

William Rapin

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PLANETARY MISSION COLLABORATOR

Mars 2020 Rover – SuperCam instrument (2018 – present):

- Training on rover operations. Calibration of LIBS and Raman signal of sulfates, clays, organics.

Mars Science Laboratory Rover – ChemCam instrument (2013 – present):

- Lead on MSL – ChemCam operations. Tactical and strategic planning of science activities.
- Developed a GUI imaging software and pipeline for contextualization of rover data.
- Laboratory calibration of ChemCam hydrogen and sulfur LIBS signal.

PROFESSIONAL EXPERIENCE

CNRS Research Scientist - IRAP, 2020-present, *Toulouse*, IMPMC/MNHN collaboration, *Paris, France*

- Evolution of water on Mars, new perspectives: *in situ* geochemistry, mineralogy and sedimentology.

Postdoctoral Researcher - CNRS, IMPMC - Sorbonne Université, Feb-Nov 2020, *Paris, France*

- Gale crater paleoenvironments (MSL) and terrestrial analogs on Jezero crater carbonates (Mars2020)

Postdoctoral Scholar - Caltech Geological and Planetary Sciences, 2017-2020, *Caltech/JPL, CA*:

- Identification of hydrated minerals using MSL/Curiosity data and paleoenvironmental implications.
- Calibration of ChemCam sulfur signal to quantify sulfates and comparison to orbital observations.

PhD Student - MSL Science Team, ChemCam Payload Uplink Lead, 2013-2016, *IRAP, France*:

- Thesis: “Hydration of the Martian surface using MSL Curiosity rover data”, detection of water-bearing minerals at Gale Crater: sulfates, clays, opals, apatites, using a new hydrogen quantification technique.
- Design and management of the ChemCam replica testbed with Mars chamber to calibrate LIBS data.
- Collaborated with five institutions to produce a suite of diverse well-characterized calibration samples.

Graduate Student Research Assistant: Mar-Sep 2013, *IRAP/CNES*. Characterization of Martian soils using ChemCam data, detection of felsic and mafic grain components on Mars.

System Engineer Assistant - NASA InSight, Jan-Jun 2012, *CNES/IRAP/ISAE, Toulouse, France*.

Science requirements definition and noise budget for the high precision and broad range seismometer (SEIS) during phase A before selection as Discovery class mission in Jul 2012.

Research Assistant at NASA Kepler Science Office, Jun-Dec 2012, *NASA ARC, CA*. Worked with the Kepler science team on planet candidates in the habitable zone, validation of Kepler-22b.

Member of ESA ESEO / ESMO Teams, 2010-2011, *ISAE, Toulouse, France*. Phase B Star Tracker instrument design, point of contact with SSTL Ltd UK to lead breadboard model development.

EDUCATION

Ph.D., Univ. Toulouse Paul Sabatier, graduated in Nov. 2016 (advisors: S. Maurice, P.-Y. Meslin)

M.Sc., in **Planetary Sciences and Astrophysics**, Univ. Toulouse Paul Sabatier, 2013

M.Sc., in **Aerospace Engineering**, ISAE-SUPAERO Graduate Program, 2013

Majors: Space Systems Design, Multiscale Multiphysics modeling, HPC, Astrophysics

Undergraduate studies for national preparatory program, 2007-09, Maths, Physics, Chemistry and Engineering Sciences, Lycée M. Monplaisir, *Lyon, France*

NASA Ames Academy for Space Exploration, June-August 2011, selected by NASA and CNES for one of the most intensive student summer program funded by NASA

AWARDS

2018 Elsevier Spect. Acta B: Atomic Spectroscopy Award for the most significant contribution of 2017

2017 Haüy-Lacroix Award from the French Society for Mineralogy and Crystallography

2015 NASA Group Achievement Award, MSL Prime Mission Science and Operations Team

2015 French Academy of Science Award for Scientific Knowledge Outreach
2013 3AF Honor Award for Commitment and Passion in Aerospace Sciences
2013 CNES / Novespace space science contest for a flight onboard A300 Zero-G
2012 NASA Group Achievement Award, Ames Honor Award to Kepler Science Conference Committee

CODING AND SOFTWARE

Proficient on Matlab, Python and IDL for data analysis in large collaborations, MSL and instrument teams.
Prototyped and supervised development of imaging pipeline for MSL-ChemCam data.
Experienced with Java and C/C++ for development of GUI and flight software.
Trained on VHDL to implement electronic components on FPGA devices.
IDE: Anaconda Spyder, Eclipse, Codeblocks
Creative: Adobe Illustrator, Photoshop, Premiere, Dreamweaver
CAD: SolidWorks, CATIA

TEACHING / ADVISING

Teaching Assistant at ISAE-SUPAERO, 2014-2015 (64 teaching hours), Orbital Mechanics, Space System Engineering, Computer Science

Supervised three students conducting Masters research projects and three Undergrad. student projects: Trained students on the analysis of Mars data, instrument design, calibration of spectroscopic signals and development of components for the ChemCam laboratory testbed.

OUTREACH ACTIVITIES

Collaboration with artists on art exhibitions:

- Artist Felicie d'Estienne d'Orves on installation depicting a Martian sunset, 2017-present
- Photographer Diana Lui on ChemCam and SuperCam art with photosensitive substrates 2016-present

Public exhibition "lasergrams" at museum of art with Diana Lui, Nov. 2016, *Abattoirs, Toulouse, France*

Public Seminar « Flowing water on Mars, what's next ? », Nov. 2015, *Space Museum, Toulouse, France*

TV live evening interview France 3 Midi-Pyrénées, on discovery of Martian brine-flows, Sep. 2015

Stratospheric balloon design and launch by high school students, planning and managing educational activities for 900 children and teenagers over a week, live contact with ISS, ESA astronauts venue, initiation to astronomy, August 2014 and 2015, *Fleurance, France*

Organizing "PhD Thesis Day", PhD students orals, and posters conference, 2015, *at IRAP/CNRS*

Public opening ceremony of Novela science festival "Team work in research", Oct 2014, *Toulouse, France*

Public panel, Novela, « Mars exploration and the search alien life », Oct. 2013, *Toulouse, France*

Conference for high school classes on space exploration, Novela, Oct. 2013, *Toulouse, France*

COMMUNITY AND PROFESSIONAL SOCIETIES

NASA Academy Alumni Association, since 2011

Astronomy Festival team, outreach festival, "Astrojeunes, Univerciel", 2013-2016

9th IPPW Organizing Committee, 2012

1st Kepler Science Conference Local Committee, 2011

ISAE-SUPAERO Space association founder, organized seminars and institution visits, 2010-2011

Astronomy club at ISAE-SUPAERO, administrator, 2010-2011

LANGUAGE SKILLS

French: native tongue

German: intermediate, several stays in Germany

English: fluent

Japanese: intermediate, 2 years of study, 2 months in Japan