

Pierre-François Léget

✉ plget@lpnhe.in2p3.fr • 🌐 github.com/PFLeget

Postdoctoral Fellow at LPNHE-IN2P3/CNRS Sorbonne Université Paris France, working within LSST-DESC.

Education

- **Ph.D. in Physics, *speciality in cosmology*** **Clermont-Ferrand, France**
Université Blaise Pascal *Sept. 2013 – Oct. 2016*
- **Master in Physics, *speciality in astrophysics, cosmology and particle physics*** **Montpellier, France**
Université de Montpellier II *Sept. 2011 – Jul. 2013*
- **Bachelor in Physics** **Nice, France**
Université de Nice Sophia-Antipolis *Sept. 2008 – Jun. 2011*

Work Experience

- **Postdoctoral Fellow, LPNHE - IN2P3/CNRS Sorbonne Université** **Paris, France**
Weak-Lensing / Type Ia Supernovae (SNIa) *Oct. 2018 – present*
Advisor: Pierre Astier
 - Weak lensing, Point Spread Function (PSF) & shape measurements:
 - Developed anisotropic Gaussian processes to model spatial variation of atmospheric turbulence.
 - Contributed to *PSFs In the Full FoV* (Piff), the PSF package developed for DES and LSST-DESC.
 - Validation of Piff using DES and HSC images.
 - SNIa modeling:
 - Worked on publication, make data and training code public.
 - Transfer of knowledge with a graduate student in France.
- **Postdoctoral Fellow, Stanford University** **Stanford, USA**
Weak-Lensing / Type Ia Supernovae (SNIa) *Oct. 2016 – Oct. 2018*
Advisor: Patricia Burchat
 - Weak lensing, Point Spread Function (PSF) & shape measurements:
 - Developed anisotropic Gaussian processes to model spatial variation of the atmospheric PSF.
 - Contributed to *PSFs In the Full FoV* (Piff), the PSF package developed for DES and LSST-DESC.
 - Validation of Piff using DES and GalSim simulations.
 - SNIa modeling:
 - Worked on publication, make data and training code public.
 - Transfer of knowledge with a graduate student in France.
- **Ph.D. student visitor, Lawrence Berkeley National Laboratory** **Berkeley, USA**
Type Ia Supernovae (SNIa)- SNIa modeling and distance measurement *Jul. 2015 – Oct. 2015*
Advisors: Alex Kim / Emmanuel Gangler
 - Developed training code of SUGAR using MPI and NERSC ressources.
- **Ph.D. Student, LPC-Clermont - IN2P3/CNRS Université Blaise Pascal** **Clermont-Ferrand, France**
Type Ia Supernovae (SNIa) - SNIa modeling and distance measurement *Sept. 2013 – Oct. 2016*
Advisor: Emmanuel Gangler
 - Developed a new SNIa model (SUGAR) to improve upon the state of the art (SALT2).
 - Studied impact of peculiar velocities on distance measurement of nearby SNIa.

Master 2 internship, LPC-Clermont - IN2P3/CNRS Université Blaise Pascal

Clermont-Ferrand, France

◦ *Type Ia Supernovae (SNIa) - SNIa modeling and distance measurement*

Mar. 2013 – Jun. 2013

Advisor: Emmanuel Gangler

- Studied spectral diversity of SNIa.

Scientific Collaborations

- The Hyper Suprime Cam collaboration (External collaborator for SNIa cosmology/PSF modeling) Sept. 2018 – present
- The Dark Energy Survey (External collaborator for PSF modeling) Sept. 2018 – present
- The LSST - Dark Energy Science Collaboration Sept. 2015 – present
- The Nearby Supernova Factory Mar. 2013 – present

Leadership Experiences

- Co-convenor of the Point Spread Function Working Group within LSST-DESC. Oct. 2019 – present
- Co-convenor of the Point Spread Function Task Force within LSST-DESC. Feb. 2019 – Oct. 2019
- Led observations on the New Technology Telescope in Chile and trained two other astronomers. Dec. 2014

Awards

- Young Researcher Award for the best Ph.D. from the city of Clermont-Ferrand (France). Apr. 2017
- Qualified to apply for lecture positions in French Universities (Qualification Maître de Conférences). Feb. 2017

Publications & peer review

◦ Publication in Journals:

- Publication with principal contribution:

- Léget, P.-F., Gangler, E., et al. 2019, *SUGAR: An improved empirical model of Type Ia Supernovae based on spectral features*, A&A accepted, (arXiv:1909.11239)
- Léget, P.-F., Przhinskaya, M. V., et al. 2018, *Correcting for peculiar velocities of Type Ia Supernovae in clusters of galaxies*, A&A, 615, A162

- Publication with minor contribution:

- The LSST Dark Energy Science Collaboration, Mandelbaum, R., Eifler, T., et al. 2018, *The LSST Dark Energy Science Collaboration (DESC) Science Requirements Document*, ArXiv e-prints:1809.01669
- Henne, V., Przhinskaya, M. V., Rosnet, P., et al. 2017, *The influence of host galaxy morphology on the properties of Type Ia supernovae from the JLA compilation*, New A, 51, 43
- Fraser, M., Kotak, R., Pastorello, A., et al. 2015, *SN 2009ip at late times – an interacting transient at +2 years*, MNRAS, 453, 3886
- Benetti, S., Nicholl, M., Cappellaro, E., et al. 2014, *The supernova CSS121015:004244+132827: a clue for understanding superluminous supernovae*, MNRAS, 441, 289

o **Proceedings:**

- Pruzhinskaya, M. V. & Léget, P.-F. 2017, *Supernovae - a tool for observational cosmology*, in Proceedings of the XII Multifrequency Behaviour of High Energy Cosmic Sources Workshop. 12-17 June, 2017 Palermo, Italy (MULTIF2017), 19
- Gangler E. & Léget P.-F. 2016, *Sugar: When Spectra Help Standardizing Supernovae*, Proceedings of Moriond 2016.

o **Thesis:**

- Léget, P.-F. 2016, *Modélisation des spectres des Supernovas de Type Ia observés par la collaboration The Nearby Supernova Factory dans le but d'améliorer les mesures de distances extragalactiques*, Theses, Université Blaise Pascal - Clermont-Ferrand II

o **Telegams:**

- 27 astronomical telegrams (<http://www.astronomerstelegam.org>), 2013-2015: #5681, #5683, #5686, #5689, #5696, #5701, #5716, #5718, #5720, #6808, #6816, #6820, #6842, #6854, #6859, #7043, #7049, #7052, #7053, #7059, #7068, #7074, #7091, #7102, #7140, #7144, #7154

o **Peer review:**

- Sept 2019, Peer reviewer for the *Journal of Cosmology and Astroparticle Physics*

Mentoring

- o Supervisor for a two-month undergraduate research internship at LPNHE - IN2P3/CNRS Sorbonne Université. May–Jun. 2019
- o Supervisor for a two-week undergraduate research internship at LPNHE - IN2P3/CNRS Sorbonne Université. Dec. 2018
- o Co-Supervisor for a two-month undergraduate research internship at Stanford University Jul.– Aug. 2018
- o Co-Supervisor for a four-month master research internship at LPC-Clermont - IN2P3/CNRS Université Blaise Pascal Mar. – Jun. 2015
- o Supervisor for a one-month undergraduate research internship at LPC-Clermont - IN2P3/CNRS Université Blaise Pascal Jun. 2014

Teaching

- o **Lecture at the LSST-DESC Dark Energy School, Université Paris Diderot** **Paris, France**
Interpolating data using Gaussian Processes: : "With great power comes great responsibility". Jul. 2019
- o **Teaching, Université Blaise Pascal** **Clermont-Ferrand, France**
Undergraduate Physics courses taught Sept. 2014 – Jun. 2016
 - Central forces and Lagrangian mechanics (Lecturer)
 - Electrostatics and magnetostatics in vacuum (TA)
 - Fluid mechanics (Lab TA)
 - Geometric optics (Lab TA)

Observing

- Observed 20 nights on the New Technology Telescope at
 - o La Silla Observatory (Chile), to classify and do follow-up of transient objects (program: PESSTO). *Dec. 2013, Dec. 2014 – Jan. 2015*
 - o Observed 5 nights on the T80 and the T120 of the Observatoire de Haute Provence (France), to observed and measured distance of RR-lyrae. *Nov. 2012*

Conferences and Presentations

Talks at *LSST-DESC* and *the Nearby Supernova Factory* collaboration meetings are omitted.

- o Seminar *Duke University, Durham, USA – Oct. 2019*
- o Seminar *University of Rochester, Rochester, USA – Oct. 2019*
- o KIPAC tea talk *SLAC, Menlo Park, USA – Oct. 2019*
- o Invited talk *15th rencontre du Vietnam - Cosmology - ICISE, Quy Nhon, Vietnam – Aug. 2019*
- o Seminar *LPNHE IN2P3-CNRS, Paris, France – Mar. 2019*
- o Seminar *IPNL IN2P3-CNRS, Lyon, France – Jan. 2019*
- o Seminar *CPPM IN2P3-CNRS, Marseille, France – Jan. 2019*
- o KIPAC tea talk *SLAC, Menlo Park, USA – May 2018*
- o Seminar *LUPM IN2P3-CNRS, Montpellier, France – Dec. 2017*
- o Invited seminar *Sternberg Astronomical Institut, Moscow, Russia – Dec. 2017*
- o KIPAC tea talk *Stanford University, Stanford, USA – May 2017*
- o Seminar *Observatoire de la Côte d'Azur, Nice, France – Mar. 2017*
- o Cosmology seminar *Stanford University, Stanford, USA – Jan. 2017*
- o Invited seminar *LPC-Clermont, Clermont-Ferrand, France – Dec. 2015*
- o Invited seminar *LBNL, Berkeley, USA – Oct. 2015*
- o Invited seminar *Universidad de Chile, Santiago de Chile, Chile – Dec. 2014*
- o Poster *Type Ia Supernovæ: progenitors, explosions, and cosmology*, University of Chicago, Chicago, USA – Sept. 2014
- o Invited seminar *LPC-Clermont, Clermont-Ferrand, France – Jan. 2014*

Technical Skills

- o **Programming Languages:** Python, $\text{\LaTeX}$, SQL, C.
- o **Expert in Python libraries:** NumPy, SciPy, Matplotlib, Piff, TreeCorr, GalSim, Scikit-learn, MPI for Python, iminuit, LmFit, George.

Languages

- o **English:** Fluent
- o **French:** Native speaker