ANKIT TYAGI

EDUCATION

2014-2019 — Doctor of Philosophy
University Park, PA

The Pennsylvania State University

Department of Mechanical Engineering
Dissertation: *Dynamics of Interacting Turbulent Flames*
Advisor: Prof. Jacqueline O'Connor

2014-2017 — Master of Science
University Park, PA

Department of Mechanical Engineering
Advisor: Prof. Jacqueline O'Connor

2010-2014 — Bachelor of Engineering
Stony Brook, NY

Stony Brook University

Department of Mechanical Engineering
Advisor: Prof. Sotirios Mamalis

PROFESSIONAL EXPERIENCE

Nov 2020 - Present — Digital Signal Processing Engineer (R&D)
Erie, PA

Eriez Manufacturing

Developing sophisticated signal processing algorithms using pattern recognition, filtering, feature extraction, and other modern digital signal processing techniques for development of advanced embedded systems to identify metal contaminants in products inspected by commercial metal detection equipment used in the food, pharmaceutical, and plastics industries

Oct 2019 - Nov 2020 — T&D Process Engineer
Hillsboro, OR

Intel Corporation

Worked on scientific lithography patterning research in a multi-disciplinary team to manufacture innovative semiconductor device architectures in a high-volume manufacturing environment. Implemented cGMP through following documented specifications, failure analysis, review and revision of safety and quality protocols. Analyzed monitoring data and developed models for defect analysis and preventative maintenance of semiconductor equipment to promote high levels of safety, quality, and yield in manufacturing. Developed image processing algorithms for detecting and quantifying silicon wafer topography. Managed qualification of new photo-resist chemical for sustaining chemical inventory

Jul 2015 - Jul 2019 — Graduate Research Assistant
University Park, PA

The Pennsylvania State University

Designed and conducted experimental research on turbulent flame-flame interactions. Designed and utilized high-speed laser diagnostics systems multi-sensor imaging experiments. Utilized digital image and signal processing, computer vision, and machine learning techniques to develop models to understand flame physics from big datasets. Developed Bayesian probabilistic models for estimating parameters in predictive statistical models to understand experimental uncertainties. Trained undergraduate and graduate students on implementing and conducting high-speed laser measurements for various research projects. Presented research findings at various national and international conferences. Mentored undergraduate research assistants.

2011 - 2014 Team Leader

Stony Brook, NY

Stony Brook Solar Racing

Led a team of undergraduate students at Stony Brook University that designed and fabricated a solar powered electric race boat for the ASME Solar Splash - Solar Boat Racing Competition. Designed and developed various mechanical and electrical subsystems of the race boat

Jun 2012 - Aug 2012 Engineering Intern

Commack, NY

Forest Laboratories Inc.

Assisted in performance qualification of various general laboratory equipment, including thermal chambers, incubators, refrigeration units, and temperature mapping using GE Kay-Val units. Conducted vibration study of pharmaceutical labs and analyzed documented results

TEACHING EXPERIENCE

Aug 2014 - May 2015 Graduate Teaching Assistant

University Park, PA

The Pennsylvania State University

Teaching Assistant for ME 410: Heat Transfer in the Department of Mechanical Engineering. Kept weekly office hours for students, graded assignments, and occasionally taught lectures. Interacted with students individually and in small groups on a weekly basis

Jul 2011 - May 2013 Undergraduate Math Tutor

Stony Brook, NY

Stony Brook University

Tutored pre-calculus and calculus to small groups of freshmen and sophomore level engineering students in 1:1 and small group settings for the College of Engineering and Applied Sciences

REFEREED JOURNAL PUBLICATIONS

Karmarkar, A., **Tyagi, A.**, Hemchandra, S., O'Connor, J., (2021) "Impact of turbulence on the coherent flame dynamics in a bluff-body stabilized flame," Proceedings of the Combustion Institute, 38(2), pp.3067-3075

Tyagi, A., O'Connor, J., (2020) "Towards a Method of Estimating Out-of-Plane Effects on Measurements of Turbulent Flame Dynamics," Combustion and Flame, 216, 206-222

Tyagi, A., Boxx, I., Peluso, S., O'Connor, J., (2020) "Pocket Formation and Behavior in Turbulent Premixed Flames," Combustion and Flame, 211, 312-324

Doleiden, D., Culler, W., **Tyagi, A.**, Peluso, S., O'Connor, J., (2019) "Flame Edge Dynamics and Interaction in a Multinozzle Can Combustor with Fuel Staging," Journal of Engineering for Gas Turbines and Power, 141 (10)

Tyagi, A., Boxx, I., Peluso, S., O'Connor, J., (2019) "Statistics and Topology of Local Flame-Flame Interactions in Turbulent Flames," Combustion and Flame, 203, 92-104

Kim, J., **Tyagi, A.**, Kim, Y., (2019) "Two-dimensional Modeling for Physical Processes in Direct Flame Fuel Cells," International Journal of Hydrogen Energy, 44, 4304-4316

Tyagi, A., Boxx, I., Peluso, S., O'Connor, J., (2019) "The Role of Flow Interaction in Flame-Flame Interaction Events in a Dual Burner Experiment," Proceedings of the Combustion Institute, 37(2), 2485-2491

Meehan, M., **Tyagi, A.**, O'Connor, J., (2018) "Flow Dynamics in a Variable-Spacing, Three Bluff-Body Flowfield," Physics of Fluids, 30, 025105

CONFERENCE PROCEEDINGS

Karmarkar, A., **Tyagi, A.**, Hemchandra, S., O'Connor, J., (2021) "Impact of turbulence onthe coherent flame dynamics in a bluff-body stabilized flame," 38th International Symposium on Combustion, Adelaide, Australia

Beseler, K., **Tyagi, A.**, O'Connor, J., (2020) "Development of a Diagnostic Damkohler Number for Interpreting Laser-Induced Fluorescence Data in Turbulent Flames," 58th AIAA Aerospace Sciences Meeting, Orlando, FL

Tyagi, A., Boxx, I., Peluso, S., O'Connor, J., (2019) "Statistics of Local Flame-Flame Interactions in Flame Interaction Zones of Two V-Flames," 57th AIAA Aerospace Sciences Meeting, San Diego, CA

Meehan, M., Wimer, N., **Tyagi, A.**, O'Connor, J., Hamlington, P., (2019) "Identifying Complex Dynamics of Interacting Turbulent Jets through Modal Decomposition," 57th AIAA Aerospace Sciences Meeting, San Diego, CA

Doleiden, D., Culler, W., **Tyagi, A.**, Peluso, S., O'Connor, J., (2019) "Flame Edge Dynamics and Interaction in a Multi-Nozzle Can Combustor with Fuel Staging," ASME Turbo Expo, Phoenix, AZ

Tyagi, A., Boxx, I., Peluso, S., O'Connor, J., (2018) "The Role of Flow Interaction in Flame-Flame Interaction Events in a Dual Burner Experiment," 37th International Symposium on Combustion, Dublin, Ireland

Shupp, R., **Tyagi, A.**, Boxx, I., Peluso, S., O'Connor, J., (2018) "The Effects of Piloting on Turbulent Flame Structure," Eastern States Section Meeting of The Combustion Institute, State College, PA

Tyagi, A., Boxx, I., Peluso, S., Shupp, R., O'Connor, J., (2018) "Topology of Local Flame-Flame Interaction Events in Turbulent Flames," Eastern States Section Meeting of The Combustion Institute, State College, PA

Tyagi, A., Boxx, I., Peluso, S., Shupp, R., O'Connor, J., (2018) Structure of Flames in Flame Interaction Zones, 56th AIAA Aerospace Sciences Meeting, Kissimmee, FL

Culler, W., **Tyagi, A.**, Venkateswaran, P., O'Connor, J., (2016) "Comparison of Three Interacting V-Flames to a Single Bluff Body Flame at Two Reynolds Numbers," 54th AIAA Aerospace Sciences Meeting, San Diego, CA

PRESENTATIONS AND POSTERS

O'Connor, J., **Tyagi, A.**, (2019) "Towards Capturing Three-dimensional Combustion Flows with Simultaneous 2D Diagnostics," IEEE-RAPID, Miramar Beach, FL

Tyagi, A., O'Connor, J., (2019) "Towards a Method of Estimating Out-of-Plane Effects on Measurements of Turbulent Flame Dynamics," poster at Gordon Research Conference on Laser Diagnostics in Combustion, Les Diablerets, Switzerland

Meehan, M., **Tyagi, A.**, O'Connor, J., Hamlington, P., (2019) "Synthetic Turbulence Generation Method to Simulate Turbulence Generating Plates," 5th Rocky Mountain Fluid Mechanics Symposium, Boulder, CO

Tyagi, A., (2018) "Identification of Dynamic Events in Turbulent Premixed Flames Using Image Registration," presentation at the Mechanical Engineering Graduate Research Forum, The Pennsylvania State University, University Park

Tyagi, A., Boxx, I., Shupp, R., Peluso, S., O'Connor, J., (2018) "Filamentarity of Local Flame-Flame Interaction Events in Turbulent Flames," poster at the 37th International Symposium on Combustion, Dublin, Ireland and at Penn State Energy Days 2018

Tyagi, A., Boxx, I., Peluso, S., O'Connor, J., (2017) "Simultaneous OH-PLIF and Stereoscopic-PIV on Interacting, Premixed-Turbulent Flames," poster at Gordon Research Conference on Laser Diagnostics in Combustion, Mount Snow, VT

Tyagi, A., Culler, W., Meehan, M., Peirce, T., Venkateswaran, P., O'Connor, J., (2016) "Global and Local Effects of Flame Spacing on the Dynamics of Three Interacting VFlames," poster at the 36th International Symposium on Combustion, Seoul, South Korea

Tyagi, A., (2016) "Global and Local Effects of Flame Spacing on the Dynamics of Interacting V-Flames," presentation at the Center for Combustion, Power, and Propulsion, The Pennsylvania State University, University Park

MAJOR RESEARCH COLLBORATIONS

2017-2019 Dr. Isaac Boxx · The German Aerospace Center (DLR), Stuttgart, Germany
Collaborated in applying advanced laser imaging diagnostics to study the fundamentals of turbulent premixed combustion

2018-2019 Dr. Peter Hamlington · University of Colorado, Boulder, CO
Collaborated in high-fidelity simulations of highly turbulent, interacting flames and flowfields

HONORS AND AWARDS

2018 NSF Travel Award for the 37th International Symposium on Combustion

2017 Princeton-Combustion Institute Summer School on Combustion

2014 Award of Honor, Department of Mechanical Engineering, Stony Brook University

2014 Outstanding Achievement - Leadership Award, Stony Brook University

2013 Academic Excellence Award, Stony Brook University

2012-2013 Leo Guthart Scholarship, Stony Brook University

2012 Frances and Velio Marsocci Scholarship, Stony Brook University

SERVICE

Peer Reviewer Reviewer for major research journals and conferences
Flow: Applications of Fluids Mechanics - 1 article
Experiments in Fluids - 1 article
Physics of Fluids - 1 article
ASME TurboExpo 2019 - 2 articles
Proceedings of The Combustion Institute - 1 article

Graduate Student Mentor Mentored undergraduate students in designing and carrying out individual research projects. Advised a senior undergraduate team with designing a pressurized fluidizedbed, solid particle seeder vessel. Trained and advised Schreyer Honors students in conducting experimental optical measurements, data processing, and analysis
Mechanical Engineering, The Pennsylvania State University

Judge Served as a judge for middle school, high school, and college level science and engineering presentations and poster exhibition

Undergraduate Research Exhibition, The Pennsylvania State University
Annual Pennsylvania Junior Academy of Science Competition, PA

Student Ambassador

Represented the college in its mission at various promotional events. Spoke with prospective high school students pursuant of engineering majors. Worked closely with the college staff to ensure students adjust to university course teaching styles
College of Engineering and Applied Sciences, Stony Brook University

STUDENTS MENTORED

2017 – 2019

Ryan Shupp
Current role: *R&D Mechanical Engineer, Keysight Technologies, NJ*

2017 – 2019

Danielle Mason
Current role: *Engine Engineer, General Motors, MI*

2016 – 2018

Sean Clees
Current role: *PhD student, Stanford University, CA*

2016 – 2018

Mark Frederick
Current role: *PhD student, Purdue University, IN*

2015 – 2017

Michael Meehan
Current role: *PhD student, CU-Boulder, CO*

SKILLS

Programming

MATLAB, Python, C, C++, Java

Software and API

LaTeX, JMP, Minitab, MS Office, SolidWorks, AutoCAD, Inventor, Photron Fastcam, LabVIEW, Code Composer Studio, Power BI, Git, OpenCV, PyMC3, Pandas, Scikit-Learn

Electrical

Oscilloscopes, Function/Delay Generators, Class IV Nd:YAG lasers, Dye-based lasers, CMOS cameras, Photo-detectors

Technical

Signal Processing, Digital Image Processing, Pattern Recognition and Automation, Statistical Analysis, Experimental Research, Design of Experiments, High-Speed Imaging, Thermal and Flow Analysis, Instrumentation and Metrology

PROFESSIONAL AFFILIATIONS

American Institute of Aeronautics and Astronautics
The Combustion Institute
Tau Beta Pi – The Engineering Honor Society