Tomás Enrique Müller Bravo

PERSONAL DETAILS

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CAREER

Postdoc 2021-Present
Institute of Space Sciences (ICE)

Ph.D. in Astronomy 2017-2021
University of Southampton

M.Sc. in Astrophysics 2015-2017
Pontificia Universidad Católica de Chile

B.Sc. in Astronomy 2011-2014
Universidad de Chile

RESEARCH EXPERIENCE

- Optical and Near Infrared Cosmology with Type Ia Supernovae
- Type II Supernovae: lightcurves, spectra and physical parameters
- Machine and deep learning techniques for classification, regression, outliers detection, etc.
- Data-reduction pipeline manager of ePESSTO+ collaboration

SKILLS

Languages	English (fluent), Spanish (fluent), French (basic)
Programming	Python (advanced), C++ (basic)
OS	Linux (main), Windows

GRANTS, AWARDS AND FELLOWSHIPS

- Becas de Doctorado en el Extranjero, Becas Chile (2017-2021; PhD Scholarship)
- RAS conference/meeting grant (June 2019)
- LSSTC Data Science Fellow (2016 - 2018)

INVITED TALKS

- "Building a Type Ia Supernova Hubble Diagram with PISCoLA", Imperial College London, London, UK (blackboard talk; February 2020)
- "Cosmology with VEILS: Building an Infrared SN Ia Hubble Diagram", AURA, La Serena, Chile (January 2019) – link
- "Cosmology with VEILS: Building an Infrared SN Ia Hubble Diagram", ESO, Santiago, Chile (December 2018)

- "Type Ia Supernova Cosmology: infrared light as a new window", Charles University, Prague, Czech Republic (July 2018) – link

ORGANIZED MEETINGS, WORKSHOPS AND CONFERENCES

- "Exploring the Exploding Transients Diversity with Next-Generation Facilities", session in National Astronomy Meeting, online (July 2021)
- A (Hubble) Tension Headache workshop, online (March 2021)
- PyData Southampton organiser (2019 - 2021)
- Southampton+Portsmouth weekly supernova-group meetings (2018 - 2021)
- "The Big Data Era in Astronomy" online conference, Southampton, UK (September 2020) - conference website
- Software Carpentry Workshop, Max Planck Institute for Plasma Physics, Greifswald, Germany (April 2018) - workshop website
- Software Carpentry Workshop, University of Southampton, Southampton, UK (April 2018) - workshop website

CONTRIBUTED TALKS

- "Gaussian Process Fitting: let the data guide you!", PyData Global, Online (November 2020)
- "Type Ia Supernova Cosmology with PISCOLA", RAS Specialist Meeting: Progress in Astrophysics with Type-Ia Supernovae, Online (November 2020)
- "Type Ia Supernova Cosmology with PISCOLA", South-Coast Cosmology Meeting, Online (October 2020)
- "Type Ia Supernova Cosmology with PISCOLA", RAS Specialist Meeting: The new window on Transients and Variable Star astronomy with the Rubin Observatory, Online (October 2020)
- "The Nickel Mass distribution of Type II Supernova and the case of SN 2016aqf", European Week of Astronomy and Space Science, Lyon, France (June 2019)
- "PISCoLA: Python for Interactive Supernova Cosmology Light-curve Analysis", Cosmic Explosions School, Institut d'Etudes Scientifiques de Cargèse, Corsica (May-June 2019)
- "Cosmology with VEILS: Building an Infrared SN Ia Hubble Diagram", South Coast Cosmology meeting, Institute of Cosmology and Gravitation, Portsmouth, UK (January 2019)
- "The Nickel Mass Distribution of Normal Type II Supernovae", II Workshop de Estudiantes de Astronomía, Universidad de Chile, Santiago, Chile (March 2017)
- "The Nickel Mass Distribution of Normal Type II Supernovae", III Millennium Institute of Astrophysics Workshop, Viña del Mar, Chile (December 2016)
- "The Nickel Mass Distribution of Normal Type II Supernovae", Preparing for SN science in the LSST era: a kick-off workshop, Pittsburgh, USA (November 2016)
- "The Nickel Mass Distribution of Normal Type II Supernovae", II Católica-Ohio State Workshop, Santiago, Chile (May 2016)

ATTENDED CONFERENCES, WORKSHOPS, MEETINGS AND SCHOOLS

- SuperVirtual 2021 online conference (November 2021)
- HostFlows kick-off meeting online (September 2021)
- ALeRCE Broker Workshop online (September 2020)
- ePESSTO+ online meeting (September 2020)

- online.tess.science (September 2020)
- Summer School on Machine Learning and Big Data with Quantum Computing (September 2020) – link
- Astro Hack Week, Online (August - September 2020)
- DotDotAstro Conference, Online (August 2020) – link
- GROWTH Astronomy School, Online (August 2020)
- Rubin Observatory Project Community Workshop, Online (August 2020)
- Deep Learning for Science School: Webinar Series, Online (July - September 2020)
- IBM-Qiskit Global Quantum-Computing Summer School, Online (July 2020) – link
- European Astronomical Society Annual Meeting, Leiden, The Netherlands (June-July 2020)
  Poster: *"Building a Type Ia Supernova Hubble Diagram with PISCOLA: in search of an alternative parameterisation"*
- The extragalactic explosive Universe, Garching, Germany (September 2019)
  Poster: *"PISCoLA: Python for Interactive Supernova Cosmology Light-curve Analysis"*
- National Astronomy Meeting, Lancaster, UK (July 2019)
  Poster: *"PISCoLA: Python for Interactive Supernova Cosmology Light-curve Analysis"*
- Canary Islands Winter School of Astrophysics, La Laguna, Tenerife, Spain (November 2018)
  Poster: *"Cosmology with VEILS: Building an Infrared SN Ia Hubble Diagram"*
- European Week of Astronomy and Space Science, Liverpool, UK (April 2018)
  Poster: *"Cosmology with VEILS: Building an Infrared SN Ia Hubble Diagram"*
- La Serena School for Data Science, La Serena, Chile (August 2017)
- Towards Science in Chile with LSST, Viña del Mar, Chile (December 2016)
- Supernovae Through the Ages Conference, Easter Island, Chile (August 2016) – link
  Poster: *"The Nickel Mass Distribution of Normal Type II Supernovae"*
- I Workshop de Estudiantes de Astronomía Universidad de Chile, Santiago, Chile (May 2016)
  Poster: *"The Nickel Mass Distribution of Normal Type II Supernovae"*
- Mock Santiago Workshop, Santiago, Chile (April 2016)
- Chilean Astronomical Society XIII Annual Meeting, Antofagasta, Chile (March 2016)
  Poster: *"The Nickel Mass Distribution of Normal Type II Supernovae"*
- II Millennium Institute of Astrophysics Workshop, Olmué, Chile (November 2015)
  Poster: *"The Nickel Mass Distribution of Normal Type II Supernovae"*

OBSERVATIONAL EXPERIENCE

- EFOSC2+SOFI/New Technology Telescope at the La Silla Observatory
- IO:O+SPRATS/Liverpool Telescope at the Roque de los Muchachos Observatory
- IMACS/Baade Magellan Telescope at the Las Campanas Observatory

CODES

- PISCOLA: type Ia supernova light-curve fitter.
- ePESSTO+ pipeline: ePESSTO+ data-reduction pipeline for the New Technology Telescope.
- SNII Fitting Code: code for fitting type II supernovae light curves and expansion velocities.
- TESSreduce: pipeline for extracting transients light curves with TESS data.

REVIEWER IN JOURNALS AND CONFERENCES

- The Journal of Open Source Software (JOSS)
- NeurIPS 2021 workshop on Machine Learning and the Physical Sciences

TEACHING

University of Southampton (2017 - 2021)
Modules: Programming and Data Analysis, Electromagnetism, Introduction to Astronomy and Space Science, Quantum Physics of Matter, Wave Physics, Physics Skills 2, Physics from Evidence I

Pontificia Universidad Católica de Chile (2016 - 2017)
Modules: Astronomy, Thermodynamics, Electricity & Magnetism, Physics II, Physics

Universidad de Chile (2014)
Modules: Electromagnetism, Mechanics

OUTREACH

- Online astronomy talks at San Benito school, Santiago, Chile (November 2020) - link
- Mentor in Humble Data Workshop as part of PyData Global for people outside of the mainstream in the data science/tech industry in Africa, Online (November 2020) - link
- RAS Early Career Poster Exhibition (2020) - link
- Demonstration at Light Up Poole, Poole, UK (2020) - link
- Pint of Science organiser, Southampton, UK (2019)
- Guest post in Astrobites (January 2019)
- Astrodome and Planeterrella demonstrator for local schools in Southampton, UK (2018 - present)
- Astronomy talk for children at *Centro de Internación Provisoria* (CIP; temporary detention centre for minors) de San Joaquín, Santiago, Chile (2017) - Link
- Representing the Millennium Institute of Astrophysics at the *Jovenes Consciencia* annual meeting of Iniciativa Milenio, to discuss about the importance of public policies in science, and at the *Science Week*, event organised by the *Explora Program* of CONICYT in the *Museo Interactivo Mirador* (2016)
- Astronomy related talks and activities at the *Hermano Eugenio Eyraud* public school and *Museo Antropológico Padre Sebastián Englert* during the Supernova Through the Ages Conference, Easter Island, Chile (2016)
- Astronomy workshop at the *San José de Peñanolen* public school as part of the *Bling Bling Universe* project from Física Itinerante, a student initiative from *Pontificia Universidad Católica de Chile* (2016)

LIST OF PUBLICATIONS

For a complete list of publications in ADS, follow this link. Current h-index of 9.

1. "An elliptical accretion disk of non-uniform eccentricity following the tidal disruption event AT 2020zso" Wevers et al., to be submitted to A&A (2021)
2. "Lass than 1% of Core-Collapse Supernovae in the local universe occur in elliptical galaxies" Irani, Prentice, Schulze et al., submitted to ApJ – arXiv:2110.02252 (2021)
3. "TESSreduce: TESS data reduction made simple", Ridden-Harper, Rest, Hounsell, **Müller-Bravo**, et al., submitted to MNRAS (2021)
4. "Applications and Techniques for Fast Machine Learning in Science" McCarn Deiana, Tran et al., submitted to Frontiers – arXiv:2110.13041 (2021)
5. "SN 2018bsz: significant dust formation in a nearby superluminous supernova" Chen, Brennan, Wesson et al., submitted to Nature Astronomy – arXiv:2109.07942 (2021)
6. "A detailed spectroscopic study of Tidal Disruption Events" Charalampopoulos et al., submitted to A&A – arXiv:2109.00016 (2021)
7. "PISCOLA: a data-driven transient light-curve fitter" **Müller-Bravo**, Sullivan, Smith et al., accepted in MNRAS – arXiv:2110.11340 (2021)
8. "Transitional events in the spectrophotometric regime between stripped envelope and superluminous supernovae" Prentice, Inserra, Schulze et al., accepted in MNRAS – arXiv:2109.14572 (2021)
9. "An impostor among us II: Progenitor, environment, and modelling of AT 2016jbu" Brennan, Fraser, Johansson et al., accepted in MNRAS – arXiv:2102.09576 (2021)
10. "An impostor among us I: Photometric and spectroscopic evolution of AT 2016jbu" Brennan, Fraser, Johansson et al., accepted in MNRAS – arXiv:2102.09572 (2021)
11. "SN 2020cpg: an energetic link between type IIb and Ib supernovae" Medler, Mazzali, Teffs et al., submitted to MNRAS, 506, 1832 (2021)
12. "SN2019hcc: A Type II Supernova Displaying Early O ii Lines" Parrag, Inserra, Schulze et al., submitted to MNRAS, 506, 4819 (2021)
13. "Core-collapse supernova subtypes in luminous infrared galaxies" Kankare, Efstathiou, Kotak et al. A&A, 649, A134 (2021)
14. "Luminous Type II Short-Plateau Supernovae 2006Y, 2006ai, and 2016egz: A Transitional Class from Stripped Massive Red Supergiants" Hiramatsu, Howell, Moriya et al. ApJ, 913, 55 (2021)
15. "The double-peaked Type Ic supernova 2019cad: another SN 2005bf-like object" Gutiérrez, Bersten, Orellana et al. MNRAS, 504, 4907 (2021)
16. "Accretion disc cooling and narrow absorption lines in the tidal disruption event AT 2019dsg" Cannizzaro, Wevers, Jonker et al. MNRAS, 504, 792 (2021)
17. "PS15cey and PS17cke: prospective candidates from the Pan-STARRS Search for Kilonovae" McBrien, Smartt, Huber et al. MNRAS, 500, 4213 (2021)
18. "SN 2017gci: a nearby Type I Superluminous Supernova with a bumpy tail" Fiore, Chen, Jerkstrand et al. MNRAS, 502, 2120 (2021)
19. "SN 2019muj - a well-observed Type Iax supernova that bridges the luminosity gap of the class" Barna, Szalai, Jha et al. MNRAS, 501, 1078 (2021)

20. “An outflow powers the optical rise of the nearby, fast-evolving tidal disruption event AT2019qiz” Nicholl, Wevers, Oates et al. MNRAS, 499, 482 (2020) - ESO press release

21. “The tidal disruption event AT 2018hyz - I. Double-peaked emission lines and a flat Balmer decrement” Short, Nicholl, Lawrence et al. MNRAS, 498, 4119 (2020)

22. “SN 2017ivv: two years of evolution of a transitional Type II supernova” Gutiérrez, Pastorello, Jerkstrand et al. MNRAS, 499, 974 (2020)

23. “SN 2018gjx reveals that some SNe Ibn are SNe IIb exploding in dense circumstellar material” Prentice, Maguire, Boian et al. MNRAS, 499, 1450 (2020)

24. “SN 2019ehk: A Double-peaked Ca-rich Transient with Luminous X-Ray Emission and Shock-ionized Spectral Features” Jacobson-Galán, Margutti, Kilpatrick et al. ApJ, 898, 166 (2020)

25. “The low-luminosity Type II SN 2016aqf: a well-monitored spectral evolution of the Ni/Fe abundance ratio” **Müller-Bravo**, Gutiérrez, Sullivan et al. MNRAS, 497, 361 (2020)

26. “The Tidal Disruption Event AT 2018hyz II: Light-curve modelling of a partially disrupted star” Gomez, Nicholl, Short et al. MNRAS, 497, 1925 (2020)

27. “The mystery of photometric twins DES17X1boj and DES16E2bjy” Pursiainen, Gutiérrez, Wiseman et al. MNRAS, 494, 5576 (2020)

28. “A Comprehensive Analysis of Spitzer Supernovae” Szalai, Zsíros, Fox et al. ApJS, 241, 38 (2019)

29. “The Nickel Mass Distribution of Normal Type II Supernovae” **Müller**, Prieto, Pejcha Clocchiatti et al. ApJ, 841, 127 (2017)

30. “Supernova progenitors, their variability and the Type IIP Supernova ASASSN-16fq in M66” Kochanek, Fraser, Adams et al. MNRAS, 467, 3347 (2017)