

Tanguy BERTRAND

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Astronomer / planetary scientist at Observatoire de Paris

Employment and Education	
April 2021 – Present <i>LESIA Paris Obs. France</i>	Permanent astronomer planetary scientist , LESIA, Paris-Meudon Observatory, France <ul style="list-style-type: none">- Research Collaborator on the MMX/MIRS team (Mars/Phobos mission)- Science team member on Mars2020/SuperCam and collaborator on Mastcam-Z team (Mars)- Science team member of New Horizons (Pluto)- Numerical modeling of the climates of Mars, Triton and Pluto. Development of a hierarchy of models (1D, 2D, 3D), data analysis, and study of their climate. Observations with JWST.- PI of the ANR SHERPAS project, aiming at understanding numerous physical and dynamical processes occurring on Pluto and Triton.- Observations of the Pluto system with JWST (data acquired in Oct. 2022).- Co-supervisor of a PhD student at LMD (Thomas Pierron)
January 2018 – April 2021 <i>NASA Ames USA</i>	NASA Postdoctoral Fellow , NASA Ames Research Center, Mountain View, CA USA Grant 2018-2020: NASA Postdoctoral Program. Advisor: Melinda Kahre <ul style="list-style-type: none">- Mars Climate Modeling Team: 3D modeling of the dust and water cycles on Mars. Development of new numerical « multi-tracer » methods for the 3D NASA Mars Global Climate Model to better simulate and understand the formation and evolution of dust storms and water ice clouds. Complete characterization of the 2018 Global Dust Storm.- NASA Solar System Workings Grant for 2021-2023: Modeling global dust storms of Mars- Numerical modeling of Triton's and Pluto's climates.- Preparation of observations of Triton and Pluto with the space telescopes HST and JWST
October 2014 – December 2017 <i>UPMC, France</i>	PhD student at the Laboratoire de Météorologie Dynamique , UPMC, Paris Thesis: « Preparation and analysis of the observations of Pluto's ices and atmosphere by the NASA New Horizons spacecraft using numerical climate models ». Advisor: François Forget Development of various analytical and numerical models to study the dynamical and physical processes at work on Pluto, comparisons with New Horizons observations.
October 2012 – October 2014 <i>UPMC, France</i>	Research engineer at the Laboratoire de Météorologie Dynamique , UPMC, Paris Development of the LMD Martian global climate model. Main research activities: <ul style="list-style-type: none">- Landing site characterization and engineering studies for the Entry, Descent and Landing environment of the InSight and ExoMars missions, using a Martian mesoscale climate model.- Modeling of the Martian environment and performances of the MARBL instrument (wind LIDAR) in the context of the call for proposal for the NASA Mars-2020 rover.- Modeling of dust storms and detached layers of dust in the Global Climate Model of Mars.
2011 - 2012 <i>UK</i>	Final-year Master degree: Double Engineering and MSc degree <ul style="list-style-type: none">- MSc in Astronautics and Space Engineering, Cranfield University- Master of Engineering, École Centrale de Nantes
2011 (4 months) <i>France</i>	Research internship , LATMOS, Paris Development of IDL algorithms reproducing the spectral measurements of the ESA TIMM-2 spectrometer (for the PHOBOS-GRUNT mission) taking into account the instruments specifications.
2009 - 2011	Student in the engineering school École Centrale de Nantes , France

Teaching activities

- Teaching during PhD at l'Université Pierre et Marie Curie (2014-2017)
 - Integrated courses, tutorials and exercises of numerical methods and algorithm optimizations (44h)
 - Supervising climate physics projects (24h) and Fortran projects (20h)
 - Courses and exercises of Thermodynamics, energetics and flight mechanics (24h), fluid mechanics (16h)
- Supervision of a master student for a 3-month internship on the theme « The paleoclimates of Pluto » (2016)

Honors and Awards

- Recipient of an **ANR grant**: Pluto's SHERPAS “Studying HazE Radiative Processes and Atmosphere-Surface interactions”. Starting in 2024. Funding for 1 Engineer (LMD), 1 Postdoc (LESIA), 1 PhD (LPG)
- Recipient of a **NASA grant Solar System Workings** (2020) – PI, Funding for 14.8 months total (1.4 FTE over 3 years)
 - Grant title: “Modeling the Global Dust Storms Of Mars With New Numerical Methods”
- Recipient of a **NASA grant New Frontier Data Analysis** (2019) – Co-I, Funding for 7 months total
 - Grant title: “Modeling gravity waves in Pluto’s atmosphere”. PI: Leslie Young, Southwest Research Institute
- Recipient of a **NASA Postdoctoral Program grant** (2017) – PI, Funding for 2 years
 - Grant title: “Investigating the closure of the dust and water cycle on current Mars by implementing the tagging method in the NASA Ames GCM”
- **PhD Prize for best thesis in 2018 from the Chancellerie des Universités de Paris (Aguirre-Basualdo, Science)**
- **2014-2017: Graduate Student Grant in Astrophysics and Astronomy**
- **Invited talks :**
 - Book Chapter presentation at the conference « Pluto System After New Horizons » in July 2019 : « Pluto's Atmosphere Dynamics: How the Nitrogen Heart Regulates the Circulation »
 - American Geophysical Union in December 2014 : «What Are the Origins of Detached Layers of Dust on Mars ? Investigation with a Global Climate Model ».
- « My thesis in 5 minutes » (2nd place), organized by the astronomy journal « Ciel et Espace » (2014)

Outreach Activities

Two articles for the Journal “La Recherche” (a French equivalent of “Scientific American”):

- **Bertrand, T.** and Forget, F. Pluton explorée aussi en version numérique. *Sept. 2017, N527.*
- **Bertrand, T.** and Forget, F. Simuler Pluton pour comprendre son climat. Hors série La Recherche: le Système solaire et ses planètes, *Sept 2017.*

Contribution to the writing of articles in “Pour la Science” and “Science et Vie Junior” (general public scientific journals).