

LANUSSE François

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Physics Department
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Data Science Fellow

Berkeley Center for Cosmological Physics, Foundation of Data Analysis Institute,
Berkeley Institute for Data Science

Positions

- Since Sept. 2018 **BCCP Computational Data Science Fellow & FODA Fellow**
Advisor: U. Seljak
Department of Physics, UC Berkeley - Berkeley, CA
- Dec. 2015 - Aug.2018 **Postdoctoral researcher**
Advisor: R. Mandelbaum
Department of Physics, Carnegie Mellon University - Pittsburgh, PA

Education

- Sept. 2012 - Nov. 2015 **Ph.D. in Astrophysics: Reconstruction of dark matter maps from weak gravitational lensing**
Advisor: J.-L. Starck
CEA Saclay/Paris 11 University - Orsay, France
- Sept. 2011 - Aug. 2012 **Master 2 Research - Fundamental Physics**
Specialization: Nuclei Particles Astroparticles Cosmology
Paris 11 University - Orsay, France
- Sept. 2010 - Aug. 2011 **Master 2 Research - Fundamental and Applied Mathematics**
Joint with Supélec degree
Paul Verlaine University- Metz, France
- Sept. 2008 - Aug. 2011 **Diplôme d'ingénieur Supélec**
Electrical Engineering degree from one of France's top Grandes Ecoles
Supélec - Campus Gif-Sur-Yvette and Metz (3rd year), France

Scientific collaborations

- 2016 - present **LSST Dark Energy Science Collaboration**
Member, weak lensing mass-mapping coordinator since Sept. 2017
- 2017 - present **Dark Energy Survey (External collaborator)**
Collaborator status for weak lensing mass-mapping projects.
- 2016 - present **Hyper Suprime Cam collaboration (External collaborator)**
Collaborator status for weak lensing shear calibration.
- 2012 - 2015 **Euclid Consortium**

Teaching

- Tutorials **IAU Symposium 306 Statistical Challenges in 21st Century Cosmology**
3 hours presentation and exercises on sparse regularization of inverse problems
Lisbon, Portugal, 25-29 May 2014
- 2nd Workshop on Scientific Computing in Astronomy**
4 hours presentations and exercises on Wavelets, Sparsity, and inverse problems
Sao Paulo, Brazil, 3-6 June 2014
- Practical Work **2nd International Summer School on INtelligent Signal Processing for**
FrontIER Research and Industry
10 afternoon sessions of 3 hours on Introduction to Sparsity.
Paris, France, 14-25 July 2014

Organization of conferences and seminars

- Sept. 2018 - Organization of bi-weekly interdisciplinary Machine Learning and Statistics discussion groups at UC Berkeley.
- Jul. 2018 - Member of the local organizing committee for the LSST DESC collaboration meeting in Pittsburgh.
- 2017 - 2018 Organization of bi-weekly Machine Learning, Statistics, and Cosmology meetings at Carnegie Mellon University.

Community service

- Journal Referee Nature Astronomy, Monthly Notices of the Royal Astronomical Society (MNRAS), Journal of Cosmology and Astroparticle Physics (JCAP), The Astrophysical Journal (ApJ)

Selected presentations and conferences

Talks at LSST DESC and Euclid collaboration meetings are omitted.

- Feb. 2019 International BASP Frontiers workshop, *Villars-sur-Ollon - Switzerland* (**invited**)
- Nov. 2018 Data Science Institute Seminar @ LLNL, *Livermore - US* (**invited**)
- Oct. 2018 Workshop on statistical inference in cosmology @ IHP, *Paris - France* (**invited**)
- Jun. 2018 SUGAR-RUSH conference, *Shanghai - China* (**invited**)
- Jun. 2018 Data Science Seminar @ Princeton University, *Princeton - USA* (**invited**)
- May 2018 Statistical Challenges in 21st Century Cosmology, *Valencia - Spain* (**invited**)
- Nov. 2017 Seminar @ The Alan Turing Institute, *London - U.K.* (**invited**)
- Oct. 2017 2nd ASTERICS-OBELICS workshop, *Barcelona - Spain* (**invited**)
- Sept. 2017 Seminar @ KICP, University of Chicago, *Chicago, IL - USA* (**invited**)
- Feb. 2017 International BASP Frontiers workshop, *Villars-sur-Ollon - Switzerland* (poster)
- Jan. 2017 AAS Meeting 229, *Dallas, TX - USA* (poster)
- Jun. 2016 Statistical Challenges in Modern Astronomy VI, *Pittsburgh, PA - USA*
- May 2016 Statistical Challenges in 21st Century Cosmology, *Chania - Greece*
- Oct. 2014 Journées Jeunes Chercheurs CNES, *Toulouse - France* (**best poster award**)
- Sept. 2014 International workshop on Cosmology and Sparsity, *Nice - France*
- Jul. 2014 Science on the Sphere, Royal Society Seminar, *Chicheley Hall - UK* (**invited**)
- May. 2014 DASPAC Seminar @ APC Laboratory, *Paris - France*
- Mar. 2014 Cosmology 2014, Rencontres de Moriond, *La Thuile - Italy* (poster)
- Aug. 2013 Wavelet and Sparsity XV, SPIE Optics & Photonics, *San Diego, CA - USA*
- Jun. 2013 Cosmo Probes 2013, *Lausanne - Switzerland* (poster)
- Jun. 2013 Workshop on weak lensing - beyond the ordinary, *Nice - France*
- Mar. 2013 CosmoStat2013, *Banff - Canada*

Public softwares

- MRS3D Implementation of the 3D Spherical Wavelet Transform in C++.
Available at: <https://github.com/CosmoStat/MRS3D>
- PRISM Sparse recovery of the Primordial Power Spectrum implemented in C++.
Part of the iSAP package: <http://www.cosmostat.org/isap.html>
- CosmicPy Python package for interactive cosmology, with an embedded fast C++ library for efficient computation of Spherical Fourier-Bessel power spectra.
Available at: <http://cosmicpy.github.io>
- GLIMPSE Sparsity based weak lensing mass-mapping software.
Available at: <http://www.cosmostat.org/software/glimpse>
- CMU DeepLens Deep learning for automated strong gravitational lens finding.
Available at: <https://github.com/McWilliamsCenter/CMUDeepLens>

Preprints

- Sept. 2018 C. Hikage, M. Oguri, T. Hamana, S. More, R. Mandelbaum, M. Takada, F. Köhlinger, H. Miyatake, A. J. Nishizawa, et al. (HSC collaboration, including **F. Lanusse**), [Cosmology from cosmic shear power spectra with Subaru Hyper Suprime-Cam first-year data](#), submitted to PASJ, **arXiv:1809.09148**
- Feb. 2018 R. B. Metcalf, M. Meneghetti, et al. (including **F. Lanusse**), [The Strong Gravitational Lens Finding Challenge](#), **arXiv:1802.03609**

Publications in peer-reviewed scientific journals

- Sept. 2018 R. Mandelbaum, **F. Lanusse**, A. Leauthaud, R. Armstrong, M. Simet, H. Miyatake, J. E. Meyers, J. Bosch, S. Miyazaki, M. Tanaka, [Weak lensing shear calibration with simulations of the HSC survey](#), MNRAS, 481, **arXiv:1710.00885**
- N. Jeffrey, F. B. Abdalla, O. Lahav, **F. Lanusse**, J.-L. Starck, A. Leonard, D. Kirk, C. Chang, E. Baxter, T. Kacprzak, S. Seitz, V. Vikram, L. Whiteway, et al. (DES Collaboration), [Improving Weak Lensing Mass Map Reconstructions using Gaussian and Sparsity Priors: Application to DES SV](#), MNRAS, 479, **arXiv:1801.08945**
- Mar. 2018 A. Bhowmick, T. Di Matteo, Y. Feng, **F. Lanusse**, [The clustering of \$z > 7\$ galaxies: Predictions from the BLUETIDES simulation](#), MNRAS, 474, **arXiv:1707.02312**
- Feb. 2018 Y. Mao, E. Kovacs, K. Heitmann, T. D. Uram, et al. (LSST Dark Energy Science Collaboration, including **F. Lanusse**), [DESCQA: An Automated Validation Framework for Synthetic Sky Catalogs](#), ApJ Supplement, 234, **arXiv:1709.09665**
- Jan. 2018 R. Mandelbaum, H. Miyatake, T. Hamana, M. Oguri, M. Simet, R. Armstrong, J. Bosch, R. Murata, **F. Lanusse**, A. Leauthaud, et al. (HSC collaboration), [The first-year shear catalog of the Subaru Hyper Suprime-Cam SSP Survey](#), PASJ, 70, SP1, **arXiv:1705.06745**

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- Jan. 2018 **F. Lanusse**, Q. Ma, N. Li, T. E. Collett, C.-L. Li, S. Ravanbakhsh, R. Mandelbaum, B. Poczós, [CMU DeepLens: Deep Learning For Automatic Image-based Galaxy-Galaxy Strong Lens Finding](#), MNRAS, 473, [arXiv:1703.02642](#)
- Sept. 2017 A. Peel, **F. Lanusse**, J.-L. Starck, [Sparse reconstruction of the merging A520 cluster system](#), ApJ, 847, [arXiv:1708.00269](#)
- Mar. 2017 A. Peel, C.-A. Lin, **F. Lanusse**, A. Leonard, J.-L. Starck, M. Kilbinger, [Cosmological constraints with weak lensing peak counts and second-order statistics in a large-field survey](#), A&A, 599, [arXiv:1612.02264](#)
- Jun. 2016 **F. Lanusse**, J.-L. Starck, A. Leonard, S. Pires, [High resolution weak lensing mass mapping combining shear and flexion](#), A&A, 591, [arXiv:1603.01599](#)
- Jun. 2015 **F. Lanusse**, A. Rassat, and J.-L. Starck, [3D Galaxy Clustering with Future Wide-Field Surveys: Advantages of a Spherical Fourier-Bessel analysis](#), A&A, 578, [arXiv:1406.5989](#)
- May 2015 A. Leonard, **F. Lanusse**, and J.-L. Starck, [Weak lensing reconstructions in 2D & 3D: implications for clusters studies](#), MNRAS, 449, [arXiv:1502.05872](#)
- Apr. 2015 A. Moller, V. Ruhlmann-Kleider, **F. Lanusse**, J. Neveu, N. Palanque-Delabrouille, J.-L. Starck, [SNIa detection in the SNLS photometric analysis using Morphological Component Analysis](#), JCAP, 04, [arXiv:1501.02110](#)
- Nov. 2014 **F. Lanusse**, P. Paykari, J.-L. Starck, F. Sureau, J. Bobin., and A. Rassat, [PRISM: Recovery of the primordial spectrum from Planck data](#), A&A, 571, [arXiv:1410.2571](#)
- Jun. 2014 P. Paykari, **F. Lanusse**, J.-L. Starck, F. Sureau, and J. Bobin, [PRISM: Sparse Recovery of the Primordial Power Spectrum](#), A&A, 566, [arXiv:1402.1983](#)
- May 2014 A. Leonard, **F. Lanusse**, and J.-L. Starck, [GLIMPSE: Accurate 3D weak lensing reconstructions using sparsity](#), MNRAS, 440, [arXiv:1308.1353](#)
- Apr. 2012 **F. Lanusse**, A. Rassat, and J.-L. Starck, [Spherical 3D Isotropic Wavelets](#), A&A, 540, [arXiv:1112.0561](#)

Peer-reviewed conference proceedings

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- Jan. 2017 M. Ravanbakhsh, **F. Lanusse**, R. Mandelbaum, J. Schneider, and B. Poczós, [Enabling Dark Energy Science with Deep Generative Models of Galaxy Images](#), AAAI-17, [arXiv:1609.05796](#).
- May 2014 **F. Lanusse**, A. Leonard, J.-L. Starck, [Density reconstruction from 3D lensing: Application to galaxy clusters](#). IAU Symposium, Volume 306
- Sept. 2013 **F. Lanusse**, J.-L. Starck, [3D sparse representations on the sphere and applications in astronomy](#). Proc. SPIE 8858, Wavelets and Sparsity XV, 88580K
- Sept. 2013 **F. Lanusse**, A. Leonard, J.-L. Starck, [Imaging dark matter using sparsity](#). Proc. SPIE 8858, Wavelets and Sparsity XV, 885824

Contribution to books

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- May 2014 **F. Lanusse**, J.-L. Starck, A. Woiselle and M.J. Fadili, [3D Sparse Representations](#), Chapter in Advances in Imaging and Electron Physics, Volume 183.