# Jérémy Bleyer

Ecole Nationale des Ponts et Chaussées, IP Paris
Chercheur (HDR) au Laboratoire Navier
Ingénieur en Chef des Ponts, des Eaux et des Forêts
Professeur chargé de cours à l'Ecole Polytechnique


April 23, 2026


Born on July 15th 1988 in Mulhouse, France
Researcher at Laboratoire Navier, École Nationale des Ponts et Chaussées (ENPC)
IP Paris, Université Gustave Eiffel, CNRS, Marne-la-vallée, France

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## Current position

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|---|---|
| **2020 – now** | Part-time Associate Professor at **École Polytechnique**, Mechanical Eng. Dpt. |
| **2017 – now** | Permanent researcher at **École Nationale des Ponts et Chaussées** (ENPC)<br>Engineer of *Corps des Ponts, des Eaux et des Forêts* |

## Previous positions

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|---|---|
| **2016** | Postdoctoral researcher at **Ecole Polytechnique Fédérale de Lausanne**, Switzerland |
| **2015** | Visiting scholar (6 weeks) at **University of Newcastle**, Australia |
| **2012–2015** | Doctoral researcher at **ENPC**, France |

## Education and key qualifications

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|---|---|
| **2024** | **Habilitation à Diriger des Recherches**[1] (HDR) from Institut Polytechnique de Paris |
| **2012 – 2015** | **PhD** from Université Paris-Est, Structures & Materials, (Dir. Patrick de Buhan) |
| **2010 – 2012** | **Engineering degree**, ENPC, Civil Engineering Department |
| **2010 – 2011** | **M.Sc.**, Mechanics of Materials and Structures, ENPC, with highest honors |
| **2007 – 2010** | **Engineering degree**, École Polytechnique, Mechanical Engineering Dpt. |

## Teaching activities

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|---|---|
| **2020 – now** | 80h/year at École Polytechnique: Structural and Solid Mechanics (Eng. level) |
| **2020 – now** | Damage Mechanics (Master level), jointly by IP Paris/Sorbonne Université |
| **2017 – 2026** | 40h/year at ENPC: Finite-Element Method for Civil Engineering (Eng. level) |
| **2011-2016** | Approx. 100h/year of teaching experience in various courses at ENPC and EPFL, (Solid mechanics, Finite-strain, Plasticity, Fracture Mechanics, etc.) |

## Fellowships and awards

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|---|---|
| **2023 Jean Mandel Prize** | Delivered by École des Mines PSL & École Polytechnique |
| **2016 PhD award** | Delivered by Université Paris-Est |
| **2016 PhD award** | Delivered by École des Ponts ParisTech |
| **2010 Medal L.E. Rivot** | Delivered by the French Academy of Sciences: *"particular interest for scientific research and quality of his work in the domain of mechanical and computational sciences"* |

*Finalist of the following PhD awards*: Paul Germain (French Association of Mechanics), CSMA (French Association of Computational Mechanics), ECCOMAS Olympiad

## Ongoing grants

2026 **ERC Consolidator Grant**, AUTOMATIX, project no 101229452

2025 **ANR MicroExpand** (PRC), *Design and fabrication of deployable micro-architected materials*, PI. Arthur Lebée (ENPC)

2025 **ANR ColdWell** (PRME, 600 k€), *Cold CO2 in Hot Reservoirs: Well Integrity in Carbon Capture and Storage*, PI. Siavash Ghabezloo (ENPC)

2024 **ANR Anohona** (PRC, 675 k€), *Advanced nonlinear homogenization for structural analysis*, PI. Noël Lahellec (Aix-Marseille University)

## Previous grants

2022 **Digital Europe** (7M€) *Digital Twins for Complex Infrastructures and Urban ecosystems*, European consortium, WP leader

2021 **Labex MMCD** (100 k€), PhD thesis funding for Zakaria Chafia, with J. Yvonnet (UGE) *Multi-scale modelling strategies for predicting the failure behaviour of cementitious materials*

2021 **Coup de Pouce Fédération Francilienne de Mécanique** (40 k€), co-PI with S. Brach (X) *Multiphase-field modeling of anisotropic brittle fracture in additively-manufactured polycrystals*

### Denied

2022 ANR JCJC (PI) OROMIS *Robust optimization for uncertainty quantification in structural design*

2020 Nuclear Valley DAS4 *Digitization for Optimization of Nuclear Design and Construction*

2017 FEDER Ile de France *Yield design of construction wood assemblies*

## Scientific supervision

### PhD students

2025-now **Ludovic Druette**, *Modeling of the poroplastic behavior of geomaterials*, co-dir. Siavash Ghabezloo, industrial collaboration with EDF R& D

2025-now **Esteban Martinez**, *Impacts of remediation and prevention solutions on damage to building structures constructed on soils prone to clay shrinkage-swell*, co-dir. Duc Toan Pham, industrial collaboration with CSTB

2024-now **Yahya Boye**, *Hierarchical matrices for accelerating contact in FEM*, dir. Vladislav Yastrebov, MINES Paris PSL

2023-now **Alice Gribonval**, *Multiscale and multiphysics modeling of 3D-printed concrete structures*, industrial collaboration with XtreeE

2023-now **Giulia d'Orio**, *Reinforced concrete behavior for modeling and safety of nuclear civil engineering structures*, industrial collaboration with EDF R&D

2023-now **Gaspard Blondet**, *Advanced modeling of cross-laminated timber panel behavior*, co-dir. Arthur Lebée, fellowship of ENS Paris-Saclay and ENPC

2021-2024 **Sabine Boulvard**, *Failure design of reinforced concrete beams subject to shear and torsional loadings in fire conditions*, dir. Duc Toan Pham, industrial collaboration with CSTB

2021-2024 **Zakaria Chafia**, *Multi-scale modelling strategies for predicting the failure behaviour of cementitious materials*, dir. Julien Yvonnet (Univ. Gustave Eiffel), funded by LabeX MMCD

2020-2023 **Goustan Bacquaert**, *Behaviour of geomaterials for the modeling and safety analysis of geotechnical structures*, dir. Djimédo Kondo (Sorbonne Université), CIFRE funding in collaboration with Électricité de France

2018-2021 **Leyla Mourad**, *Topology optimization of structural load-bearing capacity through limit analysis*, dir. Karam Sab, joint thesis with University Saint-Joseph, Lebanon

2018-2021 **Paul Bouteiller**, *Failure modeling of composites laminates in a layerwise plate model*, advisor Karam Sab, industrial collaboration with Dassault Aviation

2017-2021 **Lucille Salha**, *Mesh adaptation and hybridization for efficient stress prediction in a layerwise plate model*, dor. Karam Sab, joint thesis with University Saint-Joseph, Lebanon

2017-2020 **Chadi El Boustani**, *Innovative optimization-based numerical methods for modeling the nonlinear behavior of steel structures*, dir. Karam Sab, CIFRE funding in collaboration with Strains

2015-2018 **Karol Cascavita**, *Hybrid discretization methods for Signorini contact and Bingham flow problems*, dir. Alexandre Ern and Xavier Chateau, funded by LabeX MMCD

2015-2018 **Hugues Vincent**, *Development of a yield design model until failure for 3D reinforced concrete structures*, dir. Patrick de Buhan, CIFRE funding in collaboration with Strains

**Postdoctoral fellows**

2025 **Tongrui Liu**, *Efficient numerical models for the simulation of the mechanical behaviour of composite materials*, joint supervision with M. Bornert, F. Legoll, S. Brisard

2021 **Jean-Michel Scherer**, *Multiphase-field modeling of anisotropic brittle fracture in additively-manufactured polycrystals*, joint supervision with Stella Brach (LMS-X), funded by the *Coup de Pouce* grant from Fédération Francilienne de Mécanique

**Others**

approx. 12 master internship + 3 visiting PhD students (Hana Herndon, GeorgiaTech; Thomas W. Jensen, DTU; Hannah Keese, TU Freiberg)

## Industrial partnerships

**Électricité de France**, support for Goustan Bacquaert, Giulia d'Oria and Ludovic Druette PhD theses

**XtreeE**, support for Alice Gribonval PhD thesis

**CSTB**, support for Sabine Boulvard & Esteban Martinez PhD thesis
**Turbostream Ltd**, scientific consulting mission
**Setec tpi**, support for Leyla Mourad PhD thesis
**Dassault Aviation**, support for Paul Bouteiller PhD thesis
**Strains**, support for Chadi El Boustani and Hugues Vincent PhD theses + scientific consulting mission

## Invitations

2026 **Workshop** on AI in Mechanics, Stellenbosch, South Africa, organized by Prof. S. Skatulla, L. de Lorenzis, M. Kaliske, J. Schröder
2025 **Workshop** Fronts, organized by Prof. J.F. Remacle and N. Moës, Creta, Greece
2023 **Workshop** CSMA Juniors
*Hands-on session: Introduction to FEniCSx*
2023 **Workshop** Fronts, organized by Prof. J.F. Remacle and N. Moës, Université Catholique de Louvain, Belgium
2022 **Workshop** Homogenization and optimization of polymers, Ecole Polytechnique
*Conic programming approach for the simulation and optimization of nonlinear membranes*
2020 **Workshop** Design challenges of 3D printing in the construction industry
*Topology optimization for designing structures with optimal load-bearing capacity*
2020 **Workshop** ENPC-University of Tokyo
*An overview of computational limit analysis for civil engineering applications*
2019 **Workshop** RAM3 - Recent Advances in Mechanics and Mathematics of Materials
*An overview of computational limit analysis for civil engineering applications*
2015 **Visit (6 weeks)** to University of Newcastle, Australia, with K. Krabbenhoft and A. Lyamin

**Invited seminars** at CEA, EDF, LMS (Ecole Polytechnique), GeM (Centrale Nantes), University of Luxembourg, LMA (Aix-Marseille University), INRIA Grenoble, Leibniz Universität Hannover

## Editorial activities

2026– **Scientific Advisory Board Member** of the *Journal of Theoretical, Computational and Applied Mechanics* (Diamond Open Access)

## Reviewing activities

**Reviewer** (approx. 15/year) for Journal of the Mechanics and Physics of Solids, Computer Methods in Applied Mechanics and Engineering, International Journal for Numerical Methods in Engineering, International Journal of Fracture, International Journal of Solids and Structures, Engineering Fracture Mechanics, Engineering Structures, European Journal of Mechanics - A/Solids, etc.
**Reviewer** for SIGGRAPH conference (*Computer Graphics most prestigious conference*)
**External reviewer** for 1 ERC grant (2024), 2 proposals for national science funds (Israël, Austria)

## PhD thesis committees

### International

2023 **Sindhu Nagaraja**, ETH Zürich
*Phase-field modeling of brittle fracture: anisotropy and efficient discretization*
Jury: Corrado Maurini, Jérémy Bleyer, Laura de Lorenzis, Aldo Steinfeld

2017 **Morten A. Herfelt**, Technical University of Denmark
*Numerical limit analysis of precast concrete structures*
Jury: Henrik Stang, Jérémy Bleyer, Bent Steen Andreasen, Peter Noe Poulsen, Linh Cao Hoang, Jesper Frøbert Jensen

### France

2026 **Louis Guillet**, INRIA Grenoble
*Multiphysics and multi-scale numerical approach to damage : Application to rock salt*
Jury: FFrançois Bouchut, Djimedo Kondo, Aline Lefebvre-Lepot, Jérémy Bleyer, Maurine Montagnat, Pierre Saramito, Franck Bourrier, Vincent Acary

2025 **Nour Habib**, École Nationale Supérieure des Arts et Métiers
*Multiphysics and multi-scale numerical approach to damage : Application to rock salt*
Jury: Fabrice Barbe, Pedro Diez, Jérémy Bleyer, Laura Blanco-Martin, Michel Bornert, Saber El Arem, Amine Ammar

2025 **Lucas Salmon**, Aix-Marseille University
*Multiphysics modeling of crack-healing in a thermoelastic medium: application to the behavior of nuclear fuels*
Jury: Yann Monerie, Jérémy Bleyer, Djimédo Kondo, Véronique Lazarus, Laurent Stainier, Victor Blanc, Mihail Garajeu, Stéphane Lejeunes

2025 **Lamia Mersel**, Ecole Centrale de Nantes
*Phase field model for dynamic damage and fracture analysis through a fully explicit time integration*
Jury: Djimédo Kondo, Jérémy Bleyer, Thomas Heuzé, Anthony Gravouil, Bing Tie, Pascal Bouda, Jérémy Germain,Julien Réthoré

2025 **Laurane Preumont**, Ecole Polytechnique - IP Paris
*Fast enriched mechanical model for bead-based additive manufacturing*
Jury: Armelle Chabot, Jérémy Bleyer, Barbara Wolmuth, Claire Lestringant, Daniel Weisz-Patrault, Grégoire Allaire

2024 **Zakaria Chafia**, Université Gustave Eiffel
*Numerical multiscale strategies and High Performance Computing for predicting the fracture behaviour of heterogeneous materials*
Jury: Laura De Lorenzis, Julien Réthoré, Anthony Gravouil,Johann Rannou, Jérémy Bleyer, Julien Yvonnet

2024 **Sabine Boulvard**, Ecole Nationale des Ponts et Chausséess
*Shear and torsion strength of reinforced concrete structural elements in fire conditions*
Jury: Mohammed Hjiaj, Anne-Sophie Colas, Stefano Dal Pont, Jérémy Bleyer,Karam Sab, Duc Toan Pham

2024 **Gabriel Lima Chaves**, Ecole Polytechnique - IP Paris
*On the thermomechanics of field dislocations*
Jury: Thomas Hochrainer, Vincent Taupin, Samuel Forest, Jérémy Bleyer, Konstantinos Danas, Katrin Schulz, Lev Truskinovsky, Manas Upadhyay

2024 **Nikhil Mohanan**, Ecole Polytechnique - IP Paris
*On the intergranular response during laser scanning of additively manufactured stainless steel:*

*a thermomechanical simulation study*
Jury: Laurent Delannay, Vincent Taupin, Anna Ask, Eric Charkaluk, Martin Diehl, Maurine Montagnat, Javier Segurado, Jeremy Bleyer, Nicolò Grilli, Thomas Helfer, Manas Upadhyay

2023 **Xinyuan Zhai**, ENSTA ParisTech - IP Paris
*Crack propagation in elastic media with anisotropic fracture toughness : experiments and phase-field modeling*
Jury: Corrado Maurini, Benoit Roman, Jeremy Bleyer, Fabien Szmytka, Véronique Lazarus, Stella Brach, Thomas Corre, Andrés A. León Baldelli

2023 **Goustan Bacquaert**, Sorbonne Université
*Behavior of geomaterials for modeling and safety of geotechnical structures*
Jury: Pierre Besuelle, Laurent Stainier, Samuel Forest, Laura de Lorenzis, Jean-Jacques Marigo, François Voldoire, Jeremy Bleyer, Djimédo Kondo, Corrado Maurini, Vinicius Alves-Fernandes, Simon Raude

2023 **David Siedel**, Mines Paris - PSL
*A robust numerical approach for the description of brittle fracture and viscoplastic behavior of fuel rods*
Jury: Riccardo Rossi, Sylvain Drapier, Vanessa Lleras, Djimédo Kondo, Jérémy Bleyer, Jacques Besson, Thomas Helfer, Olivier Fandeur, Samuel Forest, Nicolas Pignet

2022 **Salim Chaibi**, ISAE Toulouse
*Prediction of low-velocity/low-energy impact damages in the latest generation of carbon-epoxy laminated composites*
Jury: Emmanuelle Abisset, Peter Davies, Rodrigue Desmorat, Zoheir Aboura, Jérémy Bleyer, Carlos G. Dávila, Johann Rannou, Christophe Bouvet.

2022 **Paul Bouteiller**, ENPC
*Simulation of laminate composite failure using stress-based layerwise plate models*
Jury: Véronique Lazarus, Federica Daghia, Corrado Maurini, Johann Rannou, Christophe Bouvet, Fabrice Congourdeau, Jérémy Bleyer, Karam Sab.

2021 **Leyla Mourad**, ENPC-Université Saint-Joseph (Beyrouth)
*Strength-based topology optimization of structures using limit analysis* Jury: Fabrice Gatuingt, Boris Desmorat,Grégoire Allaire, Jérémy Bleyer, Romain Mesnil, Joanna Nseir, Karam Sab, Wassim Raphael.

2021 **Lucille Salha**, ENPC-Université Saint-Joseph (Beyrouth)
*Mesh adaptation and hybridization for efficient stress prediction in a layerwise plate model*
Jury: Toni Sayah, Olivier Polit, Steven Marguet, Jérémy Bleyer, Joanna Bodgi, Karam Sab

2020 **Chadi El Boustani**, ENPC *Innovative optimization-based numerical methods for modeling the non-linear behavior of steel structures* Jury: Habibou Maitournam, Nicolas Moës, Mohammed Hjiaj, Mickaël Abbas, Laurence Davaine, Jérémy Bleyer, Xavier Cespedes, Karam Sab

2019 **Mohammad El Hajj Diab**, IFSTTAR *Analysis of structural robustness : characterization of accidental/exceptional events and of their impacts on infrastructures* Jury: Stéphane Grange, Alan O'Connor, Mohammed Hjiaj, Jérémy Bleyer, Robby Caspeele, Jean-François Demonceau, Cédric Desprez, André Orcesi

2018 **Karol Cascavita**, ENPC
*Hybrid discretization methods for Signorini contact and Bingham flow problems*
Jury: Raphaèle Herbin, Pierre Saramito, Patrick Hild, Miguel Angel Fernandez Varela, Erik Burman, Jérémy Bleyer, Xavier Chateau, Alexandre Ern.

2018 **Hugues Vincent**, ENPC
*Development of a yield design model for 3D reinforced concrete structures*

Jury: Aurelio Muttoni, Samir Maghous, Géry de Saxcé, Jérémy Bleyer, Patrick de Buhan.

2018 **Mingguan Yang**, ENPC
*Stability of reinforced concrete walls under fire conditions by a yield design approach*
Jury: Jean-Marc Franssen, François Buyle-Bodin, Mohammed Hjiaj, Jérémy Bleyer, Duc Toan Pham, Patrick de Buhan.

### Participation to councils or committees

**Elected member** of ENPC Research and Education council
**Elected member** of Laboratoire Navier council
**Member** of the Civil Engineering Department council at ENPC
**Hiring committee** jury member: Sorbonne Université/Polytech Sorbonne, Ecole Polytechnique, ENSTA

### Organization of scientific events

2026 **Co-organizer** of the *FEniCS 2026 Conference*, Paris
2026 **Co-organizer** (with J.S. Hale, J. Hope-Collins and P. Kerfriden) of the mini-symposium *Advances in Automatic Differentiation in Mechanics* at WCCM 2026, Münich
2025 **Co-organizer** (with M. Garcia Alberti and T. Lovas) of the mini-symposium *Digital Twins for Infrastructures and Cities* at DTE & AICOMAS 2025, Paris
2023 **Core member** of the MEALOR II Summer school
since 2021 **Core member** of the GdR MePhy *Mécanique et Physique des Systèmes Complexes*
2020 **Co-organizer** (with J.S. Hale and G. Wells) of the mini-symposium *Developments in automatic code-generation software for computational mechanics* at WCCM-ECCOMAS, Paris (online)
**Animator** of internal laboratory seminars and activities on numerical tools

## Software development & Open science principles

I am strongly involved in the FEniCSx users community. I provide regular help on the users forum and I contribute to the ecosystem via the development of the following **open-source projects**:

- *Numerical tours of Computational Mechanics using FEniCSx* form a set of commented demos oriented towards solid and structural mechanics applications[2].
- `dolfinx_materials`

  Repository: `https://github.com/bleyerj/dolfinx_materials`

  Documentation: `https://bleyerj.github.io/dolfinx_materials/`
- `dolfinx_optim` (formerly `fenics_optim`)

  Repository: `https://github.com/bleyerj/dolfinx_optim`

  Documentation: `https://bleyerj.github.io/dolfinx_optim/`

I am also involved in the development of the `MFrontGenericInterfaceSupport` open-source project lead by Thomas Helfer (CEA).

[2]Formerly, using the legacy FEniCS package at `https://comet-fenics.readthedocs.io/`

## Outreach

- Interview *La construction, un chantier d'avenir pour la mécanique*, 25 mai 2022. CNRS le Journal, Mécanique : dans l'atelier du futur
- Article revue Transitions: Bleyer J., Arquier M., Fliscounakis A., Développement d'outils de calculs innovants dans l'ingénierie de génie civil. Transitions. Les nouvelles Annales des Ponts et Chaussées, 2022, Bâtiments et construction en transition, 2, pp.54-59
- EELISA Innovation Talks/Matinale des Ponts: Digital Twins, March 28$^{th}$ 2023

## Other: Digital Twins for Infrastructures and Cities

*Digital Twins for Complex Infrastructures and Urban Ecosystems* is a project co-funded by the European Health and Digital Executive Agency, HADEA, under the Digital Europe Programme. The project is partnered by four leading European universities in the fields of Civil Engineering, Architecture and Computer Sciences (UPM Madrid, ITU Istanbul, BME Budapest, ENPC Paris). In 2023, I was acting Academic Director of the Executive Master program associated with this project. I was leading the development of the academic curriculum, entry requirements, learning outcomes, etc. I am now member of the Academic Board and in charge of the conference cycle of the master program.