

# Frédéric CHRISTIEN

48 years old – Professor

Mines de Saint-Etienne – Institut Mines Telecom

Laboratoire Georges Friedel (UMR CNRS 5307)

158 Cours Fauriel - CS 62362 - 42023 Saint-Etienne cedex 2 – France

+33 7 71 44 04 14 - frederic.christien@emse.fr



## Education

- 2013 Habilitation (HDR), University of Nantes, France, *Grain Boundary Segregation in Metals. New Quantification Methods applied to Sulphur Segregation in Nickel.*
- 2001 PhD in Metallurgy, University of Nantes, France, *Grain Boundary Embrittlement of 17-4PH Martensitic Stainless Steel during Low Temperature Ageing.*
- 1997 MEng in Materials (diplôme d'ingénieur), INSA de Rennes (Institut National des Sciences Appliquées), France.

## Professional Experience

- Since July 2016 Head of the “Mécanique Physique et Interfaces” group (~25 people), Mines Saint-Etienne, France.
- Since Dec. 2015 Professor in Materials, Mines de Saint-Etienne, Laboratoire Georges Friedel (CNRS – UMR-5307).
- 2004-2015 Associate Professor (Maître de conférences), University of Nantes, Institut des Matériaux Jean Rouxel (CNRS – UMR-6502).
- 2010-2011 Visiting Researcher, Department of Materials, University of Oxford, *NanoSIMS Quantification of Grain Boundary Segregation.*
- 2002-2004 Post-doc, CEA (Physical Metallurgy Group, Saclay), *Cluster Dynamics Modelling of Precipitation and Point Defect Clustering in Irradiated Materials.*
- 2001-2002 Assistant Professor (1 year contract), Ecole Polytechnique de l'Université de Nantes.

## Community Service

- 2011-2015 Elected Member of the French National University Council (CNU) in Materials Chemistry

## Main Teaching Activities

### At the University of Nantes (2004-2015):

General Metallurgy, Physical Metallurgy, Microscopy and MicroAnalysis

### At Mines Saint-Etienne (from December 2015):

Heading the Materials Science and Engineering master program since 2022

Master courses (taught in English): Surface and interface thermodynamics and physico-chemistry, Surface analysis methods, Scientific calculus.

Managing the Technological Projects in 2<sup>nd</sup> year of ICM (Ingénieur Civil des Mines) program (~100 students) from 2016 to 2022.

**Research Interests:** Surface and Interface Segregation, Hydrogen Embrittlement, Stress Corrosion Cracking, Physical Metallurgy, Materials Degradation and Ageing, Durability, Solid State Diffusion, Microstructures, New Methods of MicroAnalysis using Ion and Electron Beams, Phase Transformations, Neutron Diffraction

**PhD supervision:** 10 PhD theses (defended) + 4 PhD theses in progress

- 2022-2025 Emeline Péjoine, *Stress corrosion cracking and hydrogen embrittlement of high strength maraging stainless steels. Role of microstructural elements.* Funded by Aubert-et-Duval / Airbus.
- 2022-2025 Omar Zegoudi, *Multi-scale modelling of hydrogen diffusion in polycrystalline nickel.* Funded by CEA.
- 2022-2025 Sarah Alzein, *Study of hydrogen / metal surface interactions: effects of roughness, oxide layers and crystallography.* Funded by Mines Saint-Etienne.

- 2020-2023 Aman Prasad, *Computer-aided design of hydrogen-resistant superalloys*. Funded by ANR.
- 2018-2021 Vivienne Hsu, *Effect of pressure vessel steel microstructure on grain boundary segregation*. Funded by EDF.
- 2018-2021 Jolan Bestautte, *Influence of microstructure on hydrogen embrittlement of maraging stainless steels*. Funded by Aubert-et-Duval / Airbus.
- 2018-2021 Ahmed Yaktiti, *Hydrogen-porosity interaction in a low-alloy cast steel*. Funded by SafeMetal.
- 2017-2020 Hamza Ez-Zaki, *Gaseous hydrogen embrittlement of a low alloy steel*. Funded by CEA / GRT Gaz.
- 2016-2019 Michella Alnajjar, *Durability of a martensitic stainless steel obtained from additive manufacturing*. Funded by Mines Saint-Etienne.
- 2015-2019 Elia Tohme, *Application of SKPFM to the study of hydrogen in metals*. Funded by Mines Saint-Etienne.
- 2015-2018 Abel Rapetti, *Ductility dip cracking of filler metals for 690 alloy*. Funded by EDF.
- 2012-2015 Arnaud Giraudet, *High temperature plastic forming of titanium alloys*. Funded by IRT Jules Verne Nantes.
- 2009-2012 Marion Allart, *Grain boundary segregation of sulphur during plastic deformation of nickel*. Funded by Université de Nantes.
- 2007-2010 Edouard Ferchaud, *Brazing of aluminium using liquid gallium*. Funded by ANR.

**Publications:** 63 papers in peer-reviewed international journals, co-author of 2 books, 60 talks (including 15 invited), 10 invited seminars.

**Reviewer** for the following journals: *Metallurgical and Materials Transactions, Scripta Materialia, Surface Science, Surface and Interface Analysis, Applied Surface Science, Materials Characterisation, Journal of Surface Analysis, Computational Materials Science, Journal of Alloys and Compounds, Electrochemistry Communications, Materials Science and Engineering A, Materialia, Philosophical Magazine Letters, Journal of Materials Science*.

Participation in 24 **thesis or habilitation juries**, including 19 as a reviewer (rapporteur).