed toward the ISS. Their E-FIELD Flames (Electric-Field Effects on Laminar Diffusion Flames) is a part of NASA' ACME....."

Other circulation/sharing points:

- "Among the nearly 6,000 pounds of scientific research, supplies and hardware hurtling toward space aboard the Falcon 9 rocket was equipment integral to a UCI-designed-and-run combustion experiment nearly 20 years in the making." @ucirvineengineering facebook page by the Henry Samueli School of Engineering on [Jul 2nd, 2018](#).
- "UCI Conducts Combustion Research aboard the International Space Station" @UCIEngineering twitter account by the Henry Samueli School of Engineering, [Jun 21st, 2018](#).

- “E-FIELD Flames - A UC Irvine article (see the link below) was posted earlier today about the Electric-Field Effects on Laminar Diffusion Flames (E-FIELD Flames) experiment. The article explains, for example, ‘Our project is to see if we can get a better feel for where these ions are coming from and how we can pull on them to make flames more efficient and less polluting,’ says Prof. Derek Dunn-Rankin the experiment’s Principal Investigator.
The first half of the testing - using the coflow burner - has been completed, where the second half - using the gas-jet burner - will be conducted in the coming months.” @space.flames via facebook page by NASA on [Jun 18th, 2018](#).

E.4 Dean’s Report, 2018, UCI Samueli School of Engineering “[Extraterrestrial](#)”, produced by Communication Department in Engineering, writer Anna Lynn Spitzer, published on September 27th, 2018. (16,000 printed reports were mailed)

*“The experiment, called E-FIELD Flames (Electric-Field Effects on Laminar Diffusion Flames), is the long-awaited culmination of mechanical and aerospace engineering professor Derek Dunn-Rankin and project scientist **Yu-Chien (Alice) Chien**’s efforts.....”*

*“There have been some surprises, says **Chien**, and some success. ‘From the Space Station, we actually are seeing soot eliminated under the influences of the electric field.’.....”*

Other circulation/sharing points:

- “The wait is over! Check out the @UCIEngineering 2017-18 Dean’s Report here:” @ucirvineengineering facebook page by the Henry Samueli School of Engineering on [Oct 5th, 2018](#).
- “The wait is over! Check out the @UCIEngineering 2017-18 Dean’s Report here:” @UCIEngineering twitter account by the Henry Samueli School of Engineering on [Oct 5th, 2018](#).
- “E-FIELD Flames - A great opportunity to learn about combustion research in space - and more specifically the Electric-Field Effects on Laminar Diffusion Flames (E-FIELD Flames) project - is found in the new annual report from the Dean of Engineering at UC Irvine (<https://uci.edu>). The experiment which is currently operating in the space station’s Combustion Integrated Rack (CIR) is led by Prof. Derek Dunn-Rankin (right) and Dr. Yu-Chien (Alice) Chien (left).
The fifth test day in the current round of testing is scheduled for tomorrow, Oct. 17. Next week, the high-voltage power supply will be swapped by the space station commander, Alex Gerst. The subsequent four days of tests will be carried out with a positively-charged electrode mesh, where the recent tests have been carried out with a negatively-charged mesh.
The ion wind resulting from the electric field tends to lift the flame when the mesh is negatively charged and push it back toward the burner when it is positively charged.” @space.flames via facebook page by NASA, posted by NASA Project Scientist Dennis Stocker with new introduction of this article on [Oct 16th, 2018](#).

E.5 The Combustion Institute News article, “[International Space Station \(ISS\) Combustion Experiments](#),” edited by the Combustion Institute office, sending out/posted on October 15th, 2018.

*“Derek Dunn-Rankin and **Yu-Chien (Alice) Chien** from the University of California, Irvine, CA, USA are also reviewing data from recent experiments conducted in space. You can find additional information on their research at:.....”*

E.6 Space Flames, facebook page of NASA, “[ACME](#),” edited by NASA Glenn Project Scientist Dennis Stocker, posted on March 26th, 2019,

*“ACME - Early ISS results from the Advanced Combustion via Microgravity Experiments (ACME) project will be presented today at the 11th U.S. National Combustion Meeting.....Laminar Flames session, results from the Electric-Field Effects on Laminar Diffusion Flames (E-FIELD Flames) investigation will be presented in a paper by **Y.-C. (Alice) Chien et al.** titled ‘Ion Current and Flame Changes with Electric Fields in Microgravity.’”*

E.7 W.M. Keck foundation 2018 [Annual Report](#), *unleashing potential (Dr. Chien holding the burning hydrate sample on the [report cover](#)).*

Article title “Clean Power at the Bottom of the Ocean,” page 12-15, released on June 12th 2019. (15,00 printed reports were mailed)

*“With this award, Derek Dunn-Rankin and Peter Taborek, with project scientists Sunny Karnani and **Yu-Chien (Alice) Chien**, built the W.M. Keck Deep Ocean Power Science Laboratory, a unique facility that can recreate the pressures found at the bottom of the sea.....”*
*“**Alice Chien** and graduate student Navid Saeidi peer into the high-pressure combustion chamber..... ”*

Other circulation/sharing points:

- “The W.M. Keck Foundation’s 2018 Annual Report features the work of Derek Dunn-Rankin (engineering) and Peter Taborek (physics) in the UCI W. M. Keck Deep Ocean Power Science Laboratory. The campus facility, funded in 2012 with a Keck Foundation \$1 million grant, explores ways to generate carbon-free power using the low temperatures and high pressure found deep in the ocean.” Samueli School of Engineering news article, UC Irvine [“Clean Power at the Bottom of the Ocean”](#), edited by UCI campus writer Anna Lynn Spitzer, posted on Aug 15th, 2019.
- “The W.M. Keck Foundation’s 2018 Annual Report features the work of Derek Dunn-Rankin (engineering) and Peter Taborek (physics) in the UCI W. M. Keck Deep Ocean Power Science Laboratory. The campus facility, funded in 2012 with a Keck Foundation \$1 million grant, explores ways to generate carbon-free power using the low temperatures and high pressure found deep in the ocean.” @ucirvineengineering facebook page by the Henry Samueli School of Engineering on [Aug 15th, 2018](#).

E.8 Brilliant Future, 2019, The Campaign for UCI – The case for support by Chancellor Howard Gillman, [“Mechanical engineers Derek Dunn-Rankin and Yu-Chien Chien study the combustive properties of flammable gases such as methane.”](#), produced by UC Irvine magazine, published on October 4th, 2019.

E.9 NASA Science – share the science news, [“NASA Selects Proposals to Provide New Insights from Openly Available Data”](#), published on June 16, 2021.

*“One of the selected studies will take advantage of the E-FIELD Flames experiment to simulate the behavior of a small diffusion flame under the influence of an externally applied electric field in microgravity. Once validated, the simulations can be extended to Earth gravity. This is expected to lead to a better understanding and eventually control of hydrocarbon flames under the influence of electric fields, which can be used to extend flammability limits, reduce emissions, prevent instability and blowoff, as well as modify soot production. This project is a collaborative effort between the University of California, Irvine, and Lawrence Berkeley National Laboratory and is led by Prof. **Yu-Chien Chien** (University of California, Irvine).”*

**Note that most of the PIs awarded are professors while my job title is an Asso. Project Scientist instead.*

E.10 Samueli School of Engineering News article, UC Irvine, [“NASA Funds E-FIELDS Flames Simulation Project”](#), published on September 27th, 2021.

*“This June, **Chien** won NASA funding (\$200,000) for a simulation project using the E-FIELD data. Her project was one of [five proposals](#), involving recognized experts in the fields of combustion science, complex fluids, fluid physics, fundamental physics and materials science, that will use PSI data and build on prior reduced-gravity research to advance fundamental research in the physical sciences.”*

E.11 Samueli School of Engineering News article, UC Irvine, [“Chien Recognized for Gravitational and Space Research and Mentoring”](#), published on March 14th, 2022.

*“Her nominator noted **Chien**’s willingness to break boundaries, stretch the envelope of customary practice, and demand fairness and conscientious treatment of all – independent of race, gender, culture and ethnicity. ‘She recognizes the challenges of being the pathfinder across the male-dominated environment prevalent in engineering, and she accepts that struggle for herself and provides the support and encouragement for those in similar circumstances.’ ”*

Other circulation/sharing points:

- [“AWARD](#) - Congratulations to **Yu-Chien (Alice) Chien**, the Director of the Lasers, Flames & Aerosols Lab and Assoc. Project Scientist at UC Irvine. She expertly guided the ISS operations for the Electric-Field Effects on Laminar Diffusion Flames (E-FIELD Flames) and was honored in Nov. 2021 with the Thora W. Halstead Young Investigator Award by the American Society for Gravitational and Space Research.....” Space Flames, facebook page of NASA, edited by NASA Glenn Project Scientist Dennis Stocker, posted on March 18th, 2022.
- American Society for Gravitational and Space Research – ASGSR, facebook page [share the post](#) from Space.Flames
- “Congratulations Yu-Chien (Alice) Chien, recognized as an exceptional mentor and a pathfinder in her

field!." @ucirvineengineering facebook page by the Henry Samueli School of Engineering on [Mar 15th, 2022](#).

E.12 W.M. KECK FOUNDATION official [website](#) cover photo of Dr. Chien with a graduate student at the UCI MAE W.M. Keck Deep Ocean Power Science Laboratory facility, "Advancing Scientific Research and Promoting our Community," as of January 2023 ([archived photo](#)).

E.13 UC Irvine campus zotmail, Women in Technology @ UCI, "[Celebrating Women in Technology at UCI](#)", published on March 1st, 2023.

*"Dr. **Yu-Chien (Alice) Chien** is a committed and selfless mentor of women and other underrepresented groups in STEM. Dr. Chien is an accomplished researcher and project scientist, currently director of the Lasers, Flames, and Aerosols research group and the W.M. Keck Deep Ocean Power Science Laboratory.*

Dr. Chien leads through her presence and her sincerity. She provides all those interacting with her enormous insights into the challenges faced by the underrepresented, and her core philosophy values the diversity of thought in solving problems of all types. Significantly, she does all of this without sacrificing any of her humility or her demands for quality and rigor as an engineer, scientist, and educator.

Dr. Chien makes herself available to not only support access, diversity, equity and inclusion efforts in STEM, but also contributes to ADEI by launching initiatives to ensure that women and minoritized students feel a sense of belonging.

Dr. Chien believes in putting her philosophy into action, and it is this (rarely recognized externally) overarching commitment that warrants applause."

Other circulation/sharing points:

- "[Applause for Two MAE Women](#)" - Samueli School of Engineering News article, March 13th, 2023 (and all other LinkedIn, twitter).
- [Society of Women Engineers at UC Irvine](#) – "Thank you to Dr. Natascha Buswell and **Dr. Yu-Chien Chien** for their work in fostering an inclusive environment. Dr. Chien has been especially instrumental in connecting our organization with resources & supporting SWE at UCI from behind the scenes....", March, 2023

E.14 Samueli School of Engineering News article, UC Irvine, "[Graduate Students Meet Astronaut Harrison Schmitt at National Conference](#)", published on April 6th, 2023.

*"UCI project scientist **Yu-Chien (Alice) Chien**, who was aware of the opportunity through her work as principal investigator for a NASA project, recommended the three students apply."*

E.15 National Academies of Sciences, Engineering, and Medicine, Report for the decadal survey for Biological and Physical Sciences (BPS) Research in Space, "[Thriving in Space: Ensuring the Future of Biological and Physical Sciences Research: A Decadal Survey for 2023-2032 \(2023\)](#)", published on Sept 12th, 2023.

"Potential Research Areas

What aspects of fluid behavior will improve fire safety onboard spacecraft?

*.....Similarly, the data obtained under martian gravity conditions also suggested that there is a partial gravity level at which materials burn more readily than on Earth. Flames, especially in microgravity, can also be strongly affected by electromagnetic fields, as preliminary studies show (**Chien et al. 2022**)."* [page 136](#).

Invited Book Endorsement

F.1 "Winter World (The Long Winter)" by A.G. Riddle, 2021, Cité publishing (Taiwan) – Book blurb, "[冰凍地球首部曲：寒冬世界](#)", produced by Cité publishing (Taiwan), published on January 26th, 2021.

"鏡頭閃爍於低軌道上的國際太空站與地球之間，以接近真實題材為框架編織而成的故事，遊走穿梭於當代科學和作者幻想的虛實之中，撲朔且迷離、離奇又曲折，是一圓現代版的科幻航太夢之作。"—爾灣加州大學 NASA ACME E-FIELD Flames 太空實驗首席科學家暨 Lasers, Flames & Aerosols 研究團隊主任，簡毓倩博士

Translation:

"The camera flashes between the low earth orbit International Space Station (ISS) and the earth. The stories are weaving together within a realistic framework. Dashing through modern science and the author's fictitious events.

*Florescent and bewildered; bizarre and curvy. It is a work of making the sci-fi aerospace dream come true.” —
Dr. Yu-Chien Chien, Lead NASA ACME E-FIELD Flames Scientist at UCI & Director of LFA*

Other relevant clips:

- [“氣候極端異常，各地大雪封城，為何地球開始冰凍？！《冰凍地球首部曲：寒冬世界》”\(00:57\)](#), produced by Cité publishing (Taiwan), published on January 13th, 2021 on YouTube.