Clara Maurel, PhD

CEREGE – Technopôle de l'Arbois BP80 – 13545 Aix-en-Provence, France
cmaurel@cerege.fr – www.cmaurel.weebly.com

Education

Sept 2016 - June 2021	**PhD in Planetary Sciences** Massachusetts Institute of Technology, USA
Sept 2012 - Aug 2016	**BSc and MSc in aeronautics and aerospace engineering** Institut Supérieur de l'Aéronautique et de l'Espace (ISAE-Supaéro), France

Professional appointments

Nov 2023 - present	**CNES Postdoctoral Fellow –** *CEREGE (France)* Magnetic history of the solar nebula recorded by hydrated extraterrestrial samples
Sept 2023 - present	**Member of the NASA-ESA Mars Sample Return Measurement Definition Team** Establish the preliminary characterizations needed at Martial samples arrival
Nov 2021 - Nov 2023	**Marie Sklodowska-Curie Postdoctoral Fellow –** *CEREGE (France)* Fundamentals and application in magnetism of extraterrestrial samples
2017 - 2021	**Collaborator of the NASA Psyche mission**
Sept 2016 - June 2021	**PhD candidate** – *MIT (USA) with Prof. B. P. Weiss* Magnetic properties of iron meteorites and their parent bodies
Apr 2016 - Aug 2016	**Research assistant** – *OCA (France) with Dr. P. Michel* Lander/regolith interactions on asteroids
Feb 2015 - Aug 2015	**Research assistant** – *University of Maryland (USA) with Prof. D.C. Richardson* Motion-driven size sorting in asteroids regolith
Oct 2014 - Feb 2015	**Research assistant** – *University of Belgrade (Serbia) with Dr. B. Novakovic* Dynamical and orbital evolution of the Hoffmeister asteroid family

Honors and awards

2023	Appointed member of the NASA-ESA Mars Sample Return Measurement Definition Team
2022	Prix d'accueil jeune chercheur de la ville de Marseille (2 k€)
	Recognized among the best reviewers in 2022 for the journal *Icarus*
	AGU-GPE postdoctoral travel award
	Meteoritical Society early-career travel award
2021	Nininger Meteorite Award for student achievement in the meteoritical sciences (2 k$)
2019	Stephen E. Dwornik Award for the Best Graduate Oral Presentation (LPSC 2019)
2018	Zonta International Amelia Earhart Fellowship Award (10 k$)
2017	AGU Outstanding Student Paper Award (AGU 2017)
	Whiteman Fellowship Award (75 k$)
	Appointed collaborator of the NASA Psyche mission
	Mayoux-Dauriac Award, ISAE-Supaéro (3 k€)
2016	MIT Presidential Graduate Fellowship Award

Successful proposals

2023	AAPG ANR 2023: project *IronMet (*CEREGE, MNHN, U. Rouen-Normandie; 520 k€) *PI: J. Gattacceca; role: major contributor*
	CNES Postdoctoral Fellowship (2 years funding; 140 k€)
	Hayabusa 2 returned samples: 2 requests granted
2022	MSc student stipend funding, Aix-Marseille Université (3 k€)
2021-2023	SOLEIL Synchrotron time request (two 92-hour campaigns granted)
2021	Marie Sklodowska-Curie Postdoctoral Fellowship (2 years funding; 190 k€)
2019	Student Research Fund to attend the Lehigh Microscopy School
2018	Student Research Fund to visit collaborators at the Smithsonian Institution MIT-France Science and Technology Initiatives Grant (17 k$) MIT-UK Science and Technology Initiatives Grant (24 k$)
2016-2019	ALS Synchrotron time request (five 48-hour campaigns granted)

Invited Conference Presentations

2023	**C. Maurel** (2023) Magnetic fields in the early solar system: insights from meteorite paleomagnetism, Core2Disk International Workshop, Institut Pascal, Paris, France
2022	**C. Maurel**, J. Gattacceca (2022) Calibration of non-heating methods for paleointensity estimation from chemical remanent magnetization, abstract GP35A-01, AGU Fall Meeting, Chicago IL, USA
2021	**C. Maurel**, J. Gattacceca, E. Clavé, M. Uehara, T. J. McCoy, B. P. Weiss (2021) Bridging the gap between spacecraft magnetometry investigations and laboratory experiments using iron meteorite, IRM Conference on Rock Magnetism, online
2019	**C. Maurel**, J. F. J. Bryson, B. P. Weiss, R. V. Chopdekar, A. Scholl (2019) Studying ancient asteroid magnetic fields using X-ray photoemission electron microscopy, ALS User Meeting Workshop, Berkeley CA, USA
2018	**C. Maurel**, J. F. J. Bryson, C. I. O. Nichols, B. P. Weiss (2018) What have we learned from the paleomagnetism of iron meteorites?, abstract U12B-02, AGU Fall Meeting, Washington DC, USA

Invited Seminar Presentations

2023	CRPG Nancy, Planetary Science Seminar
2021	Center for Meteorite Studies, Planetary Science Seminar
	University of California Santa Cruz, IGPP Seminar Series
	NASA Jet Propulsion Laboratory, Planetary Science Seminar
	Museum National d'Histoire Naturelle, COS-MIN Seminar
2020	California Institute of Technology, Geoclub Seminar

Publications

2024	**C. Maurel** and J. Gattacceca (2024) A 4,565-My-old record of the solar nebula field, *Proceedings of the National Academy of Science,* 121, e2312802121, doi: 10.1073/pnas.2312802121
	C. Maurel, J. Gattacceca, M. Uehara (2024) Hayabusa 2 returned samples reveal a weak to null magnetic field during aqueous alteration of Ryugu's parent body, *Earth and Planetary Science Letters* 627C, 118559, doi: 10.1016/j.epsl.2023.118559
2023	**C. Maurel** and J. Gattacceca (2023) Estimating paleointensities from chemical remanent

magnetizations of magnetite using non-heating methods, *Journal of Geophysical Research: Planets* 128, e2023JE007779, doi: 10.1029/2023JE007779

B. P. Weiss, J M. G. Merayo, […] **C. Maurel**, et al. (2023) The Psyche magnetometry investigation, *Space Science Reviews* 219, 22, doi: 10.1007/s11214-023-00965-z

2022 E. N. Mansbach, J. Shah, W. Williams, **C. Maurel**, J. F. J. Bryson, B. P. Weiss (2022) Size ranges of magnetic domain states in tetrataenite, *Geochemistry Geophysics Geosystems* 23, e2022GC010631, doi: 10.1029/2022GC010631

T. J. McCoy, S. D. Dibb, P. N. Peplowski, **C. Maurel**, H. L. Bercovici, et al. (2022) Deciphering redox state for a metal-rich world, *Space Science Reviews* 218, 6, doi: 10.1007/s11214-022-00872-9

2021 **C. Maurel**, J. F. J. Bryson, J. Shah, R. J. Chopdekar, B. P. Weiss (2021) A long-lived planetesimal dynamo powered by core crystallization, *Geophysical Research Letters* 48*, e2020GL091917*, doi: 10.1029/2020GL091917

2020 E. Clavé, **C. Maurel**, E. A. Lima, J. Shah, E. N. Mansbach, M. Uehara, B. P. Weiss (2020) A portable magnetometer for magnetic measurements of meter-sized meteorites, *Geochemistry Geophysics Geosystems* 21, e2020GC009266, doi: 10.1029/2020GC009266

C. Maurel, J. F. J. Bryson, R. J. Lyons, M. R. Ball, R. V. Chopdekar, A. Scholl, F. J. Ciesla, W. F. Bottke, B. P. Weiss (2020) Evidence for a partially differentiated iron-meteorite parent body, *Science Advances* 6, eaba1303, doi: 10.1126/sciadv.aba1303

C. Maurel, P. Michel, J. M. Owen, R. P. Binzel, M. Bruck-Syal, G. Libourel (2020) Simulations of high-velocity impacts on metal in preparation for the Psyche mission, *Icarus* 338, 113505, doi: 10.1016/j.icarus.2019.113505

2019 **C. Maurel**, B. P. Weiss, J. F. J. Bryson (2019) Meteorite cloudy zone formation as a quantitative indicator of paleomagnetic field intensities and cooling rates on planetesimals, *Earth and Planetary Science Letters* 513, 166–175, doi: 10.1016/j.epsl.2019.02.027

2018 F. Thuillet, P. Michel, **C. Maurel**, R.-L. Ballouz, Y. Zhang, D. C. Richardson, J. Biele, E. Tastumi, S. Sugita (2018) Numerical modeling of lander interaction with a low-gravity asteroid regolith surface. Application to MASCOT onboard Hayabusa2, *Astronomy and Astrophysics* 615:A4, doi: 10.1051/0004-6361/201832779

C. Maurel, P. Michel, J. Biele, R.-L. Ballouz, F. Thuillet (2018) Numerical simulations of the contact between the lander MASCOT and a regolith-covered surface, *Advances in Space Research* 62, 2099–2124, doi: 10.1016/j.asr.2017.05.029

2017 **C. Maurel**, R.-L. Ballouz, D.C. Richardson, P. Michel, S.R. Schwartz (2017) Numerical simulations of oscillation-driven regolith motion: Brazil nut effect, *Monthly Notices of the Royal Astronomical Society* 464, 2866–2881, doi: 10.1093/mnras/stw2641

Y. Zhang, D.C. Richardson, O.S. Barnouin, **C. Maurel**, P. Michel, S.R. Schwartz, R.-L. Ballouz, L.A.M. Benner, S.P. Naidu, J. Li (2017) Creep stability of the proposed AIDA mission target 65803 Didymos: I. Discrete cohesionless granular physics model, *Icarus* 294, 98–123, doi: 10.1016/j.icarus.2017.04.027

2016 B. Novakovic, G. Tsirvoulis, S. Maro, V. Došovic, **C. Maurel** (2016) Secular evolution of asteroid families: the role of Ceres, *Proceedings IAU Symposium* 318, 46–54, doi: 10.1017/S1743921315008595

2015 B. Novakovic, **C. Maurel**, G. Tsirvoulis, Z. Kneževic (2015) Asteroid secular dynamics: Ceres' fingerprint identified, *Astrophysical Journal Letters* 807:L5, doi: 10.1088/20418205/807/1/L5

Communication and Outreach

2024 Maurel & Gattacceca (2024) featured in the France Culture podcast Avec Sciences and Le Figaro Sciences

2022 - 2023	Led several activities around meteorites for middle school students, at the “Fête de la Science de l’Arbois” for primary school students and at the European Researcher Night
2021	Interview for the science outreach Youtube channel “Space Y Chile”
	PhD defense featured in a rap song of the artist Baba Brinkman
2020	Clavé, Maurel et al. (2020) featured in the EOS News article “Measuring massive magnetic meteorites”, DOI: 10.1029/2020EO151292
	Speaker at the MIT Alumni event “EAPS Explore the Solar System”
	Maurel et al. (2020) featured in the MIT News article “An origin story for a family of oddball meteorites” and in the Berkeley Lab News “X-rays recount origin of oddball meteorites”
	Interviewed as ISAE-Supaéro alumni for the “Paroles d’alumni” video series
2019	Speaker at the EAPS short lecture series: “Timing the magnetic activity of protoplanets”
	Wrote articles for the MIT Graduate Blog: “Bring your own bowl”, “The art of microwaving food”, “It’s not just about the degree”
	Led hands-on activities around meteorites at the Cambridge Science Festival
	Wrote articles about my research and field work in EAPS News: “Hunting meteorites in the Atacama” and “Journey to mini metal worlds”
2018	Speaker at the MIT-EAPS student seminar: “We’ve just landed on an asteroid!”
2017	Speaker at the MIT-EAPS Planetary Lunch Seminars: “Regolith motion on asteroids”

Community Involvement

	Reviewer for Nat. Astro. (1), Icarus (2), MNRAS (2), TJSASS (1), GRL (1), Nat. Comm. Earth Env. (1), Nat. Comm. (1), JGR Planets (1), Planet. Sci. J. (1)
2022 - 2023	Member of the Outreach Committee, Institut d’Etablissement *Origines*, Aix-Marseille Univ.
2021	Contributor to the open-source software *pmagpy* (python) for paleomagnetic analyses
	Chair of the Graduate Student Advisory Group for the Planetary Science Hiring Committee
2017 - 2020	Member of the organizing committee for the MIT-EAPS Planetary Lunch Seminars

Teaching and Supervision

2023	Supervisor of a Master 2 research internship (student: G. Ségué)
2022	Co-supervisor of a first-year engineering school internship (student: A. Chapiron)
	Co-supervisor of Master 1 research internships (students: M. Darnault, F. Dumas)
2020	Lecturer for a graduate class entitled “Meteorites and their parent bodies” (1.5 hours)
2019	Co-supervisor of a MSc thesis project (student: E. Clavé)
	Teaching assistant for graduate level course “Essentials of Planetary Science”
	Lecturer for a graduate class entitled “Meteorites and their parent bodies” (3 hours)

Recent Conference Presentations

2023	C. Maurel, J. Gattacceca, M. Uehara (2023) New view on the paleomagnetic record of samples from asteroid Ryugu, abstract GP24A-02, AGU Fall Meeting, Los Angeles
	C. Maurel, J. Gattacceca, M. Uehara (2023) New view on the paleomagnetic record of samples from asteroid Ryugu, Hayabusa 2023 Symposium, Kanagawa
	J. Gattacceca and C. Maurel (2023) Calibration des méthodes de détermination de paléointensités dans le cas d’une aimantation rémanente chimique, RST, Rennes

2022 C. Maurel and J. Gattacceca (2022) A 4.565-Ga record of the solar nebula field, abstract GP36A-05, AGU Fall Meeting, Chicago

E. N. Mansbach, J. Shah, W. Williams, C. Maurel, J. F. J. Bryson, B. P. Weiss (2022) Size ranges of magnetic domain states in tetrataenite and implications for past and future paleomagnetic studies, abstract GP32A-0347, AGU Fall Meeting, Chicago

C. Maurel, J. Gattacceca, J.-A. Barrat (2022) *Paleomagnetic investigation of the oldest-known andesite Erg Chech 002*, abstract 6053, Conference of the Meteoritical Society, Glasgow

C. Maurel, J. Gattacceca, J.-A. Barrat (2022) *Paleomagnetic investigation of the oldest-known andesite Erg Chech 002*, Quadrennial meeting of the Programme National de Planétologie, Lyon

2021 C. Maurel, J. Gattacceca, J. F. J. Bryson, C. I. O. Nichols, B. P. Weiss (2021) Paleomagnetism of iron meteorites: recent advances and new questions, abstract 1166, 52th Lunar Planet. Sci. Conf., online

2020 C. Maurel, J. F. J. Bryson, J. Shah, R. V. Chopdekar, B. P. Weiss (2020) A long-lived planetesimal dynamo powered by core crystallization, abstract GP015-06, AGU Fall Meeting, online

E. N. Mansbach, C. Maurel, J. Shah, J. F. J. Bryson, B. P. Weiss (2020) Plessite as a recorder of past magnetic fields on planetesimals, abstract GP001-05, AGU Fall Meeting, online

C. Maurel, J. F. J. Bryson, J. Shah, R. V. Chopdekar, B. P. Weiss (2020) Protracted core accretion on a large planetesimal constrained by the paleomagnetism of the IIE iron meteorites, abstract 1409, 51th Lunar Planet. Sci. Conf., The Woodlands [abstract only]

2019 C. Maurel, J. F.J. Bryson, B. P. Weiss, R. J. Lyons, M. R. Ball, R. V. Chopdekar, A. Scholl (2019) Partial differentiation and magnetic history of the IIE iron meteorite parent body, abstract 2049, 50th Lunar Planet. Sci. Conf., The Woodlands

2018 C. Maurel, B.P. Weiss, J.F.J. Bryson, L.T. Elkins-Tanton, T.J. McCoy, C.T. Russell (2018) Modeling the formation of the cloudy zone in iron and iron-rich meteorites to better constrain their paleointensity estimates, abstract GP11A-03, AGU Fall Meeting, Washington DC

C. Maurel, P. Michel, J. M. Owen (2018) Numerical simulations of high-velocity impacts in metallic targets, 9th Workshop on Catastrophic Disruption in the Solar System, Kobe

C. Maurel, J.F.J. Bryson, B.P. Weiss, A. Scholl (2018) Paleomagnetic evidence for a layered partially differentiated iron-meteorite parent body, abstract 1171, 49th Lunar Planet. Sci. Conf., The Woodlands