

## Curriculum Vitae

**Pedro Bernardino Lacerda Cruz**

Born 27 March 1975, in Lisbon, Portugal

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### Education

2005/03 PhD in Astrophysics (Leiden University) Advisors: Jane Luu, Harm Habing

2000/06 Licenciado in Physics (University of Lisbon, Portugal)

1993/07–1996/05 Telecommunications Engineering (IST Lisbon, Portugal)

### Employment

2022/01– Innovation Manager, Instituto Pedro Nunes, Coimbra ([link](#))

2019/09–2021/12– Founder, Researcher, Teacher and Baker, Miolo ([link](#))

2016/08–2019/08 University Lecturer, Queen’s University Belfast

2013/11–2016/07 Research Group Leader, Max Planck Society

2011/02–2013/10 Michael West Research Fellow, Queen’s University Belfast

2009/02–2011/01 Royal Society Newton Fellow, Queen’s University Belfast

2006/10–2008/12 Postdoctoral Fellow, IfA University of Hawaii

2005/04–2006/09 FCT Postdoctoral Fellow, Coimbra University

2002/11–2003/04 Teaching Fellow, Harvard University

2000/08–2005/02 Promovendus, Leiden University

### Honors

2013 Max Planck Research Group Leader ([link](#))

2010 Michael West Research Fellow

2008 Royal Society Newton International Fellow ([link](#))

2005 Portuguese FCT Postdoctoral Fellow ([link](#))

2003 Harvard-Smithsonian SAO Predoctoral Fellow ([link](#))

1999 Portuguese FCT Initiation Researcher BII Grant

### Professional Service

- Science reviewer for NASA Discovery space mission program (2010, 2015, 2019) and the ROSES grants (2008).
- Reviewer for Science, ApJL, ApJ, AJ, A&A, MNRAS, and Icarus.

### **PhD Student Advisees**

- Sebastian Lorek, PhD 2017, Thesis: *“Comet Formation in the Framework of Streaming Instability”*. MPI for Solar System Research in Göttingen & TU Braunschweig, co-advisor: Jürgen Blum (TUB). Now postdoc Lund Observatory.
- Rosita Kokotanekova, PhD 2018, Thesis: *“Bulk Properties and Evolution of Jupiter-Family Comet Nuclei”*. MPI for Solar System Research, Göttingen & Open University, co-advisor: Colin Snodgrass (OU). Now ESO Fellow, Garching.

### **Teaching Experience**

- Lecturer & Coordinator of level 1 Mathematics, Lecturer of Lab Physics, Computational Physics, level 2 Astronomy, QUBelfast, 2016-2019
- Postgraduate Certificate Higher Ed. Teaching training, QUBelfast, 2017-2019
- Co-lecturer of Planetary Science, Göttingen University, 2015/2016
- Supervisor of 2 masters students, QUBelfast, 2012, 2016
- Teaching Fellow, Astronomy 1, Harvard University, USA, Spring Term 2003

### **Awards: Research Grants, Facility Access and Teaching**

- 2019 Most Innovative Learning Experience nomination, QUB Education Awards
- 2018 Most Inspirational Teaching nomination, QUB Education Awards
- 2017 Royal Society APEX Award (as co-I, £100,000)
- 2014 ESO Large Program (as PI, 48 nights on NTT La Silla)
- 2013 Max Planck Research Group (€750,000)
- 2013 Leverhulme Research Program Grant (£150,000)
- 2010 Michael West Research Fellowship (£200,000)
- 2008 Royal Society Newton International Fellowship (£100,000)
- 2005 FCT (Portuguese Science Foundation) Postdoctoral Fellowship (€50,000).

### **Selected Invited Review Talks**

- AOGS 2014 Annual Meeting, Sapporo, Japan; Jul 2014;  
Title: *“TNOs Are Cool”, A Herschel Survey of the Outer Solar System.*
- UK National Astronomy Meeting, Manchester, UK; Mar 2012;  
Title: *A Herschel Survey of the trans-Neptunian Belt.*
- ESO-Chile Workshop on Solar System & Minor Bodies, Santiago; Aug 2011;  
Title: *Extreme and Extremely Tilted Objects.*
- European Planetary Science Congress, Rome; Sep 2010;  
Title: *Haumea as seen by the Herschel Space Observatory.*
- RAS Meeting, Burlington House, London; Nov 2009;  
Title: *The Dark Red Spot on Dwarf Planet Haumea.*
- Conference “Binaries in the Solar System”, Steamboat Springs, CO; Aug 2007.  
Title: *The abundance of contact binaries in the Kuiper belt.*

**Selected Outreach Highlights**

- Invited participant in Portuguese TV program Sociedade Civil, 26 Nov 2021
- BBC Ideas ([link](#)), "How medieval monks can reveal our universe's secrets", 2019
- Live TV interview, New Horizons flyby of Pluto, Sky News UK, 14 June 2015
- Lecture and Q&A on Rosetta mission and Philae landing. Portugal, Nov 2014
- Astrophysics outreach coordinator at Queen's University Belfast, 2011-2013
- TV broadcast of NASA Deep Impact event scientists panel, Portugal, Jul 2005

**Languages and Other Qualifications and Activities**

- *Native:* Portuguese; *Fluent:* English; *Good:* Dutch, Italian; *Basic:* French, Spanish, German
- HACCP Certified since 2020
- Running own sourdough micro-bakery since 2020 ([link](#))

## List of Publications

### Refereed 1st Author

1. **Lacerda, P.**, Fornasier, S., Lellouch, E., et al., **2014**, *The Albedo-Color Diversity of Transneptunian Objects*, ApJL, 793, L2.
2. **Lacerda, P.**, **2013**, *Comet P/2010 TO20 LINEAR-Grauer as a Mini-29P/SW1*, MNRAS, 428, 1818.
3. **Lacerda, P.**, & Jewitt, D., **2012**, *Extinction in the Coma of Comet 17P/Holmes*, ApJL, 760, L2.
4. **Lacerda, P.**, **2011**, *A Change in the Light Curve of Kuiper Belt Contact Binary (139775) 2001 QG<sub>298</sub>*, AJ, 142, 90.
5. **Lacerda, P.**, **2009**, *Time-Resolved Near-Infrared Photometry of Extreme Kuiper Belt Object Haumea*, AJ, 137, 3404.
6. **Lacerda, P.**, Jewitt, D., & Peixinho, N., **2008**, *High-Precision Photometry of Extreme KBO 2003 EL<sub>61</sub>*, AJ, 135, 1749.
7. **Lacerda, P.**, **2008**, *Detection of Contact Binaries Using Sparse High Phase Angle Light Curves*, ApJL, 672, L57.
8. **Lacerda, P.**, & Jewitt, D. C., **2007**, *Densities of Solar System Objects from Their Rotational Light Curves*, AJ, 133, 1393.
9. **Lacerda, P.**, & Luu, J., **2006**, *Analysis of the Rotational Properties of Kuiper Belt Objects*, AJ, 131, 2314.
10. **Lacerda, P.**, **2005**, *The Shapes and Spins of Kuiper Belt Objects*, PhD Thesis
11. **Lacerda, P.**, **2003**, *On the detectability of light curves of KBOs*, JAD, 9, 8.
12. **Lacerda, P.**, & Luu, J., **2003**, *On the detectability of lightcurves of Kuiper Belt objects*, Icarus, 161, 174.

### Other Refereed

#### 2020

- Robinson, J. E., Fraser, W. C., Fitzsimmons, A., & **Lacerda, P.**, 2020, *Investigating gravitational collapse of a pebble cloud to form transneptunian binaries*, A&A, 643, A55.
- Farkas-Takács, A., Kiss, C., Vilenius, E., Marton, G., Müller, T. G., Mommert, M., Stansberry, J., Lellouch, E., **Lacerda, P.**, & Pál, A., 2020, *“TNOs are Cool”: A survey of the trans-Neptunian region. XV. Physical characteristics of 23 resonant trans-Neptunian and scattered disk objects*, A&A, 638, A23.

#### 2018

- Fitzsimmons, A., Snodgrass, C., Rozitis, B., Yang, B., Hyland, M., Seccull, T., Bannister, M. T., Fraser, W. C., Jedicke, R., & **Lacerda, P.**, 2018, *Spectroscopy & thermal modelling of the 1st interstellar object 1I/`Oumuamua*, NatAs, 2, 133.

- McNeill, A., Fitzsimmons, A., Jedicke, R., **Lacerda, P.**, Lilly, E., Thompson, A., Trilling, D. E., DeMooij, E., Hooton, M. J., & Watson, C. A., 2018, *Extreme Asteroids in the Pan-STARRS 1 Survey*, AJ, 156, 282.
- Kokotanekova, R., Snodgrass, C., **Lacerda, P.**, Green, S. F., Nikolov, P., & Bonev, T., 2018, *Implications of the small spin changes measured for large Jupiter-family comet nuclei*, MNRAS, 479, 4665.
- Pfalzner, S., Bhandare, A., Vincke, K., & **Lacerda, P.**, 2018, *Outer Solar System Possibly Shaped by a Stellar Fly-by*, ApJ, 863, 45.
- Reshetnyk, V. M., Skorov, Y. V., **Lacerda, P.**, Hartogh, P., & Rezac, L., 2018, *Dynamics of Dust Particles of Different Structure: Application to the Modeling of Dust Motion in the Vicinity of the Nucleus of Comet 67P/Churyumov-Gerasimenko*, SoSyR, 52, 266.
- Bannister, M. T., et al., 2018, *OSSOS. VII. 800+ Trans-Neptunian Objects—The Complete Data Release*, ApJS, 236, 18.
- Holman, M. J., Payne, M. J., Fraser, W., **Lacerda, P.**, et al., 2018, *A Dwarf Planet Class Object in the 21:5 Resonance with Neptune*, ApJL, 855, L6.
- Lorek, S., **Lacerda, P.**, & Blum, J., 2018, *Local growth of dust- and ice-mixed aggregates as cometary building blocks in the solar nebula*, A&A, 611, A18.
- Fraser, W. C., Pravec, P., Fitzsimmons, A., **Lacerda, P.**, Bannister, M. T., Snodgrass, C., & Smolić, I., 2018, *The tumbling rotational state of 1I/ Oumuamua*, NatAs, 2, 383.

## 2017

- Bannister, M. T., et al., 2017, *Col-OSSOS: Colors of the Interstellar Planetesimal 1I/Oumuamua*, ApJL, 851, L38.
- Kokotanekova, R., Snodgrass, C., **Lacerda, P.**, et al., 2017, *Rotation of cometary nuclei: new light curves and an update of the ensemble properties of Jupiter-family comets*, MNRAS, 471, 2974.
- Santos-Sanz, P., Lellouch, E., Groussin, O., **Lacerda, P.**, et al., 2017, *"TNOs are Cool": A survey of the trans-Neptunian region. XII. Thermal light curves of Haumea, 2003 VS<sub>2</sub> and 2003 AZ<sub>84</sub> with Herschel/PACS*, A&A, 604, A95.
- Snodgrass, C., et al., 2017, *The 67P/Churyumov-Gerasimenko observation campaign in support of the Rosetta mission*, RSPTA, 375, 20160249.
- Fraser, W. C., Bannister, M. T., Pike, R. E., Marsset, M., Schwamb, M. E., Kavelaars, J. J., **Lacerda, P.**, et al., 2017, *All planetesimals born near the Kuiper belt formed as binaries*, NatAs, 1, 0088.

## 2016

- Bannister, M. T., et al., 2016, *OSSOS. IV. Discovery of a Dwarf Planet Candidate in the 9:2 Resonance with Neptune*, AJ, 152, 212.
- Muntean, E. A., **Lacerda, P.**, Field, T. A., Fitzsimmons, A., Fraser, W. C.,

- Hunniford, A. C., & McCullough, R. W., 2016, *A laboratory study of water ice erosion by low-energy ions*, MNRAS, 462, 3361.
- Lin, H. W., Chen, Y.-T., Holman, M. J., Ip, W.-H., Payne, M. J., **Lacerda, P.**, et al., 2016, *The Pan-STARRS 1 Discoveries of Five New Neptune Trojans*, AJ, 152, 147.
  - Skorov, Y., Reshetnyk, V., **Lacerda, P.**, Hartogh, P., & Blum, J., 2016, *Acceleration of cometary dust near the nucleus: application to 67P/Churyumov-Gerasimenko*, MNRAS, 461, 3410.
  - Bannister, M. T., et al., 2016, *The Outer Solar System Origins Survey. I. Design and First-quarter Discoveries*, AJ, 152, 70.
  - Chen, Y.-T., Lin, H. W., Holman, M. J., Payne, M. J., Fraser, W. C., **Lacerda, P.**, et al., 2016, *Discovery of a New Retrograde Trans-Neptunian Object: Hint of a Common Orbital Plane for Low Semimajor Axis, High-inclination TNOs and Centaurs*, ApJL, 827, L24.
  - Gougout, F., Carry, B., Dumas, C., Vachier, F., Merlin, F., **Lacerda, P.**, Barucci, M. A., & Berthier, J., 2016, *Near-infrared spatially resolved spectroscopy of (136108) Haumea's multiple system*, A&A, 593, A19.
  - Lorek, S., Gundlach, B., **Lacerda, P.**, & Blum, J., 2016, *Comet formation in collapsing pebble clouds. What cometary bulk density implies for the cloud mass and dust-to-ice ratio*, A&A, 587, A128.

## 2015

- Muntean, E. A., **Lacerda, P.**, Field, T. A., Fitzsimmons, A., Hunniford, C. A., & McCullough, R. W., 2015, *Sputtering of oxygen ice by low energy ions*, SurSc, 641, 204.
- Pfalzner, S., Davies, M. B., Gounelle, M., Johansen, A., Münker, C., **Lacerda, P.**, Portegies Zwart, S., Testi, L., Tieloff, M., & Veras, D., 2015, *The formation of the solar system*, PhyS, 90, 068001.
- Johansen, A., Mac Low, M.-M., **Lacerda, P.**, & Bizzarro, M., 2015, *Growth of asteroids, planetary embryos, and Kuiper belt objects by chondrule accretion*, SciA, 1, 1500109.
- Hsieh, H. H., et al., 2015, *Sublimation-Driven Activity in Main-Belt Comet 313P/Gibbs*, ApJL, 800, L16.

## 2014

- Lin, H. W., Chen, Y. T., **Lacerda, P.**, et al., 2014, *Pan-STARRS 1 Observations of the Unusual Active Centaur P/2011 S1(Gibbs)*, AJ, 147, 114.
- Hsieh, H. H., et al., 2014, *Search for the Return of Activity in Active Asteroid 176P/LINEAR*, AJ, 147, 89.
- **Lacerda, P.**, McNeill, A., & Peixinho, N., 2014, *The unusual Kuiper belt object 2003 SQ<sub>317</sub>*, MNRAS, 437, 3824.

## 2013

- Lellouch, E., Santos-Sanz, P., **Lacerda, P.**, et al., 2013, "*TNOs are Cool*": A survey of the trans-Neptunian region. IX. Thermal properties of Kuiper belt objects and Centaurs from combined Herschel and Spitzer observations, *A&A*, 557, A60.
- Fornasier, S., et al., 2013, *TNOs are Cool*: A survey of the trans-Neptunian region. VIII. Combined Herschel PACS and SPIRE observations of nine bright targets at 70-500  $\mu\text{m}$ , *A&A*, 555, A15.

## 2012

- Peixinho, N., Delsanti, A., Guilbert-Lepoutre, A., Gafeira, R., & **Lacerda, P.**, 2012, *The bimodal colors of Centaurs and small Kuiper belt objects*, *A&A*, 546, A86.
- Carry, B., Snodgrass, C., **Lacerda, P.**, Hainaut, O., & Dumas, C., 2012, *Characterisation of candidate members of (136108) Haumea's family. II. Follow-up observations*, *A&A*, 544, A137.
- Hsieh, H. H., et al., 2012, *Observational and Dynamical Characterization of Main-belt Comet P/2010 R2 (La Sagra)*, *AJ*, 143, 104.
- Hsieh, H. H., et al., 2012, *Discovery of Main-belt Comet P/2006 VW<sub>139</sub> by Pan-STARRS1*, *ApJL*, 748, L15.
- Carry, B., Hestroffer, D., DeMeo, F. E., Thirouin, A., Berthier, J., **Lacerda, P.**, Sicardy, B., et al., 2011, *Integral-field spectroscopy of (90482) Orcus-Vanth*, *A&A*, 534, A115.

## 2011

- Hsieh, H. H., Ishiguro, M., **Lacerda, P.**, & Jewitt, D., 2011, *Physical Properties of Main-belt Comet 176P/LINEAR*, *AJ*, 142, 29.

## 2010

- Lim, T. L., et al., 2010, "*TNOs are Cool*": A survey of the transneptunian region III. Thermophysical properties of 90482 Orcus & 136472 Makemake, *A&A*, 518, L148.
- Lellouch, E., Kiss, C., Santos-Sanz, P., Müller, T. G., Fornasier, S., Groussin, O., **Lacerda, P.**, et al., 2010, "*TNOs are cool*": A survey of the trans-Neptunian region. II. The thermal lightcurve of (136108) Haumea, *A&A*, 518, L147.
- Müller, T. G., et al., 2010, "*TNOs are Cool*": A survey of the trans-Neptunian region. I. Results from the Herschel science demonstration phase (SDP), *A&A*, 518, L146.
- Johansen, A., & **Lacerda, P.**, 2010, *Prograde rotation of protoplanets by accretion of pebbles in a gaseous environment*, *MNRAS*, 404, 475.
- Hsieh, H. H., Jewitt, D., **Lacerda, P.**, Lowry, S. C., & Snodgrass, C., 2010, *The return of activity in main-belt comet 133P/Elst-Pizarro*, *MNRAS*, 403, 363.

## 2009

- Müller, T. G., et al., 2009, *TNOs are Cool: A Survey of the Transneptunian Region*, EM&P, 105, 209.

## 2008

- Peixinho, N., **Lacerda, P.**, & Jewitt, D., 2008, *Color-Inclination Relation of the Classical Kuiper Belt Objects*, AJ, 136, 1837.
- Sheppard, S. S., **Lacerda, P.**, & Ortiz, J. L., 2008, *Photometric Lightcurves of Transneptunian Objects and Centaurs: Rotations, Shapes, and Densities*, “The Solar System Beyond Neptune” book chapter, 129.

## 2007

- Mann, R. K., Jewitt, D., & **Lacerda, P.**, 2007, *Fraction of Contact Binary Trojan Asteroids*, AJ, 134, 1133.

## 2003

- Rousselot, P., Petit, J.-M., Poulet, F., **Lacerda, P.**, & Ortiz, J., 2003, *Photometry of the Kuiper-Belt object 1999 TD<sub>10</sub> at different phase angles*, A&A, 407, 1139.
- Luu, J., & **Lacerda, P.**, 2003, *The Shape Distribution Of Kuiper Belt Objects*, EM&P, 92, 221.

## 2001

- Peixinho, N., **Lacerda, P.**, Ortiz, J. L., Doressoundiram, A., Roos-Serote, M., & Gutiérrez, P. J., 2001, *Photometric study of Centaurs 10199 Chariklo (1997 CU<sub>26</sub>) and 1999 UG<sub>5</sub>*, A&A, 371, 753.



### **Selected proceedings and other publications**

- Kokotanekova, R., **Lacerda, P.**, & Snodgrass, C.(2019), European Planetary Science Congress-AAS/DPS Joint Meeting, 1767  
*Optimal strategy for KBO lightcurve studies from the ground*
- **Lacerda, P.**, et al. (2015), European Planetary Science Congress  
*A Survey for Extreme Shape Hilda Asteroids*
- **Lacerda, P.** (2013), AAS/Division for Planetary Sciences Meeting, 45, 414.11  
*An Unusually Shaped Haumea Family Member*
- **Lacerda, P.** & A. McNeill (2013), European Planetary Science Congress, 543  
*An Unusually Shaped Haumea Family Member*
- de Jong, J. T. A., et al., 2013, The Messenger, 154, 44.  
*The Kilo-Degree Survey*
- **Lacerda, P.** & D. Jewitt (2012), AAS/DPS Meeting, 44, 514.04  
*A Stellar Appulse by Exploding Comet 17P/Holmes*
- **Lacerda, P.** (2012), Asteroids, Comets, Meteors, 1667, 6149  
*The Unusual Comet P/2010 TO20 LINEAR-Grauer*
- **Lacerda, P.** (2011), EPSC-DPS Joint Meeting, 814  
*A Change in the Lightcurve of Contact Binary 2001 QG298*
- **Lacerda, P.**, et al. (2010), European Planetary Science Congress, 505  
*The thermal lightcurve of Kuiper belt object Haumea*
- **Lacerda, P.** (2010), Icy Bodies of the Solar System, 263, 192  
*The Dark Red Spot on KBO Haumea*
- **Lacerda, P.** (2009), The Next-Generation Infrared Space Mission: SPICA, 2004  
*The Sizes of Kuiper Belt Objects*
- **Lacerda, P.** (2009), European Planetary Science Congress, 815  
*The Seasonal Activity of Main-Belt Comet 133P/Elst-Pizarro*
- **Lacerda, P.** (2009), European Planetary Science Congress, 561  
*The surface spot on KBO Haumea*
- Jewitt, D., Moro-Martin, A., & **Lacerda, P.** (2009), Astrophysics in the Next Decade, Astrophysics and Space Science Proceedings, 10, 53  
*The Kuiper Belt and Other Debris Disks*
- **Lacerda, P.** (2008), AAS/Division for Planetary Sciences Meeting, 48.02  
*The Near-Infrared Lightcurve of 2003 EL61*
- **Lacerda, P.**, et al. (2008), Asteroids, Comets, Meteors, 1405, 8007  
*A Dark, Red Spot on 2003 EL61*
- **Lacerda, P.** (2007), AAS/DPS Meeting, 16.09  
*Detection of Contact Binaries*
- **Lacerda, P.** (2007), AAS Meeting, 42.04  
*The Fraction of KBO Contact Binaries*
- **Lacerda, P.** (2007), Keck Observatory Archive HIRES, H199Hb  
*OH Emission from Icy Small Bodies*

- **Lacerda, P.** & D. Jewitt (2006), AAS/DPS Meeting, 34.02  
*Densities from Lightcurves*
- **Lacerda, P.**, et al. (2006), Past Meets Present in Astronomy and Astrophysics, 15, 9  
*The Origin of the Spins of Kuiper Belt Objects*
- **Lacerda, P.** (2006), IAU Joint Discussion, 26, 33  
*Densities of solar system objects by lightcurve comparison with triaxial equilibrium ellipsoids*
- **Lacerda, P.**, et al. (2005), AAS/DPS Meeting, 56.18  
*On the origin of KBO spins*
- **Lacerda, P.** & J. Luu (2005), Highlights of Astronomy, 13, 775 *Detectability of lightcurves of KBOs*
- **Lacerda, P.** & J. Luu (2003), IAU Joint Discussion, 25, E34  
*Detectability of Lightcurves of KBOs*
- **Lacerda, P.** & J. Luu (2002), Asteroids, Comets, and Meteors, 500, 51  
*On the detectability of lightcurves of Kuiper Belt objects*
- Rol, E., Salamanca, I., Kaper, L., Vreeswijk, P., **Lacerda, P.**, Hodgkin, S., Tzanavaris, P., & Tanvir, N., 2001, GRB Coordinates Network, 955, 1  
*GRB010214, candidate optical afterglow,*