

## PERSONAL INFORMATION

## Franck DECROOS



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Date of birth 26/05/1994 | Nationality French

## WORK EXPERIENCE

2022 - current

### Postdoctoral position on 'Hyperspectral imaging: towards quantitative color tomography'

Employed at Université Gustave Eiffel (UGE), working between UGE and Ecole Nationale des Ponts et Chaussées (ENPC) in Mame La Vallée campus since December 2022.

Member of Navier laboratory [Navier Website](#)

#### Supervisors

Michel BORNERT (IGPEF) from Navier laboratory (ENPC)

Sébastien BRISARD (Prof.) from Laboratoire de Mécanique et d'Acoustique (LMA), (Aix-Marseille University)

- Development of an image contrast enhancement methodology for X-ray CT on geomaterials using a semiconductor detector
- Development of executable codes for image post-processing
- Development of characterization and metrology protocols for Semiconductor detector
- Coding in Python3, JavaScript

**Main fields** X-Ray tomography, semiconductor detector, image processing, geomaterials

10/2017 – 2022

### Ph.D. on 'New methods for the determination of local residual stresses'

*This time period was marked by personal problems which led to the postponement of the doctoral defense by more than two years.*

Employed at Université de Bourgogne Franche-Comté, working between Sevenans at Université de Technologie de Belfort-Montbéliard (main location), and Dijon at Université de Bourgogne from October 2017 to May 2021. Then employed at CNRS from October to December 2021.

Member of the Laboratoire Interdisciplinaire Carnot de Bourgogne (ICB laboratory) [ICB Website](#)

#### Supervisors (both members of ICB lab.)

Cécile LANGLADE (Prof.)

Eric BOURILLOT (Asst. Prof.)

- Contributing to the understanding of a manufacturing process
- Carrying out non-destructive stress investigation:
  - At micro-scale: Raman micro-spectrometry, Scanning Microwave Microscopy
  - At macro-scale stress investigation: X-Ray Diffraction via  $\sin^2(\Psi)$  method
- Carrying out the first residual stress study on ceramic materials with the Scanning Microwave Microscope and contributing to the understanding of the wave packet interaction with such materials
- Material characterization: Optical and numerical microscopy, X-Ray Diffraction (Rietveld, Williamson-Hall), Raman micro-spectrometry, Scanning Microwave Microscopy, mapping
- Data (batch) processing with Matlab and OriginPro and/or supplier softwares (Labspec6 for Raman spectra, EVA (DiffracPLUS) for diffraction patterns)
- Coding in Matlab, and C#

**Main fields** Materials Science, Solid State Physics, Residual Stress Investigation

- 07/2017 – 10/2017 **R&D Engineer**  
 Cistéo MEDICAL, Besançon (France) [Cistéo MEDICAL Website](#)
- Pursuing the development medical devices: including patient testing phase, and industrialization procedure
  - Pursuing the activities as in the internship
- Business or sector** R&D in biomedical engineering
- 01/2017 – 06/2017 **Junior R&D Engineer - Internship**  
 Cistéo MEDICAL, Besançon (France) [Cistéo MEDICAL Website](#)
- Development of medical devices: prototyping and implementation of tests
  - Development of CAD models for both medical devices and injection molds
  - Injection molding of viscous and liquid silicon
  - Project management
  - Interaction with both suppliers and customers
- Business or sector** R&D in biomedical engineering
- 09/2015 – 02/2016 **Engineer assistant - Internship**  
 C&K components, Dole (France) [C&K Website](#)
- Carrying out Repeatability & Reproducibility studies
  - CAD modelling of switches and their fitting mounts for R&R measurements
  - Technological and regulatory watch for laboratory testing
- Business or sector** R&D laboratory work, industrial development

## EDUCATION AND TRAINING

- 10/2017 – 12/2021 **Ph.D. on 'New methods for the determination of local residual stresses'** Level 8 European Qualification Framework  
 Université de Bourgogne Franche-Comté (France)
- Assessing and setting up an experimental methodology
  - Conducting research in experimental physics applied to mechanical investigation
  - Establishing an exhaustive state of the art, situating my work in an international context
- 09/2012 – 06/2017 **Ing. (M.Sc.) Mechanical Engineering and Design** Level 7 European Qualification Framework  
 Université de Technologie de Belfort-Montbéliard (France)
- Training in Mechanical Engineering and Design
  - Specialization in Materials Science field
  - Study semester abroad at Ulster University (Northern Ireland)
  - Diploma supplement: "Parcours recherche" (Research course)
  - Diploma supplement: "Parcours international" (International course)
- 09/2012 – 06-2014 **Diplôme d'Etudes Universitaires de TECnologie (DEUTEC)** Level 6 European Qualification Framework  
 Université de Technologie de Belfort-Montbéliard (France)
- Diploma supplement: "Parcours anglophone" (English-speaking course)

## PERSONAL SKILLS

Mother tongue French

Other language(s)	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C1	C1	C1	C1	C1
	BULATS C1				
Spanish	B2	B2	B1	B1	B1
	No certificate				

Levels: A1/2: Basic user - B1/2: Independent user - C1/2 Proficient user  
Common European Framework of Reference for Languages

## TEACHING

**Autumn 2023**

- "Du micron au mètre", B3
  - Practicals, 2.5h, 12 students

**Spring 2022**

- "Matériaux intelligents", B3
  - Practicals, 2h, 24 students

**Autumn 2019**

- "Structures des matériaux et alliages", B2
  - Tutorials, 14h, 1 group of 20 students

**Spring 2019**

- "Conception pour l'environnement", M2
  - Tutorials, 6h, 2 groups of 20 students each
  - Practicals, 18h, 1 group of 12 students
- "Material forming and product assembly", M2
  - Practicals, 21h, 2 groups of 12 students
- "Matériaux polymères et composites", M1
  - Tutorials, 2h, 1 group of 20 students

**Overview:**

Semester	Tutorials (h)	Practicals (h)	Totals per semester
Autumn 2023	-	2.5	<b>2.5</b>
Spring 2022	-	2	<b>2</b>
Autumn 2019	14	-	<b>14</b>
Spring 2019	8	39	<b>47</b>
<b>Totals per category</b>	<b>22</b>	<b>43.5</b>	<b>65.5</b>

## OTHER EDUCATIONAL SUPPORT EXPERIENCE

**Year 2023**

- Scientific mediation – 1h class at senior high school (11<sup>th</sup> and 12<sup>th</sup> grade) Application of basic mechanics to pole vault
- Scientific mediation – 1.5h activities in a social center (for children and teenagers) ([link](#))
- Scientific mediation – 4h Open House Day at Ecole Nationale des Ponts et Chaussées

**School year 2017/2018**

- Civic engagement at a senior high school (tenth grade)
  - Homework support
  - Organization of a visit including various meetings in a professional environment to support pupils in their career choice
  - Help pupils with their course choices

**ORGANISATIONAL AND  
MANAGERIAL POSITIONS****Roles in internal authorities:**

- 2019 – 2020, elected Ph.D. students' representative at Doctoral School council
- 2018 – 2020, elected Ph.D. students' representative at UTBM Scientific council

**Contribution to academic life**

- 2023 – 2024, Member of Sustainable and Socially Responsible Development network ([DDRS](#)) in UGE
  - Conception of a modular charter addressing environmental and social issues
- 2023 – 2024, Member of working group "[Navier 1p5](#)" dedicated to develop sustainability in research activities according to national frameworks from [labos 1p5](#)
  - Co-organization of conferences and round tables
  - Organization of workshops for lab members
- 2023 Co-organization of annual seminar of team Multiechelle
- 2018 – 2019, elected president of UTBM Young researchers' union: "*Doceo – UTBM*"
  - Organization of 2 in-house colloquiums at UTBM for young researchers nearby
    - Training for oral presentation, poster presentation, and science popularization presentation before a multidisciplinary examination board including one special guest
    - Exhibiting research works to companies and students during special event days
    - Promoting research to students at master level
  - Creation of a doctoral school course for Ph.D. students which has been a great success in the doctoral college
  - Active participation to special event days organized either by university, academic consortium, or doctoral school
  - Maintaining and strengthening partnerships

**RELATED SKILLS**

- Self confidence in public speaking
- Leadership skills
- Proactive organization
- Management of teams from two to nine members
- Ability to use different management types

**COMMUNICATION SKILLS**

- Scientific communication skills gained through numerous presentations in official scientific events as well as in-house training events for Ph.D. students: 4 posters and 7 oral presentations in total
- Interaction with scientists from external laboratories for the thesis work

**COMPUTER SKILLS**

- Coding skills for scientific post-treatment: Python 3, Matlab, C#
- Knowledge on good practices for scientific data management
  - Data save in universal formats json or yaml
  - Use of Jupyter Notebook
  - Use of markdown
- Ability to work on linux environment
- Good command of Microsoft Office™ tools C2i level 1 obtained in 2013 (French certificate)

**PERSONAL PROFILE**

- Autonomy, rigor, and rising challenges are character traits cultivated through my professional activities as well as playing sports
- Open-mindedness and good communication skills are abilities characterizing my rather curious, benevolent and knowledge sharing personality

**DRIVING LICENSES**

- B
- A2

**ADDITIONAL INFORMATION**

## Peer-Reviewed Journal Publication

- **In preparation** - Decroos F., Aïmedieu P., Brisard S., Bornert M., Detailed methodology for image contrast enhancement in geomaterials using a semiconductor detector in X-Ray CT, ***Nature materials or Review of Scientific Instruments or Scientific Reports***, 2024 - 2025
- **In preparation** - Decroos F., Langlade C., Bourillot E., "Characterization of Thermal Spray processes via residual stress fields investigations: comparison between macro and micro-scales studies", ***Journal of Thermal Spray Technology***, 2024 - 2025
- **Project** - Decroos F., Bourillot E., Langlade C., "Innovative use of a Scanning Microwave Microscope with appropriate data post-treatment for physical characterization of a dielectric material", ***Journal of Spectroscopy***, 2025

## Peer-reviewed international conference publications

- Decroos F., Langlade C., Bourillot E., Darut G., François M., "Micro-scale study of residual stresses in Cr<sub>2</sub>O<sub>3</sub> coatings sprayed by APS", in ***Polytechnica CTU Proceedings***, 2020. (Oral presentation as well) <https://doi.org/10.14311/APP.2020.27.0042>

## Oral presentation in international conference

- **Upcoming** - "Towards color X-ray tomography: Detection of small quartz grains via contrast-enhanced 3D images of carbonate rocks using a CdTe Photon Counting Detector", at "PhotoMechanics – iDICS Conference", 2024, Clermont-Ferrand (France)
- "Micro-scale study of residual stresses in Cr<sub>2</sub>O<sub>3</sub> coatings sprayed by APS" in 14th International Conference on "Local Mechanical Properties" (LMP 2019), Prague (Czech Republic)

## Other oral presentation

- "Vers la tomographie hyperspectrale quantitative", at "annual seminar of Labex MMCD", 2023, Champs-sur-Marne (France)

## Poster presentations

- "Caractérisation d'un détecteur à comptage de photons pour la tomographie X de matériaux du génie civil", at Rayons X et Matière, Nov 2023, Bordeaux, France. (hal-04493745)
- "Influence de la cinématique de projection sur le champ de contraintes de revêtements APS – Approches locales" at MECAMAT 2020, Aussois (France)
- "Etude de l'influence du TiO<sub>2</sub> sur le niveau de contraintes de revêtements Cr<sub>2</sub>O<sub>3</sub> par HVOF", at Matériaux 2018, Strasbourg (France)

## Honours and awards

- Student award from Université de Technologie de Belfort-Montbéliard, year 2018

## Memberships

- Laboratoire Navier from 2022 to current [Navier Website](#)
- Laboratoire Interdisciplinaire Carnot de Bourgogne from 2017 to 2021 [ICB Website](#)
- Engineering Sciences and Microtechniques (SPIM) doctoral school [SPIM website](#)

## References

- Cécile LANGLADE, Ph.D. supervisor (50%), Université de Technologie de Belfort-Montbéliard, cecile.langlade@utbm.fr, +33 (0)3.84.58.31.50.
- Éric BOURILLOT, Ph.D. supervisor (50%), Université de Bourgogne, eric.bourillot@u-bourgogne.fr, +33 (0)3.80.39.60.21.