

# Curriculum Vitae – Hans Huybrighs

## Personal information

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## Scientific career

*Jun. 2015 – Jun. 2018 (expected)*

**PhD thesis: "Search for activity on Jupiter's moon Europa in Galileo particles and fields data combined with predictions for the upcoming Jupiter missions Europa Clipper and JUICE"**

*Max Planck Institute of Solar System Research ([MPS](#)), Göttingen, Germany*

*Swedish Institute of Space Physics ([IRF](#)), Kiruna, Sweden*

*Braunschweig University of Technology ([TUBS](#)), Braunschweig, Germany*

- I have identified new features in the Galileo data that may be consistent with active plumes, tasks:
  - Analysis of Galileo data (plasma particle sensors, magnetometer data)
  - Numerical modelling of particle trajectories (neutrals/ions) in Europa's magnetospheric environment
- Supervisors: MPS: Dr. Norbert Krupp, Dr. Elias Roussos. IRF: Prof. Stanislav Barabash, Dr. Yoshifumi Futaana. TUBS: Prof. Karl-Heinz Glassmeier

*Apr. 2014 – May 2015*

**Master thesis: "The feasibility of in-situ observations of Europa's water vapour plumes"**

*Swedish institute of Space Physic ([IRF](#)), Kiruna, Sweden*

*Delft University of Technology, Delft, the Netherlands.*

- I demonstrated it is feasible to detect charged and non-charged particles of Europa's plumes by the PEP instrument, by numerically modelling the particle trajectories. PEP (Particle Environment Package): instrument package on JUpiter ICy moon Explorer (JUICE) mission.  
Thesis grade: 9.5 out of 10. [Access thesis online](#)
- Supervisors: IRF: Prof. Stanislav Barabash and Dr. Yoshifumi Futaana, TU Delft: Prof. Bert Vermeersen.

*Sep. 2013 – Feb. 2014*

**Internship**

*Swedish Institute of Space Physics ([IRF](#)), Kiruna, Sweden*

- I demonstrated how much radiation shielding is needed to prevent internal discharging in the PEP instrument, in the environment of the Jupiter radiation belts, with simulations using DICTAT and MATLAB.
- Supervisors: Prof. Stanislav Barabash and research engineer Stefan Karlsson.

## Education

*Sep. 2012 - May 2015*

### **Master of Science: Aerospace Engineering: Space Flight**

*Delft University of Technology, Delft, the Netherlands.*

- Graduated Cum Laude
- Main course subjects: planetary science, data processing, space instrumentation, astrodynamics, space systems engineering and mission design

*Sep. 2008 - Aug. 2012*

### **Bachelor: Aerospace Engineering.**

*Delft University of Technology, Delft, the Netherlands.*

- Minor in Sustainable Energy Technology
- Bachelor thesis: 'Space based system to monitor the mass balance of the cryosphere' (grade: 8.0 out of 10).

## Awards and distinctions

- Graduated *Cum Laude* from Delft University of Technology in 2015.
- 'Bronzen Galileïprijs 2014' (Bronze Galileo Award): award from the VVS ([Vereniging Voor Sterrenkunde](#), association for astronomy in Belgium) to people who contribute to the popularization of astronomy.

## Scientific skills

- *Modelling*: numerical modelling of particle trajectories (ions/neutrals) with parallel computing. I have developed my own software package for this.
- *Data analysis*: analysis of data of Galileo plasma particle detector and magnetometer instruments, with instrument specific and own software packages

## Computer skills

- Programming languages: MATLAB, Java, IDL and Python (NumPy, SciPy, Matplotlib and others)
- Other: CATIA (3D CAD design software), DICTAT (internal charging simulation tool), Git (advanced version control software), LaTeX

## Languages

- Dutch: native
- English: professional working proficiency
- French: elementary

## Other scientific activities

*September 2017*

**Convenor of session “Planets, exoplanets and small bodies” and member of Local Organizing Committee**

*Rocks and Stars II conference, Göttingen. A three day conference on solar system science, participants > 100.*

*September 2017*

**Local organizing committee support**

*Annual meeting of the German Astronomical Society, Göttingen, participants > 300.*

## Outreach experience

*Aug. 2015 – currently*

**Coaching of new generation of volunteer board members**

*JVS-Descartes (astronomical youth organization, active members > 40)*

*Nov. 2008 – Aug. 2015*

**Volunteer board member.**

*JVS-Descartes (astronomical youth organization, active members > 40)*

- The workload was on average about 6-8 hours per week.
- September 2010 to August 2013: president of the board
- 2012: responsible for yearly gathering event of Belgian youth organizations for astronomy (>100 participants)
- 2012: responsible for the ten day astronomy summer camp

*Nov. 2008 – Dec 2012*

**Organization of introductory course on Astronomy for youth**

*Kattevennen-Europlanetarium VZW '[Cosmodrome](#)' (public observatory and science centre in Genk, Belgium)*

- yearly course consisting of ten lectures, two hours each
- > 30 participants (10-15 yrs old)
- Tasks: coordination of lectures, promotion, teaching (multiple lectures each year) and preparation of the lecture book.

*Jul. 2010 – Jul. 2012*

**Tour guide, planetarium- and telescope operator**

*Kattevennen-Europlanetarium VZW '[Cosmodrome](#)' (public observatory and science centre in Belgium, Genk)*

# Publications, conferences and seminars

## Peer reviewed publications

- 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 289, 270-280. <https://doi.org/10.1016/j.icarus.2016.10.026>

## Oral conference presentations

- Hans 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. [Access abstract online](#)
- 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.
- Hans Huybrighs, Yoshifumi Futaana, Stas Barabash, Martin Wieser, Peter Wurz, Norbert Krupp, Karl-Heinz Glassmeier, and Bert 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. [Access abstract online](#).

## Poster presentation at conferences

- Hans L.F. Huybrighs, Elias Roussos, Norbert Krupp, Markus Fraenz, Yoshifumi Futaana, Stas Barabash, Karl-Heinz Glassmeier. *The search for active Europa plumes in Galileo plasma particle detector data: the E12 flyby*. AGU fall meeting 2017.
- Hans Huybrighs, Elias Roussos, Norbert Krupp, Markus Fraenz, Yoshifumi Futaana, Stas Barabash, Karl-Heinz Glassmeier. *The search for Europa plume signatures in Galileo plasma particle data*. Magnetospheres of Outer Planets 2017. [Access abstract online](#)
- Norbert Krupp, Markus Fraenz, Elias Roussos, Hans Huybrighs, Stas Barabash, Pontus C. Brandt, Chris Paranicas, Donald G. Mitchell, Joseph Westlake, Krishan Khurana, Xianzhe 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. [Access abstract online](#)
- 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.

## Scientific seminars

- *Getting something out of nothing. The search for Europa plume signatures in Galileo particle detector data.* Swedish Institute of Space Physics (IRF). 8<sup>th</sup> of June 2017.
- *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. 6<sup>th</sup> 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). 19<sup>th</sup> of Nov 2015.
- *PEP internal charging study: the results.* Swedish Institute of Space Physics (IRF). 20<sup>th</sup> of Feb 2014.

## Popular science publications

- Hans Huybrighs. *In-situ observations of Europa's plumes.* Leonardo Times (TU Delft Journal). April 2016. Cover article, three pages inside.
- Articles discussing my paper (Huybrighs et al., 2017) were featured on several popular science websites such as Phys.org [[access online](#)] and Spaceflight Insider [[access online](#)]

## Popular science presentations

- *Geisers op Europa, proeven van een buitenaardse oceaan (Geisers on Europa, tasting an extraterrestrial ocean).* Popular science presentation at public observatory Cosmodrome, Genk, Belgium. February 2017.