

François Willot¹

École des Mines de Paris, PSL
– Centre for Mathematical Morphology
35 rue St-Honoré, 77300 Fontainebleau
– Centre for Materials P. M. Fourn
21, allée des Marronniers
78000 Versailles, France

francois.willot@minesparis.psl.eu
Tel.: +33 (0)1 64 69 48 07
people.cmm.minesparis.psl.eu/users/willot
ORCID: 0000-0003-1544-6550
IdHAL: francois-willot

Personal details Born 1977 (48 years old). French nationality.

Curriculum

- 2026-on: directeur de recherche, Mines Paris PSL, at the *Centre for Statistics and Images*. Main research topics: Physics-based deep-learning and integral geometry. Modeling of random structures. Physics and mechanics of heterogeneous media. Homogenization. Physics-informed neural networks. Fourier-based numerical methods.
- 2012-on: chargé de recherche and directeur de recherche, *Centre for Materials* (simulation team) and *Centre for Mathematical Morphology, Mines Paris*.
- 2008-2010: tenure-track, *École des Mines de Paris*.
- 2007: Post-doctoral position. *Department for Mechanical Engineering and Applied Mechanics*, University of Pennsylvania.

Education

- 2019: HDR (“Habilitation à diriger des recherches”), *Localization in random media and its effect on the homogenized behavior of materials*, Sorbonne Université.
- 2007: PhD degree, École Polytechnique, in mechanics supervised by P. Ponte and Y.-P. Pellegrini.
- 2003: Diplôme d’études approfondies (research master), École Normale Supérieure de Cachan.
2002: Engineering diploma, École Centrale, Lille. Licence of Mathematics, Lille 3 University.

¹CV generated on August 3, 2026

Research projects

- prAIrie (phD of M. Courtois)
- ADAM – Accelerated Design of Architected Materials. ANR project part of the PEPR DIADEM. 2023-on.
- Project leader French-German ANR/DFG grant (IA for Physics call) “Smile” (2021-2025): Data-driven Stochastic 3D Microstructure modeling for LEarning mechanical properties. Collaboration Univ. of Ulm.
- Other projects include funding from L’Oréal (2019), CEA Gramat (2018), CEA Le Ripault (2018), L’Oréal (2016, 2017), US Air Force (2016), CEA Le Ripault (2014), CERIB (2013), IFPEN (2013), ANR (2012)

Thesis supervision

I have supervised the work of 16 PhD students (I was the thesis director for 9 of them).

- Florian Gilbertas (2025): Impact des gonflements internes sur le comportement mécanique du béton : analyse multi-échelle et effets cinétiques
- Alessandro Allegrezza (2025): Modélisation multi-échelle efficace de la plasticité et de l’endommagement dans les solides amorphes : de la description atomistique à la mécanique mésoscopique émergente
- Martin Courtois (2025): Modèles d’intelligence artificielle générative pour les microstructures des alliages métalliques
- Camille Robin (2023): Caractérisation de l’endommagement de matériaux énergétiques à l’échelle microstructurale.
- Corentin Thouenon (2023): Analyse statistique de l’endommagement sous choc dans des matériaux ductiles.
- Lucas Monteiro Fernandes (2022, held in 2025): Exploration des propriétés mécaniques à rupture par apprentissage automatique et microstructures virtuelles.
- Hugo Launay (2018-2021, held in 2021): Modèles réduits par apprentissage automatique pour l’étude de la nocivité de défauts, Z-ROM Z-learn.
- Élodie Kaeshammer (2017-2021, held in 2021): Étude expérimentale et numérique de la sensibilité de compositions énergétiques : influence de la microstructure et rôle de l’endommagement. Prix de thèse 2023 de l’agence de l’innovation et de défense, see <https://www.youtube.com/watch?v=CN3cXG12vMc>
- François Rabette (2017-2021, held in 2021): Prédiction de la microfissuration par champ de phase et méthode FFT pour les matériaux énergétiques comprimés.

- Laurent Lacourt (2016-2019, held in 2019): Étude numérique de la nocivité des défauts dans les soudures.
- Jean-Baptiste Gasnier (2015-2017, held in 2017): Étude du comportement thermo-mécanique et de l'endommagement d'un matériau énergétique granulaire par méthodes de Fourier.
- Vincent Bortolussi (2014-2016, held in 2016) : Étude expérimentale et numérique de la conductivité de revêtements composites métal-polymère déposés par projection dynamique par gaz froid sur substrat composite à matrice organique.
- Haisheng Wang (2014-2016, held in 2016) : Morphological modelisation and transport properties of mesoporous alumina.
- Enguerrand Couka (2013-2015, held in 2015): Modélisation des propriétés optiques de peintures par microstructures aléatoires et calculs FFT.
- Bassam Abdallah (2013-2015, held in 2015): Analyse morphologique et modélisation pour l'optimisation structurelle d'électrodes.
- Julie Escoda (2010-2012, held in 2012): Modélisation morphologique et micromécanique 3D de matériaux cimentaires.
- Master students internships: Mehran Mohammadi (2023), Victor Ludwig (2022), Louis Lepince (2021), Siyuan Zhang (2019), Jean-Baptiste Gasnier (2014), Andrea Pietrasanta (2013), Andrey Ambos (2013), Amaury Vannier-Moreau (2013), Dario Azzimonti (2012).

Teaching

- 2013-2025: organization of the one-week course in Mines ParisTech, in English “Physics and Mechanics of Random Media”, for PhD students and to students from the “Athens” european university network. The courses include training session using Fourier methods, linear and nonlinear homogenization theory, and models of random structures.
- 2018-2025: one-week course “option ingénierie et dynamique des systèmes complexes” (organized by D. Ryckelynck and É. Hachem).
- 2016-2025: PSL master courses “Dynamique et Mécanique des Structures” (organized by F. Azzouz and S. Johann'es).
- 2021: matériaux et homogénéisation, université d'Évry. 2017-2019: PSL master courses “Énergies” www.psl.eu/formation/master-energie 2014-2021: specialized courses on nanomaterials (organized by J.-F. Hochepped). Course on homogeneisation. 2011-2021: ESIEE engineering school. Courses on MPI code parallelization. 2015: doctoral courses at École des Ponts. Probabilistic modeling in mechanics.

Scientific responsibilities

- Organizer of the international conference CMDS14 in Paris (Continuous Models and Discrete Systems), see <https://doi.org/10.1007/978-3-031-58665-1>
- Organiser with the Univ. of Ulm of the Euromech 632 international conference “Data-driven modeling of porous, composite and polycrystalline microstructures for predicting their mechanical and transport properties”, Ulm, Allemagne
- Main organiser of the 14th international conference “Continuous Models and Discrete Systems” (CMDS 14, Paris)
- Organization of the Euromech symposium “Stochastic & Material Mechanics” (EMMC14, Göteborg, Sweden, 2014, co-chair S. Brisard) and other symposia at EMMC15 (Bruxelles, 2016, co-chair R. Cottureau) et EMMC16 Nantes (2018, co-chair R. Cottureau). Organization of a symposium in Madrid (EMMC17) in 2020.
- Organisation (together with other researchers) of the symposium “Numerical materials” in Lille, CFM (2017). Organization of the colloquium “Comportement Mécanique”, at the conference Matériaux 2014 (Montpellier) and of two colloquia “Endommagement et rupture” and “Matériaux numériques” in Strasbourg (2018). Symposium on “Fourier methods” at ECCOMAS (Crete) in 2015, 2020 (Paris, online due to COVID). Organiser of the Eccomas symposium “FFT methods in Mechanics” (Lisboa, 2024)
- One-week Athens course on FFT methods with KIT in Germany and UGE (2022). Courses available online at <https://media.hal.science/hal-03651763> Courses funded by a French-German doctoral college grant from UFA.
- 2018: organization of the one-week international conference held in honor of D. Jeulin in Oléron (2018), bringing together about 50 researchers (see <https://people.cmm.minesparis.psl.eu/users/willot/ESPRM/>).
- Responsible for the “Mécamat” (scientific association) working groups “Probabilistic approaches in Mechanics of Materials” and “FFT methods in micro-mechanics”. Workshops organized in Reims, 2012; St-Martin d’Hères, 2013; Paris, May 2015; Paris, Dec. 2015; Aussois, 2018; “semaine des GTs” (colloque national en ligne, 2021).
- Editor of the proceedings for the international conference CMDS14, Springer Proceedings in Mathematics & Statistics 457 (2024) 2019: invited editor of *International Journal of Solids and Structures* (Elsevier). 2019: invited editor of *Image Analysis & Stereology* (ISSIA). Editor together with S. Forest of the book “Physics & Mechanics of Random Media: from Morphology to Material Properties. A tribute to Dominique Jeulin’s contributions to science, research and teaching”, Presses des Mines, Paris, 2018. Invited editor for a special issue of “Journal of Mathematics for Industry” on “Shape, Form, and Patterns in Medicine, Biotechnology and Materials Science”

List of publications

See <https://scholar.google.fr/citations?user=Gjv6430AAAAJ&hl=en> (Google scholar, H-index 25), <https://www.scopus.com/authid/detail.uri?authorId=23981490600> (Scopus). Most articles are available online in the HAL repository (see https://hal.archives-ouvertes.fr/search/index/q/*/authIdHal_s/francois-willot) or from my web page <https://people.cmm.minesparis.psl.eu/users/willot/>.