

Benoît Seignovert

ASTROPHYSICIST · RESEARCH ENGINEER · DATA SCIENTIST

Laboratory of Planetology and Geodynamics (LPG), Nantes, FR

✉ benoit.seignovert.fr

Employment

Laboratory of Planetology and Geodynamics (LPG)

CNRS RESEARCH ENGINEER

Nantes, France

Nov. 2020 - Oct. 2021

- Development of **coverage analysis** tool for ESA-JUICE mission, under contract with ESA.

Jet Propulsion Laboratory (NASA/JPL-Caltech)

POST-DOCTORAL RESEARCHER

Pasadena, CA USA

Oct. 2018 - Oct. 2020

- Mapping of Titan's specular reflexions during the Cassini mission.
- Analysis of lossy compression on hyperspectral datasets for outer-planets exploration.
- Characterization of Titan's clouds and haze structure

Laboratory of Planetology and Geodynamics (LPG)

RESEARCH ENGINEER / POST-DOCTORAL RESEARCHER

Nantes, France

Jan. - Sept. 2018

- Development of the **Cassini VIMS Data Portal**, a web interface for the calibrated Cassini-VIMS dataset.

Group of Molecular and Atmospheric Spectroscopy (GMSA)

RESEARCH ENGINEER

Reims, France

Oct. - Dec. 2017

- Development of analysis tools for the Cassini-ISS instrument.

Education

University of Reims Champagne-Ardenne

DOCTOR OF PHILOSOPHY (ASTRONOMY & ASTROPHYSICS)

Reims, France

2014 - 2017

- Thesis title: **Analysis of Titan's Detached Haze Layer with Cassini-ISS instrument**
- Supervisors: Pr. Pascal RANNOU and Dr. Panayotis LAVAS

École Normale Supérieure of Lyon

BACHELOR AND MASTER DEGREE IN EARTH AND PLANETARY SCIENCE (WITH HONOURS)

Lyon, France

2011 - 2014

Research Internships

Cassini high resolution navigation with star catalogues

SUPERVISOR: ROBERT A. WEST

JPL, Pasadena, USA

Mar. - Apr. 2017

- Full calibration and deconvolution of ISS data
- Star navigation with the Tycho & GAIA catalogues

Modeling radar response of Linear Dunes and Mega-Yardangs on Earth and Titan

SUPERVISOR: PHILIPPE PAILLOU

LAB, Bordeaux, France

Jan. - Jul. 2014

- Cassini and TerraSAR-X radar image analysis
- SRTM and GDEM data processing
- Radar backscattering modeling

Cassini VIMS image processing on Titan

SUPERVISOR: CHRISTOPHE SOTIN

JPL, Pasadena, USA

May - Aug. 2013

- Hyperspectral infrared image processing
- Image navigation and mapping
- Gravitational fields analysis

Analysis on stable tungsten isotopes in iron meteorites

SUPERVISORS: BRETON THOMAS & QUITTÉ GHYLAINE

ÉNSL, Lyon, France

Jan. - Apr. 2013

- Iron meteorites sampling
- Isotopic chemistry extraction
- ICP mass spectrometry

First-author publications:

- 3 MAPPING VIMS SPECULAR REFLECTIONS ON TITAN'S SURFACE DURING THE CASSINI MISSION in prep.
Seignovert B., Sotin C., Seignovert B., Lawrence K.J. & Heslar M.
- 2 HAZE SEASONAL VARIATIONS OF TITAN'S UPPER ATMOSPHERE DURING THE CASSINI MISSION 2021
Seignovert B., Rannou P., West R.A. & Vinatier S. Astrophysical Journal
- 1 AEROSOLS OPTICAL PROPERTIES IN TITAN'S DETACHED HAZE LAYER BEFORE THE EQUINOX 2017
Seignovert B., Rannou P., Lavvas P., Cours T. & West R.A. Icarus

Second-author publications:

- 3 TITAN'S DETACHED HAZE SEASONAL CYCLE 2018
West, R.A., Seignovert B., Rannou P., Dumont Ph., Turtle, P., Perry J., Roy M. & Ovanessian A. Nature Astronomy
- 2 TRANSPARENCY OF 2 μm WINDOW OF TITAN'S ATMOSPHERE 2017
Rannou P., Seignovert B., Le Mouélic S., Maltagliati L. & Sotin C. Planetary and Space Science
- 1 RADAR SCATTERING OF LINEAR DUNES AND MEGA-YARDANGS: APPLICATION TO TITAN 2016
Paillou Ph., Seignovert B., Radebaugh J. & Wall S. Icarus

N-author publications:

- 12 EUROPA CLIPPER PREPARATORY PHOTOMETRY TO CONSTRAIN SURFACE PROPERTIES 2021
Dhingra R.D., Buratti B.J. & Seignovert B. Planetary Science Journal
- 11 TITAN: EARTH-LIKE ON THE OUTSIDE, OCEAN WORLD ON THE INSIDE 2021
MacKenzie S. and 32 colleagues Planetary Science Journal
- 10 COMPRESSION ALGORITHMS FOR BIG DATA IN PLANETARY AND EXOPLANETARY MISSIONS 2021
Xie H., West R.A., Seignovert B., Jewell J., Kurth W. & Averkam T. JATIS
- 9 DISTRIBUTION AND INTENSITY OF WATER ICE SIGNATURE IN SOUTH XANADU AND TUI REGIO 2021
Coutelier M., Cordier D., Seignovert B. & Rannou P. Icarus
- 8 SUN GLITTER ON TITAN'S KRAKEN MARE: EVIDENCE FOR TIDAL CURRENTS AND WIND WAVES 2020
Heslar M., Barnes J., Soderblom J., Dhingra R., Seignovert B. & Sotin C. Planetary Science Journal
- 7 TEMPERATURE AND CHEMICAL SPECIES DISTRIBUTIONS IN THE STRATOSPHERE AND MESOSPHERE OF TITAN FROM MID-NORTHERN SPRING TO EARLY SUMMER 2020
Vinatier, S., Mathé, C., Bézard, B., Vasant d'Ollone, J., Lebonnois, S., Dauphin, C., Seignovert, B., Sylvestre, M., Teanby, N.A., Achterberg, R.K., Flasar, F.M., Goriuss, N., Jennings, D.E., Mamoutkine, A. & Guandique, E. Astronomy & Astrophysics
- 6 INVESTIGATING LUNAR BOULDERS AT THE APOLLO 17 LANDING SITE USING PHOTOGRAMMETRY AND VIRTUAL REALITY 2020
Le Mouélic S., Enguehard P., Schmitt H.H., Caravaca G., Seignovert B., Mangold N., Combe J-Ph. & Civet F. Remote sensing
- 5 PHOTOMETRICALLY-CORRECTED GLOBAL INFRARED MOSAICS OF ENCELADUS: NEW IMPLICATIONS FOR ITS SPECTRAL DIVERSITY AND GEOLOGICAL ACTIVITY 2020
Robidel R., Le Mouélic S., Tobie G., Massé M., Seignovert B., Sotin C. Icarus
- 4 SPICEYPY: A PYTHONIC WRAPPER FOR THE SPICE TOOLKIT 2020
Annex A.M., Pearson B., Seignovert B., Carcich B.T., Eichhorn H., Mapel J.A., Freiherr von Forstner J.L., McAuliffe J., del Rio J.D., Berry K.L., Aye K.M., Steffo M., de Val-Borro M., Kulamani S. & Murakami S. JOSS
- 3 THE 3.4 μm ABSORPTION OF THE TITAN'S STRATOSPHERE: CONTRIBUTION OF ETHANE, PROPANE, BUTANE AND COMPLEX HYDROGENATED ORGANICS 2020
Cours T., Cordier D., Seignovert B., Maltagliati L. & Biennier L. Icarus
- 2 THE CASSINI VIMS ARCHIVE OF TITAN: FROM BROWSE PRODUCTS TO GLOBAL INFRARED COLOR MAPS 2019
Le Mouélic S., Cornet T., Rodriguez S., Sotin C., Seignovert B., Barnes J.W., Brown R.H., Baines K.H., Buratti B.J., Clark R.N., Nicholson Ph.D., Lasue J. & Soderblom J. Icarus
- 1 MAPPING POLAR ATMOSPHERIC FEATURES ON TITAN WITH VIMS: FROM THE DISSIPATION OF THE NORTHERN CLOUD TO THE ONSET OF A SOUTHERN POLAR VORTEX 2018
Le Mouélic S., Rodriguez S., Robidel R., Rousseau B., Seignovert B., Sotin C., Barnes J.W., Brown R.H., Baines K.H., Buratti B.J., Clark R.N., Nicholson Ph.D., Rannou P. & Cornet T. Icarus

Seminars & Conference Talks

2021	5th Planetary Data Workshop (PDW)	<i>Virtual Conference</i>
2020	American Geophysical Union (AGU)	<i>Virtual Conference</i>
	European Planetary Science Congress (EPSC)	<i>Virtual Conference</i>
	Titan Through Time , <i>cancelled</i>	<i>Boulder, USA</i>
	51th Lunar and Planetary Science Conference (LPSC) , <i>cancelled</i>	<i>The Woodlands, USA</i>
2019	American Geophysical Union (AGU)	<i>San Francisco, USA</i>
	Titan Surface Meeting - Titan after Cassini Huygens	<i>Madrid, Spain</i>
	European Planetary Science Congress (EPSC)	<i>Geneva, Switzerland</i>
	50th Lunar and Planetary Science Conference (LPSC)	<i>The Woodlands, USA</i>
	NASA Astrobiology Institute workshop (NAI)	<i>Pasadena, USA</i>
2018	European Planetary Science Congress (EPSC)	<i>Berlin, Germany</i>
	Committee on Space Research (COSPAR)	<i>Pasadena, USA</i>
	European Geosciences Union (EGU)	<i>Vienna, Austria</i>
2017	European Planetary Science Congress (EPSC)	<i>Riga, Latvia</i>
	European Geosciences Union (EGU)	<i>Vienna, Austria</i>
	48th Lunar and Planetary Science Conference (LPSC)	<i>Houston, USA</i>
2016	Division for Planetary Science (DPS)	<i>Pasadena, USA</i>
	Titan Surface Meeting (TSW)	<i>Paris, France</i>
	Titan Aeronomy and Climate workshop (TAC)	<i>Reims, France</i>
2015	European Planetary Science Congress (EPSC)	<i>Nantes, France</i>
2014	Reunion des Sciences de la Terre (RST)	<i>Pau, France</i>
	Workshop on the Habitability of Icy Worlds	<i>Pasadena, USA</i>
2013	American Geophysical Union (AGU)	<i>San Francisco, USA</i>
	European Geological Union (EGU)	<i>Vienna, France</i>
2012	Annual Meteoritical Society Meeting (MetSoc)	<i>Cairns, Australia</i>

Training

Summer schools

Jun. 2015	Spec-Atmos , CNRS	<i>Fréjus, France</i>
Jul. 2014	Space missions for geophysics of the terrestrial planets , ESA/FFG/CNES	<i>Alpbach, Austria</i>

Field works

Oct. 2012	Stratigraphy analysis of sedimentary basin	<i>Blieux, France</i>
Oct. 2012	Geomorphology in ophiolitic context	<i>Mt Chenaillet, France</i>
May 2012	Sedimentology, Metamorphism and Volcanism	<i>Tournon & Puy de Sancy, France</i>
Apr. 2012	Marine Seismology	<i>Nice, France</i>
2011	Initiation to geology field work / Geology Mapping , 2 weeks	<i>Le Mas/Cucugnan, France</i>

Honors & Awards

2018 – 2020	Postdoctoral Scholarship , Jet Propulsion Laboratory	<i>Pasadena, CA, USA</i>
2014 – 2017	Doctor of Philosophy Scholarship , French Ministry of Research	<i>Reims, France</i>
2014	ESA summer school Alpbach grant , CNES	<i>Alpbach, Austria</i>
2013	EXPLORA travel grant for international interns , Rhône-Alpes region	<i>Pasadena, USA</i>

Outreach

2020	Enceladus in Infrared	<i>Astronomical Picture Of the Day</i>
	Enceladus in the Infrared - PIA 24023	<i>NASA JPL Photo Journal</i>
2018	Titan comme vous ne l'avez jamais vu	<i>Ciel & Espace</i>
	Seeing Titan	<i>Astronomical Picture Of the Day</i>
	Seeing Titan with Infrared Eyes - PIA 21923	<i>NASA JPL Photo Journal</i>
2015	Airburst over Chelyabinsk and small impactors	<i>GSMA Journal Club</i>
2014	La chute de la météorite de Tcheliabinsk (Russie) du 15 février 2013, un an après	<i>Planet Terre</i>

Leadership & Community Service

Open source projects

900+ CONTRIBUTIONS IN 2018, 1,200+ IN 2019, 400+ IN 2020.

Python modules

10 PACKAGES.

ESA/JUICE moon-coverage tool

MAIN DEVELOPER.

Pole Surface Planétaires

ADMIN & MEMBER.

PyVIMS toolbox

FOUNDER & MAIN DEVELOPER.

Cassini VIMS Data Portal

DESIGNER & WEBMASTER: vims.univ-nantes.fr

Fireball Recovery and InterPlanetary Observation Network (FRIPON)

MEMBER & LOCAL TECHNICAL SUPPORT

Astro-Café Parisien

MEMBER

Titan Aeronomy & Climate workshop

CO-ORGANIZER & WEBMASTER: planeto.univ-reims.fr/tac

ÉNS Lyon Astro club – têteENSI'air

PRESIDENT & WEBMASTER: bde.ens-lyon.fr/clubs/astro

Github

2015-2021

PyPI / Conda

2018-2021

Gitlab / ESA DataLabs

2020-2021

Github

2021

Github / Blender

2018-2021

Nantes, France

2018-2019

Reims, France

2016-2017

Paris, France

2016-2017

Reims, France

2016

Lyon, France

2011-2014

Skills

Programming

Python, Fortran, C, Matlab, Julia, Bash, T_EX

Data analysis

NAIF-SPICE, USGS-ISIS, QGIS/ArcGIS, IDL/ENVI

Web-Frontend

HTML5, CSS, JS (React/Vue/Three/D3), Sphinx, Swagger

Web-Backend

PHP (Symfony/ApiPlatform), Django/Flask, nodeJS, Golang

Database

SQLite, MySQL

Management

Git (PR/CI/CD), Docker, Composer/Yarn/NPM, Webpack/Gulp, Apache/Nginx

Photography

Lightroom, Photoshop, Inkscape, PTGui

Virtual Reality

Povray, ThreeJS, Unity, Blender

Video

DaVinci Resolve

Activities

Astronomy

Nightscape to deep field observation and survey

Photography

Digital / B&W film capture and processing: photos.seignovert.fr

Sports

Walking/Hiking/Trekking, Skiing, Climbing, Mountain biking

Music

Flutist, Oboist, Rock band bassist

Other

Citizenship

French

Birth year

1990 (31 years old)

Languages

French (native), English, Russian, German, Ancient Greek

Driving

California Class C/French B/European licence