

# 1) Curriculum Vitae - Hans Huybrighs

## Scientific career

*Jan. 2019 – Jan. 2022; ESA/ESTEC, Noordwijk, the Netherlands*  
**ESA postdoctoral research fellow**

- Investigating Europa's water plumes and the interaction of energetic ions with Jupiter's moons (Europa and Io)
- Scientific preparations of the JUICE mission.
- JUICE project management tasks
  - Design of JUICE information database (in close collaboration with JUICE project scientist)
  - Lead the design of the JUICE acronym database (in collaboration with IT team and JUICE project scientist)

## Education

*Jun. 2015 – Dec. 2018; Max Planck Institute of Solar System Research, Göttingen, Germany (Jun. 2016 – Dec, 2018). Swedish Institute of Space Physics (IRF), Kiruna, Sweden (Jun. 2015-Jun. 2016). Braunschweig University of Technology, Braunschweig, Germany.*

**PhD: "A search for signatures of Europa's atmosphere and plumes in Galileo charged particle data"**

*Sep. 2008 - May 2015; Delft University of Technology, Delft, the Netherlands*  
**Master of Science: Aerospace Engineering: Space Flight**  
**Bachelor: Aerospace Engineering**

## Awards and distinctions

- PhD cup 2020: Nominated for the PhD cup ([www.phdcup.be](http://www.phdcup.be)) . The PhD cup is a science communication competition for recent PhD graduates in Belgium. I was selected as 1 of 16 nominees out 81 applications.
- Editors' Pick in AGU Advances, my paper was selected as one of the Editors' Pick in the AGU Advances digest. 2020.
- Europlanet Science Congress - Science Flash - First Prize, three minute improvised science presentation. 2020.
- Famelab Delft 2019 winner: competition where scientists present their research in three minutes. Participated in Dutch national finals.
- PhD *Magna Cum Laude*, Braunschweig University of Technology, 2018
- MSc *Cum Laude*, Delft University of Technology in 2015.
- 'Bronzen Galileïprijs 2014': uitgereikt door Vereniging Voor Sterrenkunde voor contributies aan het populariseren van sterrenkunde.

## Contributions to the scientific community

2017 - now

### **Organisation of scientific conferences**

- Lead co-organiser: Outer planet moon-magnetosphere interaction workshop (November 2020)
- Session convener 'Environments of outer planet moons: particles, plasma, fields and dust': European Planetary Science Congress (Granada/online, September 2020)
- Early career events (social event, course on future research). European Planetary Science Congress (Granada/online, September 2020)
- Session co-convener 'Particle and plasma interactions in the ionospheres, exospheres and at surfaces of solar system bodies': European Geophysical Union General Assembly (Vienna/online, May 2020)
- Session co-convener 'Ocean Worlds and Icy Moons': European Planetary Science Congress (Genève, September 2019)
- Conference local organizing committee: Rocks and Stars II conference (Göttingen, 2017)
- Session co-convener: Rocks and Stars II conference (Göttingen, 2017)

Jun. 2019 - now

### **Founding of research fellow network at ESTEC**

Connect research fellows of the different departments

May 2019 - now

### **Europlanet Early Career Network: working group on future research**

Founded a working group to connect early career researchers to future research (organising talks, writing articles, conducting interviews...)

## Educational tasks

Jun. 2019 - now

### **Supervision of students as main supervisor**

- 2 BSc students (2.5 months summer 2019, summer 2020)
- 1 MSc student (Sept. 2019 - June 2020), University Leiden

2019

### **Seminars for students BSc/MSc about my research**

At the university of Delft (March) and Leiden (July)

## Science communication

2015-now

- Presentations for a non-scientific audience (both adults and kids) for schools, public observatories and others (science festival) in different countries (*Belgium*, the Netherlands, Germany, New Zealand and Iceland). Since 2019 on average more than one talk per month.

- *Cultural collaboration*: lecture with Jazz trio, space sarau with dancers and musicians, lecture astronomy and navigation (cultural collaboration Volkenkunde museum Leiden and Maori, native New Zealanders).
- Designing and performing workshops for kids
- Answering questions of journalists (de Volkskrant, Dutch radio, het Belang van Limburg, Gizmodo). Podcast day of science Belgium, 2020.
- Science shows (ESA open day 2019, Göttingen Night of Science 2017, hundreds of participants)
- Tours at the scientific institutes where I work
- Writing popular scientific articles (EOS wetenschap)

2008 - 2015

**Youth organisation for astronomy Descartes (Cosmodrome Genk, Belgium)**

Make kids and teenagers passionate about astronomy. Active members: 40-50. Workload: 6hrs/week. Activities every two weeks, summer camp, spring camp.

- September 2010 - August 2013: president (workload: 8 hours/week)
- 2011: responsible for the astronomy introduction course (>30 participants, 10 lessons)
- 2012: responsible for the yearly gathering of Belgian astronomy clubs with lecture of ESA astronaut Frank De Winne (>100 participants)
- 2012: responsible for ten day astronomy youth camp
- Since 2015: coaching of new generation of volunteers

## 2) Scientific publications

First author, published

- H. L. F. Huybrighs, E. Roussos, A. Blöcker, N. Krupp, Y. Futaana, S. Barabash, L. Z. Hadid, M. K. G. Holmberg, O. Lomax and O. Witasse. (2020). **An Active Plume Eruption on Europa During Galileo Flyby E26 as Indicated by Energetic Proton Depletions**. Geophysical Research Letters <https://doi.org/10.1029/2020GL087806>
- H.L.F. Huybrighs, Y. Futaana, S. Barabash, M. Wieser, P. Wurz, N. Krupp, K-H. Glassmeier, B. Vermeersen. (2017). **On the in-situ detectability of Europa's water vapour plumes from a flyby mission**. *Icarus*. <https://doi.org/10.1016/j.icarus.2016.10.026>

Co-author, published

- Gianluca Carnielli, M Galand, François Leblanc, L Leclercq, Ronan Modolo, A Beth, HLF Huybrighs, X Jia. (2019) **First 3D test particle model of Ganymede's ionosphere**. *Icarus*. <https://doi.org/10.1016/j.icarus.2019.04.016>

White papers (non-peer reviewed)

- F. Crary, G.B. Clark, P. Delamere, C. Dong, R.W. Ebert, C. Harris, G Hospodarsky, S. Hsu, H. Huybrighs, A. Kotova, T. Livengood, C. Paranicas, K. Retherford, E. Roussos, Y. Sarkango, J. Saur, J.R. Szalay, M. Vogt and L. Wang. **The Magnetosphere of Jupiter: Moving from Discoveries Towards Understanding**. White paper for NASA decadal survey, 2020.

### 3) Scientific presentations

#### Oral presentations at scientific conferences

- H. Huybrighs, C. van Buchem, A. Blöcker, E. Roussos, N. Krupp, V. Dols, Y. Futaana, S. Barabash, O. Witasse, M. Holmberg. *Plumes and atmospheric charge exchange as a cause of energetic ion losses near Europa and Io*. COSPAR Scientific Assembly. January 2021, Sydney, Australia.
- H.L.F. Huybrighs, E. Roussos, N. Krupp, M. Fraenz, Y. Futaana, S. Barabash. *Signatures of Europa's Atmosphere in Galileo Data*. Asia-Oceania Geophysics Society Congress 2019. Singapore. **Invited talk**.
- H.L.F. Huybrighs, E. Roussos, N. Krupp, M. Fraenz, Y. Futaana, S. Barabash. *Signatures of Europa's atmosphere in Galileo EPD data*. Outer planet moon-magnetosphere interactions 2019, Selfoss, Iceland.
- H.L.F. Huybrighs, Elias Roussos, Norbert Krupp, Markus Fraenz, Yoshifumi Futaana, Stas Barabash, Karl-Heinz Glassmeier. *Are there signatures of active Europa plumes in Galileo in-situ data?* European Planetary Science Congress 2017, Vienna, Austria.
- H. Huybrighs, E. Roussos, N. Krupp, M. Fränz, Y. Futaana, S. Barabash, K.-H. Glassmeier. *The search for signatures of Europa plumes in Galileo in-situ data*. Rocks 'n' Stars II, 2017, Göttingen, Germany.
- H. Huybrighs, Y. Futaana, S. Barabash, M. Wieser, P. Wurz, N. Krupp, E. Roussos, M. Fränz, K.-H. Glassmeier, and B. Vermeersen. *Feasibility study of the in-situ detectability of Europa's neutral and plasma plumes from a flyby mission*. Europa-Enceladus Plumes Workshop, Caltech, October 15, 2016.
- H. Huybrighs, Y. Futaana, S. Barabash, M. Wieser, P. Wurz, N. Krupp, K.-H. Glassmeier, and B. Vermeersen. *Feasibility study of in-situ measurements of Europa's neutral and plasma plumes with JUICE/PEP*. In: Geophysical Research Abstracts Vol. 18, EGU2016-13425, 2016 EGU General Assembly 2016, Vienna.

#### Poster presentations at scientific conferences

- H. Huybrighs, A. Blöcker, E. Roussos, C. van Buchem, N. Krupp, Y. Futaana, S. Barabash, M. Holmberg, and O. Witasse. *Energetic proton depletions near Europa: the effect of plumes, atmospheric charge exchange, Alfvén wings and the wake*. American Geophysical Union Fall Meeting 2020.
- R. Dayton-Oxland, H. Huybrighs, A. Mahieux, D. Goldstein, T. Winterhalder. *Impact of using a collisional plume model on detecting Europa's water plumes from a flyby*. Outer planet moon - magnetosphere interaction workshop 2020. ESA/ESTEC
- H. Huybrighs, A. Blöcker, E. Roussos, C. van Buchem, N. Krupp, Y. Futaana, S. Barabash, M. Holmberg, O. Witasse. *Energetic proton depletions near Europa: the effect of plumes, atmospheric charge exchange, Alfvén wings and the wake*. Outer planet moon - magnetosphere interaction workshop 2020. ESA/ESTEC
- H. Huybrighs, A. Blöcker, E. Roussos, C. van Buchem, N. Krupp, Y. Futaana, S. Barabash, M. Holmberg, and O. Witasse. *Energetic proton depletions near Europa: plumes, atmospheric charge exchange and Alfvén wings*. European Planetary Science Congress 2020. Granada/Online.

- C. van Buchem, H. Huybrighs, A. Blöcker, V. Dols, O. Witasse, and Y. Miguel. *Energetic proton depletion near Io: atmospheric charge exchange and inhomogeneous magnetic and electric fields*. European Planetary Science Congress 2020. Granada/Online.
- M. Holmberg, F. Cipriani, G. Déprez, C. Imhof, O. Witasse, N. Altobelli, H. Huybrighs, and J.-E. Wahlund. *Variability of the plasma environment of the Jovian magnetosphere and implications for future particle and fields measurements by JUICE*. European Planetary Science Congress 2020. Granada/Online.
- H. Huybrighs, C. van Buchem, A. Blöcker, E. Roussos, N. Krupp, V. Dols, F. Yoshifumi, S. Barabash, O. Witasse, M. Holmberg. *Energetic ion depletions near Europa and Io: the effect of plumes and atmospheric charge exchange*. European Geophysical Congress 2020, Vienna/online
- M. Holmberg, F. Cipriani, H. Huybrighs, L. Hadid, G. Deprez. *How are the Cassini in-situ measurements affected by the presence of the spacecraft? Spacecraft - plasma interaction simulation results compared to in-situ measurements*. The 16th Spacecraft Charging Technology Conference 2020, Florida, US.
- H. Huybrighs, E. Roussos, N. Krupp, M. Fränz, Y. Futaana, S. Barabash, A. Blöcker, V. Dols, and O. Witasse. *Energetic ion depletions near the Galilean moons: atmospheric interaction and indications of the charge state*. European Planetary Science Congress, 2019, Geneva. **Poster**.
- H.L.F. Huybrighs, E. Roussos, N. Krupp, M. Fraenz, Y. Futaana, S. Barabash, K.-H. Glassmeier. *Signatures of Europa's atmosphere in Galileo EPD data during the E12 flyby*. Magnetospheres of Outer Planets 2018.
- G. Carnielli, M. Galand, R. Modolo, F. Leblanc, A. Beth, H.L.F. Huybrighs, X. Jia *Constraining Ganymede's neutral and plasma environment through numerical simulations of its ionosphere*. Magnetospheres of Outer Planets 2018.
- G. Carnielli, M. Galand, R. Modolo, F. Leblanc, A. Beth, H.L.F. Huybrighs, X. Jia. *Constraining Ganymede's exosphere through numerical simulations of its ionosphere and Galileo observations*. European Planetary Science Congress 2018
- H.L.F. Huybrighs, E. Roussos, N. Krupp, M. Fraenz, Y. Futaana, S. Barabash, K.-H. Glassmeier. *The search for active Europa plumes in Galileo plasma particle detector data: the E12 flyby*. AGU fall meeting 2017. New Orleans, US.
- H. Huybrighs, E. Roussos, N. Krupp, M. Fraenz, Y. Futaana, S. Barabash, K.-H. Glassmeier. *The search for Europa plume signatures in Galileo plasma particle data*. Magnetospheres of Outer Planets 2017. Uppsala, Sweden.
- N. Krupp, M. Fraenz, E. Roussos, H. Huybrighs, S. Barabash, P.C. Brandt, C. Paranicas, D.G. Mitchell, Joseph Westlake, K. Khurana, X. Jia. *Electron measurements in the low latitude magnetosphere of Jupiter and in the vicinity of the Galilean moons: Current knowledge and future investigations with the PEP JEI and JoEE sensors onboard the JUICE spacecraft*. Magnetospheres of Outer Planets 2017. Uppsala, Sweden.
- H. Huybrighs, E. Roussos, N. Krupp, M. Fraenz, Y. Futaana, S. Barabash, and K.-H. Glassmeier. *The search for Europa plume signatures in Galileo in-situ data*. DPG Frühjahrstagung 2017 (German Physical Society Spring Meeting), Bremen, March 14, 2017.

## Seminars

- Europa's water plumes. Technical University of Delft. October 2020. **Invited**
- Europa's water plumes. European Space Agency Science Seminar. June 2020. **Invited**
- Europa's water plumes. Advanced concepts team European Space Agency. April 2020. **Invited**
- Signatures of plumes and atmospheric charge exchange in energetic ion data from Europa. ESA, November 2019.
- How do Jupiter's icy moons interact with the magnetosphere? Leiden University, July 2019. **Invited**
- Europa's water plumes, will we get to detect them with JUICE? ESAC, June 2019. **Invited**
- Europa's plumes and atmosphere, what we can (still) learn from Galileo's charged particle data. Technical University of Delft. March 2019. **Invited**
- *Getting something out of nothing. The search for Europa plume signatures in Galileo particle detector data.* Swedish Institute of Space Physics (IRF). 8th of June 2017. **Invited**
- *Tasting Europa's ocean The search for Europa plume signatures in Galileo particle detector data.* Max Planck Institute for Solar System Research. 10<sup>th</sup> of May 2017.
- *In-situ detectability of Europa's water vapour plumes.* Max Planck Institute for Solar System Research. 6th of July 2016.
- *Tasting Europa's ocean: the feasibility of in-situ observations of Europa's water vapour plumes.* Swedish Institute of Space Physics (IRF). 19th of Nov 2015. *PEP internal charging study: the results.* Swedish Institute of Space Physics (IRF). 20th of Feb 2014.

## 4) Overview science communication

### Presentations to non-scientific audiences (since 2016)

- Alien detective work. VVS/JVS weekend. Cosmodrome, Genk. 3 October 2020
- Alien detective work, PhD cup semi-finals, Brussels. 23 September 2020
- Manen van ijs en vuur (Moons of Ice and Fire). Sound of Science, science festival, 6 September 2020. (cancelled because of pandemic)
- Online presentation en Q&A about Starlink en BepiColombo. Youth organisation for Astronomy, Belgium, 3 May 2020
- Twintigduizend mijlen onder een buitenaardse zee (Twenty thousand leagues under an alien ocean). Sterrenwacht Copernicus. 16 April 2020 (cancelled because of pandemic)
- Manen van ijs en vuur (Moons of Ice and Fire). Descartes youth symposium. 28 March 2020 (cancelled because of pandemic)
- Online astronomy Q&A. International School of Amsterdam. 23 March 2020
- Watervulkanen op Europa, proeven van een buitenaardse oceaan (Water volcanoes on Europa, a taste of an extraterrestrial ocean). Galileo, KNVWS afd. Zuid-Limburg. 23 November 2019
- Moons of Ice and Fire. Space storytellers, ESA open day. Noordwijk, Nederland. 7 October 2019
- Science show exoplanets. ESA open day. Noordwijk, the Netherlands. 7 October 2019
- Science show moons. ESA open day. Noordwijk, the Netherlands. 7 October 2019
- Europa: a taste of an extraterrestrial ocean. Bessensap 2019, Amsterdam, the Netherlands. 21 June 2019
- Moons of Ice and Fire. Astronomy on Tap Leiden, Nederland. 27 May 2019
- Watervulkanen op Europa, proeven van een buitenaardse oceaan (Water volcanoes on Europa, a taste of an extraterrestrial ocean). JWG Leiden, Nederland. 10 May 2019
- Moons of Ice and Fire. Nederlandse Famelab Finale NL. Tivoli, Utrecht, the Netherlands. 9 May 2019
- Europa: a taste of an extraterrestrial ocean. Winning presentation Famelab Delft. 3 April 2019.
- Water volcanoes on Europa, tasting an extraterrestrial ocean. Sunnulækjarskóli, Selfoss, IJsland. 11 February 2019.
- Water volcanoes on Europa, tasting an extraterrestrial ocean.
- New Zealand Astrobiology Network (NZAN), Lower Hutt, New Zealand. 2 November 2018
- Water volcanoes on Europa, tasting an extraterrestrial ocean.
- Wellington Institute of Technology, Lower Hutt, New Zealand. 2 November 2018
- Water volcanoes on Europa, tasting an extraterrestrial ocean. Taita College, Lower Hutt, New Zealand. 2 November 2018.
- Water volcanoes on Europa, tasting an extraterrestrial ocean. Auckland Astronomical Society. Auckland, New Zealand. 22 October 2018.



- Watervulkanen op Europa, proeven van een buitenaardse oceaan (Water volcanoes on Europa, a tast of an extraterrestrial ocean). Cosmodrome, Genk, *Belgium*. 15 March 2018.
- Water volcanoes on Europa, tasting an extraterrestrial ocean. Otto-Hahn-Gymnasium, Göttingen, Germany. 30 November 2017.
- Planet 9. Summercamp JVS-Descartes, Zutendaal. July 2017.
- Volcanism in the solar system, science show. Night of Science. Max Planck Institute for Solar System Research, Göttingen, Duitsland. 21 January 2017.
- Water volcanoes on Europa: tasting an extraterrestrial ocean. Science Slam. Max Planck Institute for Solar System Research, Göttingen, Duitsland. 15 July 2016.

## Cultural collaborations

- Space sarau, Munganga theater, Amsterdam, 28 Mei 2020 (cancelled because of pandemic)
- Navigating by the stars. Maori weekend (visit of native New Zealanders), Museum Volkenkunde Leiden, 2 Mei (cancelled because of pandemic)
- Sounds of Interstellar Space, lecture with jazz trio Trifid. Noordwijk, Space Expo. 24 January 2020
- Sounds of Interstellar Space, lecture with jazz trio Trifid. Bovenkarspel, sterrenwacht Orion. 11 January 2020
- Sounds of Interstellar Space, lecture with jazz trio Trifid. Utrecht, sterrenwacht Sonnenborgh. 10 January 2020

## Written science communication

### Op-ed

- Kritische vragen over klimaatverandering zijn nuttig, maar we mogen niet in herhaling vallen (Critical questions about climate change are useful, but we shouldn't keep repeating ourselves). *Knack*, Januari 2019.

### Popular scientific writing

- Buitenaards detectivewerk (Extraterrestrial detective work). EOS wetenschap. September 2020.
- Neen, de eerste bewoonbare exoplaneet kennen we nog niet (No, we haven't identified the first habitable exoplanet yet). EOS wetenschap. Augustus 2020.
- De leefbare zone bestaat niet (The habitable zone doesn't exist). EOS wetenschap. February 2020.
- Manen van ijs en vuur (Moons of ice and fire). EOS wetenschap. November 2019.
- Twintigduizend mijlen onder een buitenaardse zee (Twenty thousand leagues under an alien ocean). EOS wetenschap, September 2019
- Water volcanoes on Europa, a tast of an extraterrestrial ocean. Heelal, Januari 2019.

- Plumes on Europa - tasting an extraterrestrial ocean. *Room, the space journal*. April 2017.
- In-situ observations of Europa's plumes. *Leonardo Times*. April 2016.

## Workshops

- Hoe weten we de Jupitermaan Europa een ondergrondse oceaan heeft? (How do we know that Jupiter's moon Europa has a subsurface ocean? Interactive online workshop). 14 November 2020, Jongerenvereniging voor Sterrenkunde, Belgium
- Hoe land ik op een andere planeet? (How to land on another planet) Sound of Science science festival. 5-6 September 2020 (cancelled because of pandemic)
- Hoe land ik op een andere planeet (how to land on another planet)? Kinderuniversiteit Antwerpen. 8 Maart 2020 (cancelled because of pandemic)
- Nepnieuws (fakenews): teach kids how to recognize fakenews and how to find reliable information on science. JVS-Descartes, Cosmodrome, Genk. 16 Maart 2019.
- Landen op een andere planet (how to land on another planet): Zomerkamp JVS-Descartes, Born *België*. 2014.