

PERSONAL INFORMATION

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EDUCATION

1999 – 2003 PhD; Department of Physics and Astronomy, University of Turku; Finland
1995 – 1999 MSc; Department of Physics and Astronomy, University of Amsterdam; Netherlands

CURRENT POSITION(S)

2024 – Associate Professor II. Centre for Planetary Habitability, University of Oslo; Norway
2021 – Research Fellow. Research Centre for Astronomy and Earth Sciences (CSFK); Hungary

PREVIOUS POSITIONS

2014 – 2020 Associate Professor. Earth Life Science Institute (ELSI); Japan
Key achievement: Fusion of dynamical simulations with cosmochemistry. I built and maintained a small computer cluster for me and my students' private usage. My contributions at ELSI beyond the scientific realm were a major part of my career development. I a) set up scientific presentations, discussions, interactions and workshops between world renowned scientists; b) opened our work to secondary school children from Japan, Vietnam and China; c) introduced an open culture of conducting science and public outreach; d) facilitated discussions between management and employees, and e) ensured staff could work from home during the first wave of COVID.

2011 – 2014 Visiting Scholar. Academia Sinica Institute for Astronomy and Astrophysics; Taiwan
Key achievement: The simulated Oort cloud to Scattered Disc population ratio is 13, in accordance with observations from long-period and short-period comets. During this time I began to supervise students. Specifically, I supervised a summer student from Malaysia in 2012 and one from Korea in 2013. I co-organised my first workshop and I began to operate my own Condor computer cluster.

2008 – 2011 Helmholtz Alliance Fellow. Observatoire de la Côte d'Azur; France
Key achievement: The late migration of the giant planets had to occur through mutual scattering rather than the clearing of nearby small bodies.

2007 – 2008 Postdoctoral scientist. University of Toronto at Scarborough; Canada
Key achievement: The Oort comet cloud had to form in two stages.

2005 – 2007 National Fellow. Canadian Institute for Theoretical Astrophysics (CITA); Canada
Key achievement: The origin of the distant dwarf planet Sedna is the result of a close stellar encounter while the Sun was in its birth cluster.

2004 – 2005 Postdoctoral scientist. Queen's University; Canada
2003 – 2004 Postdoctoral scientist. York University; Canada
Key achievement: All the terrestrial planets have temporary co-orbital asteroids.

FELLOWSHIPS AND AWARDS

2005 – 2007 CITA National Fellowship, Queen's University; Canada
2002 CIMO Fellowship, Tuorla Observatory; Finland
2002 Yrjö Väisälä foundation fellowship, Tuorla Observatory; Finland

SUPERVISION OF SUMMER AND GRADUATE STUDENTS

2023 – 2024 Supervision of MSc student (**Mitchell Yzer**)
University of Amsterdam; Netherlands

2022 – 2023 Supervision of MSc student (**Anuja Raorane**)
Indian Institute of Science Education and Research, Pune; India

2021 – 2024 Co-supervision of a PhD student (**Petra Hatalova**)
University of Oslo; Norway

2016 – 2024 3 PhD, 1 MSc (**Jason Woo** PhD, **Jingyi Mah** PhD, **Emily Wong** MSc + PhD)
Earth Life Science Institute, Tokyo Institute of Technology; Japan

2012 – 2013 Summer students (**Jingyi Mah & Yoonyoung Kim**)

TEACHING ACTIVITIES

- 2017 – 2018 Introduction to Planetary Science; Tokyo Institute of Technology; Japan
2020 – From Planets to Cells; Indian Institute for Science Education and Research, Pune; India
2023 – 2023 Impromptu lecture on Planetary Habitability at the PRL, Ahmedabad; India

INVITED CONFERENCE PRESENTATIONS

1. Molecular Origins of Life Munich (2021; Munich, DE)
2. The Origins Of Life: A Public Dialog to Discover New Solutions to Old Questions (2018; Atlanta, USA)
3. Reading Terrestrial Planet Evolution in Isotopes and Element Measurements (2018; Bern, CH)
4. Asia Oceania Geosciences Society (AOGS) Annual meeting 2017 (Singapore)
5. Rencontres du Vietnam - Search for life: from early Earth to exoplanets (2016; Quy Nhon, VN)
6. International Workshop on Comets (2016; Paris, FR)
7. Comets and the Late Heavy Bombardment (2014; Gdynia, PL)
8. 5th Subaru conference: Exoplanets and disks (2013; Kona, HI, US)
9. 1st COSPAR Symposium (2013; Bangkok, TH)
10. Dynamics and Formation of the Oort cloud (2011; Lille, FR)
11. Quantifying the Martian geological reservoirs (2011; Bern, CH)

ORGANISATION OF SCIENTIFIC MEETINGS

- 2022 Rencontres du Viet Nam – Planets: The Young Solar system; Vietnam (chair) (cancelled)
2018 Puzzles and Solutions in Astrobiology; ELSI, Japan (chair)
2016 Before the Moon; ELSI, Japan (chair)
2016 The 4th ELSI Symposium; ELSI, Japan (co-chair)
2013 The First 100 million years of the Solar System; Taiwan (co-chair)

INSTITUTIONAL RESPONSIBILITIES

- 2022 – Seminar organiser; Konkoly Observatory, Hungary
2018 – 2020 Member of Science Steering Committee; ELSI, Japan
2017 – 2020 Member of Research Interaction Committee; ELSI, Japan
2015 – 2018 Member of the Public Relations Committee; ELSI, Japan
2015 – 2018 Institute Librarian; ELSI, Japan
2014 – 2020 Leader of deployment and maintenance of computational infrastructure; ELSI, Japan

REVIEWING ACTIVITIES

- 2009 Review panel member, NASA Outer Planets Research; USA
2007 – Reviewer for research grants submitted to: NASA (USA), FWF (Austria), FONDECYT (Chile), Subaru Telescope (Japan)
2003 – Reviewer for international journals: Astronomy & Astrophysics, Monthly Notices of the Royal Astronomical Society, The Astrophysical Journal, The Astronomical Journal, Icarus, Nature, Nature Astronomy, Nature Geosciences, Earth and Planetary Sciences Letters, Celestial Mechanics and Dynamical Astronomy, The Planetary Science Journal, Geophysical Research Letters.

MEMBERSHIPS OF SCIENTIFIC SOCIETIES

- 2021 – Meteoritical Society
2018 – European Geochemical Society
2004 – 2017 Division of Planetary Sciences, American Astronomical Society

COLLABORATIONS

Primary: **Audrey Bouvier** (University of Bayreuth), **Mario Fischer-Gödde** (University of Cologne), **Simon Grimm** (ETH Zürich), **Man Hoi Lee** (University of Hong Kong), **Tommy Lau** (LMU), **Soko Matsumura** (University of Dundee), **Stephen Mojzsis** (CSFK), **Stephanie Werner** (University of Oslo).
Secondary: **Nicolas Dauphas** (University of Chicago), **Vera Dobos** (University of Groningen), **Shigeru Ida** (ELSI), **Kristina Kislyakova** (University of Vienna), **Alessandro Morbidelli** (College de France), **Gabriele**

Pichierri (Caltech), Joachim Stadel (University of Zürich), Yogita Kadlag (PRL).

PAST GRANT AWARDS

JSPS Shingakujutsu Kobo (JPN); JSPS Fund for International Collaboration (JPN); JSPS Kakenhi Grand-in-aid for Young Researchers (JPN); Daiwa Anglo-Japanese foundation (GBR); NINS Astrobiology consortium Personal Grant (JPN)

OUTREACH ACTIVITIES

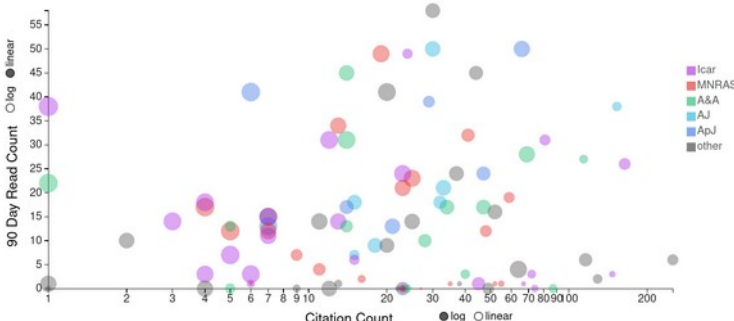
In Japan I have: a) hosted secondary school children (lectures and mutual exercises) from China and Vietnam, b) gave in-person lectures to the public about the origin of the solar system, c) I spoke at several Super Science High School Student fairs, d) I manned booths at conferences, at fundraising events, and at the annual Tokyo Tech Open Day. I also gave a lecture at the Denver Museum of Nature and Science in 2018.

CAREER BREAKS

10/2020 – 08/2021 Brexit: my wife is a UK citizen and we had to return to the EU before 31/12/2020 to avoid Brexit-related visa/work permit problems.

PUBLICATIONS SUMMARY

I have published 99 peer-reviewed manuscripts, of which 42% are as a first author; this increases to 158 when non-peer-reviewed publications are considered. I have an h-index of 33 (peer-reviewed works only; source: NASA ADS). The figure shows a plot of number of reads in the last 90 days vs citation count with symbol size being proportional to time (source: NASA ADS). The journals include Nature, Science, Nature Astronomy, Nature Geosciences (news & views), Monthly Notices of the Royal Astronomical Society, The Astronomical Journal, The Astrophysical Journal, Astronomy & Astrophysics, Celestial Mechanics and Dynamical Astronomy, Icarus, Earth and Planetary Sciences Letters, and Geophysical Research Letters.



SCIENTIFIC DISCOVERIES IN THE LAST DECADE

- The mass in leftover planetesimals after the Moon's formation is extremely low, posing a significant problem for terrestrial planet formation models.
- Jupiter could not form with pebble accretion unless the protosolar disc had a ring-like structure.
- Mars likely formed in or near the asteroid belt, and its feeding zone was different from Earth's.
- The Earth's late accretion must have consisted almost entirely of a single large impact rather than an assumed constant stream of planetesimals. This event kick-started origins of life on our planet.
- Mars must have suffered a colossal impact in order to explain the abundances of highly siderophile elements in its mantle. For both Earth and Mars these colossal impacts occurred at ca. 4480 Ma.
- The Jupiter-Family comets and the Long-Period comets share the same origin. Both the Oort comet cloud and trans-Neptunian planetesimal populations can be explained from a single population that was stirred during an episode of giant planet migration.

SUPERCOMPUTING ALLOCATIONS

2022 – 2023 PRACE-ICIE Call #7 December 2021 (51840 node hours \equiv 6 635 520 CPU hours)
2022 – 2023 EuroHPC Regular Access JU November 2021 (1 700 000 GPU hours)
2023 – 2024 PRACE-ICIE Call #11 December 2022 (69120 node hours \equiv 8 847 360 CPU hours)
2023 – 2024 EuroHPC Regular Access JU November 2022 (2 300 000 GPU hours)
2024 – 2025 EuroHPC Regular Access JU November 2023 (40320 node hours \equiv 5 160 960 CPU hours)
2024 – 2025 Komondor CPU (HU) (774 600 CPU hours)

CONTRIBUTIONS TO EARLY CAREERS OF RESEARCHERS

In 2012 I began supervising summer students, followed by full-time graduate student supervision in 2016. At that time ELSI was not yet ready to host students, but its faculty were so impressed when Jason Woo visited that they accepted him because I could help him reach his potential. I recruited both Jason Woo and Jingyi

Mah from the University of Hong Kong. The fusion of cosmochemistry and dynamics was in its infancy, and their theses focused on further developing this interdisciplinary method. I taught them basic cosmochemistry and we discussed their projects and necessary tasks. We successfully applied this interdisciplinary approach to several planet formation models. They are both active post-docs in the EU. Emily Wong approached me while I visited the University of Hong Kong in 2017. She became my MSc student in autumn 2018 and transitioned to PhD in April 2020 after obtaining a JSPS fellowship. We are now the global leading scientists on crater chronology in the outer solar system. In 2021 I accepted to co-supervise Petra Hatalova at the University of Oslo to study exoplanet formation and internal composition. In August 2022 I took on a master student from the Indian Institute for Science Education and Research, Pune, who has since graduated. In September I begun to co-supervise a master student from the University of Amsterdam, who will graduate in August 2024.