Curriculum Vitae

# Pedro Bernardino Lacerda Cruz

Pedro Bernardino Lacerda Cruz obtained a master in Physics in 2000 at the University of Lisbon, and a PhD in Astronomy and Astrophysics in 2005 at Leiden University. He mas awarded a Royal Society Newton Fellowship in 2008 and was Max Planck Research Group Leader from 2013 to 2016. Pedro works in the area of exact sciences, physics and astronomy. In his Ciência Vitae the most common keywords in terms of scientific, technological and cultural production are: Kuiper Belt; Comets; Planetary Science; Solar System.

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Pedro Bernardino Lacerda Cruz concluiu a Licenciatura em Física em 2000 pela Faculdade de Ciências da Universidade de Lisboa e PhD em Astronomy and Astrophysics em 2005 pela Universiteit Leiden. Recebeu 1 prémio da Royal Society e foi Max Planck Research Group Leader. Atua na área de Ciências Exatas, Física com ênfase em Astronomia. No seu currículo Ciência Vitae os termos mais frequentes no contexto da produção científica, tecnológica e artístico-cultural são: Kuiper Belt; Comets; Planetary Science; Solar System.

## Identification

### Personal identification

Full name
Pedro Bernardino Lacerda Cruz

### Citation names

Pedro Lacerda

### Author identifiers

Ciência ID
601F-21C5-E180

ORCID iD
0000-0002-1708-4656

### Knowledge fields

Exact Sciences - Physical Sciences - Astronomy

## Languages

| Language | Speaking | Reading | Writing | Listening | Peer-review |
|---|---|---|---|---|---|
| Portuguese (Mother tongue) | | | | | |
| English | Proficiency (C2) | Proficiency (C2) | Proficiency (C2) | Proficiency (C2) | Proficiency (C2) |
| Dutch | Upper intermediate (B2) | Upper intermediate (B2) | Upper intermediate (B2) | Advanced (C1) | Upper intermediate (B2) |
| French | Intermediate (B1) | Advanced (C1) | Intermediate (B1) | Intermediate (B1) | Intermediate (B1) |
| Italian | Upper intermediate (B2) | Advanced (C1) | Intermediate (B1) | Advanced (C1) | Intermediate (B1) |
| Spanish; Castilian | Elementary (A2) | Advanced (C1) | Elementary (A2) | Upper intermediate (B2) | Intermediate (B1) |
| German | Beginner (A1) | Elementary (A2) | Beginner (A1) | Beginner (A1) | |

## Education

| | Degree | Classification |
|---|---|---|
| 2017/01 - 2019/01<br>Attended | Postgraduate Certificate in Higher Education Teaching (Postgraduate Certificate)<br><br>Queen's University Belfast, United Kingdom | |
| 2005/02/17<br>Concluded | Astronomy and Astrophysics (Doktor (PhD))<br><br>Universiteit Leiden, Netherlands<br>*"The shapes and spins of Kuiper Belt objects"*<br>*(THESIS/DISSERTATION)* | - |
| 2000<br>Concluded | Física (Licenciatura)<br><br>Universidade de Lisboa Faculdade de Ciências, Portugal | 15 |
| 1997<br>Attended | Engenharia Electrotécnica e de Computadores (Mestrado)<br><br>Universidade de Lisboa Instituto Superior Técnico, Portugal | aproveitamento em 20 cadeiras |

## Affiliation

## Science

| | Category<br>Host institution/organization | Employer |
|---|---|---|
| 2022/01/03 - Current | Science and Technology Management<br>Associação para a Inovação e Desenvolvimento em Ciência e Tecnologia, Portugal | Associação para a Inovação e Desenvolvimento em Ciência e Tecnologia, Portugal |
| 2013 - 2016 | Coordinating Researcher (Research)<br>Max-Planck-Institut für Sonnensystemforschung, Germany | Max-Planck-Institut für Sonnensystemforschung, Germany |
| 2011 - 2013 | Contracted Researcher (Research)<br>Queen's University Belfast, United Kingdom | Queen's University Belfast, United Kingdom |
| 2009 - 2011 | Principal Investigator (Research)<br>Queen's University Belfast, United Kingdom | The Royal Society, United Kingdom |
| 2006 - 2008 | Postdoc (Research) | University of Hawai'i at Manoa Institute for Astronomy, United States |
| 2005 - 2006 | Postdoc (Research) | Universidade de Coimbra, Portugal |
| 2000 - 2005 | Contracted Researcher (Research)<br>Universiteit Leiden, Netherlands | Universiteit Leiden, Netherlands |
| 2002 - 2003 | Visiting Researcher (Research) | Harvard-Smithsonian Center for Astrophysics, United States |
| 1999 - 2000 | Research Trainee (Research) | Instituto de Astrofísica e Ciências do Espaço, Portugal |

## Teaching in Higher Education

| | Category<br>Host institution/organization | Employer |
|---|---|---|

| | | |
|---|---|---|
| 2016 - 2019 | Lecturer (University Teacher) | Queen's University Belfast, United Kingdom |
| 2003 - 2004 | Assistant (University Teacher)<br>Harvard University Department of Physics, United States | Harvard University Department of Physics, United States |

## Projects

### Grant

| | Designation | Funders |
|---|---|---|
| 2018 - 2020 | PATT Travel Grant for observational astrophysics at QUB: 2018 - 2020<br>ST/S001298/1<br>Researcher<br>Queen's University Belfast, United Kingdom | Science and Technology Facilities Council, United Kingdom<br>Concluded |
| 2017 - 2020 | Queen's University Belfast Consolidated Grant in Solar Physics and Solar System Studies 2017 - 2020<br>ST/P000304/1<br>Researcher<br>Queen's University Belfast, United Kingdom | Science and Technology Facilities Council, United Kingdom<br>Concluded |
| 2016 - 2018 | PATT Linked Grant for observational astrophysics at QUB: 2016 - 2018<br>ST/P001041/1<br>Researcher<br>Queen's University Belfast, United Kingdom | Science and Technology Facilities Council, United Kingdom<br>Concluded |
| 2013 - 2015 | A laboratory and telescopic study of the colours of icy solar system objects<br>RPG-2013-389<br>Principal investigator<br>Queen's University Belfast, United Kingdom | Leverhulme Trust, United Kingdom<br>Concluded |
| 2009 - 2011 | Extreme Objects in the Outer Solar System<br>7422<br>Principal investigator<br>The Royal Society, United Kingdom<br>Queen's University Belfast, United Kingdom | The Royal Society, United Kingdom<br>Concluded |

## Other

| | Designation | Funders |
|---|---|---|
| 2013 - Current | Outer Solar System Origins Survey (OSSOS)<br>CFHT LP OSSOS<br>Researcher | Ongoing |
| 2009 - Current | TNOs are Cool: A Survey of the Transneptunian Region<br>KPOT_thmuelle_1<br>Researcher | Ongoing |
| 2014 - 2017 | A Magnitude Limited Survey of the Rotational Properties of Kuiper Belt Objects<br>194.C-0207<br>Principal investigator<br>European Southern Observatory, Germany | Concluded |

# Outputs

## Publications

| | | |
|---|---|---|
| Book chapter | 1 | Pedro Lacerda; Jewitt, David; Moro-Martìn, Amaya; Lacerda, Pedro. "The Kuiper Belt and Other Debris Disks". In *Astrophysics in the Next Decade*. 2009.<br>Published · 10.1007/978-1-4020-9457-6_3 |
| | 2 | Sheppard, S. S.; Lacerda, P.; Ortiz, J. L.. "Photometric Lightcurves of Transneptunian Objects and Centaurs: Rotations, Shapes, and Densities". In *The Solar System Beyond Neptune*. 2008.<br>Published |
| Conference abstract | 1 | Robinson, James E.; Fraser, Wesley C.; Fitzsimmons, Alan; Lacerda, Pedro. "Investigating Gravitational Collapse of Pebble Clouds to form Trans-Neptunian Binaries". 2020. |
| | 2 | Kokotanekova, Rosita; Lacerda, Pedro; Snodgrass, Colin. "Optimal strategy for KBO lightcurve studies from the ground". 2019. |
| | 3 | Kokotanekova, Rosita; Snodgrass, Colin; Lacerda, Pedro; Green, Simon; Masoumzadeh, Nafiseh; Tubiana, Cecilia; Rizos, Juan Luis; et al. "Testing the surface evolution hypothesis of JFCs with ground photometric observations". 2019. |

4 Kokotanekova, Rosita; Snodgrass, Colin; Lacerda, Pedro; Green, Simon F.. "Evidence for a Surface Evolution Trend in Jupiter-Family Comets". 2018.

5 Pfalzner, Susanne; Bhandare, Asmita; Vincke, Kirsten; Lacerda, Pedro. "Did a stellar fly-by shape the outer solar system?". 2018.

6 Kokotanekova, Rosita; Snodgrass, Colin; Lacerda, Pedro; Green, Simon F.. "Physical properties of Jupiter-family comets and KBOs from ground-based lightcurve observations". 2017.

7 McNeill, Andrew; Fitzsimmons, Alan; Jedicke, Robert; Lilly, Eva; Lacerda, Pedro; Trilling, David E.; Members of the Pan-STARRS Science Consortium. "The search for extreme asteroids in the Pan-STARRS 1 Survey". 2017.

8 Alexandersen, M.; Benecchi, S.; Chen, Y. -T.; Schwamb, M. E.; Wang, S. -Y.; Lehner, M.; Lacerda, P.; Thirouin, A.; Peixinho, N.. "Hyper Suprime-Cam Lightcurve Studies of Trans-Neptunian Objects from the Outer Solar System Origins Survey". 2017.

9 Kokotanekova, R.; Snodgrass, C.; Lacerda, P.; Lowry, S. C.; Fernández, Y. R.; Green, S. F.; Tubiana, C.; Fitzsimmons, A.; Hsieh, H. H.. "Evidence for low tensile strength in comet nuclei". 2017.

10 Holman, Matthew J.; Chen, Ying-Tung; Lackner, Michael; Payne, Matthew John; Lin, Hsing-Wen; Cristopher Fraser, Wesley; Lacerda, Pedro; Pan-STARRS 1 Science Consortium. "Primary results from the Pan-STARRS-1 Outer Solar System Key Project". 2016.

11 Paquette, J. A.; Altobelli, N.; Altwegg, K.; Briois, C.; Colangeli, L.; Cottin, H.; Baklouti, D.; et al. "COSIMA at Comet 67P/Churyumov-Gerasimenko After Perihelion". 2015.

12 Bardyn, Anais; Hilchenbach, Martin; Briois, Christelle; Kissel, Jochen; Koch, Andreas; Langevin, Yves; Schulz, Rita; et al. "COSIMA - In-situ dust particles measurements in the inner coma of comet 67P/Churyumov-Gerasimenko". 2015.

13 Lorek, S.; Lacerda, P.; Gundlach, B.; Blum, J.. "Compaction of ice pebbles in collapsing pebble clouds and the dust-to-ice ratio of comets". 2015.

14 Kokotanekova, R.; Lacerda, P.; Snodgrass, C.; Lockhart, M.; Lorek, S.; Peixinho, N.; Thirouin, A.; et al. "A Magnitude Limited Survey of the Rotational Properties of Kuiper Belt Objects". 2015.

15 Lacerda, P.; Ali-Lagoa, V.; Licandro, J.; Peixinho, N.. "A Survey for Extreme Shape Hilda Asteroids". 2015.

16 Johansen, Anders; Mac Low, Mordecai-Mark; Lacerda, Pedro; Bizzarro, Martin. "Growth of Asteroids by Chondrule Accretion". 2015.

17 Hilchenbach, M.; Langevin, Y.; Engrand, C.; Merouane, S.; Stenzel, O.; Kissel, J.; Briois, Ch.; et al. "In-Situ Cometary Particle Measurements in the Inner Coma of Comet 67P/Churyumov-Gerasimenko". 2015.

18 Dumas, Christophe; Gourgeot, Florian; Carry, Benoit; Lacerda, Pedro; Merlin, Frederic; Vachier, Frederic; Antonieta Barucci, Maria; Berthier, Jerome. "Near-infrared spatially resolved spectroscopy of 136108 Haumea's multiple system". 2015.

19 Muntean, Elena Andra; Field, Tom; Fitzsimmons, Alan; Hunniford, Adam; Lacerda, Pedro; McCullough , Bob. "Irradiation of oxygen and water ices at by 4 keV singly and doubly charged ions; sputtering and molecular synthesis". 2014.

20 Santos-Sanz, P.; Lellouch, E.; Ortiz, J. L.; Kiss, Cs.; Müller, Th.; Vilenius, E.; Stansberry, J.; et al. "Thermal short-time variability of Kuiper Belt Objects observed with Herschel". 2014.

21 Lin, H.; Chen, Y.; Lacerda, P.; Ip, W.; Holman, M.. "Active Centaur P/2011 S1 (Gibbs)". 2013.

22 Stansberry, John A.; Müller, T.; Lellouch, E.; Barucci, A.; Fornasier, S.; Kiss, C.; Lacerda, P.; et al. "TNOs are Cool! Summary Results from the Herschel Key Programme". 2013.

23 Lacerda, Pedro. "An Unusually Shaped Haumea Family Member". 2013.

24 Lacerda, P.; McNeill, A.. "An Unusually Shaped Haumea Family Member". 2013.

25 Gourgeot, Florian; Dumas, C.; Carry, B.; Merlin, F.; Hestroffer, D.; Lacerda, P.. "Surface Heterogeneity of the dwarf-planet Haumea". 2012.

26 Lellouch, Emmanuel; Santos-Sanz, P.; Mommert, M.; Fornasier, S.; Stansberry, J.; Müller, T.; Duffard, R.; et al. "Thermal Properties Of Trans-neptunian Objects And Centaurs From Combined Herschel And Spitzer Observations". 2012.

27 Lacerda, Pedro; Jewitt, D.. "A Stellar Appulse by Exploding Comet 17P/Holmes". 2012.

28 Santos-Sanz, Pablo; Lellouch, E.; Fornasier, S.; Kiss, C.; Müller, T. G.; Lacerda, P.; TNOs are Cool Team. "Dwarf planets observations with Herschel Space Observatory". 2010.

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| | 29 | Hsieh, Henry H.; Lacerda, P.. "176P/LINEAR: A Slow-Rotating, Highly Elongated Main-Belt Comet". 2010. |
| | 30 | Lacerda, Pedro. "The Near-Infrared Lightcurve of 2003 EL61". 2008. |
| | 31 | Lacerda, Pedro. "Detection of Contact Binaries". 2007. |
| | 32 | Peixinho, Nuno; Lacerda, P.; Jewitt, D.. "Exploring The Color-inclination Correlation For Classical Tnos". 2007. |
| | 33 | Lacerda, Pedro. "The Fraction of KBO Contact Binaries". 2007. |
| | 34 | Mann, Rita; Jewitt, D.; Lacerda, P.. "Fraction of Contact Binary Trojan Asteroids". 2006. |
| | 35 | Lacerda, Pedro; Jewitt, D.. "Densities from Lightcurves". 2006. |
| | 36 | Lacerda, P.. "Densities of solar system objects by lightcurve comparison with triaxial equilibrium ellipsoids". 2006. |
| | 37 | Lacerda, P.; Dominik, C.; Luu, J.; Kenyon, S.. "On the origin of KBO spins". 2005. |
| | 38 | Lacerda, Pedro; Luu, Jane. "Detectability of Lightcurves of Kbos". 2003. |
| | 39 | Peixinho, N.; Lacerda, P.; Roos-Serote, M.; Ortiz, J.; Doressoundiram, A.. "New Results on Centaurs 1997CU26 and 1999UG5". 2000. |
| Conference paper | 1 | Peixinho, N.; Delsanti, A.; Guilbert-Lepoutre, A.; Gafeira, R.; Lacerda, P.. "Centaur-Sized KBOs Also Show Bimodal Colors". 2012. |
| | 2 | Lacerda, P.. "The Unusual Comet P/2010 TO20 LINEAR-Grauer". 2012. |
| | 3 | Peixinho, N.; Delsanti, A.; Guilber-Lepoutre, A.; Gafeira, R.; Lacerda, P.. "The Kuiper Belt Color Controversy Returns". 2012. |

4 Hsieh, H. H.; Yang, B.; Haghighipour, N.; Kaluna, H. M.; Fitzsimmons, A.; Denneau, L.; Novakovic, B.; et al. "Discovery of Main-Belt Comet P/2006 VW139 by Pan-STARRS1". 2012.

5 Lacerda, P.. "A Change in the Lightcurve of Contact Binary 2001 QG298". 2011.

6 Dumas, C.; Carry, B.; Hestroffer, D.; Merlin, F.; Lacerda, P.; Gourgeot, F.. "High-contrast observations of the Haumea system". 2011.

7 Santos-Sanz, P.; Kiss, C.; Lellouch, E.; Müller, T. G.; Stansberry, J.; Böhnhardt, H.; Lacerda, P.; et al. "Thermal lightcurve observations of TNOs with Herschel". 2011.

8 Lacerda, P.; Lellouch, E.; Kiss, C.; Müller, T. G.; Groussin, O.; Santos-Sanz, P.. "The thermal lightcurve of Kuiper belt object Haumea". 2010.

9 Mommert, Michael; Müller, G.; Bühnhardt, Hermann; Lellouch, Emmanuel; Stansberry, John; Barucci, Antonella; Crovisier, Jacques; et al. "TNOs are Cool: A Survey of the Trans-Neptunian Region: Radiometric properties of Trans-Neptunian Objects". 2010.

10 Lacerda, Pedro. "The Dark Red Spot on KBO Haumea". 2010.

10.1017/S1743921310001730

11 Lacerda, P.. "The Sizes of Kuiper Belt Objects". 2009.

10.1051/spica/200902004

12 Lacerda, P.. "The surface spot on KBO Haumea". 2009.

13 Lacerda, P.. "The Seasonal Activity of Main-Belt Comet 133P/Elst-Pizarro". 2009.

14 Müller, Th. G.; Lellouch, E.; Böhnhardt, H.; Stansberry, J.; Barucci, A.; Crovisier, J.; Delsanti, A.; et al. "Herschel Open Time Key Programme—TNOs are Cool: A Survey of the Transneptunian Region". 2008.

15 Peixinho, N.; Lacerda, P.; Jewitt, D.. "Classical Kuiper Belt: Modeling the Color-Inclination Trend". 2008.

16 Lacerda, P.; Jewitt, D.; Peixinho, N.. "A Dark, Red Spot on 2003 EL61". 2008.

17 Stevenson, R.; Kleyna, J.; Lacerda, P.; Jewitt, D.. "Comet Holmes: Examining Four Months of Evolution Using Widefield Images". 2008.

18 Müller, T. G.; Lellouch, E.; Böhnhardt, H.; Stansberry, J.; Barucci, A.; Crovisier, J.; Delsanti, A.; et al. "Hershel Open Time Key Programme: TNOs are Cool: A Survey of the Transneptunian Region". 2008.

19 Lacerda, Pedro; Dominik, Carsten; Luu, Jane; Kenyon, Scott. "The Origin of the Spins of Kuiper Belt Objects". 2006.

10.1142/9789812773067_0003

20 Lacerda, Pedro; Luu, Jane. "On the detectability of lightcurves of Kuiper Belt objects". 2002.

21 Peixinho, Nuno; Lacerda, Pedro; Ortiz, Jose-Luis; Doressoundiram, Alain; Roos-Serote, Maarten; Gutiérrez, Pedro J.. "Photometry of Centaurs 1997 $CU_{26}$ and 1999 $UG_5$". 2001.

10.1142/9789812811110_0024

Journal article

1 P. Lacerda. Corresponding author: P. Lacerda. "Markov Chain Simulations of Kuiper Belt Binary Evolution". *(In preparation)* (2022):

2 Lacerda, P.; Kokotanekova, R.; Snodgrass, C.; et al.. Corresponding author: Lacerda, P.. "Machine Learning Analysis of Solar System Rotational Lightcurves (in preparation)". (2022):

3 J. E. Robinson; W. C. Fraser; A. Fitzsimmons; P. Lacerda. "Investigating gravitational collapse of a pebble cloud to form transneptunian binaries". *Astronomy & Astrophysics* 643 (2020): A55-A55. https://doi.org/10.1051%2F0004-6361%2F202037456.

10.1051/0004-6361/202037456

4 A. Farkas-Takács; Cs. Kiss; E. Vilenius; G. Marton; T. G. Müller; M. Mommert; J. Stansberry; et al. ""TNOs are Cool": A survey of the trans-Neptunian region". *Astronomy & Astrophysics* 638 (2020): A23-A23. https://doi.org/10.1051%2F0004-6361%2F201936183.

10.1051/0004-6361/201936183

5 Andrew McNeill; Alan Fitzsimmons; Robert Jedicke; Pedro Lacerda; Eva Lilly; Andrew Thompson; David E. Trilling; et al. "Extreme Asteroids in the Pan-STARRS 1 Survey". *The Astronomical Journal* (2018): https://doi.org/10.3847/1538-3881/aaeb8c.

10.3847/1538-3881/aaeb8c

6 Kokotanekova, R.; Snodgrass, C.; Lacerda, P.; Green, S. F.; Nikolov, P.; Bonev, T.. "Implications of the small spin changes measured for large Jupiter-family comet nuclei". *Monthly Notices of the Royal Astronomical Society* (2018):

10.1093/mnras/sty1529

7 Susanne Pfalzner; Asmita Bhandare; Kirsten Vincke; Pedro Lacerda. "Outer Solar System Possibly Shaped by a Stellar Fly-by". *The Astrophysical Journal* (2018): https://doi.org/10.3847/1538-4357/aad23c.

10.3847/1538-4357/aad23c

8 Reshetnyk, V. M.; Skorov, Yu. V.; Lacerda, P.; Hartogh, P.; Rezac, L.. "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". *Solar System Research* (2018):

10.1134/S0038094618030085

9 Bannister, Michele T.; Gladman, Brett J.; Kavelaars, J. J.; Petit, Jean-Marc; Volk, Kathryn; Chen, Ying-Tung; Alexandersen, Mike; et al. "OSSOS. VII. 800+ Trans-Neptunian Objects—The Complete Data Release". *The Astrophysical Journal Supplement Series* (2018):

10.3847/1538-4365/aab77a

10 Lorek, S.; Lacerda, P.; Blum, J.. "Local growth of dust- and ice-mixed aggregates as cometary building blocks in the solar nebula". *Astronomy and Astrophysics* (2018):

10.1051/0004-6361/201630175

11 Matthew J. Holman; Matthew J. Payne; Wesley Fraser; Pedro Lacerda; Michele T. Bannister; Michael Lackner; Ying-Tung Chen; et al. "A Dwarf Planet Class Object in the 21:5 Resonance with Neptune". *The Astrophysical Journal* 855 1 (2018): L6-L6. https://doi.org/10.3847/2041-8213/aaadb3.

10.3847/2041-8213/aaadb3

12 Wesley C. Fraser; Petr Pravec; Alan Fitzsimmons; Pedro Lacerda; Michele T. Bannister; Colin Snodgrass; Igor Smolic. "The tumbling rotational state of 1I/'Oumuamua". *Nature Astronomy* 2 5 (2018): 383-386. https://doi.org/10.1038%2Fs41550-018-0398-z.

10.1038/s41550-018-0398-z

13 Michele T. Bannister; Megan E. Schwamb; Wesley C. Fraser; Michael Marsset; Alan Fitzsimmons; Susan D. Benecchi; Pedro Lacerda; et al. "Col-OSSOS: Colors of the Interstellar Planetesimal 1I/'Oumuamua". *The Astrophysical Journal* 851 2 (2017): L38-L38. https://doi.org/10.3847/2041-8213/aaa07c.

10.3847/2041-8213/aaa07c

14 Kokotanekova, R.; Snodgrass, C.; Lacerda, P.; Green, S. F.; Lowry, S. C.; Fernández, Y. R.; Tubiana, C.; Fitzsimmons, A.; Hsieh, H. H.. "Rotation of cometary nuclei: new light curves and an update of the ensemble properties of Jupiter-family comets". *Monthly Notices of the Royal Astronomical Society* (2017):

10.1093/mnras/stx1716

15 Santos-Sanz, P.; Lellouch, E.; Groussin, O.; Lacerda, P.; Müller, T. G.; Ortiz, J. L.; Kiss, C.; et al. ""TNOs are Cool": A survey of the trans-Neptunian region. XII. Thermal light curves of Haumea, 2003 $VS_2$ and 2003 $AZ_{84}$ with Herschel/PACS". (2017): https://ui.adsabs.harvard.edu/#abs/2017A&A...604A..95S.

10.1051/0004-6361/201630354

16 Snodgrass, C.; A'Hearn, M. F.; Aceituno, F.; Afanasiev, V.; Bagnulo, S.; Bauer, J.; Bergond, G.; et al. "The 67P/Churyumov-Gerasimenko observation campaign in support of the Rosetta mission". (2017): https://ui.adsabs.harvard.edu/#abs/2017RSPTA.37560249S.

10.1098/rsta.2016.0249

17 Fraser, Wesley C.; Bannister, Michele T.; Pike, Rosemary E.; Marsset, Michael; Schwamb, Megan E.; Kavelaars, J. J.; Lacerda, Pedro; et al. "All planetesimals born near the Kuiper belt formed as binaries". (2017): https://ui.adsabs.harvard.edu/#abs/2017NatAs...1E..88F.

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18 Fraser, Wesley C.; Bannister, Michele T.; Pike, Rosemary E.; Marsset, Michael; Schwamb, Megan E.; Kavelaars, J. J.; Lacerda, Pedro; et al. "Corrigendum: All planetesimals born near the Kuiper belt formed as binaries". (2017): https://ui.adsabs.harvard.edu/#abs/2017NatAs...1E.138F.

10.1038/s41550-017-0138

19 Fitzsimmons, Alan; Snodgrass, Colin; Rozitis, Ben; Yang, Bin; Hyland, Méabh; Seccull, Tom; Bannister, Michele T.; et al. "Spectroscopy and thermal modelling of the first interstellar object 1I/2017 U1 'Oumuamua". (2017): http://dx.doi.org/10.1038/s41550-017-0361-4.

10.1038/s41550-017-0361-4

20 Bannister, Michele T.; Alexandersen, Mike; Benecchi, Susan D.; Chen, Ying-Tung; Delsanti, Audrey; Fraser, Wesley C.; Gladman, Brett J.; et al. "OSSOS. IV. Discovery of a Dwarf Planet Candidate in the 9:2 Resonance with Neptune". (2016): https://ui.adsabs.harvard.edu/#abs/2016AJ....152..212B.

10.3847/0004-6256/152/6/212

21 Muntean, Elena A.; Lacerda, Pedro; Field, Thomas A.; Fitzsimmons, Alan; Fraser, Wesley C.; Hunniford, Adam C.; McCullough, Robert W.. "A laboratory study of water ice erosion by low-energy ions". (2016): https://ui.adsabs.harvard.edu/#abs/2016MNRAS.462.3361M.

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22 Hsing Wen Lin (¿¿¿); Ying-Tung Chen (¿¿¿); Matthew J. Holman; Wing-Huen Ip (¿¿¿); M. J. Payne; P. Lacerda; W. C. Fraser; et al. "THE PAN-STARRS 1 DISCOVERIES OF FIVE NEW NEPTUNE TROJANS". *The Astronomical Journal* (2016):

10.3847/0004-6256/152/5/147

23 Chen, Ying-Tung; Lin, Hsing-Wen; Holman, Matthew J.; Payne, Matthew John; Fraser, Wesley Cristopher; Lacerda, Pedro; Ip, Wing-Huen; Pan-STARRS 1 Builders. "Discovery of A New Retrograde Trans-Neptunian Object: Hint of A Common Orbital Plane for Low Semi-Major Axis, High Inclination TNOs and Centaurs". (2016): https://ui.adsabs.harvard.edu/#abs/2016DPS....4811304C.

24 Kokotanekova, Rosita; Snodgrass, Colin; Lacerda, Pedro; Green, Simon F.. "Rotation Rates and Spin Changes of Jupiter Family Comet Nuclei: New optical lightcurves and an update on the population properties.". (2016): https://ui.adsabs.harvard.edu/#abs/2016DPS....4821904K.

25 Lorek, Sebastian; Lacerda, Pedro; Blum, Jürgen. "Comet Formation in Collapsing Pebble Clouds: Pebble Formation". (2016): https://ui.adsabs.harvard.edu/#abs/2016DPS....4833107L.

26 Skorov, Yuri; Reshetnyk, Volodymyr; Lacerda, Pedro; Hartogh, Paul; Blum, Jürgen. "Acceleration of cometary dust near the nucleus: application to 67P/Churyumov-Gerasimenko". (2016): https://ui.adsabs.harvard.edu/#abs/2016MNRAS.461.3410S.

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27 Bannister, Michele T.; Kavelaars, J. J.; Petit, Jean-Marc; Gladman, Brett J.; Gwyn, Stephen D. J.; Chen, Ying-Tung; Volk, Kathryn; et al. "The Outer Solar System Origins Survey. I. Design and First-quarter Discoveries". (2016): https://ui.adsabs.harvard.edu/#abs/2016AJ....152...70B.

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28 Gourgeot, F.; Carry, B.; Dumas, C.; Vachier, F.; Merlin, F.; Lacerda, P.; Barucci, M. A.; Berthier, J.. "Near-infrared spatially resolved spectroscopy of (136108) Haumea's multiple system". (2016): https://ui.adsabs.harvard.edu/#abs/2016A&A...593A..19G.

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63 2010 TF192. 2016. Gibson, B.; Goggia, T.; Primak, N.; Schultz, A.; Willman, M.; Chen, Y. -T.; Fraser, W.; et al.

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107 Observations and Orbits of Comets. 2013. Kostov, A.; Enikova, P.; Cernis, K.; Giambersio, A. M.; Foglia, S.; Galli, G.; Buzzi, L.; et al.

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109 Minor Planet Observations [F65 Haleakala-Faulkes Telescope North]. 2011. Bedient, J.; Tholen, D. J.; Micheli, M.; Guido, E.; Lister, T.; Howes, N.; Blyth, H.; et al.

110 Minor Planet Observations [F65 Haleakala-Faulkes Telescope North]. 2010. Fitzsimmons, A.; Asher, D. J.; Miles, R.; Roche, P.; Micheli, M.; Sergison, D.; Hsieh, H.; et al.

111 Comet 133P/Elst-Pizarro. 2007. Jewitt, D.; Lacerda, P.; Peixinho, N..

## Activities

### Oral presentation

| | Presentation title | Event name<br>Host (Event location) |
|---|---|---|
| 2015/11/14 | O novo Sistema Solar | 2.ª Conferência de Professores EspAciais - ESERO PT<br>Ciência Viva / Pavilhão do Conhecimento / ESERO (Lisbon, Portugal) |
| 2015/11/13 | Encontro com um Cientista | Encontro com um Cientista<br>Pavilhão do Conhecimento (Lisbon, Portugal) |
| 2015/05/21 | Planet and Comet Formation | Class for High School Students<br>Colégio Salesianos de Lisboa (Lisbon, Portugal) |
| 2014/11/12 | From Comets to Planets | Philae landing on comet 67P<br>Ciência Viva/Pavilhão do Conhecimento (Lisbon, Portugal) |
| 2013/06/22 | The impact of philanthropy on my career and research | Queen's University Belfast Benefactors Lunch<br>Queen's University Belfast (Belfast, United Kingdom) |
| 2013/05/07 | Today's Astrophysics, Tomorrow's Discoveries | Café Scientifique - Science Cafe<br>Belfast Science Café (Belfast, United Kingdom) |

## Supervision

| | Thesis Title<br>Role | Degree Subject (Type)<br>Institution / Organization |
|---|---|---|
| 2017 - 2020 | The origin and evolution of Transneptunian binaries<br>Co-supervisor of James Robinson | Astrophysics (PhD)<br>Queen's University Belfast, United Kingdom |
| 2014 - 2018 | Bulk Properties and Evolution of Jupiter-Family Comet Nuclei<br>Co-supervisor of Rosita Kokotanekova | (PhD)<br>Max-Planck-Institut für Sonnensystemforschung, Germany |
| 2014 - 2017 | Comet Formation in the Framework of Streaming Instability<br>Co-supervisor of Sebastian Lorek | (PhD)<br>Max-Planck-Institut für Sonnensystemforschung, Germany |

## Event organisation

| | Event name<br>Type of event (Role) | Institution / Organization |
|---|---|---|
| 2018/06/22 - 2018/06/23 | Before and After Halley explores, for the first time, how medieval records of comets can be used to test the theory that our solar system may include an | |

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| | additional, undiscovered planet: Planet Nine. Combining the skills of a medievalist and an astronomer, this exhibit challenges the assumption that early medieval scientific thought was simple and undeserving of serious scientific investigation. (2018/06/22 - 2018/06/23)<br>Festival (Co-organisor) | |
| 2018/05/02 - 2018/06/03 | Marvelling at the Skies: Comets through the Eyes of the Anglo-Saxons. This exhibition combines records of comets from Anglo-Saxon sources with images from NASA, Armagh Observatory & AAANI. A cosmic journey from a description of a comet in England in the year 891 under the period of Alfred the Great, to the sighting of a hazy green-hued comet Lovejoy in 2013. This exhibition is part of the Royal Society APEX project 'Before and After Halley: Medieval Visions of Modern Science' funded by the UK leading academies and the Leverhulme Trust. (2018/05/02 - 2018/06/03)<br>Exhibition (Co-organisor) | Ulster Museum, United Kingdom |
| 2016/07/04 - 2016/07/10 | The comet revealed: Rosetta and Philae at Comet 67P. Rosetta has revealed Comet 67P to be a bizarre chunk of dusty ice, with a fascinating landscape of towering cliffs and smooth plains, from which jets of gas and dust erupt into space. The comet is a natural laboratory for a wealth of chemical and physical processes, detected by the orbiter and lander. By combining this data with images and spectra observed from Earth, we're glimpsing the Solar System's early history. (2016/07/04 - 2016/07/10)<br>Exhibition (Co-organisor) | The Royal Society, United Kingdom |
| 2013/07/02 - 2013/07/07 | Ice Worlds - Royal Society Summer Science Exhibition. Exhibit about the moons of the outer planets and other large icy bodies in our solar system, many of which have atmospheres, volcanoes that erupt water, and underground oceans. We helped the public understand the gravity, orbits, compositions and atmospheres of these icy worlds, and how their surfaces are altered by being exposed to radiation. We highlighted future space missions that may determine whether it's possible for humans to inhabit some | The Royal Society, United Kingdom |

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| | mysterious icy world one day. (2013/07/02 - 2013/07/07)<br>Exhibition (Co-organisor) | |
| 2012/10/17 - 2012/10/17 | Michael West Lecture: "The Sun". Dr Lucie Green is a space scientist who studies the Sun. She was a Royal Society Dorothy Hodgkin Research Fellow and I now holds a Leverhulme Fellowship. Dr Green also works in TV (you may have seen her in The Sky At Night) and radio, writes science articles and give talks about the UK's current research in solar system science. She was the 2009 recipient of the Kohn Award for excellence in public engagement with science. (2012/10/17 - 2012/10/17)<br>Seminar (President of the Organising Committee) | Queen's University Belfast, United Kingdom |
| 2012/05/02 - 2012/05/02 | Michael West Lecture: "What if the speed of light isn't constant? What you gain and what you lose." João Magueijo has defied one of the tenets of modern physics, that the speed of light is constant. His research in cosmology lies at the very frontier of our understanding of how the Universe was born and evolves. Magueijo has held the prestigious St. John's College (Cambridge) and Royal Society research fellowships, and was visiting researcher at the UC Berkeley and Princeton. He is Reader in Theoretical Physics at Imperial College London. (2012/05/02 - 2012/05/02)<br>Seminar (President of the Organising Committee) | Queen's University Belfast, United Kingdom |
| 2011/08/03 - 2011/08/03 | Michael West Lecture: Killer Asteroids. Dr Robert Jedicke has had four professional careers: Canadian football player, particle physicist, software engineer and astronomer. At the University of Hawaii he leads the PanSTARRS team searching for asteroids and comets. In three years, PanSTARRS will discover more solar system objects than have been found in the past two centuries. A renowned asteroid hunter, Jedicke is leading the search for dangerous asteroids that may impact the Earth in the future. (2011/08/03 - 2011/08/03)<br>Seminar (President of the Organising Committee) | Queen's University Belfast, United Kingdom |

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| 2011/07/22 - 2011/07/22 | Michael West Lecture on "Supermassive Black Holes". Prof Reinhard Genzel, director of the Max Planck Institute for Extraterrestrial Physics & Professor at the UC Berkeley was the recipient of the 2007 Albert Einstein Medal.<br>Over the past two decades, compelling evidence has been obtained for the existence of black holes with masses millions of times that of our Sun. In 2008, Reinhard Genzel won the prestigious Shaw Prize for establishing the existence of such a supermassive black hole in the centre of our own Milky Way. (2011/07/22 - 2011/07/22)<br>Seminar (President of the Organising Committee) | Queen's University Belfast, United Kingdom |

## Jury of academic degree

| | Theme<br>Role | Candidate name (Type of degree)<br>Institution / Organization |
|---|---|---|
| 2014/12/11 | Formation of pebble-pile planetesimals: understanding the interior structure of comets. The thesis studies the collapse of a self- gravitating cloud of pebbles to form planetesimals. The self-gravitating cloud contracts when it loses energy in inelastic collisions between pebbles leading to a higher density. Because of the negative heat capacity of the system the relative speeds of the pebbles increase when the cloud loses energy. Higher density and collision speeds results in higher collision rates, faster energy dissipation and run-away collapse.<br>(Thesis) Arguer | Karl Wahlberg Jansson (Other)<br>Lunds Universitet, Sweden |

## Course / Discipline taught

| | Academic session | Degree Subject (Type) | Institution / Organization |
|---|---|---|---|
| 2018/09 - 2019/09 | Computational Modelling in Physics | Physics MSci (Master) | Queen's University Belfast, United Kingdom |
| 2016/09 - 2019/09 | Mathematics for Scientists and Engineers | Physics MSci (Master) | Queen's University Belfast, United Kingdom |
| 2016/09 - 2019/09 | Scientific Skills | Physics MSci (Master) | Queen's University Belfast, United Kingdom |
| 2016/09 - 2019/09 | Foundation Physics | Physics MSci (Master) | Queen's University |

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| | | | Belfast, United Kingdom |
| 2015/04 - 2015/07 | Solar System Science: The Planetary System. It gives an introduction to this Solar System Science at the graduate level and is mandatory for all first-year IMPRS PhD students. | Solar System Science: The Planetary System (Doktor (PhD)) | Max-Planck-Institut für Sonnensystemforschung, Germany |
| 2012 - 2012 | STEPS (Sci/Tech Experts in Primary Schools) Class on the Solar System at Primary School, Dunmurry, Northern Ireland | Our Solar System | Christ the Redeemer Primary School, United Kingdom |
| 2005 - 2005 | Solar System Teacher at the BEST Summer School | Solar System (Outros) | Board of European Students of Technology, Portugal |
| 2003 - 2004 | Astronomy 101 | (Bachelor) | Harvard University Department of Physics, United States |

## Evaluation committee

| | Activity description<br>Role | Institution / Organization | Funding entity |
|---|---|---|---|
| 2019 - 2019 | NASA Discovery Mission (space exploration) Scientific Evaluation Panel<br>Specialist | NASA Science Mission Directorate, United States | |
| 2015 - 2015 | NASA Discovery Mission (space exploration) Scientific Evaluation Panel<br>Specialist | NASA Science Mission Directorate, United States | |
| 2011 - 2011 | NASA Discovery Mission (space exploration) Scientific Evaluation Panel<br>Specialist | NASA Science Mission Directorate, United States | |
| 2007 - 2007 | NASA ROSES Grants Program<br>Specialist | NASA Science Mission Directorate, United States | |

## Interview (newspaper / magazine)

| | Activity description | Newspaper / Forum |
|---|---|---|
| 2016/09/30 | Final da missão Rosetta. "Foi a primeira vez que vimos um cometa tão perto, que o seguimos durante uma boa parte da órbita, que vimos como muda | Diário de Notícias |

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| | quando se aproxima do Sol, que aterrámos um zingarelho na sua superfície", destaca o astrofísico Pedro Lacerda que estuda os dados da Rosetta, em conjunto com o seu aluno de doutoramento, Sebastian Lorek, que trabalha no Instituto Max Planck para Investigação do Sistema Solar, em Göttingen. Até há bem pouco tempo, diz o investigador, isto eram "coisas de sonho". | |
| 2016/07/11 | Astronomers discover distant dwarf planet beyond Neptune. Currently designated 2015 RR245, the giant ball of ice and rock lies nine billion kilometres away in the the most distant reaches of the solar system. | The Guardian |
| 2014/11/14 | Atterragem da sonda Philae no comet 67P/CG. Mesmo de lado, o Philae está recolher dados 'espetaculares'. | Diário de Notícias |
| 2014/08/07 | Interview with Teresa Firmino of Público on the structure of comet 67P/CG | Público |
| 2014/07/17 | Cometa 'duplo' surpreende cientistas da sonda Rosetta. Missão europeia que vai ao 67P Churyumov-Gerasimenko revela que ele tem dois blocos. Pedro Lacerda, um astrofísico português no Instituto Max Planck estuda dados da sonda. | Diário de Notícias |
| 2014/07/16 | Interview on the surprising shape of comet 67P/CG, target of the Rosetta Mission. | New Scientist |
| 2014/07/16 | Comment on the remarkable images by ESA Rosetta spacecraft revealing comet target as a twin and not a single body, | Daily Mail |

## Interview (tv / radio show)

| | Program | Theme |
|---|---|---|
| 2021/11/26 - Current | Sociedade Civil | Astros |
| 2018/05/03 - 2018/05/03 | Good Morning Ulster, BBC Radio Ulster | Ulster Museum exhibition and Royal Society APEX award on "Comets through the eyes of the Anglo-Saxons." |
| 2015/07/15 - 2015/07/15 | Sky News | New Horizons flyby of Pluto |
| 2015/06/28 - 2015/06/28 | A Quinta Essência | A Quinta Essência da Astrofísica |

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|---|---|---|
| 2014/11/12 - 2014/11/20 | TSF Rádio Notícias | Rosetta/Philae Landing on comet 67P |
| 2014/11/12 - 2014/11/12 | Edgar Canelas | Rosetta/Philae Landing on comet 67P |
| 2014/11/12 - 2014/11/12 | Rádio Renascença Notícias | Rosetta/Philae Landing on comet 67P |
| 2013/03/12 - 2013/03/12 | BBC Radio Ulster: Good Morning Ulster | Comet C/2011 L4 PANSTARRS |
| 2013/03/12 - 2013/03/12 | Highland Radio - Main News Bulletin | Comet C/2011 L4 PANSTARRS |
| 2013/03/11 - 2013/03/11 | BBC Radio Ulster News | Comet C/2011 L4 PANSTARRS |
| 2013/02/15 - 2013/02/15 | Caroline Fleck Show - Downtown Radio | Close approach of near-Earth asteroid 2012 DA14 |

### Journal scientific committee

| | Journal title (ISSN) | Publisher |
|---|---|---|
| 2019 - Current | Nature Astronomy | Springer |
| 2017 - Current | The Astrophysical Journal | IOP Science |
| 2015 - Current | Monthly Notices of the Royal Astronomical Society | Oxford University Press |
| 2010 - Current | Science | AAAS |
| 2009 - Current | Planetary and Space Sciences | Elsevier |
| 2008 - Current | The Astrophysical Journal Letters | IOP Science |
| 2008 - Current | The Astronomical Journal | IOP Sciences |
| 2007 - Current | Astronomy and Astrophysics | EDP Sciences |
| 2005 - Current | Icarus | Elsevier |

## Distinctions

### Award

| | |
|---|---|
| 2017 | Royal Society APEX Award (co-I)<br>The Royal Society, United Kingdom<br>Queen's University Belfast - Student Union, United Kingdom |
| 2008 | Royal Society Newton International Fellowship<br>The Royal Society, United Kingdom |

### Title

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|---|---|
| 2013 | Max Planck Research Group Leader<br>Max-Planck-Institut für Sonnensystemforschung, Germany |

## Other distinction

| | |
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| 2019 | Most Innovative Learning Experience Runner up<br>Queen's University Belfast - Student Union, United Kingdom |
| 2018 | Most Inspirational Education Award Nomination<br>Queen's University Belfast - Student Union, United Kingdom |
| 2017 | Asteroid (10694) Lacerda is named after Dr. Pedro Lacerda<br>International Astronomical Union, France |