

# CURRICULUM VITAE

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## Current position

### CNRS Research engineer

Feb/2020 - now                      CNRS/Laboratoire de Physique de Clermont (LPC)  
   Université Clermont-Auvergne (UCA), Clermont Ferrand - France

## Research experience

### Post-Doctoral researcher

Jan/2016 - Jan/2020              Laboratoire de Physique de Clermont (LPC)  
   Université Clermont-Auvergne (UCA), Clermont Ferrand - France  
Jan/2014 - Dec/2015              Max Planck Institute for Astrophysics (MPA), Germany  
Sep/2011 - Dec/2013              University of São Paulo (USP), Brazil  
Sep/2010 - Aug/2011              Kavli - IPMU  
   The Institute for the Physics and Mathematics of the Universe, Japan

## Funding obtained

### CNRS - IEA

Jan/2021 - Dec/2022              CNRS International Emerging Actions, obtained in a joint application,  
   also approved by the Russian Foundation for Basic Research (RFBR)  
   14k EUR

### CNRS MOMENTUM

Jan/2018 - Dec/2020              CNRS, France : 180 kEUR

## Education

Mar/2006 - Mar/2010              **PhD** in Physics (Cosmology), UFRJ, Rio de Janeiro, Brazil  
   Sep/2008 - Aug/2009 - **Exchange PhD student** at UCL, London, UK  
Mar/2004 - Feb/2006              **Master** in Sciences (Physics), UFRJ, Rio de Janeiro, Brazil  
Mar/1999 - Dec/2003              **Bachelor in Physics**, Universidade Estadual de Campinas - Brazil

## Management experience

### LSST Dark Energy Science Collaboration duties

Mar/2010 - now                      LSST-DESC membership committee member  
Apr/2019 - now                      Project lead : RESSPECT

REcommendation System for SPECTroscopic follow-up  
an official collaboration between LSST-DESC and the Cosmostatistics Initiative  
Oct/2018 - now LSST-DESC Collaboration Council member  
Dec/2016 - now Photometric LSST Astronomical Time-series Classification Challenge  
PLAsTiCC core team

**Founding member and science coordinator**

Apr/2018 - now Fink - community broker for LSST

**Founding member and French logistic manager**

Jun/2018 - now The SNAD collaboration - incorporating expert knowledge in smart anomaly detection for astronomical big data

**Founding member, logistic manager and leader of Python projects**

Apr/2014 - now The Cosmostatistics Initiative (COIN)

**Participation in Organizing Committees for International events (selected list)**

07-19/Jun/2021 Statistical Challenges of Modern Astronomy VII, USA  
26-29/Jul/2019 ESO Workshop on Artificial Intelligence in Astronomy, Germany  
1-8/Oct/2018 Journées Informatique de l'IN2P3-IRFU, France  
20-22/May/2018 Astronomical Data Analysis Summer School IX, Spain

**Mentoring experience**

**Participation in Master Thesis Jury**

19/Apr/2016 Renuka Pampana, Dep. of Computer Science - U. of Houston, USA  
Thesis title : *A new approach to domain adaptation applied to supernova photometric classification*  
Supervisor : Prof. Ricardo Vilalta

**Co-supervision of PhD students**

Oct/2021 - Sep/2024 Etienne Russeil, LPC - France  
Thesis title : *Anomaly detection in large astronomical surveys*  
Supervisor : Prof. Emmanuel Gangler

Jun/2016 - Dec/2018 Alexandre Ciulli, LPC - France  
Thesis title : *Cosmology and Type Ia Supernovae : influence of peculiar velocities and anisotropies*  
Supervisor : Prof. Philippe Gris

Jun/2012 - Jun/2015 Michele Sasdelli, MPA - Germany  
Thesis title : *A new metric space for type Ia supernova spectra*  
Supervisor : Prof. Wolfgang Hillebrandt

May/2011 - Aug/2013 Sandra Benitez-Herrera, MPA - Germany  
Thesis title : *Cosmological Parameter Estimation from type Ia supernovae*  
Supervisor : Prof. Wolfgang Hillebrandt

### Selected list of invited talks/lectures

05-10/Dez/2021 14th TRR33 Winter School on Cosmology, Passo del Tonale - Italy  
*4h tutorial on Statistics in Cosmology*

04/Mar/2020 Bayesian Deep Learning for Cosmology and Gravitational Waves, Paris - France

25/Apr/2019 Enabling Multi-Messenger Astrophysics in the Big Data Era, Baltimore - USA

20/May/2018 Astronomical Data Analysis Summer School, Valencia - Spain  
*4.5 hours tutorial on Machine Learning*

10-16/Dez/2017 11th TRR33 Winter School on Cosmology, Passo del Tonale - Italy  
*4h tutorial on Statistics in Cosmology*

# Emille E. O. Ishida

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## Publication List

### Books

1. Hilbe, J. M., de Souza, R. S. and **Ishida, E. E. O.**, *Bayesian Models for Astrophysical Data: Using R, JAGS, Python and Stan*, Cambridge University Press, Jun, 2017 - PROSE Awards winner in the category "Astronomy and Cosmology"

### Published Papers

1. Aleo *et al.* (incl. **Ishida, E. E. O.**), *SNAD Transient Miner: Finding Missed Transient Events in ZTF DR4 using k-D trees*, *New Astronomy*, Volume 96, article id. 101846, Oct/2022
2. Leoni *et al.* (incl. **Ishida, E. E. O.**), *Fink: early supernovae Ia classification using active learning*, *Astronomy and Astrophysics*, Volume 663, id.A13, 10 pp., Jul/2022
3. Kuhn *et al.* (incl. **Ishida, E. E. O.**), *A high pitch angle structure in the Sagittarius Arm*, *Astronomy and Astrophysics*, 651, id.L10, 13 pp., Jul/2021
4. **Ishida, E. E. O.** *et al.*, *Active Anomaly Detection for time-domain discoveries*, *Astronomy and Astrophysics*, 650 (A195), Jun/2021
5. Kuhn *et al.* (incl. **Ishida, E. E. O.**), *SPICY: The Spitzer/IRAC Candidate YSO Catalog for the Inner Galactic Midplane*, *Astrophysical Journal Supplement Series*, 254, Issue 2, id.33, 31 pp., Jun/2021
6. Malanchev *et al.* (incl. **Ishida, E. E. O.**), *Anomaly detection in the Zwicky Transient Facility DR3*, *MNRAS*, 502, Issue 4, pp.5147-5175, Apr/2021
7. Möller *et al.* (incl. **Ishida, E. E. O.**), *Fink, a new generation of broker for the LSST community*, *MNRAS*, 501, Issue 3, pp.3272-3288, Mar/2021
8. Feigelson, E. D. *et al.* (incl. **Ishida, E. E. O.**), *21st Century Statistical and Computational Challenges in Astrophysics*, *Annual Review of Statistics and Its Application*, 8:1, 493-517, Mar/2021
9. Moews, B. *et al.* (incl. **Ishida, E. E. O.**), *Ridges in the Dark Energy Survey for cosmic trough identification*, *MNRAS*, 500, Issue 1, p. 859-870, Jan/2021
10. Boucaud, A. *et al.* (incl. **Ishida, E. E. O.**), *Photometry of high-redshift blended galaxies using deep learning*, *MNRAS*, 491 (2), Jan/2020
11. Pruzhinskaya, M. V. *et al.* (incl. **Ishida, E. E. O.**), *Anomaly detection in the Open Supernova Catalog*, *MNRAS*, 489, Issue 3, p.3591-3608, Nov/2019
12. Malz, A. I. *et al.* (incl. **Ishida, E. E. O.**), *The Photometric LSST Astronomical Time-series Classification Challenge PLAsTiCC: Selection of a Performance Metric for Classification Probabilities Balancing Diverse Science Goals*, *AJ*, 158 (5), article id. 171, Nov/2019
13. Kessler, R. *et al.* (incl. **Ishida, E. E. O.**), *Models and Simulations for the Photometric*

- LSST Astronomical Time Series Classification Challenge (PLAsTiCC)*, PASP, 131 (1003), pp. 094501, Sep/2019
14. Moews, B. *et al.* (incl. **Ishida, E. E. O.**), *Stress testing the dark energy equation of state imprint on supernova data*, PRD, 99 (12), id.123529, Jun/2019
  15. Cantat-Gaudin, T. *et al.* (incl. **Ishida, E. E. O.**), *Gaia DR2 unravels incompleteness of nearby cluster population: New open clusters in the direction of Perseus*, A&A, 624 (A126), Apr/2019
  16. **Ishida, E. E. O.** *et al.*, *Optimizing spectroscopic follow-up strategies for supernova photometric classification with active learning*, MNRAS, 483 (1), p.2-18, Feb/2019
  17. González-Gaitán, S. *et al.* (incl. **Ishida, E. E. O.**), *Spatial field reconstruction with INLA: Application to IFU galaxy data*, MNRAS, 482 (3), p.3880-3891, Jan/2019
  18. Beck, R., Lin, C-A, **Ishida, E. E. O.** *et al.*, *On the realistic validation of photometric redshifts, or why Teddy will never be Happy*, MNRAS, 468 (4), p. 4323-4339, Jul/2017
  19. Sasdelli, M. *et al.* (incl. **Ishida, E. E. O.**), *A metric space for type Ia supernova spectra: a new method to assess explosion scenarios*, MNRAS, 466 (4), p.3784-3809, May/2017
  20. Henne, V. *et al.* (incl. **Ishida, E. E. O.**), *The influence of host galaxy morphology on the properties of Type Ia supernovae from the JLA compilation*, New Astronomy, 51, p. 43-50, Fev/2017
  21. Sasdelli, M. **Ishida, E. E. O.** *et al.*, *Exploring the spectroscopic diversity of Type Ia supernovae with DRACULA: a machine learning approach*, MNRAS, 461, Issue 2, p.2044-2059, Sep/2016
  22. Sasdelli, M., **Ishida, E. E. O.** *et al.*, *Breaking the color-reddening degeneracy in type Ia supernovae*, MNRAS, 461 (2), p.2044-2059, Jul/2016
  23. Tartaglia, L. *et al.* (incl. **Ishida, E. E. O.**), *The supernova impostor PSN J09132750+7627410 and its progenitor*, ApJ 823 (2), article id. L23, Jun/2016
  24. Bhardwaj, A. *et al.* (incl. **Ishida, E. E. O.**), *Large Magellanic Cloud Near-Infrared Synoptic Survey - III. A statistical study of non-linearity in the Leavitt Laws*, In: MNRAS, 457 (2), p.1644-1665, Apr/2016
  25. Pastorello, A. *et al.* (incl. **Ishida, E. E. O.**), *Massive stars exploding in a He-rich circumstellar medium - VIII. PSN J07285387+3349106, a highly reddened supernova Ibn*, In: MNRAS, 454 (4), p.4293-4303, Dez/2015
  26. Pastorello, A. *et al.* (incl. **Ishida, E. E. O.**), *Massive stars exploding in a He-rich circumstellar medium - VII. The metamorphosis of ASASSN-15ed from a narrow line Type Ibn to a normal Type Ib Supernova*, In: MNRAS, 453 (4), p.3649-3661, Nov/2015
  27. **Ishida, E. E. O.** *et al.*, *cosmoabc: Likelihood-free inference via Population Monte Carlo Approximate Bayesian Computation*, In: Astronomy & Computing, 13 (1-11), Nov/2015
  28. de Souza, R. S. *et al.* (incl. **Ishida, E. E. O.**), *The Overlooked Potential of Generalized Linear Models in Astronomy-III: Bayesian Negative Binomial Regression and Globular Cluster Populations*, MNRAS, 453 (2), Oct/2015
  29. Elliot, J., *et al.* (incl. **Ishida, E. E. O.**), *The overlooked potential of Generalized Linear Models in astronomy-II: Gamma regression and photometric redshifts*, Astronomy & Computing, 10 (961-72), April/2015
  30. Sasdelli, M. *et al.* (incl. **Ishida, E. E. O.**), *A metric space for Type Ia supernova spectra*,

MNRAS, 447 (2), Feb/2015

31. Krone-Martins, A., **Ishida, E. E. O.**, de Souza, R. S., *The first analytical expression to estimate photometric redshifts suggested by a machine*, MNRASL, 443, L34-L38, Sep/2014
32. de Souza, R. S., **Ishida, E. E. O.**, Johnson, J. L., Whalen, D. J. and Messinger, A., *Detectability of the first cosmic explosions*, MNRAS, 436 (1555), Dez/2013
33. Benitez-Herrera, S., **Ishida, E. E. O. et al.**, *Cosmological Parameter Estimation from SN Ia data: a Model-Independent Approach*, MNRAS, 436 ( 854), Nov/2013
34. **Ishida, E. E. O.** and de Souza, R. S., *Kernel PCA for type Ia supernovae photometric classification*, MNRAS, 430 (509), Mar/2013
35. de Souza, R. S. *et al.* (incl. **Ishida, E. E. O.**), *Looking for the first stars with Gaia mission*, Astronomy & Astrophysics, 545 (A102), Sep/2012
36. **Ishida, E. E. O.**, de Souza, R. S. and Ferrara, A., *Probing cosmic star formation up to  $z = 9.4$  with GRBs*, MNRAS, 418 (500), Nov/2011
37. de Souza, R. S. *et al.* (incl. **Ishida, E. E. O.**), *The Effect of a Single Supernova Explosion on the Cuspy Density Profile of a Small-Mass Dark Matter Halo*, MNRAS, 415 (2969-2973), Aug/2011
38. **Ishida, E. E. O.** and de Souza, R. S., *Hubble parameter reconstruction from PCA: minimizing the bias*, Astronomy & Astrophysics, 527 (A49), Mar/2011
39. de Souza, R. S. and **Ishida, E. E. O.**, *An analytical approach to the dwarf galaxies cusp problem*, Astronomy & Astrophysics, 524 (A74), Dec/2010
40. **Ishida, E. E. O. et al.**, *When did cosmic acceleration start? How fast was the transition?*, Astroparticle Physics, v. 28 (6), 547-552, Jan/2008
41. **Ishida, E. E. O.**, *Statefinder Revisited*, Brazilian Journal of Physics, v.35 (4B), Dec/2005

## Submitted Papers

1. de Souza, R. S. *et al.* (incl. **Ishida, E. E. O.**), *A graph-based spectral classification of Type II supernovae*, arXiv:astro-ph/2206.14335
2. Kilbinger, M., **Ishida, E. E. O.** and Cisewski-Kehe, J., *Sidestepping the inversion of the weak-lensing covariance matrix with Approximate Bayesian Computation*, arXiv:astro-ph/2112.03148
3. Hlözek *et al.* (incl. **Ishida, E. E. O.**), *Results of the Photometric LSST Astronomical Time-series Classification Challenge (PLAsTiCC)*, arXiv:astroph/2012.12392

## Book chapters

1. Delli Veneri, M. *et al.* (incl. **Ishida, E. E. O.**), *Periodic Astrometric Signal Recovery through Convolutional Autoencoders*, In: "Intelligent Astrophysics" of the series "Emergence, Complexity and Computation", Book eds. I. Zelinka, D. Baron, M. Brescia, Springer Nature Switzerland, ISSN: 2194-7287

## Refereed Proceedings

1. Acquaviva, V., Lovell, C. and **Ishida, E. E. O.**, *Debunking Generalization Error or: How I Learned to Stop Worrying and Love My Training Set*, 2020 NeurIPS workshop "Machine Learning and the Physical Sciences"
2. Kennamer, N. , **Ishida, E. E. O.** et al., *Active learning with RESSPECT: Resource allocation for extragalactic astronomical transients*, 2020 IEEE Symposium Series on Computational Intelligence, Canberra, Australia, 2020
3. Malanchev, K. et al. (incl. **Ishida, E. E. O.**), *Realization of Different Techniques for Anomaly Detection in Astronomical Databases*, In: Elizarov A., Novikov B., Stupnikov S. (eds) *Data Analytics and Management in Data Intensive Domains. DAMDID/RCDL 2019. Communications in Computer and Information Science*, vol 1223. Springer, Cham, pp. 97-107, 2020, DOI:10.1007/978-3-030-51913-1\_7
4. Vilalta, R., **Ishida, E. E. O.** et al., *Photometric Redshift Estimation: An Active Learning Approach*, IEEE Symposium on Computational Intelligence and Data Mining (CIDM-17), Hawaii, USA, 2017, pp. 1-8. doi: 10.1109/SSCI.2017.8285192
5. Gupta, K. D. et al. (incl. **Ishida, E. E. O.**), *Automated Supernova Ia Classification Using Adaptive Learning Techniques*, 2016 IEEE Symposium Series on Computational Intelligence (SSCI), Athens, Greece, 2016, pp. 1-8. doi: 10.1109/SSCI.2016.7849951
6. **Ishida, E. E. O.** et al., *Exploring the spectroscopic diversity of type Ia supernovae with Deep Learning and Unsupervised Clustering*, IAU Symposium 325 - Astroinformatics, Sorrento - Italy, Nov/2016
7. **Ishida, E. E. O.**, Abdalla, F. B. and de Souza, R. S., *Improved KPCA for Supernova Photometric Classification*, Proceedings of the International Astronomical Union, Volume 10, Symposium S306, pp 326-329, published Jul/2015
8. **Ishida, E. E. O.**, *Kernel PCA for Supernovae Photometric Classification*, Highlights of Astronomy, 16 (683-684), Mar/2015
9. Elliot, J., de Souza, R. S., Krone-Martins, A., Cameron, E., **Ishida, E. E. O.**, Hilbe, J., *Using gamma regression for photometric redshifts of survey galaxies*, "The Universe of Digital Sky Surveys" conference held at the INAF - Observatory of Capodimonte, Naples, on 25th-28th Nov/2014

## Research notes

1. Pruzhinskaya, M. et al. (incl. **Ishida, E. E. O.**), *Could SNAD160 be a Pair-instability Supernova?*, Res. Notes AAS, 6, 6, id.122, 2022, DOI:10.3847/2515-5172/ac76cf
2. Delli Veneri, M. et al. (incl. **Ishida, E. E. O.**), *How Have Astronomers Cited Other Fields in the Last Decade?*, Res. Notes AAS, 6, 6, id.113, 2022, DOI: 10.3847/2515-5172/ac74c7
3. de Souza, R. S. et al. (incl. **Ishida, E. E. O.**), *Probabilistic Modeling of Asteroid Diameters from Gaia DR2 Errors*, Res. Notes AAS, 5, 199, 2021, DOI:10.3847/2515-5172/ac205e
4. Aleo, P.D. et al. (incl. **Ishida, E. E. O.**), *The Most Interesting Anomalies Discovered in ZTF DR3 from the SNAD-III Workshop*, Res. Notes AAS, 4, 112, 2020, DOI:10.3847/2515-5172/aba6e8

## Magazines

1. **Ishida, E. E. O.**, *Machine learning and the future of supernova cosmology*, Nature Astronomy, Volume 3, p. 680-682, Aug/2019
2. de Souza, R. S. and **Ishida, E. E. O.**, *Making sense of massive unknowns*, In: Significance Magazine, vol 11 issue 5, Dez/2014

## Softwares

1. **Ishida, E. E. O.**, *ActSNClass: Active learning for supernova photometric classification*, ascl:1908.003 - documentation available at Readthedocs, Bibcode: 2019ascl.soft08003I
2. Agüena, M. et al. (incl. **Ishida, E. E. O.**), *DRACULA: Dimensionality Reduction And Clustering for Unsupervised Learning in Astronomy*, ascl:1512.009, Bibcode: 2015ascl.soft12009A
3. **Ishida, E. E. O.**, *cosmoabc*, ascl:1505.013 - documentation available at Readthedocs, Bibcode: 2015ascl.soft05013I
4. de Souza, R. S., Elliott, J., Krone-Martins, A., **Ishida, E. E. O.**; Hilbe, J., Cameron, E., *CosmoPhotoz*, ascl:1408.018, Bibcode: 2014ascl.soft08018D

## Data Catalogs

1. Cantat-Gaudin, T. et al. (incl. **Ishida, E. E. O.**), *VizieR Online Data Catalog: New open clusters in Perseus direction*, In: VizieR On-line Data Catalog: J/A+A/624/A126

## Outreach

1. **Ishida, E. E. O.**, *Plutão ainda tem muito a nos revelar*, Cientistas descobriram que ..., November 3<sup>rd</sup>, 2015 - in Portuguese
  2. **Ishida, E. E. O.**, *Pesquisadores brasileiros investigam a estrutura da Via-Láctea*, Cientistas descobriram que ..., July 7<sup>th</sup>, 2015 - in Portuguese
  3. **Ishida, E. E. O.**, *Planetas semelhantes a Terra existiram por quase toda história do Universo*, Cientistas descobriram que..., March 10<sup>th</sup>, 2015 - in Portuguese
  4. **Ishida, E. E. O.**, *Laniakea: um super-aglomerado para chamar de lar*, Cientistas descobriram que ..., October 21<sup>st</sup>, 2014 - in Portuguese
- Ishida, E. E. O.**, *The Lutheran Church and the birth of Modern Astronomy*, The British Lutheran, ELCE, October 2009, London, UK

## Others

1. *LACAN - Survey of scientific working environment in the Brazilian astronomical Community*, de Souza, R. S., **Ishida, E. E. O.**, Trevisan, M., Rua, J., Pereira, M.E.S., Jul/2015 - statistical results and proposed preventive actions can be found in <http://lacanastro.wix.com/lacan2015-english>
2. Portuguese translation of Richard Murphy's poem *Sailing to an Island*, de Souza, R. S. and **Ishida, E. E. O.**, *Navengando rumo à Ilha*, Art i Literatura, v. 47, serie ALPHA, Valencia, Spain, September 2010 (ISSN 1989-3590)