

Meet the Authors



Patrick Cordier is professor of physics at the University of Lille (France) and a member of the Institut Universitaire de France. Trained as a materials scientist, he obtained his PhD at the University of Lille on the hydrolytic weakening of quartz. He is particularly interested in the deformation mechanisms of minerals and rocks. His

preferred approaches are transmission electron microscopy, multiscale numerical modeling, and various experimental techniques involving high pressures or nanomechanical testing. He is a Fellow of the Mineralogical Society of America and of the American Geophysical Union.



Vasilije V. Dobrosavljevic is a research scientist and Science Development Lead at the Earth & Planets Laboratory of the Carnegie Institution for Science (USA). He studies physics and chemistry at extreme conditions to understand how atomic-scale processes shape the planetary-scale phenomena that make Earth a dynamic habitable planet. His

research focuses on the core–mantle boundary and its central role in Earth’s evolution, using various in-house and synchrotron-based experimental methods with interdisciplinary collaborations. He previously completed a Carnegie Postdoctoral Fellowship and received a PhD in geophysics from Caltech and a BS in physics from Yale, both in the USA.



Roger Fu is a professor of Earth and planetary science at Harvard University (USA). He received his PhD from MIT (USA) in 2015. He uses and develops paleomagnetic tools to investigate problems in planet formation, planetary geophysics, Earth history, and, most recently, extreme weather events.



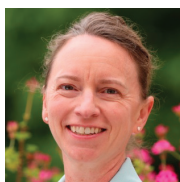
Richard Harrison is a professor of Earth and planetary materials in the Department of Earth Sciences, University of Cambridge (UK). He obtained his PhD in Cambridge in 1996 and, following a series of postdoctoral fellowships at the Institut für Mineralogie, Universität Münster, Germany, took up his current academic post back in Cambridge in

2007. Harrison leads the NanoPaleoMagnetism group, which combines high-resolution 2D and 3D X-ray magnetic imaging with nanotomography, micromagnetic simulations, and machine learning methods to study the fundamental rock magnetic properties of terrestrial and extraterrestrial materials. NanoPaleoMagnetism is a multi-scale, multi-dimensional approach to extract reliable data from complex samples that defy conventional bulk paleomagnetic analysis.



Daniel Heyner is a planetary scientist at Technische Universität Braunschweig (TU-BS) in Germany, specializing in planetary magnetic fields and space plasma interactions. He received his PhD in physics from TU-BS and is Principal Investigator of the MPO-MAG magnetometer on ESA’s and JAXA’s *BepiColombo* mission to Mercury. He also serves as

Co-Investigator on ESA’s *JUICE* mission. His research combines spacecraft data and numerical models to study magnetospheric dynamics and planetary dynamos. He collaborates across disciplines, including nonlinear physics and geophysics.



Jennifer M. Jackson is the William E. Leonhard Professor of Mineral Physics in the Seismological Laboratory at Caltech (USA), where she also serves as Vice Provost for Research. After earning her PhD from the University of Illinois at Urbana-Champaign (USA), she was a Visiting Scientist at the Advanced Photon Source and postdoctoral fellow at the

Carnegie Institution for Science (USA). Her research centers on Earth’s interior, blending perspectives from geodynamics, seismology, and mineral physics, while advancing X-ray scattering techniques to probe materials under extreme conditions. She is also developing balloon-based geophysical methods to probe planetary bodies with dense atmospheres, such as Venus. She is a Fellow of the Mineralogical Society of America. .



Mattia L. Mazzucchelli is a junior lecturer at the University of Lausanne, Switzerland. He received his PhD from the University of Pavia, Italy, and held an Alexander von Humboldt postdoctoral fellowship at the University of Mainz, Germany. His research explores how geomaterials respond to high temperature, pressure, and deformation across

scales. He has developed elastic thermobarometry methods integrating mechanical modeling with Raman spectroscopy and X-ray diffraction to reconstruct metamorphic and diamond-forming conditions. His current work investigates how nonhydrostatic stress influences chemical equilibria in deforming systems by combining atomistic simulations and continuum mechanics.



Kenji Ohta is a professor in the Department of Earth and Planetary Sciences at the Institute of Science Tokyo, Japan. His research focuses on high-pressure mineral physics, particularly using diamond-anvil cell techniques. He has developed and applied methods to measure the electrical and thermal conductivity (transport properties) of deep Earth

and planetary materials under extreme conditions. He actively supervises postdoctoral researchers and students, manages his laboratory, and has conducted numerous experiments at SPring-8, a synchrotron facility in Japan. His work contributes to understanding the thermal and compositional evolution of planetary interiors, including Earth’s and Mars’ cores, through experimental geophysics.



Anne Pommier investigates the composition and evolution of terrestrial planets and moons by performing geophysical experiments at high pressure and temperature. A special research interest involves the characterization of the transport properties within mantles and cores. She received a degree in engineering and a PhD in

experimental petrology at the CNRS-University of Orléans, France, before moving to the USA. After postdoctoral experiences at MIT and ASU, she joined the faculty at the University of California, San Diego and obtained tenure in 2020. She has been a staff scientist at the Earth and Planets Laboratory, Carnegie Institution for Science (USA) since 2021.



Eva Scheller is an assistant professor in the Department of Earth and Planetary Science at Stanford University (USA). She works on spectroscopy and geochemistry of minerals and other materials in the laboratory and on spacecraft missions to other planets. She has collaborated on infrared reflectance spectrometers in Mars and

Earth orbit, the Raman spectrometer, SHERLOC, on the *Perseverance* rover, and the mass spectrometer, SAM, on the *Curiosity* rover. Her academic background is in solid-state spectroscopy, isotope geochemistry, remote sensing, and planetary sciences, with a PhD from Caltech (USA) focused on aqueous minerals in the context of terrestrial planet climates and habitability.



Kate Selway is Managing Director of the geophysics consultancy Vox Geophysics and adjunct associate professor at the University of Tasmania (Australia). She received her PhD from the University of Adelaide (Australia). Kate's expertise is in magnetotellurics and she is particularly interested in using geophysics to understand the composition and evolution of the lithosphere. She does this by combining geophysics, experimental mineral physics, geology, and geochemistry, with particular applications to constraining mantle viscosity for glacial isostatic adjustment modeling and to understanding economic mineral systems.



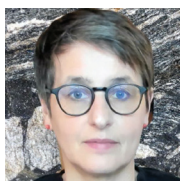
Natalia Solomatova leads a team of scientists and engineers at Arca (Canada), advancing strategies for geological carbon capture. Prior to Arca, she helped develop Raman instruments and measurement protocols at Miraterra (Canada). Her academic background is in mineral physics, with a PhD from Caltech (USA) focused on spin transitions in iron-bearing lower mantle phases and the stability of high-pressure carbonates in the context of Earth's deep carbon cycle. Natalia's work has involved utilizing spectroscopy to characterize the optical, physical, and elastic properties of minerals. She now applies this expertise to carbon sequestration in ultramafic rocks and the design of field-deployable technologies.

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Michael Tauber is a physical chemist who has applied optical and magnetic resonance spectroscopy to a variety of systems. The topics have included fundamentals of solvent/solute interactions (solvated electrons during his graduate research at UC Berkeley), photophysics of organic molecules (e.g., carotenoids in solution, aggregates, or within bird feathers), and most recently, sulfide-bearing minerals and rocks. Although these topics are diverse, recurring themes include transfer of charge and energy, and Raman spectroscopy. He has been a faculty member at UC San Diego (USA) since 2006, and a visiting scientist at the Earth and Planets Laboratory, Carnegie Institution for Science (USA) since 2024.

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Claudia Trepmann is a geologist interested in deformation and transformation of rocks at all scales. Her research focuses on episodic deformation at transient stresses recorded by metamorphic rocks and on the development of shock effects in impactites. She combines field-based observations with microanalytical techniques and rock deformation experiments. She is professor in the Department of Earth and Environmental Sciences of the Ludwig-Maximilians-University, Munich, Germany, received her PhD at the Ruhr-University Bochum, Germany, and was a postdoctoral fellow at the University of New Brunswick, Canada.

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Samantha Trumbo is an assistant professor in the Department of Astronomy & Astrophysics at the University of California, San Diego (USA). Her group uses spectra from ground- and space-based observatories and spacecraft data to study the chemistry of moons and dwarf planets in the outer Solar System in the context of their formation, evolution, and surface processes. She is a member of the Mapping Imaging Spectrometer for Europa (MISE) science team on NASA's recently launched *Europa Clipper* mission. Previously, she obtained her PhD in planetary science from Caltech (USA) and was a Heising-Simons 51 Pegasi b postdoctoral fellow at Cornell University (USA).

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