

# Kaustubh Hakim

SENIOR SCIENTIST / RESEARCH EXPERT

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## Employment

02.2023 – present **Research Expert (staff member, 0.5 FTE)**, University of Leuven (KU Leuven)  
02.2023 – present **Senior Scientist (work leader, 0.5 FTE)**, Royal Observatory of Belgium  
02.2019 – 01.2023 **Postdoctoral Researcher**, University of Bern, Bern, Switzerland  
09.2014 – 12.2018 **PhD Candidate**, University of Amsterdam, Amsterdam, Netherlands  
07.2014 – 08.2014 **Summer Researcher**, Nicolaus Copernicus Astronomical Center, Warsaw, Poland  
07.2010 – 08.2012 **Analyst**, Nomura Investment Bank, Mumbai, India  
05.2009 – 07.2009 **Intern**, IBM, Bangalore, India

## Education

### University of Amsterdam / VU Amsterdam

Amsterdam, Netherlands

PHD, ASTROPHYSICS & GEOCHEMISTRY (AWARDED ON 18.12.2018)

12.2018

### KU Leuven

Leuven, Belgium

MSc, ASTRONOMY & ASTROPHYSICS

07.2014

### Indian Institute of Technology Kharagpur

Kharagpur, India

BTECH, ELECTRONICS ENGINEERING

07.2010

## Awards & Distinctions

2023 **BELSPO FED-tWIN Research Program, Belgium**, Career Grant  
2021 **NCCR PlanetS, Switzerland**, Research Project Grant  
2021 **Swiss Society of Astronomy & Astrophysics**, Travel Award  
2020 **University of Bern**, Young Academics Support Award  
2014 **KU Leuven**, MSc with *magna cum laude*  
2010 **IIT Kharagpur**, BTech with *Honours*  
2006 **Engineering Entrance Examination, India**, 99.97 %tile among 0.5 million candidates

## Publications

### PEER-REVIEWED

Gillmann, C., **Hakim, K.**, Lourenco, D., Quanz, S., Sossi, P. (2024). Interior Controls on the Habitability of Rocky Planets. *Space: Science & Technology* 0075 [journal]

Narang, M., Oza, A. V., **Hakim, K.**, Puravankara, M., Tyagi, H., Banerjee, B., Surya, A., Nayak, P.K., Banyal, R.K., Thorngren, D.P. (2023), uGMRT observations of the hot-Saturn WASP 69b: Radio-Loud Exoplanet-Exomoon Survey II (RLEES II), *Monthly Notices of the Royal Astronomical Society* 522, 2 [journal] [arXiv]

Konrad, B.S., Alei, E., Quanz, S.P., Mollière, P., Angerhausen, D., Fortney, J.J., **Hakim, K.**, Jordan, S., Kitzmann, D., Rugheimer, S., Shorttle, O., Wordsworth, R., and the LIFE Collaboration (2023), Large Interferometer For Exoplanets (LIFE): IX. Assessing the impact of clouds on atmospheric retrievals at mid-infrared wavelengths with a Venus-twin exoplanet, *Astronomy & Astrophysics* [journal] [arXiv]

**Hakim, K.**, Tian, M., Bower, D.J., Heng, K. (2023), Diverse Carbonates in Exoplanet Oceans Promote the Carbon Cycle, *Astrophysical Journal Letters* 942, L20 [journal] [arXiv]

- Narang, M., Oza, A. V., **Hakim, K.**, Puravankara, M., Banyal, R., Thorngren, D. **(2023)**, Radio-Loud Exoplanet-Exomoon Survey (RLEES): GMRT Search for Cyclotron Maser Emission, *Astronomical Journal* 165, 1 [journal] [arXiv]
- Bower, D. J., **Hakim, K.**, Sossi, P. A., Sanan, P. **(2022)**, Retention of water in terrestrial magma oceans and carbon-rich early atmospheres, *Planetary Science Journal* 3, 93 [journal] [arXiv]
- Hakim, K.**, Bower, D. J., Tian, M., Deitrick, R., Auclair-Desrotour, P., Kitzmann, D., Dorn, C., Mezger, K., Heng, K. **(2021)**, Lithologic Controls on Silicate Weathering Regimes of Temperate Planets, *Planetary Science Journal* 2, 49 [journal] [arXiv]
- Hakim, K.**, van den Berg, A., Vazan, A., Höning, D., van Westrenen, W., Dominik, C. **(2019)**, Thermal evolution of rocky exoplanets with a graphite outer shell, *Astronomy & Astrophysics* 630, A152 [journal] [arXiv]
- Hakim, K.**, Spaargaren, R., Grewal D.S., Rohrbach A., Brendt J., Dominik, C., van Westrenen, W. **(2019)**, Mineralogy, structure and habitability of carbon-enriched rocky exoplanets: A laboratory approach, *Astrobiology* 19, 7 [journal] [arXiv]
- Hakim, K.**, van Westrenen, W., Dominik, C. **(2018)**, Capturing the oxidation of silicon carbide in rocky exoplanetary interiors, *Astronomy & Astrophysics* 618, L6 [journal] [arXiv]
- Hakim, K.**, Rivoldini, A., Van Hoolst, T., Cottenier, S., Jaeken, J., Chust, T., Steinle-Neumann, G. **(2018)**, A new ab initio equation of state of hcp-Fe and its application to the interior structure and mass-radius relation of rocky super-Earths, *Icarus* 313, 61–78 [journal] [arXiv]

## THESES

- Hakim, K. (2018)**, Diving Deep Into Rocky Exoplanets, *University of Amsterdam, Netherlands*
- Hakim, K. (2014)**, The Interior Structure of Super-Earths, *KU Leuven, Belgium*
- Hakim, K. (2010)**, Performance Evaluation of s-MAC protocol for Wireless Sensor Networks, *IIT, Kharagpur, India*

## Selected Presentations

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- Hakim, K. (2023, invited seminar)**, Chemical Diversity in Rocky Interiors and Interior-Atmosphere Interactions, *Exoplanet Seminar Series, NASA Goddard Space Flight Center, USA (virtual)*
- Hakim, K. (2023, invited lecture)**, Chemistry of Rocky Worlds and Sub-Neptunes, *ATOMIUM Meeting, KU Leuven, Belgium*
- Hakim, K. (2023, invited review talk)**, Astronomical Windows into Planetary Interiors and Evolution, *Strange New Worlds Exoplanet Conference, IISER Pune, India*
- Hakim, K. (2023, invited lecture)**, Impact of Refractory Carbon on Rocky Exoplanet Mineralogy, Evolution & Habitability, *VLT MATISSE Science Team Meeting (virtual)*
- Hakim, K. (2022, keynote talk)**, Chemically-Diverse Exoplanet Interiors and Interior-Atmosphere Interactions, *NOVA NW2 Meeting, Groningen, Netherlands (virtual)*
- Hakim, K. (2022, invited talk)**, Carbon and Sulfur in Exoplanetary Interiors, *HP4 Workshop, Brussels, Belgium*
- Hakim, K. (2022, invited review talk)**, Exoplanetary Interiors and Evolution, *PFE-SPP1992 joint meeting, Berlin, Germany*
- Hakim, K. (2022, invited seminar)**, Chemistry of Planetary Interiors and Surfaces, *National Institute of Science Education and Research, Bhubaneswar, India*
- Hakim, K.**, Bower, D. J., Tian, M., Deitrick, R., Auclair-Desrotour, P., Kitzmann, D., Dorn, C., Mezger, K., Heng, K. **(2021, talk)**, A Lithology-based Silicate Weathering Model for Earth-like Planets, *European Geosciences Union General Assembly (virtual)*
- Hakim, K. (2020, plenary talk)**, Geochemistry of Carbon Cycles on Rocky Exoplanets, *Exoplanets III Conference (virtual)*
- Hakim, K. (2020, seminar)**, Application of Geosciences to Exoplanets, *Tata Institute of Fundamental Research, Mumbai, India*
- Hakim, K. (2019, poster)**, Geochemistry of Carbon Cycles on Rocky Exoplanets, *Extreme Solar Systems 4, Reykjavik, Iceland*
- Hakim, K.**, van den Berg, A., Vazan, A., Höning, D., van Westrenen, W., Dominik, C. **(2019, talk)**, Thermal evolution of rocky exoplanets covered with graphite, *Division of Planetary Sciences – Europlanet Science Congress, Geneva, Switzerland*
- Hakim, K.**, van Westrenen, W., Dominik, C. **(2017, talk)**, Mineralogy of Carbon-Enriched Rocky Extra-Solar Planets from Laboratory Experiments, *Lunar and Planetary Science Conference, Houston, Texas*

**Hakim, K.**, Rivoldini, A., Van Hoolst, T., Cottenier, S., Chust, T., Steinle-Neumann, G. (2017, talk), A New Ab Initio Equation of State of hcp-Iron and Its Application to the Interior Structure of Rocky Super-Earths, *Lunar and Planetary Science Conference, Houston, Texas*

## Teaching Experience

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- 2020 – 2021 **Radiative Transfer**, Teaching Assistant / Co-Lecturer, *MSc Physics*  
2018 **Planetary Science**, Co-Lecturer, *MSc Earth Sciences*  
2015 – 2017 **Interstellar Medium**, Teaching Assistant, *MSc Astronomy & Astrophysics*

## Supervision Experience

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- 2023 – present **Ine Malfait**, MSc Thesis, KU Leuven (Advisor)  
2021 – present **Lukas Carmichael**, MSc Thesis, ETH Zürich (Co-Advisor)  
2020 – present **Mark Oosterloo**, PhD Thesis, University of Groningen / VU Amsterdam (External Advisor)  
2018 **Dieke Bentjees**, BSc Thesis, VU Amsterdam (Co-Advisor)  
2016 **Rob Spaargaren**, BSc Thesis, VU Amsterdam (Co-Advisor)

## Service, Leadership and Professional Development

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### PEER REVIEW FOR HIGH-IMPACT JOURNALS

Astrobiology, Journal of Geophysical Research, Astronomy & Astrophysics, Monthly Notices of Royal Astronomical Society, Planetary Science Journal, Geochimica et Cosmochimica Acta

### LEADERSHIP ROLES

- 2023 **Session Convener**, Goldschmidt Conference, Lyon, France  
2022 **Working Group Coordinator**, NCCR PlanetS Phase 3  
2022 – 2023 **Session Convener**, European Geosciences Union General Assembly, Vienna, Austria  
2019 – 2022 **Working Group Organiser**, Atmosphere-Interior Exchange, University of Bern  
2016 – 2017 **PhD Representative**, PhD-PostDoc Council, University of Amsterdam, Netherlands  
2015 – 2017 **Meeting Organiser**, Interdisciplinary PEPSci Network, Netherlands  
2012 – 2014 **Student Representative**, Permanent Education Committee, KU Leuven

### DEVELOPMENT COURSES

**Lessons in leadership**, University of Bern, How to keep your team motivated

**Project Management for Researchers**, NCCR PlanetS, How to drive collaborative projects successfully

**Public Speaking for Scientists**, University of Bern, Effectively connect your scientific content with the audience

### SCIENCE COMMUNICATION

**Outreach Contribution**, Planets in the Solar System, Astronomy Calendar (2021)

**Public Science Talk**, Cooking Tiny Planets in the Lab, Astronomy on Tap, Bern, Switzerland (2019)

**Blog Writing**, The Role of Geosciences in Exoplanet Science, European Geosciences Union Blogs (2019)

**Magazine Contribution**, A New Ultra-High-Pressure Equation Of State For Iron Gives Insight Into Super-Earth Interiors, Science Trends (2018)

**Student Engagement Talk**, Carbon-rich exoplanets, Universidad de los Andes, Bogotá, Colombia (2016)

**Volunteer**, Public Stargazing Nights, University of Amsterdam (2015–2017)

### PROFESSIONAL MEMBERSHIPS

- 2018 – present **Junior Member**, International Astronomical Union  
2019 – present **Member**, European Geosciences Union  
2020 – present **Member**, European Association of Geochemistry