The Combustion Institute
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Dr. Stephane Richard

Head of the Combustor Design Department – Safran Helicopter Engines
Engine combustion lecturer at Ecole Centrale Supelec & IFP School
2024 Candidate Profile: The Combustion Institute Board of Directors

Reasons for Nomination

With nearly 25 years of experience in scientific and technological development in combustion, my career has evolved from academic research in piston engines and gas turbines to leading combustion chamber design at Safran Group. I have focused on developing high-fidelity simulation and advanced experimental analysis methods, integrating them into engineering design offices for concrete applications successfully.

Today, the climate and energy challenges more than ever needs support from the international research community, perfectly embodied by The Combustion Institute. With a long track of collaborative projects between academia and industry players worldwide, I believe in leveraging such partnership to accelerate sustainable technologies and fuels development.

Advocating for a position at the CI board of directors I wish to enhance these collaborations, fostering mutual understanding to inspire future talent to address societal challenges. I aim also to raise awareness of combustion's role in a sustainable future among the public and policymakers. Additionally, I aspire to guide CI's strategic orientations exploiting AI, HPC, and high- speed optical diagnostics.

My application is thus rooted in the belief that collaboration, innovation, and strategic direction are essential for realizing the potential of combustion in shaping a sustainable future.

See the next page for the candidate's curriculum vitae.

Curriculum Vitae
Stephane RICHARD

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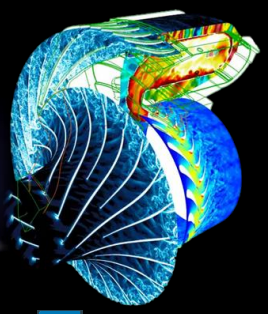

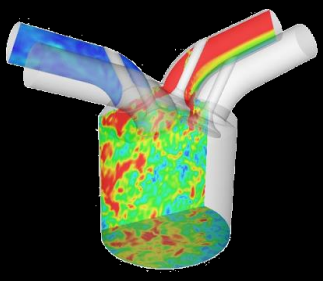

LinkedIn profile ResearchGate

#websitesrichard

EDUCATION

PhD in Energetics and Combustion (supervision D. Veynante), Ecole Centrale Paris 2005

Master Degree in Piston Engines Design, Emissions and After-Treatment IFP-School & Univ. Paris VI 2002

Engineering Degree in Mechanics and Aeronautics, ENSMA 2001

PROFESSIONAL EXPERIENCE

Safran Helicopter Engines
Head of the combustor design department since 2021
Head of the fluid mechanics and energetics group 2017-2021
Safran group combustion expert in CFD since 2014

IFP Energies Nouvelles
Project manager for aircraft propulsion system development 2010-2013
Manager of the engine system simulation team 2009-2013
Researcher in engines and combustion 2002-2013

RENAULT SA
Trainee in engine performance and combustion (1D and 3D CFD, component and engine test beds, optical diagnostics) 2001-2002

CNRS-LEA –Dassault Aviation
Trainee in active control of infrared signature for military aircrafts (wind tunnel measurements) 2000

TEACHING AND DISSEMINATION ACTIVITIES

- Lecturer in Engineering schools on gas turbines combustion technologies and design (Ecole Centrale Supelec, IFP-School) since 2017 – Formerly lecturer on piston engines combustion and design at Ecole Centrale Nantes and University Paris 13 (2008-2017)
- Lecturer at Von Karman Institute for Fluid Dynamics on gas turbines combustion in the biannual turbulent combustion Lecture series (with L.Vervisch, D.Veynante, A.Dreizler, R.Kock, C.Hasse, D.Haworth) since 2015.
- Lecturer in combustion physics and numerical simulation at Safran University since 2016
- Supervision as principal or industrial adviser of 14 PhD thesis (2 on-going), 2 Postdocs (CTR Stanford) and 18 Master thesis since 2008
- Conferences and events on low-carbon fuels combustion for motorsport (Politics, FFSA-French Motorsport Federation) since 2021

AWARDS, GRANTS, HIGHLIGHTS

- **World premieres in high-fidelity simulation:** Large Eddy Multicycle simulation of combustion in a piston engines in collaboration with CERFACS, Large Eddy Simulation of knock and superknock phenomena in the PhD's of G. Lecocq and A. Robert
- **World Premiere in rotorcraft propulsion:** High Performance Piston Engine Flight on an Airbus Helicopter EC120 in 2015, demonstrating 50%CO_2 reduction video_ICE_Rotorcraft
- **Yves Chauvin Prize** as scientific adviser for the **PhD of Anthony Robert 2014**
- **Safran Innovation Awards finalist** for research on real time modeling of composite fire for engine certification 2019
- **Joseph Fourier Prize** as Industrial adviser for the **PhD of Walter Agostinelli 2021**
- PRACE grants leader for HySProp (2023), SPIN360 (2022) and Revolution (2020) projects
- **World Premiere in motorsport:** First Single Seater development and demo with an Hydrogen Combustion Engine at Pau Grand Prix Festival 2023 video_ICE_H_2

PROFESSIONAL ASSOCIATIONS MEMBERSHIPS

- Regular reviewer for combustion journals: International Symposium On Combustion, Combustion and Flame, Flow Turbulence and Combustion
- Member of the Industrial Board of IFP-School
- Stanford affiliates corresponding person from 2013-2017 (postdocs co-supervision)
- Co-Founder of Vision Technology a start-up promoting the role of motorsport in low-carbon fuels combustion technology development

RESEARCH INTEREST AND EXPERTISE

(Hfactor on Research Gate: 20, total citations: 1726). Full list available here (66 peer reviewed journal and conference papers, 2 book chapters, 15 patents):

- Combustion models and code development, numerical simulation (DNS, LES, RANS, 1D) on several codes: AVBP, IFP-C3D, AMESim. Industrial implementation of simulation tools
- Combustion phenomena investigation using advanced optical diagnostics applied to industrial combustors
- Transient event analysis in gas turbines and piston engines: Ignition, LBO, Cyclic variability and abnormal combustion (knock-super-knock-detonation)
- Formal model reduction in turbulence and combustion, Artifical Neural Network for ICE modelling
- Low-emission piston engines and gas turbines combustion system development including engine hybridization
- Low-carbon fuels combustion (SAF, hydrogen, methane, ethanol, blends…) in gas turbines and piston engines (including motorsport)