

# Tanguy BERTRAND

1725 Wright Avenue Apt 49  
Mountain View  
94043 CA, USA  
28 years old (02/03/1989)

Phone: +1 650 537 5334 / +1 650 604 1488 (office)

Email: [tanguy.bertrand@nasa.gov](mailto:tanguy.bertrand@nasa.gov)

Personal web page: <http://www.lmd.jussieu.fr/~tbertrand/>

## Astrophysics - Planetary science PhD at University Pierre et Marie Curie, Paris

### Work Experience and Education

2018 USA	<b>NASA Postdoctoral Fellow</b> , NASA Ames Research Center, Mountain View, CA USA <b>Grant:</b> NASA Postdoctoral Programm, supervised by Melinda Kahre Mars Climate Modeling Team: implementation of new numerical methods in Mars climate models
2014 - 2017 France	<b>PhD student at the Laboratoire de Météorologie Dynamique</b> , UPMC, Paris « <b>Preparation and analysis of the observations of Pluto's ices and atmosphere by the NASA New Horizons spacecraft using numerical climate models</b> ». Advisor: François Forget Development of various analytical models and numerical codes to study the dynamical and physical processes at work on Pluto, comparisons with New Horizons observations and interactions with the New Horizons team. <b>PhD Prize 2018 from the Chancellerie des Universités de Paris (Aguirre-Basualdo, Science)</b>
2012 - 2014 France	<b>Research engineer at the Laboratoire de Météorologie Dynamique</b> , UPMC, Paris Development of the LMD Martian global climate model. Main research activities: <ul style="list-style-type: none"><li>- Engineering studies for the Entry, Descent and Landing environment of the InSight and ExoMars missions, using a Martian mesoscale model.</li><li>- Modeling of the Martian environment and performances of the MARBL instrument (wind LIDAR) in the context of the call for proposal for the NASA 2020 Martian rover.</li><li>- Modeling of dust storms and detached layers of dust in the Global Climate Model of Mars.</li></ul>
2011 - 2012 UK	<b>Final-year Master degree: Double Engineering and MSc degree</b> <ul style="list-style-type: none"><li>- <b>MSc in Astronautics and Space Engineering</b>, Cranfield University<ul style="list-style-type: none"><li>▪ <b>Course Director's Prize for Excellent Overall Performance</b></li><li>▪ Space system engineering, astrodynamics and mission analysis, space propulsion and communication, spacecraft dynamics and attitude control, finite element method...</li><li>▪ Design Project: « Design of a low altitude high-res Earth observation satellite (0.15 cm/pix) ».</li><li>▪ <b>Master thesis:</b> « Feasibility study and Trajectory Analysis for a 2020-2040 Uranus Mission »</li></ul></li><li>- <b>Master of Engineering</b>, École Centrale de Nantes</li></ul>
2011 (4 months) France	<b>Research internship</b> , LATMOS, Paris Development of IDL algorithm reproducing spectral measurements (TIMM-2, PHOBOS-GRUNT).
2009 - 2011	<b>Student in the engineering school École Centrale de Nantes</b> , France
2007 - 2009	<b>1<sup>st</sup> and 2<sup>nd</sup> years in five-year engineering degree course</b> , Lycée Chateaubriand, Rennes, France
2007	<b>French Baccalaureat and German Baccalaureat (Abitur)</b> , Lycée Chateaubriand, Rennes, France

### Skills

<b>Computer</b>	Environment: Linux, Windows and Mac OS. Programming: Fortran, C, Matlab, Python, IDL, java, javascript, css.
<b>Languages</b>	French (native language), English (fluent), German and Spanish (advanced)

### Hobbies

Badminton, soccer, bike, piano, Irish flute, swing dance.

## Teaching during PhD at UPMC

- 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)

## Publications as first author

- 1) **Bertrand, T.**, Forget, F., Umurhan, O. M., Grundy, W. M., Schmitt, B., Protopapa, S., Zangari, A. M., White, O. L., Schenk, P. M., Singer, K. N., Stern, A., Weaver, H. A., Young, L. A., Ennico, K. and Olkin, C. B., 2018. The nitrogen cycles on Pluto over seasonal and astronomical timescales. *Icarus*, 309, 277-296.
- 2) **Bertrand, T.** and Forget, F., 2017. 3D modeling of organic haze in Pluto's atmosphere. *Icarus*, 287, 72–86.
- 3) **Bertrand, T.** and Forget, F., 2016. Observed glacier and volatile distribution on Pluto from atmosphere-topography processes. *Nature*, 540, 86-89.

## Publications as co-author

- 1) Spiga, A., Banfield, D., Teanby, N. A., Forget, F., Lucas, A., Kenda, B., Rodriguez M., Jose A., Widmer-Schnidrig, R., Murdoch, N., Lemmon, M. T., Garcia, R. F., Martire, L., Karatekin, O., Le Maistre, S., Van Hove, B., Dehant, V., Lognonné, P., Mueller, N., Lorenz, R., Mimoun, D., Rodriguez, S., Beucler, E., Daubar, I., Golombek, M. P., **Bertrand, T.**, Nishikawa, Y., Millour, E., Rolland, L., Brissaud, Q., Kawamura, T., Mocquet, A., Martin, R., Clinton, J., Stutzmann, E., Spohn, T., Smrekar, S., and Banerdt, W. B., 2018. Atmospheric Science with InSight. *Space Science Reviews*, 214-7, 109, 64.
- 2) Wang, C., Forget, F., **Bertrand, T.**, Spiga, A., Millour, E., and Navarro, T, 2018. Parameterization of Rocket Dust Storms on Mars in the LMD Martian GCM: Modeling Details and Validation. *Journal of Geophysical Research: Planets*, 123-4, 982-1000.
- 3) Telfer, M., Parteli, E., Radebaugh, J., Beyer, R., A., **Bertrand, T.**, Forget, F., Nimmo, F., Grundy, W., M., Moore, J., M., Stern, S., A., Spencer, J., Lauer, T., Earle, A. M., Binzel., R., Weaver, H., A., Olkin, C., B., Young, L., A., Ennico, K., Runyon, K., and the New Horizons Team, 2018. Dunes as New Evidence of Recently Active Surface Processes on Pluto. *Science*, 360-6392, 992-997.
- 4) Grundy, W. M., **Bertrand, T.**, Binzel, R. P., Buie, M. W., Buratti, B. J., Cheng, A. F., Cook, J. C., Cruikshank, D. P., Devins, S. L., Dalle Ore, C. M., Earle, A. M., Ennico, K., Forget, F., Gao, P., Gladstone, G. R., Howett, C. J. A., Jennings, D. E., Kammer, J. A., Lauer, T. R., Linscott, I. R., Lisse, C. M., Lunsford, A. W., McKinnon, W. B., Olkin, C. B., Parker, A. H., Protopapa, S., Quirico, E., Reuter, D. C., Schmitt, B., Singer, K. N., Spencer, J. A., Stern, S. A., Strobel, D. F., Summers, M. E., Weaver, H. A., Weigle, G. E., Wong, M. L., Young, E. F., Young, L. A. and Zhang, X, 2018. Pluto's haze as a surface material. *Icarus*, 314, 232-245.
- 5) Moore, J. M., Howard, A. D., Umurhan, O. M., White, O. L., Schenk, P. M., Beyer, R. A., McKinnon, W. B., Spencer, J. R., Singer, K., Grundy, W. M., Earle, A. M., Schmitt, B., Protopapa, S., Nimmo, F., Young, L. A., Stern, S. A., Weaver, H. A., Olkin, C. B., Ennico, K., Collins G., **Bertrand, T.**, Forget, F. and the New Horizons Science Team, 2018. Bladed terrain on Pluto: Possible origins and evolution. *Icarus*, 300, 129–144.
- 6) Forget, F., **Bertrand, T.**, Vangvichith, M., Leconte, J., Millour M. and Lellouch E., 2017. A post-New Horizons Global climate model of Pluto including the N<sub>2</sub>, CH<sub>4</sub> and CO cycles. *Icarus*, 287, 54-71.
- 7) White, O., L., Moore, J., M., McKinnon, W., B., Spencer, J., R., Howard, A., D., Schenk, P., M., Beyer, R., A., Nimmo, F., Singer, K., N., Umurhan, O., M., Stern, S., A., Ennico, K., Olkin, C., B., Weaver, H., A., Young, L., A., F. Cheng, A., F., **Bertrand, T.**, Binzel, R., P., Earle, A., M., Grundy, W., M., Lauer, T., R., Protopapa, S., Robbins, S., J., Schmitt, B., and the New Horizons Science Team, 2017. Geological mapping of Sputnik Planitia on Pluto. *Icarus*, 287, 261-286.

## Outreach

### 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).