

# Stéphane Chevalier, PhD, HDR

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## Working experiences and education

- 2024 - **French accreditation to supervise research (HDR – equivalent to Tenured position)** from Physics and Engineering doctoral school of Bordeaux University (France)
- 2018 - **Associate Professor** at Arts et Métiers Institute of Technology (Bordeaux, France)
- 2016 - **Incoming Marie Curie fellow** in the thermal and energy science laboratory (LTEN), Nantes University (France)
- 2015 - **Invited researcher (2 months)** in Helmholtz Institute of Ulm (Germany)
- 2014 - **Postdoctoral fellow** at Thermofluids for energy and advanced materials (TEAM) laboratory, University of Toronto (Canada)
- 2013 – **PhD Thesis**, Mechanical Engineering at Nantes University (France). *Title: Multiphysics modelling of PEM fuel cell impedance applied to stack diagnosis by E.I.S.*
- 2010 – **Junior Engineer** at Safran in Paris (France)
- 2010 – **Engineering Degree** at Polytech’Nantes (France). *Major: Energetics and Heat Transfers, Minor: Mechanical engineering*

## Teaching activities (responsible of Energetic and Mechatronic Systems department at Arts et Métiers)

- 2021 - **Advanced Fuel cells technologies**. Lectures and tutorials for Master Research students: 10h/yr
- 2018 – **Heat Transfers**. Lab classes 60 h/yr
- 2018 – **Advanced Energetic**. (Turbomachinery, compressible fluid dynamics, Thermodynamics). Lectures and tutorials, 123 h/yr

## Research grants (1 M€ in total from European and French Agencies)

- 2023 - **SMARTBAT**. Project coordinator. Grant from the Research Collaboration Program between Tokyo University and The Centre National de la Recherche Scientifique (CNRS). 2 PhD scholarship (~250k€) and 30k€ for mobility.
- 2022 - **OptUSEH2**. Work package coordinator (WP1 & WP3). Grant from the Carnot Institute ART in the framework of the hydrogen program. Project in collaboration with three others academic partner. 120k€ for small equipments and an 18-month postdoc
- 2022 - **NeuroTherm**. Project coordinator. Grant from the Centre National de la Recherche Scientifique (CNRS) in the framework of PEPS instrument. Project in collaboration with IMS. 20k€ for small equipment.
- 2021 - **ITEM**. Work package leader. Grant from the Region Nouvelle Aquitaine in the continuation of the project I2MPAC. 60 k€ of equipment are funded to acquire new cameras and optical sources. The total project funded by the Region NA is 200 k€.

- 2020 - **IMAGING**. Project coordinator. Grant from the Research Collaboration Program between The University of Toronto (U of T) and The Centre National de la Recherche Scientifique (CNRS). 1 PhD scholarship (~123k€) and 15k€ for mobility. Project related to K. Krause PhD thesis.
- 2020 - **I2MPAC**. Project coordinator. Grant from the French National Research Agency (ANR) in the framework of JCJC instruments. A total of 238k€ for 1 PhD scholarship /equipment/mobility/teaching release. Project related to M. Garcia PhD thesis.
- 2016 - **Engineered gas diffusion layer structure with controlled transport properties for improved PEM fuel cell performance**. Project coordinator. Grant from the European Union (Marie Curie fellowship) for a two-year postdoctoral scholarship (~90 k€) at the Laboratoire de Thermique et Énergie de Nantes (LTEN).

## PhD Students supervision (4 defended and 2 undergoing)

- Alisa Svirina**, Optimisation et caractérisation temps réel des transferts d'énergie dans les batteries à flux organique, 2023-2026. Co supervised 50% with J.-C. Batsale (I2M), and J. Maire (I2M)
- Florian Crouau**, Imagerie thermique super résolue pour l'optimisation des transferts d'énergie dans les microsystèmes, 2023-2026. Co supervised 30% with J. Maire (I2M) and J.-L. Battaglia (I2M)
- Marine Garcia**, Développement d'une plateforme d'imagerie pour la caractérisation du transfert de masse dans les microsystèmes : Application aux piles à combustible microfluidiques, 2021-2024. Co supervised 50% with J.-C. Batsale (I2M), and A. Sommier (I2M)
- Kevin Krause**, Operando infrared characterization of polymer electrolyte membrane water splitting electrolyzers, 2021-2024. Co-supervised 50% avec J.-L. Battaglia (I2M).
- Coline Bourges**, Thermographie dans des milieux semi-transparents à l'infrarouge par thermotransmittance, 2020-2023. Co-director 30% with J. Maire (I2M) and S. Dilhaire (LOMA).
- Abderezak Aouali**, Tomographie thermo-spectroscopique par imagerie 3D pour l'étude des torches à plasma, 2019-2021. Co-supervised (50%) with C. Pradère (I2M)

## Selected publications (1450 citations and h-index of 24 on Web of Science, data extracted on 26/05/2024)

(PhD students underlined)

1. C. Bourges et al., *S. Mid-Infrared Spectroscopic Thermotransmittance Measurements in Dielectric Materials for Thermal Imaging*. Appl. Phys. Lett. (2024), 124 (1).
2. M. Garcia et al., *Interdiffusion Measurements in Thermally Controlled Microchannel Using Infrared Spectroscopic Imaging*. Chem. Eng. Sci. (2023), 282, 119136.
3. K. Krause et al., *Probing Membrane Hydration in Microfluidic Polymer Electrolyte Membrane Electrolyzers via Operando Synchrotron Fourier-Transform Infrared Spectroscopy*. Lab Chip (2023), 23 (18), 4002–4009.
4. **S. Chevalier**, *Semianalytical modeling of the mass transfer in microfluidic electrochemical chips*, Phys. Rev. E. 104 (2021) 035110.
5. A. Aouali et al., *3D infrared thermospectroscopic imaging*, Sci. Rep. 10 (2020) 22310.
6. **S. Chevalier**, et al., *Infrared thermospectroscopic imaging of heat and mass transfers in laminar microfluidic reactive flows*, Chem. Eng. J. Adv. 8 (2021) 100166.
7. **S. Chevalier**, et al., *Novel electrospun gas diffusion layers for polymer electrolyte membrane fuel cells: Part II. In operando synchrotron imaging for microscale liquid water transport characterization*, J. Power Sources. 352 (2017) 281–290.
8. **S. Chevalier** et al., *Analytical solutions and dimensional analysis of pseudo 2D current density distribution model in PEM fuel cells*, Renew. Energy. 125 (2018) 738