C U R R I C U L U M V I T A E

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Current positions

Oct 2013 – present
CNRS Research Scientist
MINES ParisTech, Centre des Matériaux (Évry, France)
Mechanics and physics of contact and friction, computational mechanics

May 2018 – present
Co-founder and Technical Editor
Journal of Theoretical, Computational and Applied Mechanics (JTCAM)
The first Diamond OA overlay journal in mechanics

Past professional experience

Apr 2012 – Sept 2013
Postdoctoral fellow
MINES ParisTech, Centre des Matériaux (Évry, France)
Topic: coupling discrete dislocation dynamics with the finite element method
Advisers: Georges Cailletaud, Frédéric Feyel

Feb 2011 – Mar 2012
Postdoctoral fellow
EPFL, Computational Solid Mechanics Laboratory (Lausanne, Switzerland)
Topic: Research on the origin of friction (*ERCstg UFO-240332*)
Adviser: Jean-François Molinari

Apr 2006 – Sept 2007
Engineer, Corning Scientific Center (St-Petersburg, Russia)
Subject: optimization of heating and cooling schedules for ceramic structures.

Education

Jul 2022
Executive Education (9 months)
Challenge+, HEC, Jouy-en-Josas, France
Executive education for start-up founders and managers

Nov 2021
Habilitation à Diriger des Recherches (HDR) in Mechanics
Sorbonne University, Paris, France
Thesis: *Mechanics and Physics of Contact Interfaces*
Committee: M.C. Baietto, D. Kondo, S. Stupkiewicz, V. Popov, B. Audoly, B. Roman, S. Forest

Mar 2011
Ph.D. in Mechanics
MINES ParisTech, Centre des Matériaux
Thesis: *Computational contact mechanics: geometry, detection and numerical techniques*
Thesis advisers: Georges Cailletaud, Frédéric Feyel

Jun 2007	**Master of Science in Applied Mechanics (honorable mention)**
Jun 2005	**Bachelor of Science in Applied Mechanics (honorable mention)**
	St Petersburg Polytechnic University, Department of Physics and Mechanics
	MSc thesis: *Continuum damage mechanics: phenomenological description and numerical simulation of damage accumulation in quasi-brittle materials*
	BSc thesis: *Continuum damage mechanics: numerical simulations using coupled approach*
	Theses advisers: Artem S. Semenov, Boris E. Melnikov
Jun 2001	**High School**
	Saint-Petersburg Lyceum of Physics and Mathematics FML 239, Russia
	Alumni: G. Perelman and S. Smirnov (Fields medals 2006, 2010)

Research interests

Solid and fluid mechanics, numerical methods, mechanics and physics of contact and friction, multiscale and multiphysical mechanics of materials, computational tribology, surface roughness, wear, sealing, conductivity, friction, nonlinear dynamics, architected materials, finite and boundary element methods, fast boundary element methods, glaciers and icebergs.

Teaching

Currently taught at MINES Paris – PSL

- *Finite Element Method: a reference tool for scientists and engineers*
  head, lecturer and tutor of a "Special Education" PSL week, since 2023 (30h).
- *Contact Mechanics and Elements of Tribology*
  head, lecturer and tutor, 1 week open master/doctoral course, since 2016 (24-30h).
- *Multiscale Simulations of Materials and Structures*
  lecturer and tutor, 1 week open master/doctoral course, since 2016 (8h).
- *Continuum Solid Mechanics*
  1st year students at MINES Paris, tutor, since 2015 (16h).
- *Nonlinear Computational Mechanics*
  tutor of mini-projects and lecturer*, 2009, since 2014* (2-3h).

Taught in the past at MINES ParisTech

- *Finite Element Method*
  tutor of mini-projects, 2008-2010.
- *Short Course on Contact Mechanics and Tribology*
  tutor of mini-projects and lecturer, Wemesurf network, 2010.
- *Mechanics of Solid Materials*
  tutor of experimental mini-projects, since 2013.
- *Computational Approach to Micromechanical Contacts*
  lecturer and tutor, 1 week special course, 2017.

Taught in the past elsewhere

- *Contact Mechanics and Elements of Tribology*
  lecturer, master course, St Petersburg Polytechnic University, Russia, April 2016 (18h).

Institutional and other responsibilities

• 2018-present	Co-founder, board member & technical editor at JTCAM
• 2021-2023	Member of the CSMA PhD award committee
• 2020	Swedish Research Council, member of the review panel Mechanical Engineering
• 2017-2022	Member of the committee CSMA Juniors, The French Association for Computational Mechanics, junior section (under 40)
• 2013-2018	Organizer of "Club Rama": bimonthly meeting of users of the lab's computer cluster.

Scientific stays

- Visiting scholar, Cornell University, October 2018.
- Guest at Peterhouse, University of Cambridge, February 2017.
- Invited scholar, Computational Solid Mechanics Laboratory, EPFL, Switzerland, (1 month) 2014, (1 month) 2015.
- Invited scholar, TriboLab, Politechnico di Bari, Italy, (1 week) January 2014.
- Visiting student (DAAD program), TU Dresden, Germany, (1 month) December 2004.

External committees

Examinator, Assistant Professor position (Maître de conférence)

- INSA-Lyon, laboratory LaMCoS, Spring 2021
- Sorbonne University, Institut ∂'Alambert, Spring 2023

Examinator/reporter, PhD defense jury

- **Quentin Caradec** "On the modeling and numerical simulation of fretting wear", (reporter, Nov 6, 2023, ENSTA, CEA), PhD adviser: Habibou Maitournam.
- **Ioannis Koureas** Fundamentals of failure in topologically interlocked structures, (reporter, Oct 30, 2023, ETH Zürich, Switzerland)
- **Alexis Hingue** "Study of the crack initiation criticality of the blade-disk connection of turbomachine under fretting-fatigue loading" (reporter, June 28, 2023, INSA Lyon, France) PhD advisers: Daniel Nélias, Thibaut Chaise
- **Libang Hu** "Modelling of adhesive frictional contact problems for soft matters" (reporter, March 10, 2022, University of Evry, France) PhD advisers: Z.Q. Feng, Y. Cong
- **Jacopo Bonari** "Novel Interface Discretisation Methods for Contact Mechanics" (reporter, May 21, 2021, IMT-Lucca, Italy) PhD advisers: M. Paggi & A. Popp
- **Mohit Pundir** "A new view on the fundamentals of shear transfer through cracks in concrete via interface roughness at different scales" (reporter, Feb 5, 2021, EPFL, Switzerland) PhD adviser: G. Anciaux
- **Soha Baydoun** "Investigation of fretting wear of a flat-on-flat 34NiCrMo16 interface: Application and modelling of the contact oxygenation concept" (Nov 12, 2020, École Centrale de Lyon, France) PhD advisers: S. Fouvry, S. Descartes
- **Dimitri Bălăsoiu** "Modelling and simulating the mechanical behavior of ice floes" (Oct 13, 2020, Laboratory Jean Kuntzmann, Université Grenoble Alpes, France) PhD advisers: J. Weiss, S. Labbé

PhD monitoring committee

- **Quentin Caradec** "On the modeling and numerical simulation of fretting wear", (2022, ENSTA, CEA), PhD adviser: Habibou Maitournam.
- **Kofi E. Agode** "Analysis and Modeling of Wear Behavior of Cutting Tools for Hard Superalloys", (2019, 2020, 2021 LEM3, University of Lorraine, France), PhD advisers: C. Wolff, M. Nouari.

Licentiate thesis

- **Francesc Pérez Ràfols** "Modelling and Numerical Analysis of Leakage Through Metal-to-Metal Seals" (April 14, 2016, Luleå University of Technology, Luleå, Sweden), PhD adviser: A. Almqvist.

Master projects

- **Ilyass El Yamani** "Prediction of the service life of the blade-disk assemblies of aircraft engines in fretting-fatigue under complex loads" (2021, master Magis, ENS Paris-Saclay, France), advisers: S. Pommier, Y. Guilhem.
- **Benjamin Paccaud** "Elasto-plastic normal contact between representative rough surfaces" (July 14, 2015, EPFL, Switzerland), adviser: J.F. Molinari.

Organization of conferences, symposia, seminars

- Mini-symposium "Open-Source Software in Mechanics" at the ECCOMAS 2023, Lisbon, Portugal, 3-7 June 2023
- Mini-symposium "Contact Mechanics and Tribology" at the ECCOMAS Young Investigator Conference, Porto, Portugal, 19-21 June 2023.
- 5th CSMA Juniors Workshop at the 15th Colloque CSMA, Giens, France, May 14, 2022.
- PolyCrystal: International workshop on the mechanics of polycristalline materials, Paris, France, 23-25 May 2022.
- Journée en l'honneur de Georges Cailletau "Modélisation et simulation numérique des matériaux", Paris, France, 22 April 2022.
- CSMA-GAMM Junior Workshop, in the framework of WCCM 2020, Paris, France, January 2021
- 3rd CSMA Workshop for young researchers, Giens, France, May 2019
- 2nd CSMA Workshop for young researchers, Gif-sur-Yvette, France, March 2018
- 1st CSMA Workshop for young researchers, Giens, France, May 2017
- Micro/Nanoscale Modelling for Tribology, CECAM-Lorentz Workshop, Leiden, Netherlands, January-February 2017
- Alan Needleman 70s Symposium, Ecole des Mines, Paris, France, August 2014

Review activities

Journals (170+):
Tribology Letters (13), Physical Review E (13), International Journal of Solids and Structures (12), Tribology International (12), ASME Journal of Tribology (9), Journal of Engineering Tribology (8), Computer Methods in Applied Mechanics and Engineering (7), Physical Review Letters (7), Meccanica (6), Wear (5), Friction (5), International Journal for Numerical Methods in Engineering (4), Nonlinear Dynamics (4), Journal of the Mechanics and Physics of Solids (4), Physical Review Materials (4), Computational Mechanics (2), Mechanics and Industry (2), Metallurgical Research and Technology (2), Modelling and Simulation in Materials Science and Engineering (2), Surface Review and Letters (2), Physical Review B (2), Advanced Modeling and Simulation in Engineering Sciences (2), Journal of Nuclear Materials (2), Scientific Reports (2), Applied Surface Science (1), SAGE Journal of Mechanical Engineering Science (1), The Journal of Strain Analysis for Engineering Design (1), Tribology Transactions (1), Journal of Engineering Mechanics (1), Biomimetics (1), Zeitschrift fur Angewandte Mathematik und Mechanik (1), Smart Materials and Structures (1), The Journal of Adhesion (1), Materials Research Letters (1), Industrial Lubrication and Tribology (1), Journal of the Mechanical Behavior of Biomedical Materials (1), Computational Materials Science (1), Journal of Mechanics of Materials and Structures (1), Applied Physics (1), ASME Journal of Applied Mechanics (1), International Journal of Applied Mechanics (1), Computers and Structures (1), Journal of Optimization Theory and Applications (1), Journal of Alloys and Compounds (1), Mechanics of Advanced Materials and Structures (1), International Journal of Mechanical Sciences (1), European Journal of Mechanics / A Solids (1)

Professorship reviews:
- Swiss National Science Foundation (2)

Research proposals:
- Swedish Research Council, 2020 (19)
- Hungarian Scientific Research Fund OTKA, 2015 (1)
- NWO, Netherlands Organisation for Scientific Research, 2018 (1)

Conference paper reviews:
- 7th World Tribology Congress 2022 (18)
- 21st International Conference on Wear of Materials 2017 (1)
- IEEE Holm Conference on Electric Contact 2016 (1)

Conference scientific committees (8):
- Contact Mechanics International Symposium (CMIS) 2024, Lyon, France
- CSMA conference, Giens, editions 2015, 2017, 2019, 2022, 2024
- 7th ECCOMAS Young Investigators Conference 2023, Porto, Portugal
- International Conference on Computational Contact Mechanics 2023, Torino, Italy
- Contact Mechanics International Symposium 2020, Chexbres, Switzerland

Supervision

Internship students:

- **Olga Trubienko** (MINES, 2008), Computational Contact Mechanics (master), with G. Cailletaud.
- **Olga Zinovieva** (MINES, 2012), Plasticity induced Roughness (master), with G. Cailletaud.
- **Fadoua Majid** (MINES & Schneider, 2015-2016), Electric contactors (master), with G. Cailletaud & V. Esin.
- **Amine Saidi** (MINES & Safran Tech, 2018-2019), Simulation of fretting wear (master), with S. Basseville & J. Vignollet.
- **Yirun Zou** (MINES, 2019), Machine learning for non-linear dynamics (undegraduate).
- **Paul Beguin** (MINES, 2020), Iceberg-glacier dynamics (master).
- **Florestan Fontaine** (MINES, 2022), Machine learning for rough surfaces (undegraduate), with D. Ryckelynck.
- **Emilie Despinoy** (MINES, 2022), Nano-indentation (master), with H. Proudhon, S. Forest & D. Texier

Co-supervision of graduate students:

- **Julian Durand** (MINES, 2009-2010), Elasto-plastic rough contact, with G. Cailletaud & H. Proudhon.
- **David S. Kammer** (EPFL, 2011-2012), Dynamic sliding, with J.F. Molinari & P. Spijker.
- **Dmitry Tkalich** (MINES & NTNU, Norway, 2012-2016), Wear of drilling tools, with G. Cailletaud, Ch. C. Li, A. Kane.
- **Amandine Sergeant-Boy** (IPGP, Paris, 2013-2016), Glacial earthquakes, with A. Mangeney,
  O. Castelnau, P. Montagner, E. Stutzmann.
- **Matti Lindroos** (TUT & TWC, Finland, 2014), Thermo-mechano-metallurgical wear model, with G. Cailletaud.
- **Basava R. Akula** (MINES & Safran, 2015-2018), Parallel mortar-based contact algorithms, with J. Vignollet.
- **Robin Lethiecq** (MINES & CEA-Leti, 2015-2018), Textile embedded chip on wire, with H. Proudhon, V. Mandrillon.
- **Takahiro Sakimoto** (MINES, 2015-2017), Modeling DWTT for high-strength steels, with J. Besson, Y. Madi.
- **Andrei Shvarts** (MINES, 2015-2018), Fully coupled FE framework for fluid/contact interface, with J. Vignollet.
- **Paolo Cinat** (IMT Lucca, Italy, 3 months stay, 2016), Sealing problems.
- **Aurélien Fouque** (MINES & SUPELEC & Schneider Electric, 2016-2020), Electric arc, with G. Cailletaud, V. Esin, F. Houzé, Ph. Testé.
- **Pauline Bonnet** (IPGP & ENSAM & MINES, 2017-2020), Glacial earthquakes, with A. Mangeney, O. Castelnau, A. Leroyer, P. Queutey.
- **Vikram Phalke** (MINES, 2018-2021), Size effect in single crystal indentation, with S. Forest.
- **Paul Beguin** (MINES, 2020-2023), Thermomechanical contact, with S. Forest & C. Ovalle-Rodas.
- **Amina El Bachari** (MINES-ONERA, 2022-2025), CUT-FEM for topology optimization, with S. Claus, J. Rannou & P. Kerfriden.

Co-supervision of postdoctoral fellows:

- **Ming Liu** (MINES, 2012-2013), Indentation analysis, with H. Proudhon.
- **Ayaovi Dzifa Kudawoo** (MINES, 2012-2013), Computational contact, with G. Cailletaud.
- **Frederick S. Mballa Mballa** (LaSIPS: MINES & SUPELEC, 2013-2015), Electric contact, with G. Cailletaud, H. Proudhon, F. Houzé, S. Noël.

- **Dmitry Tkalich** (MINES, 2016-2017), Microstructural mechancis of cemented tungsten carbides, with G. Cailletaud.
- **Mathias Lamari** (MINES, 2023-2024), Mesoscale Crystal Plasticity, with S. Forest & P. Kerfriden.
- **Soha Baydoun** (MINES, CEA 2023-2024), Fretting wear in cooling of Magnetic Confinement Fusion reactors, with P. Arnaud & S. Fouvry.

Awards and distinctions

- Jean Mandel Award, 2023.
- CNRS Bronze Medal, 2018.
- Prix Paul Caseau for the best PhD thesis in Modeling and Numerical Simulations Academy of Technology and Electricité de France, France, 2012.
- PhD award, The French Computational Structural Mechanics Association (CSMA), 2012.
- Finalist in the selection for the ECCOMAS PhD award, 2012.
- CNRS "Prime d'Encadrement Doctoral et de Recherche", 2016-2020, 2020-2024.
- Government grant for best master theses, St Petersburg, Russia, 2006-2007.
- Leonard Euler's Stipendium (DAAD), Dresden, Germany, 2004-2005.
- Participation in National Olympiad in Strength of Materials, Saransk, Russia, 2003.
- 1st place in St Petersburg Olympiad in Strength of Materials, St Petersburg, Russia, 2003.

• Personal information

Language skills: Russian (mother tongue), English (proficient), French (proficient).
Hobbies: photography ∪ astronomy, chess.
Personal: married and have three wonderful children.

Invited talks

- ⋆ **Modeling & Simulation of Rough Contact and Associated Phenomena**
  LMS, Ecole Polytechnique, Palaiseau, France, Feb 29, 2024.
- **Contact of Rough Elastic & Inelastic Surfaces**
  R&D Michelin, Ladoux, France, Dec 11, 2023.
- **Few Research Stories Around Contact Mechanics and Geometry and some thoughts about the future of scientific research**
  Prix Jean Mandel seminar, École Polytechnique, Palaiseau, France, Oct 25, 2023.
- **Contact of Rough Surfaces and its Sealing Performance**
  TriboNet online seminar, February 24, 2023.
- **"Contact of Rough Surfaces: Theory & Practice of Fluids & Solids"**
  LaMCoS, INSA Lyon, Lyon, France, October 6, 2022.
- **"Scientific Publications"**
  LaMCoS, INSA Lyon, Lyon, France, October 6, 2022.
- **"Mechanics and Physics of Contact Interfaces"**
  James Watt School of Engineering, University of Glasgow, Glasgow, UK, September 20, 2022.
- **"Fluid Flow in Static Contact Interfaces"**
  LSMS/EPFL, Lausanne, Switzerland (virtually), July 19, 2022.
- **"Finite Element Method for Topology Optimization"**
  Journée de l'optimisation topologique, Dijon, France, June 30, 2022.
- **"Nouvelles pratiques de publication ou d'évaluation de la recherche"**
  Round table at the Journée "Les Nouveaux Modèles d'édition", Paris, France, June 28, 2022

- **"Scientific Publications"**
  5th CSMA Juniors Workshop at 15th Colloque CSMA, Giens, France, May 14, 2022.
- **"Zooming in the Contact Interface: Roughness, Contact, and Transport of Heat and Mass"**, IPPT, Warsaw, Poland (virtually), March 28, 2022.
- **"Modeling and simulation of multi-physics contact at the roughness scale"**
  ArcelorMittal Global R&D, Maizières-lès-Metz, France, March 11, 2022.
- **"Zooming in the Contact Interface: Roughness, Contact, and Mass Transport"**
  LMA, Marseille, France, March 8, 2022.
- **"Scientific Publications"**
  Junior Workshop at WCCM-ECCOMAS 2020/2021, Paris, France (virtually), January 8, 2021.
- **"Weakly and strongly coupled simulations of interfacial fluid flow at roughness scale"**
  "Predictive approach of sealing", Maestral lab 50th anniversary, Pont du Garde, Oct 2-3 2019.
- **"Contact Mechanics at the Roughness Scale"**
  VI International Conference on Computational Contact Mechanics, Leibnizhaus Hannover, Germany, July 3-5 2019.
- **"The role of surface roughness in contact and transport phenomena"**
  School of Civil & Environmental Engineering, Cornell University, Ithaca, USA, October 4, 2018.
- **"The role of surface roughness in contact and transport phenomena"**
  Sullivan Park, Corning Inc, Corning, USA, October 2, 2018.
- **"Contact along virtual interfaces: coupling the X-FEM with the mortar discretization"**
  7th GACM Colloquium on Computational Mechanics, Stuttgart, Germany, October 12, 2017.
- **"The role of surface roughness in contact and transport phenomena"**
  Institut Jean le Rond d'Alambert, Paris, France, September 28, 2017.
- **"Micromechanical and transport properties of contact interfaces between rough surfaces"**
  Laboratoire Modélisation et Simulation Multi Echelle (MSME), Université Paris-Est, Marne-la-Vallé, France, April 20, 2017.
- **"Contact and sealing between solids with rough surfaces: numerical approach"**
  Institute of Mechanics, Lomonosov State University, Moscow, Russia, November 21, 2016.
- **"Quelques exemples de dynamique non-linéaire dans la mécanique du contact / frottement"**
  Manifestation du GDR DYNOLIN, DYnamique NOn LINáire, ENSTA ParisTech, Palaiseau, France, October 11, 2016, opening lecture.
- **"Contact between rough surfaces: mechanical and transport phenomena at small scales"**
  ICTAM 2016: 24th International Congress of Theoretical and Applied Mechanics, Montreal, Canada, August 26, 2016.
- **"Contact between rough surfaces: mechanical and transport phenomena"**
  Department of Engineering Sciences and Mathematics, Luleå University of Technology, LTU, Luleå, Sweden, April 13, 2016.
- **"Mechanical contact between rough elastic-plastic solids: scale effect in deformation of asperities"**
  Society of Engineering Science (SES) Technical Meeting, Texas A&M University, USA, October 27, 2015.
- **"Mechanics and physics of rough contact"** [link]
  Fédération Francilienne de Mécanique, Arts et Métiers ParisTech, Paris, France, May 7, 2015.

- **"Computational contact mechanics: engineering approach"**
  Centre de Mise en Forme des Matériaux, MINES ParisTech, Sophia-Antipolis, France, April 21, 2015.
- **"A numerical study of the contact between rough surfaces: mechanical and transport phenomena at small scales."** [abstract]
  Seismology lab, Institut de Physique du Globe de Paris, France, November 25, 2014.
- **"Sealing and percolation of rough surfaces: focus on contact mechanics"** [pdf]
  Workshop "Predictive approach to sealing", Paris, France, October 13, 2014.
- **"Mechanics of contact between rough surfaces"** [pdf]
  Laboratoire de Mécanique des Structures Industrielles (LaMSID), CNRS-EDF-CEA, Clamart, France, March 20, 2014.
- **"Mechanics of elastic and elasto-plastic contact between rough surfaces"** [link]
  TriboLab, Politecnico di Bari, Italy, January 29, 2014.
- **"Computational contact mechanics with finite elements"** [abstract]
  Laboratoire de Mécanique et Technologie (LMT), ENS Cachan, France, December 5, 2013.
- **"Some recent developments in computational contact mechanics"** [abstract]
  Colloquium of the French Computational Structural Mechanics Association (CSMA), Giens, France, May 16, 2013.
- **"Computational Contact Mechanics: geometry, detection and numerical techniques"**
  PhD Olympiad, ECCOMAS Young Investigators Conference, Aveiro, Portugal, April 25, 2012.
- **"Parallel treatment of contact problems"** [abstract]
  Laboratoire de Mécanique des Structures Industrielles (LaMSID), CNRS-EDF-CEA, Clamart, France, June 28, 2011.