CURRICULUM VITAE

Tim Lichtenberg

Assistant Professor | Kapteyn Astronomical Institute | University of Groningen

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I study the physical and chemical processes that drive the growth and long-term evolution of rocky planets and exoplanets, from formation through billions of years of geodynamic and climate evolution. I trace how radioactive heating and planetesimal differentiation set the initial volatile budgets, how magma ocean epochs forge the first atmospheres, and how mantle dynamics and volatile cycling shape planetary environments over geological time. By bridging planetary physics, geochemistry, and exoplanet observations, my research group works to understand the conditions for the origins of life and its cosmic prevalence.

Research Positions

Tenure Track Assistant Professor & Branco Weiss Fellow (University of Groningen, NL) 10/2022-

Simons Collaboration on the Origins of Life Postdoctoral Fellow (University of Oxford, UK) 10/19-09/22

Swiss National Science Foundation Early.Postdoc Mobility Fellow (University of Oxford, UK) 08/18-09/19

Education

Dr. sc. ETH Zurich (Department of Earth Sciences, ETH Zurich, Switzerland) 09/14-07/18

Thesis: Thermal Evolution of Forming Planets: Isotope Enrichment, Differentiation & Volatile Retention

Master of Science Physics (Georg-August-Universität Göttingen, Germany) 09/12-08/14

Thesis: Modeling gravitational instabilities in compact and massive protoplanetary disks with adaptive mesh refinement techniques

Semester abroad (Peking University, People's Republic of China) 09/12-01/13

Studies of Chinese language and culture

Bachelor of Science Physics (Georg-August-Universität Göttingen, Germany) 09/09-08/12

Thesis: Constraining Exoplanet Characteristics with Asteroseismology

Honours & Awards

Europlanet Early-Career Medal, Europlanet Society 09/25

Planetary and Solar System Sciences Division Outstanding Early Career Scientist Award, European Geosciences Union (EGU) 04/23

Winton Award for Early Achievement in Geophysics, Royal Astronomical Society 01/22

Doctoral Thesis Award 2019, German Astronomical Society 09/19

PhD Prize for Planetary Systems and Astrobiology 2018, International Astronomical Union 06/19

European Astrobiology Network Association, Horneck-Brack Presentation Award, 2nd prize 09/18

'Dr. Berliner - Dr. Ungewitter' award for M.Sc. thesis, Georg-August-Universität Göttingen 12/14

Master's diploma awarded 'with distinction', Georg-August-Universität Göttingen 08/14

Grants & Fellowships

19 grants and fellowships in total, incl. 15 as PI (∼€4M), 4 as Co-I

Selected list. Full list online

Dutch Research Council (NWO) Vidi grant (€849'779, *Hazy worlds around tiny stars: testing the influence of extreme carbon abundance variability on M-dwarf exoplanet atmospheric evolution*), PI 10/26

Open eScience Project *inversePROTEUS* (€531'000, incl. about 3 person-years of research software engineering, *Scalable Physics-based Inference of Exoplanet Evolution*), Netherlands eScience Center, PI 10/26

Computing Time on National Computer Facilities, Small Compute grant EINF-19723 (535'000 SBU on the Snellius supercomputer, 50'000 CPU hours on the SURF Research Cloud, *Pilot for the Interra Project exoplanet simulation ensemble on Snellius*), Dutch Research Council (NWO) & SURF, PI 09/26

AEThER Collaboration, Sloan Foundation, Co-I 07/25

European Research Council's (ERC) Starting Grant MagmaWorlds (€1.5M), PI 09/25

Dutch Research Council (NWO) Consortium Grant (€329'065 out of €7.0M in total, *PRELIFE - Pathways, Reactions, and Environments leading to LIFE*), work package leader, Co-I 11/24

NOVA Consortium Grant (LIFE: Mid-infrared detection of biosignatures in the atmospheres of terrestrial exoplanets), PI: van der Tak (fte + cash € 249'000), Co-I 07/24

Open eScience Early Career Project PROTEUS (€134'000, *An Adaptive Numerical Framework to Simulate Lava Exoplanets*), Netherlands eScience Center, PI 12/23

Faculty Research Grant, Faculty of Science and Engineering (€150'000), University of Groningen, PI 12/22

Research Fellowship of the Branco Weiss Foundation (*CHF 500'000, Molten Exoplanets as a Window into the Earliest Earth*), PI 08/22

Non-stipendiary Junior Research Fellowship, St Cross College, University of Oxford, PI 06/19

Simons Collaboration on the Origins of Life Postdoctoral Fellowship ($276'000, *Geodynamic Regimes during Planetogenesis*), Simons Foundation, PI 12/18

Early Postdoc.Mobility fellowship (*CHF 77'650, Linking Interior-Atmosphere Regimes to Planetary Accretion*), Swiss National Science Foundation, PI 12/17

Publications

Research-ID links: ORCID • Google Scholar • ADS • SciX • Scopus • arXiv

84 articles in total, incl. 16 first-author, 1 single-author, 21 co-/supervised student papers, 8 co-/mentored postdoc papers°*
As first author 2x Science, 1x Nature Astronomy, 3x ApJL, 1x E&PSL

PREPRINTS & SUBMITTED JOURNAL ARTICLES

T Lichtenberg, °M Attia, H Nicholls, *M Sastre, DJ Bower, *K Stuitje, *FC Pascal, L Soucasse, D Apai, P Bos, R Calder, *L Cesario, L Dang, *E Decocq, *M van Dijk, M Farhat, K Hakim, °T Kimura, *I Kisvárdai, S Krijt, Y Miguel, *I Panagiotou, *E Postolec, M Schlecker, S Seager, A Shahar, O Shorttle, PA Sossi, W van Westrenen. Super-Earth Interiors Shrink by About 10% as They Crystallise. Submitted to *The Planetary Science Journal*.

*Postolec E, **T Lichtenberg**, JK Teske, H Nicholls, °M Attia, A Piette, L Dang, NL Wallack, M Plotnykov, A McGinty, S Boucher, B Peng, D Valencia. Evolutionary pathways toward survival of a thick CO_2- or SO_2-rich atmosphere on the lava world TOI-561 b. In revision at *The Astrophysical Journal*.

°Attia M, **T Lichtenberg**. Atmospheric escape fractionates secondary but not primary atmospheres.

°Nicholls H, **T Lichtenberg**, B Riegler, R Calder, V Fortuin. Constraining the lives and times of exoplanets through evolutionary Bayesian retrievals. In revision at *The Astrophysical Journal*.

*Panagiotou I, **T Lichtenberg**, S-M Tsai, H Nicholls. Sulfur photochemistry observationally traces mantle redox states of rocky planets. In revision at *Astronomy & Astrophysics*.

°Nicholls H, J Krissansen-Totton, **T Lichtenberg**, L Schaefer, K Hamano, M Maurice, H Samuel, A Papesh, C Ortiz-Quintana, J Perez, Y Miguel, D Sergeev, P Baumeister, S Dash, L Janssen, J Keathley, A de Larminat, E Marcq, L Noack, H Pelissard, B Peng, *E Postolec, R Ramirez, *M Sastre, A Zorzi. Coupled atmosphere Interior modeL Intercomparison (CHILI). I. Evolutionary Modelling – Primordial Magma Oceans of Earth and Venus. In revision at *The Planetary Science Journal*.

REFEREED RESEARCH JOURNAL ARTICLES

Zieba S, B Edwards, SN Quinn, LJ Janssen, NB Cowan, L Kreidberg, M Lopez-Morales, L Dang, L Malavolta, Y Miguel, TG Nguyen, A Vanderburg, TG Wilson, M Zilinskas, NJ Connors, IJM Crossfield, O Herbort, AL Kraus, **T Lichtenberg**, *M Sastre, JP Wardenier. The First Hubble Detection of a Secondary Eclipse from a Rocky Exoplanet: the 5.4-hour planet TOI-2431 b. *The Astrophysical Journal Letters*, in press (2026).

*Sastre M, **T Lichtenberg**, L Dang, A Piette, HS Wang, M López-Morales, T Wilson, C-É Boukaré, M Herath, N Cowan, MA Al Zaman, MG Barber, C Brinkman-Traverse, N Connors, I Crossfield, L D'Aoust, O Herbort, L Janssen, M Kervazo, O Lammert, Y Miguel, RT Pierrehumbert, A Vazan, JP Wardenier, S Zieba. Thermal Evolution of Lava Planets Across System Ages: Predictions for Hell of a Survey. *The Astrophysical Journal*, in press (2026).

Turner DA, A Mortier, JG Rogers, JA Egger, AV Freckelton, **T Lichtenberg**, AAA Piette. No statistically significant evidence for a correlation between stellar and planetary composition. *Monthly Notices of the Royal Astronomical Society* 552, stag1756 (2026).

Boucher S, L Dang, A McGinty, JK Teske, RT Pierrehumbert, AAA Piette, NL Wallack, A Weeks, NT Lewis, **T Lichtenberg**, M Plotnykov, *E Postolec, D Huber, TR Bedding, H Nicholls, B Peng, M Hammond, D Valencia. A Highly Reflective Atmosphere on the Lava World TOI-561b Revealed by JWST/NIRSpec Phase Curves. *The Astronomical Journal* 172, 239 (2026).

°Nicholls H, O Shorttle, **T Lichtenberg**, *F Pascal. Beyond the mass-radius plane: Integrated radiative-convective and interior structure simulations of the exoplanet continuum. *Monthly Notices of the Royal Astronomical Society* 551, stag1489 (2026).

*Cesario L, **T Lichtenberg**, M Min, L Noack, C Brachmann, E Alei, SP Quanz, LIFE Collaboration. Characterizing the oxidation state of rocky exoplanets with the Large Interferometer for Exoplanets (LIFE). *Monthly Notices of the Royal Astronomical Society* 552, stag1451 (2026).

Williams J, S Krijt, J Drążkowska, **T Lichtenberg**. Planetesimal Formation Across the Stellar Mass Spectrum and its Influence on Exoplanet-Inherited Volatile Budgets. *Monthly Notices of the Royal Astronomical Society* 551, stag1510 (2026).

*Postolec E, **T Lichtenberg**, *H Nicholls, L Soucasse, F van der Tak. Atmospheric evolution through outgassing and escape on young molten rocky exoplanets. *Astronomy & Astrophysics* 714, A434 (2026).

*Cesario L, **T Lichtenberg**, °M Attia, H Nicholls, *I Kisvárdai, Q Changeat. Reflation: Redox-Driven Atmospheric Inflation as Tracer of Super-Earth Geochemistry. *The Astrophysical Journal Letters* 1007, L8 (2026).

°Attia M, **T Lichtenberg**, *E Jungová, *M Sastre. PALEOS: Multiphase Equations of State and Mass-Radius Relations for Exoplanet Interiors. *Astronomy & Astrophysics* 713, A225 (2026).

*Sastre M, **T Lichtenberg**, L Soucasse, DJ Bower, *H Nicholls, I Kamp. Geophysical and atmospheric implications of fO_2-dependent melting on rocky exoplanets. *Astronomy & Astrophysics* 713, A159 (2026).

Grenfell JL, B Taysum, I van Zelst, F Schreier, H Innes, AMS Smith, S Csizmadia, N Iro, S Rugheimer, T Kozakis, E Alei, L Noack, **T Lichtenberg**, SP Quanz, K Herbst, M Sinnhuber, A Bartenschlager, J Cabrera, H Rauer. Detectability of Atmospheric Climate and Biosignatures with the Large Interferometer for Exoplanets (LIFE) for Terrestrial-type Exoplanets. *Monthly Notices of the Royal Astronomical Society* 550, staf1878 (2026).

Calder R, O Shorttle, H Nicholls, **T Lichtenberg**, CM Guimond. Most Rocky Sub-Neptunes are Molten: Mapping the Solidification Shoreline for Gas Dwarf Exoplanets. *Monthly Notices of the Royal Astronomical Society* 549, stag1007 (2026).

T Lichtenberg, L Schaefer, J Krissansen-Totton, Y Miguel, DE Sergeev, P Baumeister, J Cmiel, LJ Janssen, TG Nguyen, Y Miyazaki, H Nicholls, A Papesh, H Pelissard, B Peng, J Perez, E Postolec, M Sastre et al. Coupled atmospHere Interior modeL Intercomparison (CHILI) Protocol Version 1.0: A CUISINES Intercomparison Project of Magma Ocean Models. *The Planetary Science Journal* 7, 108 (2026).

*van Dijk MR, *H Nicholls, **T Lichtenberg**. Onset of habitable conditions on the Hadean Earth set by feedback between tides and greenhouse forcing. *The Planetary Science Journal* 7, 94 (2026).

Rugheimer S, E Alei, BS Konrad, B Taysum, JL Grenfell, **T Lichtenberg**, D Kitzmann, F van der Tak, SP Quanz, LIFE collaboration. The Goldilocks problem for detecting water in terrestrial planets: Constraining water abundances in the mid-IR with LIFE. *The Astrophysical Journal* 1003, 85 (2026).

*Nicholls H, **T Lichtenberg**, RD Chatterjee, CM Guimond, *E Postolec, RT Pierrehumbert. Volatile-rich evolution of molten super-Earth L 98-59 d. *Nature Astronomy* 10, 809-817 (2026).

°Kimura T, **T Lichtenberg**. Water enrichment of forming sub-Neptune envelopes limited by oxygen exhaustion. *The Astrophysical Journal* 1000, 220 (2026).

Meier TG, CM Guimond, RT Pierrehumbert, J Birkby, RD Chatterjee, CE Fisher, GJ Golabek, M Hammond, TD Komacek, **T Lichtenberg**, A McGinty, E Meier Valdés, H Nicholls, LT Parker, RJ Spaargaren, PJ Tackley. Mantle convection and nightside volcanism on lava world K2-141 b. *Monthly Notices of the Royal Astronomical Society* 547, stag390 (2026).

Nixon MC, S Sander Somers, AB Savel, J Ih, EMR Kempton, ED Young, HE Schlichting, **T Lichtenberg**, L Welbanks, W Misener, AAA Piette, NF Wogan. Magma ocean interactions can explain JWST observations of the sub-Neptune TOI-270 d. *The Astrophysical Journal* 995, 95 (2025).

Teske JK, NL Wallack, AAA Piette, L Dang, **T Lichtenberg**, M Plotnykov, RT Pierrehumbert, *E Postolec, et al. A Thick Volatile Atmosphere on the Ultra-Hot Super-Earth TOI-561 b. *The Astrophysical Journal Letters* 995, L39 (2025).

*Nicholls H, CM Guimond, HCFC Hay, RD Chatterjee, **T Lichtenberg**, RT Pierrehumbert. Self-limited tidal heating and prolonged magma oceans in the L 98-59 system. *Monthly Notices of the Royal Astronomical Society* 541, 2566-2584 (2025).

Apai D., R. Barnes, M.M. Murphy, **T. Lichtenberg**, et al. A Terminology and Quantitative Framework for Assessing the Habitability of Solar System and Extraterrestrial Worlds. *The Planetary Science Journal* 6, 165 (2025).

*Boer ID, *H Nicholls, **T. Lichtenberg**. Absence of a Runaway Greenhouse Limit on Lava Planets. *The Astrophysical Journal* 987, 172 (2025).

Schlecker M, D Apai, A Affholder, S Ranjan, R Ferrière, KK Hardegree-Ullman, **T. Lichtenberg**, S Mazevet. Bioverse: Potentially Observable Exoplanet Biosignature Patterns Under the UV Threshold Hypothesis for the Origin of Life. *The Astrophysical Journal* 987, 24 (2025).

Farhat M, P Auclair-Desrotour, G Boué, **T. Lichtenberg**, J Laskar. Tides on Lava Worlds: Application to Close-in Exoplanets and the Early Earth-Moon System. *The Astrophysical Journal* 979, 133 (2025).

Hammond M, CM Guimond, **T. Lichtenberg** et al. Reliable Detections of Atmospheres on Rocky Exoplanets with Photometric JWST Phase Curves. *The Astrophysical Journal Letters* 978, L40 (2025).

***Nicholls H, RT Pierrehumbert, **T. Lichtenberg** et al. Convective shutdown in the atmospheres of lava worlds. *Monthly Notices of the Royal Astronomical Society* 536, 2957-2971 (2025).

***Nicholls H, **T. Lichtenberg**, DJ Bower, RT Pierrehumbert. Magma ocean evolution at arbitrary redox state. *Journal of Geophysical Research: Planets* 129, 2024JE008576 (2024).

***Cesario L, **T. Lichtenberg** et al. Large Interferometer For Exoplanets (LIFE). XIV. Finding terrestrial protoplanets in the galactic neighborhood. *Astronomy & Astrophysics* 692, A172 (2024).

Eatson J. W., RJ Parker, **T. Lichtenberg**. Towards a unified injection model of short-lived radioisotopes in N-body simulations of star-forming regions. *The Astrophysical Journal* 977, 13 (2024).

°Meier T. G., D.J. Bower, **T. Lichtenberg**, M. Hammond, P.J. Tackley, R.T. Pierrehumbert, et al. Geodynamics of super-Earth GJ 486b. *Journal of Geophysical Research: Planets* 129, e2024JE008491 (2024).

°Eatson J. W., **T. Lichtenberg**, R. J. Parker, T. V. Gerya. Devolatilization of extrasolar planetesimals by ^{60}Fe and ^{26}Al heating. *Monthly Notices of the Royal Astronomical Society* 528, 6619-6630 (2024).

Shorttle O., S. Jordan, H. Nicholls, **T. Lichtenberg**, D. J. Bower. Distinguishing oceans of water from magma on mini-Neptune K2-18b. *The Astrophysical Journal Letters* 962, L8 (2024).

Schlecker M., D. Apai, **T. Lichtenberg**, G. Bergsten, A. Salvador, K. K. Hardegree-Ullman. Bioverse: The Habitable Zone Inner Edge Discontinuity as an Imprint of Runaway Greenhouse Climates on Exoplanet Demographics. *The Planetary Science Journal* 5, 3 (2024).

Patel M., C. K. M. Polius, M. Ridsdill-Smith, **T. Lichtenberg**, R. Parker. Photoevaporation versus enrichment in the cradle of the Sun. *Monthly Notices of the Royal Astronomical Society* 525, 2399-2410 (2023).

***Meier T. G., D. J. Bower, **T. Lichtenberg**, M. Hammond, P. J. Tackley. Interior dynamics of super-Earth 55 Cancri e. *Astronomy & Astrophysics* (2023).

Piette A. A. A., P. Gao, K. Brugman, A. Shahar, **T. Lichtenberg**, F. Miozzi, P. Driscoll. Rocky world? Observability of low-density lava world atmospheres. *The Astrophysical Journal* 954, 29 (2023).

Parker R. J., **T. Lichtenberg**, M. Patel, C. K. M. Polius, M. Ridsdill-Smith. Short-lived radioisotope enrichment in star-forming regions from stellar winds and supernovae. *Monthly Notices of the Royal Astronomical Society* 521, 4838-4851 (2023).

Janson M., J. Patel, S. C. Ringqvist, C. Lu, I. Rebollido, **T. Lichtenberg**, A. Brandeker, D. Angerhausen, L. Noack. Imaging of exocomets with infrared interferometry. *Astronomy & Astrophysics* 671, A114 (2023).

Stammler S. M., **T. Lichtenberg**, J. Drążkowska, T. Birnstiel. Leaky dust traps: How fragmentation impacts dust filtering by planets. *Astronomy & Astrophysics Letters* 670, L5 (2023).

Bonsor A., **T. Lichtenberg**, J. Drążkowska, A. M. Buchan. Rapid formation of exoplanetesimals revealed by white dwarfs. *Nature Astronomy* 7, 39-48 (2023).

***Graham R. J., **T. Lichtenberg**, R. T. Pierrehumbert. CO_2 ocean bistability on terrestrial exoplanets. *Journal of Geophysical Research: Planets* 127, 2022JE007456 (2022).

Lichtenberg T., M. S. Clement. Reduced late bombardment on rocky exoplanets around M-dwarfs. *The Astrophysical Journal Letters* 938, L3 (2022).

Curry A., A. Bonsor, **T. Lichtenberg**, O. Shorttle. Prevalence of short-lived radioactive isotopes across exoplanetary systems inferred from polluted white dwarfs. *Monthly Notices of the Royal Astronomical Society* 515, 395-406 (2022).

Dannert F. et al. (incl. **T. Lichtenberg**) Large Interferometer For Exoplanets (LIFE): II. Signal simulation, signal extraction and fundamental exoplanet parameters from single epoch observations. *Astronomy & Astrophysics* 664, A22 (2022).

Quanz S. P. et al. (incl. **T. Lichtenberg**) Large Interferometer For Exoplanets (LIFE): I. Improved exoplanet detection yield estimates for a large mid-infrared space-interferometer mission. *Astronomy & Astrophysics* 664, A21 (2022).

Jin Z., M. Bose, **T. Lichtenberg**, G. D. Mulders. New evidence for wet accretion of inner solar system planetesimals from meteorites Chelyabinsk and Benenitra. *The Planetary Science Journal*, 2, 244 (2021).

Tsai S.-M., H. Innes, **T. Lichtenberg**, J. Taylor, M. Malik, K. Chubb, R. T. Pierrehumbert. Inferring Shallow Surfaces on Sub-Neptune Exoplanets with JWST. *The Astrophysical Journal Letters* 922, L27 (2021).

Dorn C., **T. Lichtenberg**. Hidden water in magma ocean exoplanets. *The Astrophysical Journal Letters* 922, L4 (2021). (summary video)

***Graham R. J., **T. Lichtenberg**, R. Boukrouche*, R. T. Pierrehumbert. A multispecies pseudoadiabat for simulating condensable-rich exoplanet atmospheres. *The Planetary Science Journal* 2, 207 (2021). (summary video)

***Boukrouche R., **T. Lichtenberg**, R. T. Pierrehumbert. Beyond runaway: initiation of the post-runaway greenhouse state on rocky exoplanets. *The Astrophysical Journal* 919, 130 (2021). (summary video)

Lichtenberg T. Redox hysteresis of super-Earth exoplanets from magma ocean circulation. *The Astrophysical Journal Letters* 914, L4 (2021). (summary blog, summary video)

Lichtenberg T., S. Krijt. System-level fractionation of carbon from disk and planetesimal processing. *The Astrophysical Journal Letters* 913, L20 (2021). (summary blog, summary video)

*Meier T. G., D. J. Bower, **T. Lichtenberg**, P. J. Tackley, B.-O. Demory. Hemispheric tectonics on super-Earth LHS 3844b. *The Astrophysical Journal Letters* 908, L48 (2021). (summary video)

Lichtenberg T., D. J. Bower, M. Hammond, R. Boukrouche*, P. Sanan, S.-M. Tsai, R. T. Pierrehumbert. Vertically resolved magma ocean-protoatmosphere evolution: H_2, H_2O, CO_2, CH_4, CO, O_2, and N_2 as primary absorbers. *Journal of Geophysical Research: Planets* 126, e2020JE006711 (2021). (summary blog, summary video)

Lichtenberg T., J. Drążkowska, M. Schönbächler, G. J. Golabek, T. O. Hands. Bifurcation of planetary building blocks during Solar System formation. *Science* 371, 365–370 (2021). (summary blog, summary video)

Lichtenberg T., G. J. Golabek, R. Burn, M. R. Meyer, Y. Alibert, T. V. Gerya, C. Mordasini. A water budget dichotomy of rocky protoplanets from ^{26}Al heating. *Nature Astronomy* 3, 307–313 (2019). (summary blog)

Lichtenberg T., T. Keller, R. F. Katz, G. J. Golabek, T. V. Gerya. Magma ascent in planetesimals: control by grain size. *Earth and Planetary Science Letters* 507, 154–165 (2019). (blog post)

*Bonati I., **T. Lichtenberg**, D. J. Bower, M. Timpe, S. P. Quanz. Direct imaging of molten protoplanets in nearby young stellar associations. *Astronomy & Astrophysics* 621, A125 (2019). (blog post)

Lichtenberg T., G. J. Golabek, C. P. Dullemond, M. Schönbächler, T. V. Gerya, M. R. Meyer. Impact splash chondrule formation during planetesimal recycling. *Icarus* 302, 27–43 (2018). (blog post)

Hunt A. C., D. L. Cook, **T. Lichtenberg**, P. M. Reger, M. Ek, G. J. Golabek, M. Schönbächler. Late metal-silicate separation on the IAB parent asteroid: Constraints from combined W and Pt isotopes and thermal modelling. *Earth and Planetary Science Letters* 482, 490–500 (2018).

Parker R. J., **T. Lichtenberg**, S. P. Quanz. Was Planet 9 captured in the Sun's natal star-forming region? *Monthly Notices of the Royal Astronomical Society: Letters* 472, L75–L79 (2017).

Lichtenberg T., R. J. Parker, M. R. Meyer. Isotopic enrichment of forming planetary systems from supernova pollution. *Monthly Notices of the Royal Astronomical Society* 462, 3979–3992 (2016). (blog post)

Lichtenberg T., G. J. Golabek, T. V. Gerya, M. R. Meyer. The effects of short-lived radionuclides and porosity on the early thermo-mechanical evolution of planetesimals. *Icarus* 274, 350–365 (2016). (blog post)

Lichtenberg T., D. R. G. Schleicher. Modeling gravitational instabilities in self-gravitating protoplanetary disks with adaptive mesh refinement techniques. *Astronomy & Astrophysics* 579, A32 (2015).

REFEREED REVIEW ARTICLES

Lichtenberg T, O Shorttle, J Teske, EMR Kempton. Constraining exoplanet interiors using observations of their atmospheres. *Science* 390, eads3660 (2025).

Lichtenberg T., Y. Miguel. Super-Earths and Earth-like Exoplanets. *Treatise on Geochemistry*, 3rd edition, Vol. 7, 51-112 (2025).

Suer T.-A., C. Jackson, D. S. Grewal, C. Dalou, **T. Lichtenberg**. The distribution of volatile elements during rocky planet formation. *Frontiers in Earth Science* 11:1159412 (2023).

Lichtenberg T., L. K. Schaefer, M. Nakajima, R. Fischer. Geophysical Evolution During Rocky Planet Formation. *Protostars and Planets VII*, ASP Conference Series, Vol. 534, 907 (2023).

PERSPECTIVES AND COLLABORATION PAPERS

Hu R. et al. (incl. **T. Lichtenberg**). Identifying rocky planets and water worlds among sub-Neptune-sized exoplanets with the Habitable Worlds Observatory. *Astronomical Society of the Pacific Conference Series* 542, 429 (2026).

Rauer H. et al. (incl. **T. Lichtenberg**). The PLATO mission. *Experimental Astronomy* 59, 26 (2025).

Menti F. et al. (incl. **T. Lichtenberg**). Database of Candidate Targets for the LIFE Mission. *Research Notes of the AAS*, 8, 267 (2024).

TRAPPIST-1 JWST Community Initiative (incl. **T. Lichtenberg**) A roadmap for the atmospheric characterization of terrestrial exoplanets with JWST. *Nature Astronomy Perspective*, Vol. 8, 810-818 (2024).

Helled R. et al. (incl. **T. Lichtenberg**). Ariel Planetary Interiors White Paper. *Experimental Astronomy* 53, 323-356 (2021).

Tinetti G. et al. (incl. **T. Lichtenberg**). Ariel: Enabling planetary science across light-years. *ESA Ariel Definition Study Report* (2021).

INSTRUMENTATION & METHODS

*Nicholls H., R.T. Pierrehumbert, **T. Lichtenberg**. AGNI: A radiative-convective model for lava planet atmospheres. *Journal of Open Source Software* 10, 7726 (2025).

Glauser A. M., S. P. Quanz, J. Hansen et al. (incl. **T. Lichtenberg**). The Large Interferometer For Exoplanets (LIFE): a space mission for mid-infrared nulling interferometry. *Proceedings of the SPIE* 13095, 130951D (2024).

WHITE PAPERS (NOT IN PUBLICATION COUNT)

Meadows V. et al. (incl. **T. Lichtenberg**) Community Report from the Biosignatures Standards of Evidence Workshop. Workshop Report (2022).

Khullar G. et al. (incl. **T. Lichtenberg**). Astrobites as a Community-led Model for Education, Science Communication, and Accessibility in Astrophysics. Astro2020: NASA Decadal Survey on Astronomy and Astrophysics, *BAAS*, 51, 7, 230 (2019).

Quanz S. P. et al. (incl. **T. Lichtenberg**). Atmospheric characterization of terrestrial exoplanets in the mid-infrared: biosignatures, habitability & diversity. *ESA Voyage 2050* White Paper (2019).

Line M. et al. (incl. **T. Lichtenberg**). The Importance of Thermal Emission Spectroscopy for Understanding Terrestrial Exoplanets. Astro2020: NASA Decadal Survey, *BAAS*, 51, 3, 271 (2019).

Lyra W. et al. (incl. **T. Lichtenberg**). Planet formation — The case for large efforts on the computational side. Astro2020: NASA Decadal Survey, *BAAS*, 51, 3, 271 (2019).

Conference and Institute Seminar Presentations

174 presentations in total, incl. 149 oral presentations and 25 posters; 86 invited ‡

Selected list. Full list online

CONFERENCES AND WORKSHOPS

Layers of Understanding: Model Intercomparisons of Exoplanet Interiors, Heidelberg, DE ‡	PDF	04/26
International Conference on Exoplanets and Planet Formation, Shanghai, CN ‡	PDF	12/25
Frontiers in Nanoscience CeNS/CRC 392, Venice, IT ‡	PDF	09/25
Europlanet Science Congress, Helsinki, FI ‡	PDF	09/25
Origins Federation Conference, Cambridge, UK ‡	PDF	09/24
The Geoscience of Exoplanets: Going Beyond Habitability, International Space Science Institute, Bern, CH ‡	PDF	04/24
Exoclimes VI, Exeter, UK ‡	PDF	06/23
Gordon Research Conference – Origins of Solar Systems, South Hadley, US ‡	PDF	06/23
European Geosciences Union (EGU) General Assembly, Vienna, AUT ‡	PDF	04/23
Protostars and Planets VII, Kyoto, JP ‡	PDF	04/23
International Astronomical Union General Assembly, Division F: Planetary Systems and Astrobiology, Busan, KR ‡	PDF	08/22
Annual Meeting of the European Astronomical Society, Valencia, ESP ‡	PDF	06/22
Goldschmidt 21, Chemical geodynamics throughout the Solar System, Lyon, FR (virtual) ‡	PDF	07/21
Habitable Worlds 21, NASA NExSS, NExScI, US (virtual) ‡	PDF	02/21

COLLOQUIA AND SEMINAR TALKS

Institute of Astronomy, KU Leuven, Leuven, BE ‡	PDF	10/26
Globe Institute, Centre for Star and Planet Formation, Copenhagen, DK ‡	PDF	02/26
Department of Astrophysics, Radboud University, Nijmegen, NL ‡	PDF	03/25
Max Planck Institute for Solar System Research, Göttingen, DE ‡	PDF	05/24
Austrian Academy of Sciences Space Research Institute, Graz, AUT ‡	PDF	05/24
Royal Astronomical Society Ordinary Meeting, London, UK ‡	PDF	10/23
Harvard University, Department of Earth and Planetary Sciences, Cambridge, US ‡	PDF	06/23
California Institute of Technology, Division of Geological and Planetary Sciences, Pasadena, USA ‡	PDF	07/22
AEThER Collaboration Seminar, Carnegie Earth and Planets Laboratory, Washington DC, USA ‡	PDF	06/22
Free University of Berlin, Department of Earth Sciences, Berlin, DE ‡	PDF	04/22
Imperial College, Department of Earth Sciences, London, UK ‡	PDF	03/22
European Astrobiology Institute Seminar, Strasbourg, FR (virtual) ‡	PDF	03/22

Heidelberg Initiative for the Origins of Life Colloquium, Max Planck Institute for Astronomy, DE ‡ PDF 11/21

Postdoc Mentoring

4 mentored postdocs in total, incl. 3 with personal fellowships (2 SNSF, 1 JSPS), 1 ERC-funded

Patrick Bos, Senior Research Software Engineer (ERC Starting Grant *MagmaWorlds*), Kapteyn Institute 03/26-

Mara Attia, SNSF Postdoctoral Fellow, Kapteyn Institute 05/25-

Tadahiro Kimura, JSPS Postdoctoral Fellow, Kapteyn Institute 06/24-03/26

Rob Spaargaren, SNSF Postdoctoral Fellow, Kapteyn Institute 12/23-11/25

Student Mentoring

44 supervised theses and projects in total, incl. 8 PhD, 11 MSc, 16 BSc theses, 9 projects/internships

Selected list. Full list online

PHD STUDENTS

Saphira Brandenberger, exoplanet core evolution, Kapteyn Institute 09/26-

Emeline Decocq, prebiotic climate and ocean levels of the Hadean Earth, Kapteyn Institute 09/25-

Imre Kisvárdai, interior-atmosphere evolution on low-mass exoplanets, Kapteyn Institute 09/25-

Emma Postolec, evolution of magma ocean exoplanet atmospheres, Kapteyn Institute 10/23-

Mariana V. Sastre, evolution of magma ocean exoplanet interiors, Kapteyn Institute 09/23-

Harrison Nicholls, rocky planet evolution (co-supervised with Raymond Pierrehumbert), Oxford Atmospheric, Oceanic and Planetary Physics 04/23-01/26

Robert J. Graham, condensable-rich exoplanet atmospheres (co-supervised with Raymond Pierrehumbert), Oxford Atmospheric, Oceanic and Planetary Physics 08/20-09/22

Ryan Boukrouche, the post-runaway greenhouse state on rocky exoplanets (co-supervised with Raymond Pierrehumbert), Oxford Atmospheric, Oceanic and Planetary Physics 01/20-09/22

THESES AND PROJECTS (BY INSTITUTION)

Kapteyn Institute and Physics department, University of Groningen: 7 MSc and 15 BSc theses and 5 research projects (partly co-supervised with Mara Attia, Quentin Changeat and Joost van den Born) on magma oceans and lava planets, atmospheric escape, oceans on sub-Neptunes and Earth-like planets, the Hadean Earth, interior structure, steam and rock-vapour atmospheres, and observations with LIFE and Ariel; the projects include the visiting PhD student Anna Grace Ulses (University of Washington) and a PhD research project with Beat Hubmann 04/23-

TU Munich: MSc thesis with Erik Gräter, testing the habitable zone inner edge with PLATO (co-supervised with Martin Schlecker, Martin Turbet and Dániel Apai) 07/26-

FU Berlin: MSc thesis with Bruna Fena, “Shedding ultraviolet light on the early Earth’s surface” (co-supervised with Harrison Nicholls and Lena Noack) 11/25-

St Cross College, Oxford: pastoral support and mentoring for 16 MSc and DPhil students 10/19-09/22

University of Bern: PhD research projects with Tobias G. Meier (co-supervised with Dan J. Bower) on the interior dynamics of tidally locked super-Earths 06/20-09/22

ETH Zurich: 2 MSc theses, 1 BSc thesis and 3 semester projects (co-supervised with Taras Gerya and Sascha Quanz) on planetesimal hydrology, core formation and pebble accretion, protoplanetary collisions, and the surfaces of airless exoplanets 08/16-10/22

Lectures and Courses

17 courses in total, incl. 11 as lecturer, 6 as teaching/lab assistant

Selected list. Full list online

Planetary Systems, BSc course, Kapteyn Institute, lecturer (∼40 students) 09/26-11/26

Exoplanets, MSc course, Kapteyn Institute, lecturer (∼20 students) 02/26-04/26

Planetary Systems, BSc course, Kapteyn Institute, lecturer (∼50 students) 09/25-11/25

Exoplanets, MSc course, Kapteyn Institute, lecturer (∼20 students) 10/24-02/25

Star and Planet Formation, MSc course, Kapteyn Institute, co-lecturer (∼30 students) 02/25-04/25

Exoplanets, MSc course, Kapteyn Institute, lecturer (∼20 students) 10/23–02/24

Hands-on Numerical Astrophysics School for Planet Formation Sciences, summer school, DFG priority programme 1992 "Exoplanet Diversity", Rauenberg, lecturer (∼30 students) 08/23

Star and Planet Formation, MSc course, Kapteyn Institute, co-lecturer (∼30 students) 02/23–04/23

External/Co-Examination & Defence Committees

24 examinations in total, incl. 7 PhD, 2 MSc, 15 BSc

Selected list. Full list online

PHD DEFENCES

Aditya Arabhavi, planet-forming materials around young stars with JWST, University of Groningen 09/25

Mark Oosterloo, CHNOS in the early stages of planet formation, University of Groningen 01/25

Francisco Ardévol Martinez, machine learning for exoplanets, University of Groningen 10/24

Keavin Moore, water on terrestrial planets around M dwarfs, McGill University 12/23

Bayron Armando Portilla Revelo, radiative transfer models of planet-forming disks, University of Groningen 12/23

Yapeng Zhang, isotopes and the characterization of extrasolar planets, Leiden Observatory 06/23

Mantas Zilinskas, atmospheres of lava worlds, Leiden Observatory 05/23

MSC AND BSC THESES

University of Groningen: 2 MSc and 15 BSc theses on exoplanet atmospheres and JWST data, the radius valley, the climate of Earth-like exoplanets, protoplanetary disk chemistry, non-LTE line diagnostics, and exoplanet host stars 06/23–07/26

Refereeing & Panel Service

AGU Advances, Astronomical Journal, Astronomy & Astrophysics, Astrophysical Journal, Astrophysical Journal Letters, Earth and Planetary Science Letters, Elements, Icarus, Journal of Geophysical Research: Planets, Monthly Notices of the Royal Astronomical Society, Nature, Nature Astronomy, Nature Communications, Planetary Science Journal, Proceedings of the National Academy of Sciences, Publications of the Astronomical Society of Australia, Science, Science Advances

Belgian Research Foundation (FWO), Cambridge University College Fellowships, Dutch Research Council (NWO), European Research Council (ERC), Max Planck Society (MPG), NASA Emerging Worlds program, NASA Hubble Fellowship Program (NHFP), Natural Sciences and Engineering Research Council of Canada (NSERC), Swiss National Science Foundation (SNSF), UK Research and Innovation (UKRI), US National Science Foundation (NSF)

Astrobiology Science Officer, EGU Planetary and Solar System Sciences Division 06/23–05/25

National & International Collaborations

4 observing programmes with 268.3 hr of telescope time, incl. 1 as PI; member of 11 consortia and research programmes

TELESCOPE TIME

INT/HARPS3 Semester 26B, SI2026b03: *High-Precision RVs for an Expanded Census of Stellar and Planetary Compositions* (62.2 hr), PI 07/26–

INT/HARPS3 Semester 26B, SI2026b01: *HARPS3-NEAR: A Radial-Velocity Census of the Nearest Sun-like Stars* (61.5 hr), PI: Snellen, Co-I 07/26–

JWST Cycle 4, GO 8864: *Surveying Hellish Worlds: Lava Planets as Time Capsules of Thermal Evolution* (100.4 hr), PI: Dang, Co-I 04/25–

JWST Cycle 2, GO 3860: *Phase Curve Observations of TOI-561 b To Study Atmosphere-Interior Exchange* (44.2 hr), PI: Teske, Co-I 02/23–

CONSORTIA & RESEARCH PROGRAMMES

NCCR Genesis (Directors: Queloz, Marin Carbonne), contributing expert in the project *Quantifying the detectability of life on exoplanets* (PI: Quanz) 06/26–

ELT Planetary Camera and Spectrograph (PCS), co-lead of the protoplanet science case 2025–

PRELIFE – Pathways, Reactions, and Environments leading to LIFE, NWO consortium (PI: ten Kate), Co-I and work package leader 11/24–

ESA PLATO mission consortium (PI: Rauer), Science Core Team member (since 2025), member of Exoplanet Science WPs *Atmospheres of PLATO Terrestrial Planets* (WP116400) and *Climate/ Atmospheres of PLATO Habitable Zone Planets* (WP116530) 12/21-

AEThER: Atmospheric Empirical, Theoretical, and Experimental Research, Carnegie-led research program (PI: Shahar), Co-I (since 2024, previously associate member) 09/21-

Alien Earths: Searching for Habitable Worlds in Nearby Planetary Systems, NASA (PI: Apai), associate member 03/21-

LIFE Collaboration (lead: Quanz), co-lead of the *Science Team* 02/21-01/26

NASA's Nexus for Exoplanet System Science, *Quantifying Habitability* working group 09/20-

ESA Ariel Consortium (PI: Tinetti), member of the *Exoplanetary Interiors* working group 04/20-

Simons Collaboration on the Origins of Life (SCOL project), Postdoctoral Fellow 10/19-09/22

Large Interferometer for Exoplanets (LIFE) Collaboration, member 01/19-

Conference & Workshop Organisation

30 events in total, incl. 8 as main organiser

Selected list. Full list online

Rocky Worlds Conference Series (main organiser & board member) Chair 07/22-

Rocky Worlds 5, Berlin, DE SOC 04/28

Lorentz Center Workshop *Characterizing Habitable Exoplanets With Interdisciplinary Expertise*, Leiden, NL SOC 04/26

Rocky Worlds IV (main organiser), Groningen, NL Chair 01/26

Science and Technology for the Era of LIFE, Barcelona, ES SOC 11/25

Lorentz Center Workshop *Atmospheric and interior evolution of planetary magma oceans* (main organiser), Leiden, NL Chair 10/25

Exoclimes VII, Montréal, CA SOC 07/25

Exoplanets V, Leiden, NL Convenor 06/24

Rocky Worlds III, ETH Zurich, CH SOC 01/24

Annual LIFE Science Team Workshop, Berlin, DE Co-Chair 09/23

Goldschmidt 2023, *Unraveling planetary interiors with extraterrestrial samples and space data*, Lyon, FR Convenor 07/23

Origins of Solar Systems Gordon Research Seminar (main organiser), South Hadley, US Co-Chair 06/23

The (geo)chemistry of terrestrial planet formation, Groningen, NL SOC & LOC 03/23

Rocky Worlds Discussions, monthly virtual seminar series (main organiser) SOC 10/22-09/24

Rocky Worlds II (main organiser), University of Oxford, UK Chair 07/22

AGU 2021 session *Multidisciplinary perspectives on the formation and early evolution of terrestrial worlds*, New Orleans, US Convenor 12/21

ESA PLATO Exoplanet Atmospheres Workshop, Berlin, DE SOC 12/21

Lorentz Center Workshop *LIFE – Large Interferometer for Exoplanets* (main organiser), Leiden, NL SOC 06/21

Advanced Teaching & Research Training Courses

14 courses in total, incl. 10 on teaching, education & supervision and 4 research schools

Selected list. Full list online

TEACHING, EDUCATION & SUPERVISION

Academic Leadership, University of Groningen, NL 09/25

University Teaching Qualification (UTQ), University of Groningen, NL 03/24

Active Bystander Training, Kapteyn Institute, NL 04/23

Coaching PhD students, University of Groningen, NL 01/23

Inclusive Leadership: The Power of Workplace Diversity, University of Colorado, US (online) 06/21

RESEARCH SCHOOLS

4 international research schools on star and planet formation, Solar System chronology and planetary geodynamics: 45th Saas-Fee Advanced Course (Les Diablerets, CH), Les Houches (FR), TRR 170 winter school (Hodenhagen, DE), ISSAC 2013 (UC Santa Cruz, US) 08/13-02/17

Outreach & Public Engagement

50+ outreach activities, incl. 15 media interviews & press features, 5 public talks & 2 panels, 16 blog posts & videos, 22 peer-reviewed Astrobites articles

Selected list. Full list online

MEDIA, PUBLIC TALKS & PRESS

Media interview, *Earth and Mars May Have Formed in Weirdly Different Ways*, The New York Times 10/26

Media interview, *Astronomen ontdekken de eerste rotsachtige exoplaneet met een atmosfeer*, KIJK Magazine 07/26

Press coverage for Nicholls et al. Nature Astronomy 2026 on the molten sulfur world L 98-59 d, primary feature *Molten Sulfurous World Blurs Exoplanet Categories* (Sky & Telescope), also covered in ABC News, Space.com, University of Groningen news, and others 03/26

Media interview, *Stormy planets and an unexpected atmosphere*, FSE Science Newsroom, University of Groningen 12/25

Media interviews for NASA, Space.com, phys.org, ScienceDaily, and others on TOI-561 b atmosphere detection 12/25

Joint public lecture *Time across scales*, Branco Weiss Lecture 2025, ETH Zurich, CH 11/25

Interview, *Quickfire Questions with Tim Lichtenberg*, Europlanet Magazine 09/25

Media interview, *This Blazing Exoplanet Breaks All the Rules about Alien Atmospheres*, Scientific American 09/25

Media interview, *Exoplanet plate tectonics: A new frontier in the hunt for alien life*, New Scientist 12/24

Media interview, podcast *Die knifflige Suche nach außerirdischem Leben*, Deutschlandfunk 12/24

Media interview, *What is a presumed sign of life doing on a dead comet?*, Science News 04/24

Biographical interview, *Welt der Physik*, Year of Science 2023, German Ministry for Science and Education 04/23

Press coverage for Lichtenberg+2021 *Science*, phys.org, ScienceDaily, UPI, SciTechDaily, and 36+ outlets 01/21

Press coverage for Lichtenberg+2019 *Nature Astronomy*, ETH Zurich, NCCR PlanetS, and 21+ outlets 02/19

Academic Associations

Memberships: International Astronomical Union, European Astronomical Society, Royal Astronomical Society, American Geophysical Union, European Geosciences Union, European Association of Geochemistry, Europlanet Society, Royal Netherlands Astronomical Society, German Astronomical Society, German Physical Society