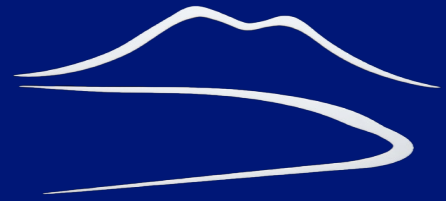




SPP 2419 HyCAM

Hydrogen-based fuel combustion
using additive manufacturing



Program

1st HyCAM International Workshop

Towards Hydrogen-Based Fuel Combustion

Enabled by Additive Manufacturing

October 21–23, 2026

Sorrento, Italy

www.spp2419.rwth-aachen.de/hycam-workshop-2026/



Welcome To Sorrento!

On behalf of the Organizing Committee, it is our great pleasure to welcome you to the

1st HyCAM International Workshop

Towards Hydrogen-Based Fuel Combustion Enabled by Additive Manufacturing

Workshop at a Glance

Wednesday, October 21, 2026

- 16:30 – 22:00 | Welcome Reception & On-site Registration

Thursday, October 22, 2026

- 08:30 – 09:00 | Registration
- 09:00 – 18:00 | Scientific sessions
- 19:15 – 23:00 | Social Dinner

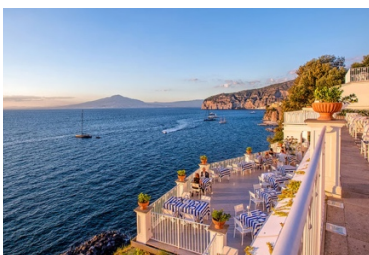
Friday, October 23, 2026

- 08:40 – 16:50 | Scientific sessions
- 16:50 – 17:00 | Workshop wrap-up

Venues

Workshop Venue

Grand Hotel Riviera
Via Aniello Califano, 22, 80067, Sorrento, Italy



Welcome Reception & On-site Registration; Social Dinner

Circolo dei Forestieri Sorrento
Via Luigi De Maio, 35, 80067, Sorrento, Italy



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Key Information for Presenters

- Oral presentations: 20 minutes (15-minute presentation followed by a 5-minute Q&A)
- Invited Keynote lectures slots: 35 minutes (28-minute presentation followed by a 7-minute Q&A)
- Posters: A0 portrait format. Thursday posters are labelled TH-P01 to TH-P16; Friday posters are labelled FR-P01 to FR-P15.

Workshop website

www.spp2419.rwth-aachen.de/hycam-workshop-2026/

Scan to Access:
... the Webpage



Scan to Access:
... the Abstracts of Invited Talks



Scientific Organizing Committee

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Dr. Marianna Cafiero
Dr.-Ing. Michael Gauding
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Acknowledgements

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Scientific Program - October 22, 2026

08:30 – 09:00	Registration	
09:00 – 09:15	Opening & Welcome <i>H. Pitsch, M. Cafiero</i>	
09:15 – 10:30	Session 1 Advanced Manufacturing and Surface Engineering	Chairman: <i>N. Kretzer</i>
09:15 – 9:50	Keynote Lecture: Additive Manufacturing at Everllence – Serial & Series Production in a Transforming Market <i>S. Vervoort Everllence</i>	
09:50 – 10:10	Influence of AM Manufactured Surface Roughness on the Flashback Limits of Premixed Hydrogen/Air Flames <i>J. Bajrami, D. Bill, J. P. Wahl, M. Müller, S. Kaierle, F. Dinkelacker, A. Ghani</i>	
10:10 – 10:30	Designed Surfaces in Selective Laser-Induced Etching: From Predictive Etch Simulation to Parameter-Controlled Topography for Fused Silica Liquid Ammonia Nozzles <i>H. Axt, M. Kratz, B. Bornschlegel, C. Hinke, C. L. Häfner</i>	
10:30 – 11:00	Coffee Break	
11:00 – 12:35	Session 2 Hydrogen Combustion Systems: Modeling, Validation and Control	Chairman: <i>T. Kaiser</i>
11:00 – 11:35	Keynote Lecture: The HYFLEXPOWER Project: First Engine Validation of Siemens Energy's 100% Hydrogen Combustion Technology-Enabled by Additive Manufacturing of Burners <i>S. Pfadler Siemens Energy</i>	
11:35 – 11:55	High Pressure Validation of TFLES/PCM-FPI Applied to an Additively Manufactured Hydrogen Swirled Micromix Injector <i>N. C. W. Treleaven, S. Ramanagar Sridhara, T. Triki, M. Leroy, M. Truscelli</i>	
11:55 – 12:15	Thermochemistry Modelling for Multi-Regime Hydrogen-Air Turbulent Flames <i>P. Boivin</i>	
12:15 – 12:35	Additive-Manufacturing-Enabled Acoustic Metamaterial Micromix Burners for Tunable Multiband Thermoacoustic Control in Hydrogen Combustion <i>C. Zhang, M. Zhu</i>	

12:35 – 13:35	Lunch	
13:35 – 14:55	Session 3 Ammonia Combustion: Injection, Mixing and Emissions Control	Chairman: <i>G. B. Ariemma</i>
13:35 – 13:55	Staged Flameless Combustion of Cracked Ammonia <i>C. Wüning, A. Garcia, N. Schmitz, C. Wuppermann, M. W. R. Wilke, J. G. Wüning</i>	
13:55 – 14:15	Micro-Mixing Driven Emission Optimisation of Partially Cracked Ammonia in AM Fuel-Flexible Injector <i>J. Ahn, B. Jose, H. Kim, F. Hampp</i>	
14:15 – 14:35	Liquid Ammonia Flash-Boiling and Mixture Formation: Insights Enabled by SLE Micro-Manufacturing <i>P. W. Augustin, H. Axt, C. Hinke, M. Kratz, C. Häfner, H.-S. Choi, H. Pitsch, W. Rohlf, M. A. Reddemann</i>	
14:35 – 14:55	First Experimental Demonstration of a Novel Low-Emission Swirl-Stabilized Gas Turbine Combustor Designed for Direct Ammonia Combustion <i>K. J. Nogenmyr, O. Lindman, M. Persson, D. Moëll, I. Saanum, M. Ditaranto</i>	
14:55 – 15:05	Coffee Break	
15:05 – 16:25	Poster Session (TH-P01 to TH-P16)	
16:25 – 18:00	Session 4 Data-Driven Modeling and Optimization of Combustion Systems	Chairman: <i>K. Niemietz</i>
16:25 – 17:00	Keynote Lecture: Digital Twins and Agentic AI for On-demand Combustion Design and Operation <i>A. Parente (HyCAM Mercator Fellow) Université Libre de Bruxelles (ULB)</i>	
17:00 – 17:20	A Surrogate-Informed Framework for Efficient Design-Space Exploration: Application to Hydrogen-Fueled Perforated Burners <i>F. Fruzza, M. Rosellini, R. Lamioni, T. Grenga, A. Mariotti, L. Tamellini, M. V. Salvetti, C. Galletti</i>	
17:20 – 17:40	Flashback-Aware Multi-Objective Optimization of an Additively Manufacturable Hydrogen Micromixer <i>L. Juris, C. Charalampous, J. Henrich Schleifenbaum</i>	
17:40 – 18:00	Adjoint-Based Data Assimilation on Standard k-ε Turbulent Model: Mean Flow and Sensitivity Evaluation <i>X. Song, S. Knechtel, K. Hildebrandt, M. Juniper, K. Oberleithner, T. L. Kaiser</i>	
19:15 – 23:00	Social Dinner	

Scientific Program - October 23, 2026

08:40 – 10:15	Session 5 Fuel-Flexible Combustors: Thermal Management and Flame-Wall Interaction	Chairman: <i>A. Gruber</i> <i>HyCAM Mercator Fellow</i>
08:40 – 09:15	Keynote Lecture: Printing the Path to Fuel Flexibility: Sequential Combustion Enabled by Additive Manufacturing for Hydrogen-Based Fuels <i>A. Ciani Ansaldo Energia Switzerland AG</i>	
09:15 – 09:35	Direct Numerical Simulation of Turbulent Hydrogen Flames Interacting with Transpiration-Cooled Walls <i>K. Niemietz, J. Son, Z. Hong, B. Savard</i>	
09:35 – 9:55	Effects of Wall Cooling and Near-Wall Dilution on Thermodiffusive Flame–Wall Interaction in Ultra-Lean Hydrogen Flames <i>M. Marburger, C. Möller, A. Macfarlane, A. Dreizler</i>	
09:55 – 10:15	Boundary Layer Flame-Wall Interaction of Lean Hydrogen-Air Premixed Flames at Elevated Pressures <i>U. Ahmed, R. S. Cant</i>	
10:15 – 10:45	Coffee Break	
10:45 – 12:00	Session 6 Porous Burner Architectures for Hydrogen and Ammonia Combustion	Chairman: <i>F. Hampf</i>
10:45 – 11:20	Keynote Lecture: Pore Solution: Porous Media Combustion as an Advanced Concept for Carbon-free Energy Utilization <i>M. Ihme Stanford University</i>	
11:20 – 11:40	Improving Ammonia Combustion Characteristics through Partial Premixing in Porous Media <i>R. Puri, D. Kretzler, T. Zirwes, B. Stelzner, D. Trimis, O. T. Stein</i>	
11:40 – 12:00	Experimental Stabilization of Pure Hydrogen Flames in Uniform TPMS Porous Burners <i>G. Labrid, L. Selle</i>	
12:00 – 13:00	Lunch	
13:00 – 14:35	Session 7 Advanced Manufacturing Materials and Process Optimization and Control	Chairman: <i>J.H. Schleifenbaum</i>

13:00 – 13:35	Keynote Lecture: Qualify the Process, Not the Part: Physics-Based AI for Additively Manufactured Hydrogen Combustion Hardware <i>P. Böttner NEOFORGE</i>
13:35 – 13:55	Effects of Waiting Times in between Vectors on the Processability of CM247LC in PBF-LB/M <i>N. Kretzer, N. Ostermann, N. Hantke, T. Grimm, J. T. Sehart</i>
13:55 – 14:15	Layer-Thickness-Dependent Process Windows in PBF-LB of Mo-9Si-8B <i>C. Schmidt, N. Kretzer, J. Sehart, M. Krüger</i>
14:15 – 14:35	Effect of Substrate Preheating Strategy on Directed Energy Deposition of YSZ on Inconel 718 <i>P.-S. Becks, M. Nobach, T. Wegener, R. Reitz, T. Niendorf, M. Oechsner</i>
14:35 – 14:45	Coffee Break
14:45 – 16:10	Poster Session (FR-P01 to FR-P15)
16:10 – 16:50	Session 8 Flame Propagation and Ignition Modeling Chairman: <i>M. Gauding</i>
16:10 – 16:30	Development of a Subgrid-Scale Stretch Factor (I_0) Model for Non-Unity Lewis Flames <i>A. Zambare, C. Mehl, K. Truffin, O. Colin</i>
16:30 – 16:50	Modelling The Ignition Process of an Additively Manufactured Hydrogen Swirled Micromix Injector Using Large Eddy Simulation and Dynamic Mesh Adaptation <i>T. Triki, M. Leroy, M. Truscelli, S. Ramanangar Shridhara, N. C. W. Treleaven</i>
16:50 – 17:00	Workshop wrap-up

Poster Session - October 22, 2026 (15:05 - 16:25)

TH-P01	Direct Numerical Simulation of a Lean Premixed Hydrogen Low-Swirl Flame in an Enclosed Chamber <i>X. Chen, F. W. Young, U. Ahmed</i>
TH-P02	A Stainless-Steel Jet-Stirred Flow Reactor via Additive Manufacturing for High-Pressure Oxidation Tests <i>M. V. Manna, P. Sabia, B. Cassese, G. B. Ariemma, M. de Joannon, R. Ragucci</i>
TH-P03	Reconciling Temperature Dependent Rate Constant Data in Hydrogen Combustion <i>T. Dinelli, M. Primi, L. Pratali Maffei, C. Cavallotti, M. Pelucchi</i>
TH-P04	Eigenvalue-based Linear Stability Analysis of Thermodiffusively Unstable H ₂ -Air Flames <i>T. L. Kaiser, S. Knechtel, M. Matthaïou, Q. Wen, P. Munch, S. May, T. Zirwes</i>
TH-P05	Instabilities in Planar Hydrogen Flames as Global Modes of the Linearized Reactive Flow Equations <i>D. Herting, P. Brokof, W. Polifke, G. Varillon</i>
TH-P06	Effect of Laser Exposure Strategy on Layer Topography in Multi-Material PBF-LB/M Processes <i>S. Acharya, H.-C. Möhring</i>
TH-P07	Influence of Laser Focal Position during Contour Exposure of Additively Manufactured Surfaces and its Effect on Hydrogen Combustion Behavior <i>J. Schrauder, S. Faderl, R. Strickling, D. Bartels, F. J. Bauer, F. H. Vance, A. Scholtissek, S. Will, M. Schmidt</i>
TH-P08	Optical Characterization of an Additively Manufactured Hencken-type Flat-flame Burner <i>S. R. Faderl, H. Pillai, J. Schrauder, D. Bartels, M. Schmidt, S. Will, F. J. Bauer</i>
TH-P09	Numerical and Experimental Characterization of Flame Stability in Optimized Hydrogen Burner Nozzles <i>R. Strickling, S. Faderl, J. Schrauder, F. H. Vance, F. J. Bauer, D. Bartels, M. Schmidt, S. Will, A. Scholtissek</i>
TH-P10	Ammonia Decomposition in Distributed Non-Premixed Combustion within Porous Media <i>D. Kretzler, N. Brachhold, B. Stelzner, C. G. Aneziris, D. Trimis</i>
TH-P11	The Role of Additive Manufacturing in the Design Process of Hydrogen Injectors at Safran <i>N. Treleaven, M. Leroy, S. Ramanagar Sridhara, T. Triki, M. Truscelli</i>
TH-P12	DNS/FGM for Turbulent NH ₃ /H ₂ Combustion: A Two-Control-Variable Approach using H ₂ O Mass Fraction and Flame Curvature <i>I. Mushtaq, R. J. M. Bastiaans</i>
TH-P13	Permeability of Open Porous Structures Realized by Laser-Based Powder Bed Fusion of IN718 <i>M. Nobach, J. Richter, M. Marburger, P.-S. Becks, M. Oechner, A. Dreizler, T. Niendorf</i>
TH-P14	Effusion Cooling Air–Flame Interaction of Premixed Ammonia–Hydrogen Flames <i>E. Henn, M. Schneider, V. Schuh, F. Rong, C. Hasse, H. Nicolai</i>
TH-P15	Integrated Design Loop for Additively Manufactured Hydrogen Industrial Gas Burners in Electric Arc Furnaces <i>C. Gofrau, Y. Heising, F. Krause, R. Omri, J. Wiesheier, M. Wirsum, J.-H. Schleifenbaum, H.-J. Odenthal, S. Elsabagh</i>
TH-P16	Emission Formation of Lean Premixed Ammonia Hydrogen Flames Stabilized by Bluff-Body Flame Holders <i>L. Gaip, C. Chi, D. Thévenin</i>

Poster Session - October 23, 2026 (14:45 – 16:10)

FR-P01	A Priori Assessment of Two-Mixture-Fraction Tabulated Chemistry for DNS of MILD and Non-MILD Combustion <i>L. Frascino, M. Vivenzo, H. Chu, H. Pitsch</i>
FR-P02	Nonthermal Plasma-Driven Enhancement of Ammonia Combustion under CO ₂ -Enriched Conditions <i>I. Ambrazevičius, Ž. Vainauskas, R. Paulauskas</i>
FR-P03	Development of an Internal Highspeed Laser Coating Method to create Metallic Barriers in High Pressure Pipes made from Filament Wound Fibre Reinforced Plastic <i>V. Grün, M. Lenhard, C. Müller</i>
FR-P04	Numerical Investigation of Wall Nucleation Effects on Flash Boiling Atomization of Liquid Ammonia <i>H.S. Choi, P. Augustin, M. Reddemann, W. Rohlf, H. Axt, M. Kratz, C. Hinke, C. Häfner, H. Pitsch</i>
FR-P05	Long-Term Aging, Material-Flame Interaction and Thermal-Shock Investigation of Additively Manufactured Porous Alumina for Hydrogen Combustion <i>D. V. Thota, F. Kerber, K. Markuske, S. Eckart, H. Krause, C. G. Aneziris</i>
FR-P06	Flamelet Model Extension for Hydrogen Methane Blends <i>S. Nerzak, T. L. Howarth, M. Gauding, H. Pitsch</i>
FR-P07	Flame–Wall Interaction of Thermodiffusively Unstable Hydrogen Flames in a Turbulent Channel Flow at Varying Ret <i>F. Rong, M. Schneider, A. Gruber, H. Nicolai, C. Hasse</i>
FR-P08	ENERGIZE – Adjoint-Based and Additive Manufacturing-Enabled Optimization of Hydrogen Combustion Systems <i>L. Melzig, F. Riegger, M. F. Zaeh</i>
FR-P09	Adaptive Reactive Effusion Strategies via Additive Manufacturing for N ₂ O Mitigation in Ammonia Combustion under Flame–Wall Interaction (ACTUATION) <i>D. Geyer, M. Klein, E. Jäggle</i>
FR-P10	Integrated Process Modelling, Thermodynamic and Chemical Kinetic Analysis of an H-Class Combined-Cycle Power Plant Fuelled by Hydrogen from On-Site Ammonia Cracking <i>M. Gangadhar Pavan Kumar, A. Stagni, G. Sorrentino, M. de Joannon, C. S. Mistry, A. K. Gupta, N. Saxena, V. M. Reddy</i>
FR-P11	Investigation of the Influence of the Bluff-Body Geometry on NO _x and Fuel Slip in NH ₃ /H ₂ Combustion <i>G. Guggilla, C. Schmidt, L. Gaip, A. Kropman, C. Chi, F. Beyrau, M. Krüger, D. Thévenin</i>
FR-P12	Towards LES of a Full-Scale 1 MW Industrial Burner: Comparison of Dynamic Thickened Flame and Fractal-PaSR Models <i>H. A. Haider Sehole, J. Ala-Juusela, M. Laakso, V. Vuorinen</i>
FR-P13	MILD Combustion of NH ₃ /H ₂ Mixtures at Fuel-Lean Conditions in a Semi-Industrial Furnace <i>N. Ingolihar, N. Cid Rodríguez, N. Vaysse, A. Parente, M. Lubrano Lavadera</i>
FR-P14	Additive Manufacturing as an Enabler for Canonical Hydrogen Flame Experiments: Design and OH*/CH* Chemiluminescence of a High-Pressure Counterflow Combustor <i>L. Pesapane, G. Sorrentino, A. Maffei, H. Pitsch, P. Sabia, V. Castro, R. Ragucci, M. de Joannon</i>
FR-P15	Periodic Boundary Verification of an Adaptive Hydrogen and Air Rotating Detonation Simulation <i>H. Pasumarthi, A. A. Abdul Khadhar, S. K. Nambala, D. Georgiou</i>