

POU Sophal Laurent

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Work experience

- **2022 - current:** NASA Postdoctoral Program (NPP) Fellow at Jet Propulsion Laboratory (JPL) with Mark Panning, working on tidal quakes on Europa.
 - Co-Lead of the SEIS Data Processing Working Group in the InSight Science Team
 - Core member of the HERA working group 3, tasks 3 and 5 (internal structure – tidal evolution)
- **2019 - 2022:** Postdoctoral scholar at the University of California Santa Cruz with Francis Nimmo, working on data processing in the InSight team, the recovery of the Phobos tides and the tidal modeling of Mars for constraining its interior structure.
- **2016 – 2019:** PhD at ISAE-Supaero, Toulouse, France titled “Constraints on the internal structure of Mars and measurements of the Phobos tide for the InSight mission” funded by CNES + ANR, under David Mimoun and Raphaël Garcia. Work on the calibration of the SEIS instrument, the measurements of the Martian strains induced by the Phobos tides and calculations of the gravitational field and tidal stress of asteroids using the finite element method (metrology, signal processing, numerical modeling, gravimetry, geodesy, geophysics). Defense successful on the 18th of January, 2019.
- **April 2015 - October 2015:** Internship at the Observatory of Lyon on Adaptive optics using an iterative method for the very large European telescope E-ELT. Works on adaptive optics, data processing, atmospheric turbulence, and numerical analysis.
- **May 2014 - August 2014:** Internship at the Petroleum Institute at Abu Dhabi, United Arab Emirates, as assistant researcher for detecting defaults in pipelines using ultrasonic signals
- **October 2013 - April 2014:** Internship at Total, in the Exploration and Production, working on a program for calculating performances of gas turbines in Visual Basic (R&D)
- **July 2012 - August 2012:** Language course at Motosu, Japan followed by worker training at Ishioka, Japan

Studies

- **2016 - 2019:** PhD at ISAE-Supaero, Toulouse, France, with 168 hours of teaching at undergraduate level in mathematics and celestial mechanics
- **2011 - 2015:** Student at the engineering school ISAE-Supaero, the French institute of Aeronautics and Space, with lessons on aerodynamics, fluid dynamics, continuum mechanics, system engineering, mathematics, data processing, numerical modeling, and programming. Majoring in astrophysics.
- **2009 - 2011:** Preparatory classes: undergraduate intensive course for entrance examinations to the French Grandes Ecoles (Mathematics and Physics) in Le Parc high school
Research project about stellar spectroscopy and Doppler effect with the Observatory of Lyon.
- **2009:** French scientific baccalaureate with distinction, majoring Mathematics

Languages

- French (native speaker): Proficient in both written and verbal communications
- English: Very good in both written and verbal communications.
- Japanese: Good in both written and verbal communications
- German: Basic knowledge in both written and verbal communications

Hobbies

- Badminton, Biking, Drawing, Astronomy, Cooking

Publications

- **Pou L.**, Garcia R. F., Salaun M., Mimoun D., Karatekin O. (2022, in prep) Determination of the gravitational field of asteroid using the finite element method
- **Pou L.** and Nimmo F. (2022, in prep) Tidal Dissipation in Binaries of Asteroids Pairs

- **Pou L.**, Nimmo F., Rivoldini A., Plesa A., Khan A., Gray T., Bagheri A., Samuel H., Lognonné P., Gudkova T. (2022, in review) Tidal constraints on the Martian interior

- Kim D. et al. (2021) Potential Pitfalls in the Analysis and Structural Interpretation of Seismic Data from the Mars InSight Mission, *Bulletin of the Seismological Society of America* 2021;; 111 (6): 2982–3002. doi: <https://doi.org/10.1785/0120210123>
- **Pou L.**, Nimmo F., Mimoun D., Garcia R. F., Pinot B., Lognonné P., Rivoldini A., Banfield D., Banerdt W. B. (2021) Forward modeling of the Phobos tides and its applications, *Earth and Space Science*, 8, e2021EA001669. <https://doi.org/10.1029/2021EA001669>
- Stähler, S. et al. (2020) Geophysical observations of Phobos transits by InSight. *Geophysical Research Letters*, 47, e2020GL089099. <https://doi.org/10.1029/2020GL089099>
- Scholz, J-R. et al. (2020) Detection, analysis and removal of glitches from InSight's seismic data from Mars. *Earth and Space Science*, 7, e2020EA001317. <https://doi.org/10.1029/2020EA001317>
- Lognonné P. et al. (2020) Constraints on the shallow elastic and anelastic structure of Mars from InSight seismic data. *Nature Geosciences* 13, 213-220 <https://doi.org/10.1038/s41561-020-0536-y>
- Lognonné P. et al. (2019) SEIS: The Seismic Experiment for Internal Structure of InSight. *Space Science Reviews* <https://doi.org/10.1007/s11214-018-0574-6>
- **Pou L.**, Mimoun D., Lognonné P., Garcia R. F., Karatekin O., Nonon-Latapie M., Llorca-Cejudo R. (2019) High precision SEIS calibration for the InSight mission and its applications. *Space Science Reviews* (2019) 215: 6. <https://doi.org/10.1007/s11214-018-0561-y>
- Murdoch N., Hempel S., **Pou L.**, Cadu A., Garcia R. F., Mimoun D., Margerin L., Karatekin O. (2017) Probing the internal structure of the asteroid Didymos with a passive seismic investigation. *Planetary and Space Science* 144:89–105, <https://doi.org/10.1016/j.pss.2017.05.005>

Communications and posters

- Pou L. et al. (2022) Tidal constraints on the Martian interior, LPSC 2022
- Pou L. and Nimmo F. (2021) Tidal Dissipation in Binaries of Asteroids Pairs, LPSC 2021
- Pou L. et al. (2019) Forward modeling of the Phobos tides and its applications, AGU 2019
- Pou L. et al. (2019) Taking the pulse of Mars using the InSight VBB seismometer, EGU 2019 & LPSC 2019
- Pou L. et al. (2018) Determination of the Gravitational Potential and Tidal Stress of Asteroids using the Finite Element Method, EGU 2018 & LPSC 2018
- Pou L. et al. (2017) Tidal stress and failure in the moon of binary asteroid systems: Application to asteroid (65803) Didymos, EGU 2017
- Pou L. et al. (2016) Mars Deep Internal Structure determination using Phobos tide measurement strategy with the SEIS/InSight experiment, EGU 2016

Referents

- Francis Nimmo, Professor at University of California Santa Cruz, United States of America (supervisor, fnimmo@ucsc.edu)
- Raphael Garcia, Professor at ISAE-Supaero, France (raphael.garcia@isae-supaero.fr)
- David Mimoun, Professor at ISAE-Supaero, France (david.mimoun@isae-supaero.fr)