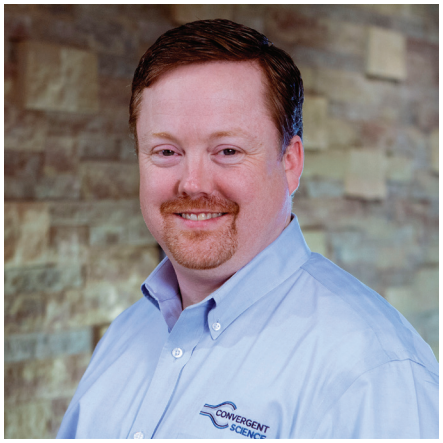
CONVERGE

USER CONFERENCE

NORTH AMERICA 2020

ONLINE

WELCOME



Dr. Kellly Senecal
Co-Owner & Vice-President
Convergent Science

Welcome to the online 2020 CONVERGE User Conference–North America! Every year, we look forward to hosting our user conference and fostering a fun environment to connect with colleagues and exchange ideas. We're thrilled to be able to host this event virtually and bring together the CFD community, even in these difficult times.

We're pleased to feature speakers and attendees from around the globe, as well as keynotes from Argonne National Laboratory, the Penn State University College of Medicine, and Saudi Aramco. Our keynotes will address a range of topics: fuel injection, CFD in the biomedical field, and internal combustion engines and transportation. The diversity of presentations at this year's conference highlights CONVERGE's continued growth into new application areas, with speakers presenting on electromobility, rockets, gas turbines, renewable energy, and exhaust aftertreatment. True to CONVERGE's roots, our speakers will also discuss topics related to internal combustion engines, including combustion, sprays, ignition, and geometry optimization.

At Convergent Science, we're continually inspired by all of you to push the bounds of innovation in a way that best meets your CFD needs. To show our appreciation, we try to provide a unique, informative, and enjoyable conference. And while this year's conference looks a little different, that mission remains the same.

Thank you to all of our speakers for sharing your expertise with the CONVERGE community. We also thank this year's sponsors and invite you to check out their virtual exhibits to learn about their exciting products and services. On behalf of everyone at Convergent Science, thank you for attending, and we hope you enjoy the conference.

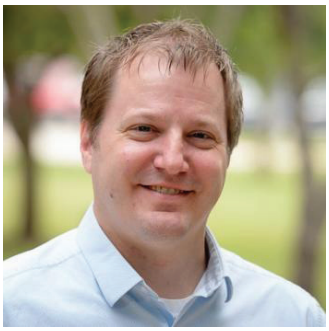
SPONSORS – THANK YOU!

KEYNOTE SPEAKERS

Dr. Choon-Sik Jhun
Penn State University College of Medicine

EVEN BLOOD IS NOT HAPPY WITH TURBULENCE: HEMOSTATIC PERSPECTIVES
Tuesday, September 29

Dr. Choon-Sik Jhun is an Assistant Professor of Surgery in the Division of Applied Biomedical Engineering (ABE) at the Penn State University College of Medicine. Dr. Jhun received an M.S. in mechanical engineering and a Ph.D. in biomedical engineering in 2001 and 2005, respectively, from Texas A&M University. Early in his career, Dr. Jhun's research focused on nonlinear continuum mechanics applied to cardiovascular mechanics. Since joining the faculty of the Div. of ABE in 2012, he has developed a track record in the areas of continuous flow left ventricular assist devices (CF-LVADs) and has been heavily involved in both experimental and computational fluid dynamics and modeling to characterize turbulent flows in blood pumps and blood contacting devices. Dr. Jhun has published 24 articles in peer-reviewed journals and six book chapters, and he serves as a board member of the American Society for Artificial Organs (ASAIO).



Dr. Christopher Powell
Argonne National Laboratory

X-RAY DIAGNOSTICS FOR THE VALIDATION OF NOZZLE FLOW AND SPRAY SIMULATIONS
Tuesday, September 29

Dr. Christopher Powell is a principal research scientist at Argonne National Laboratory, leading Argonne's experimental work studying fuel injection and sprays. His team was the first to apply synchrotron x-rays to study fuel injection, and he has pioneered the application of several diagnostics to the study of sprays, including time-resolved radiography, phase-contrast imaging, x-ray fluorescence, and ultra-small-angle x-ray scattering. Dr. Powell has 20 years of experience in diagnostic measurements of fuel injection and sprays. He earned a B.S. in chemistry from Indiana University and a Ph.D. in chemical physics from Michigan State University. He serves on the board of directors for ILASS Americas, as a task leader for the International Energy Agency's Combustion Agreement, and as a team leader for the Department of Energy's Partnership for Advanced Combustion Engines.

Dr. Amer A. Amer
Aramco Reasearch Center

TRANSPORT CHALLENGES AND OPPORTUNITIES IN CARBON CONSTRAINED WORLD
Wednesday, September 30

Dr. Amer A. Amer is currently the Transport Chief Technologist at Saudi Aramco. With more than 25 years of broad experience in academia and the transport and oil industries, Dr. Amer brings a successful track record in co-optimizing fuels and engines for transport applications. Along with a team of 80 researchers and scientists, Dr. Amer mobilized a significant number of global stakeholders to support a mix of transport solutions and energy vectors to ensure a lasting impact on GHGs for light-duty, heavy-duty, marine, and aviation transport sectors. Early in his career, Dr. Amer spent more than 12 years in the automotive industry. While working for Chrysler in Detroit as an engine development specialist, several of his design inventions were implemented in production engines. Dr. Amer has co-authored over 35 journal articles, holds 6 granted patents, and was named as a recipient of the 2020 FISITA Academy of Technical Leadership.

CONFERENCE SCHEDULE – DAY ONE

Tuesday, September 29 | *All times listed in CDT*

8:50	**Welcome** | Kelly Senecal | Convergent Science
9:00	**KEYNOTE | Even Blood Is Not Happy With Turbulence: Hemostatic Perspectives** Choon-Sik Jhun | Penn State University College of Medicine
9:30	**Technoeconomic Analysis Framework: A Shrouded Wind Turbine LES Study** Mahmoud Koraiem | Stony Brook University
9:50	**Numerical Evaluation of Spark Assisted Cold Idle Operation in a HD GCI Engine** Emma Zhao | Argonne National Laboratory
10:10	**3D-RANS Study on Liquid Properties of Gasoline, Ethanol and Water Mixtures** Tim Franken | Brandenburg University of Technology Cottbus-Senftenberg
10:30	**The Initial Flow Condition Influence on the Combustion Process in a CI Engine** Michele Pipicelli | Università degli Studi di Napoli Federico II (CNR - Istituto Motori)
10:50	**Modeling High-Pressure Mixing and Combustion in Rocket Engines With CONVERGE** David Rowinski | Convergent Science
11:20	**SPONSOR** | Tecplot
11:35	**Break**
12:10	**KEYNOTE | X-Ray Diagnostics for the Validation of Nozzle Flow and Spray Simulations** Christopher Powell | Argonne National Laboratory
12:40	**CFD Modeling of Fuel Injection via Coupling of In-Nozzle Flow and Ensuing Spray** Hengjie Guo | Argonne National Laboratory
1:00	**Using X-Rays and Machine Learning to Improve Internal Flow Simulations Tools** Gina M. Magnotti | Argonne National Laboratory
1:20	**Low- and High-Temperature Flame Analysis For Spray A and D Using RANS and LES** Fabien Tagliante | Sandia National Laboratories
1:40	**Real Fluid Modeling in CONVERGE** Chaouki Habchi | IFP Energies nouvelles
2:00	**Hot Surface Ignition Assistant for Aircraft Compression Ignition Engines** Je Ir Ryu | U.S. Army Research Laboratory
2:20	**LES of a Turbulent Spray Burner Using Thickened Flame Model and AMR** Aleksandra Rezchikova | IFP Energies nouvelles
2:40	**Expanding CONVERGE's Advantages in Gas Turbines and Aftertreatment** Scott Drennan | Convergent Science
3:00	**Thermal Evaluation of SCR Catalyst Using CFD in Diesel Engine** Saurabh Sharma | Isuzu Technical Center of America

CONFERENCE SCHEDULE – DAY TWO

Wednesday, September 30 | *All times listed in CDT*

8:50	**Welcome Back** | Elizabeth Favreau | Convergent Science
9:00	**KEYNOTE | Transport Challenges and Opportunities in Carbon Constrained World** Amer A. Amer | Aramco Research Center
9:30	**Piston Bowl and Cooling Gallery Design Optimization for Heavy-Duty Engines** Chaitanya Kavuri | Caterpillar Inc.
9:50	**Understanding Low Load Advanced Compression Ignition With Gasoline Using LES** Patrick O'Donnell | Clemson University
10:10	**Towards Advanced Modeling of Multi-Mode Combustion Engines** Sayop Kim | Argonne National Laboratory
10:30	**Development of CFD Models for Ignition Processes in Internal Combustion Engines** Joohan Kim | Argonne National Laboratory
10:50	**Development and Validation of Spray-Wall Interaction Models for GDI Applications** Roberto Torelli | Argonne National Laboratory
11:10	**Real-Fuel Injection for GDI Applications: Nozzle-Flow and Ensuing Spray** Lorenzo Nocivelli | Argonne National Laboratory
11:30	**Simulating Cycle-to-Cycle Variation in a GDI Engine With RANS and LES/TFM** Eric Pomraning | Convergent Science
11:50	**SPONSOR** | R Systems
12:05	**Break**
12:50	**Prediction of Cyclic Variability and Knock in a GDI Engine at High Speed and Load** Ronald Grover | General Motors
1:10	**Developing a Methodology to Tailor Chemical Mechanisms for SI Combustion** Anqi Zhang | Aramco Research Center
1:30	**Comparison Study Between Online and Tabulated Chemistry Approach for SI engine** Krishna Prasad Shrestha | Brandenburg University of Technology Cottbus-Senftenberg
1:50	**Recent Chemical Kinetic Mechanism Developments** Henry Curran | NUI Galway
2:10	**Extending Tabulated Flamelet Models for Compression Ignition Engine Applications** A. Cody Nunno | Argonne National Laboratory
2:30	**Electromobility in CONVERGE** Tristan Burton | Convergent Science
2:50	**CONVERGE Development Update: Version 3.1** Keith Richards | Convergent Science
3:10	**Closing Remarks** Kelly Senecal | Convergent Science

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2020 CONVERGE USER CONFERENCE

CONVERGENT SCIENCE - CONVERGE CFD SOFTWARE

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