

# CHRISTOPHER CLARK

## CURRICULUM VITÆ

GALAXY EVOLUTION | INTERSTELLAR MEDIUM | EVOLVED STARS | DATA PIPELINES

### CONTACT INFORMATION

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### SCIENCE HIGHLIGHTS

- Clark et al. (2023) & **Revealing dramatic evolution in the dust-to-gas ratio in the Local Group**  
Clark et al. (2021) With custom *Herschel* reductions for Local Group galaxies, combined in Fourier space with *Planck*, IRAS, and COBE data, I show that the dust-to-gas ratio can vary by over a factor of 20 within a galaxy, demonstrating the dramatic importance of interstellar grain-growth.
- Clark et al. (2019) **The first maps of the dust mass absorption coefficient in nearby galaxies**  
Created maps of the notoriously poorly-constrained dust mass absorption coefficient, in M 74 and M 83; I find a very unexpected inverse correlation with density.
- Clark et al. (2015) **Uncovering a previously-overlooked population of blue and dusty gas-rich galaxies**  
Assembled the first blind *Herschel* galaxy sample at low- $z$ , finding it dominated by a class of intermediately-evolved galaxies sharing unusual set of traits; HI-dominated but metal-rich, with very little attenuation despite abundant dust and plentiful star-formation.

### ACADEMIC & EMPLOYMENT HISTORY

2023–	EUROPEAN SPACE AGENCY / AURA ASTRONOMER   Space Telescope Science Institute
2018–2023	POSTDOCTORAL FELLOW   Space Telescope Science Institute Supervisor: Dr Julia Roman-Duval   (+1) 410 338 4351   <a href="mailto:duval@stsci.edu">duval@stsci.edu</a>
2014–2018	POSTDOCTORAL RESEARCH ASSOCIATE   Cardiff University Supervisor: Prof Jonathan Davies <sup>†</sup>
2011–2015	PHD ASTRONOMY   Cardiff University   <a href="#">ADS Link to Thesis</a> Thesis: <i>On the Origins of Cosmic Dust and the Evolution of Nearby Galaxies with Herschel</i> Supervisor: Prof Haley Gomez   (+44) 29 2087 4058   <a href="mailto:haley.gomez@astro.cf.ac.uk">haley.gomez@astro.cf.ac.uk</a>
2007–2011	MPhys ASTROPHYSICS   CARDIFF UNIVERSITY MPhys with honours, upper division, 2 <sup>nd</sup> class

### TEACHING & MENTORING

#### POSTDOCS SUPERVISED

2024–Present **Logan Jones** | Primary supervisor, STScI

#### STUDENTS SUPERVISED

- 2025 **Christina Lindberg** | PhD co-supervisor supervisor, Johns Hopkins University  
2015–2016 **Jennifer Millard** | Master's project primary supervisor, Cardiff University  
2015–2016 **Franziska Zaunig** | Master's project co-supervisor, Cardiff University  
2014–2015 **Rhian Miles** | Undergraduate project co-supervisor, Cardiff University  
2014–2015 **Lewyse Lee** | Undergraduate project co-supervisor, Cardiff University  
2014–2015 **Jennifer Millard** | Undergraduate project co-supervisor, Cardiff University

#### COURSES TAUGHT

- 2016–2017 *Computational Skills for Problem Solving* | Lab lecturer, Cardiff University  
2011–2014 *Observational Techniques in Astronomy* | Lab assistant, Cardiff University

- 2013 Planetary Physics | Teaching assistant, Cardiff University  
2011-2012 Mathematics for Physical Scientists | Teaching assistant, Cardiff University

## GRANTS & AWARDS

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- 2023 **\$299 686** | NASA  
JWST General Observer Grant (Program GO-03429)
- 2022 **\$224 979** | NASA  
HST Archival Research Grant | *Tackling the Mysteries of BADGRs' Bizarre ISM Using Extinction Mapping*
- 2021 **\$113 800** | NASA  
SOFIA Observer Grant (Program 09-0030)
- 2020 **\$92 047** | NASA  
HST General Observer Grant (Program GO-16222)
- 2019 **1000 TB hrs** | NATIONAL SCIENCE FOUNDATION  
Computing time awarded by NSF's XSEDE supercomputing facility
- 2016 **£12 205** | CARDIFF DATA INNOVATION RESEARCH INSTITUTE  
Seedcorn Fund | *Astronomical Oncology – Astronomical Image Analysis Techniques for Cancer Microscopy*
- 2013 CARDIFF UNIVERSITY  
Bessie Jones Prize for Most Outstanding Research Student

## OBSERVING PROGRAMMES

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- ALMA **PI: 135 hours** | Co-I: 14 hours  
2025 (Cycle 21) PI | *The R<sub>2:1</sub> Magellanic Stripe Survey*
- SWIFT **PI: 12 hours**  
2025 (Cycle 21) PI | *Combining Swift & JWST to Benchmark the Radiation-ISM Interplay in M101*
- JWST **PI: 24 hours** | Co-I: 93 hours  
2023 (Cycle 3) PI | *One-Stop Shopping: Pan-Metallicity PAH Benchmarking in M101*  
2021 (Cycle 1) PI | *The Resolved Properties of PAHs at Low Metallicity*  
2021 (Cycle 1) PI | *Structure Formation and Baryonic Cycling in the Edge-On Galaxy NGC 891*
- SOFIA **PI: 12 hours**  
2021 (Cycle 9) PI | *An Unambiguous Measurement of Carbon Depletion, via 158 μm [CII] Absorption*
- HST **PI: 6 orbits** | Co-I: 577 orbits  
2020 (Cycle 28) PI | *Extinction Mapping in Leo P: The Lowest-Metallicity ISM in the Local Universe*  
2019 (Cycle 27) PI | *Scylla: A Parallel Multi-Headed Attack on Dust Evolution in ULLYSES Galaxies*
- IRAM 30 M **PI: 19 hours** | Co-I: 215 hours | Nights at telescope: 6  
2017 PI | *A Pilot Study for Nearby Galaxy Observations with NIKA2*
- JCMT 'Architect': 780 hours | Co-I: 1000+ hours | Nights at telescope: 22  
2017–present PI | *NESS: the Nearby Evolved Stars Survey*

## EXAMPLE SCHOLARLY PRESENTATIONS

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- 2025 **Talk** | *Strange Dust Properties in Super-Extended AGB Star Dust Shells*  
THE INTERSTELLAR INSTITUTE 7 | Paris-Saclay
- 2024 **Talk** | *Evolution in the Dusty ISM Across the Local Group*  
MILKY CLOUDS OVER MANHATTAN | Flatiron Institute
- 2022 **Invited Colloquium** | *Evolution in the Dusty ISM Across the Local Group*  
UNIVERSITY OF MARYLAND | College Park
- 2022 **Talk** | *Evolution in the Dusty ISM Across the Local Group*  
THE INTERSTELLAR INSTITUTE 5 | Paris-Saclay
- 2022 **Press Panel & Image Release** | *The Stardust Ecosystem in our Galactic Neighbours*  
240TH AMERICAN ASTRONOMICAL SOCIETY MEETING | Pasadena
- 2022 **Invited Seminar** | *Evolution in the Dusty ISM Across the Local Group*  
UNIVERSITY OF EXETER | Exeter

- 2022 **Colloquium** | *Evolution in the Dusty ISM Across the Local Group*  
MAX-PLANCK-INSTITUT FÜR ASTRONOMIE | Heidelberg
- 2022 **Seminar** | *Evolution in the Dusty ISM Across the Local Group*  
YALE UNIVERSITY GALAXY LUNCH | New Haven
- 2021 **Seminar** | *Evolution in the Dusty ISM Across the Local Group*  
UCLA | Los Angeles
- 2019 **Colloquium** | *The Quest For The Missing Flux*  
EAST ASIAN OBSERVATORY | Hilo
- 2019 **Talk** | *The First Maps of  $\kappa_d$  in Nearby Galaxies*  
LINKING THE MILKY WAY AND NEARBY GALAXIES | Helsinki
- 2019 **Colloquium** | *The First Maps of  $\kappa_d$  in Nearby Galaxies*  
UNIVERSITY COLLEGE LONDON | London
- 2018 **Symposium Chair** | *The ISM as a Window onto Galaxy Evolution*  
EUROPEAN WEEK OF ASTRONOMY AND SPACE SCIENCE 2018 | Liverpool

## TECHNICAL EXPERIENCE

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PROGRAMMING LANGUAGES	Python, IDL, R, FORTRAN90
OTHER COMPUTING	Git, Bash, Slurm, L <sup>A</sup> T <sub>E</sub> X, XSEDE, TFLearn
ASTRONOMICAL TOOLS	HIPE, TOpCaT, SWarp, Montage, DS9, Glue, SIAP/STAP, Kappa, STILTS, SPLAT
DATA EXPERIENCE	JWST, <i>Hubble</i> , <i>Swift</i> , GALEX, SDSS, SkyMapper, DSS, VISTA, UKIRT, 2MASS, COBE, WISE, <i>Spitzer</i> , IRAS, <i>Herschel</i> , JCMT, ALMA, <i>Planck</i> , Mopra, IRAM, VLA

## COMMUNITY SERVICE

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- 2025 SOC & LOC chair, 2025 Spring Symposium, STScI
- 2024 External reviewer, AAPG 2024, French National Research Agency
- 2024 Reviewer, Archival Research Visitor Programme, ESA
- 2024 Reviewer, Space Astronomy Summer Program, STScI
- 2022–PRESENT Referee, Journals of the AAS
- 2021–PRESENT Faculty (formerly postdoc) representative, Research Computing Forum, STScI
- 2015–PRESENT Referee, Astronomy & Astrophysics
- 2022–2023 Postdoc representative, Science Staff Executive Committee, STScI
- 2020–2023 Panel support, JWST & *Hubble* time allocation committees, STScI/NASA
- 2020 White paper author, Astro2020 Decadal Survey, National Academy of Sciences
- 2020 Review panellist, ROSES Grant Panel, NASA
- 2020 Co-organiser, JWST Proposal Planning Workshop, University of Maryland
- 2017–2019 External reviewer, time allocation committee, James Clerk Maxwell Telescope
- 2018 Chair, special symposium *The ISM as a Window onto Galaxy Evolution*, EWASS

## SELECTED PUBLIC OUTREACH

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- 2024 Public talk, *Interstellar Cosmic Star Dust*, Baltimore Chapter of Astronomy on Tap
- 2019–PRESENT Co-organiser, Astronomy on Tap @ Baltimore
- 2019–2022 Coordinator of science education activities, *Soaring Eagles Learning Camp*, Baltimore
- 2022 Image Release & Press Panel, 240<sup>th</sup> American Astronomical Society Meeting
- 2017–2018 Volunteer, *Physics In A Field* @ The Royal Welsh Show, Institute of Physics
- 2017 Public talk, *Herschel: Revealing the Dusty Universe Near & Far*, Manchester Students' Union Astronomy Society
- 2016 Public talk, *The Origins of Stardust*, Monmouth Astronomical Research Society
- 2015 Public talk, *The Origins of Stardust*, Society for Popular Astronomy
- 2012–2014 Presenter, *BBC Stargazing Live*, National Museum of Wales
- 2012–2013 Presenter, *The Christmas Lectures*, Cardiff University
- 2012 Science writer, Cardiff University Students' Union newspaper *Gair Rhydd*

## PUBLICATIONS

FIRST AUTHOR	Clark, C. J. R., et al., 2025 <i>Measuring Interstellar Carbon Abundance via 158 μm [CII] Absorption with SOFIA – A Potential Detection, and Proof-of-Concept for Depletion Studies with Future Far-IR Facilities</i> , accepted for publication in AJ  Clark, C. J. R., et al., 2023 <i>The Quest for the Missing Dust: II – Two Orders of Magnitude of Evolution in the Dust-to-Gas Ratio Resolved Within Local Group Galaxies</i> , ApJ 946 42  Clark, C. J. R., et al., 2021, <i>The Quest for the Missing Dust: I – Restoring Large Scale Emission in Herschel Maps of Local Galaxies</i> , ApJ 921 35  Clark, C. J. R., et al., 2019, <i>The First Maps of <math>\kappa_d</math> – the Dust Mass Absorption Coefficient – in Nearby Galaxies, with DustPedia</i> , MNRAS 489 5256  Clark, C. J. R., et al., 2018, <i>DustPedia: Multiwavelength Photometry and Imagery of 875 Nearby Galaxies in 42 Ultraviolet–Microwave Bands</i> , A&A 609 A37  Clark, C. J. R., et al., 2016, <i>An Empirical Determination of the Dust Mass Absorption Coefficient, <math>\kappa_d</math>, Using the Herschel Reference Survey</i> , MNRAS 459 1646  Clark, C. J. R., et al., 2015, <i>Herschel-ATLAS: The Surprising Diversity of Dust-Selected Galaxies in the Local Submillimetre Universe</i> , MNRAS 452 397  Clark, C. J. R., 2015, <i>On the Origins of Cosmic Dust and the Evolution of Nearby Galaxies with the Herschel Space Observatory</i> , PhD Thesis	<a href="#">ADS Link</a>
NON-PEER-REVIEWED	Clark, C. J. R., et al., 2026, <i>Using 23 Years of ACS/SBC Data to Understand Backgrounds: Explaining &amp; Predicting Background Variations</i> , Hubble Space Telescope Instrument Science Report ACS 2026-01  Clark, C. J. R., et al., 2025, <i>Using 23 Years of ACS/SBC Data to Understand Backgrounds: Significant Reductions in Expected Background Levels</i> , Hubble Space Telescope Instrument Science Report ACS 2025-04  Clark, C. J. R., et al., 2019, <i>Astro2020: Unleashing the Potential of Dust Emission as a Window onto Galaxy Evolution</i> , Science white paper, Astro2020 Decadal Survey on Astronomy & Astrophysics  Clark, C. J. R., et al., 2014, <i>A Blind Survey of the Local Dusty Universe with Herschel-ATLAS</i> , in proceedings of ‘The Life Cycle of Dust in the Universe’, PoS LCDU2013 073	<a href="#">ADS Link</a>
Co-AUTHOR	Tarantino, J., et al., 2026, <i>JWST Captures Growth of Aromatic Hydrocarbon Dust Particles in the Extremely Metal-poor Galaxy Sextans A</i> , Submitted for publication in Nature Astronomy  Amada, K., et al., 2025, <i>The Nearby Evolved Stars Survey. IV. Mapping cold gas in the circumstellar envelopes of evolved stars with <math>^{12}\text{CO}</math> and <math>^{13}\text{CO}</math> (<math>J = 1 \rightarrow 0</math>) emission</i> , MNRAS  Wallstrom, S. H. J., et al., 2025, <i>The Nearby Evolved Stars Survey: III. First data release of JCMT CO-line observations</i> , A&A 704 A276	<a href="#">ADS Link</a>

McDonald, I., et al., 2025, *The Nearby Evolved Stars Survey (NESS) V: properties of volume-limited samples of Galactic evolved stars*, MNRAS 541 516 [ADS Link](#) |

Galliano Frede, , et al., 2025, *PRIMA promise of deciphering interstellar dust evolution with observations of the nearby Universe*, JATIS 11 031612 [ADS Link](#) |

Lindberg, C. W., et al., 2025, *Scylla. IV. Intrinsic Stellar Properties and Line-of-sight Dust Extinction Measurements toward 1.5 Million Stars in the SMC and LMC*, ApJ 982 33 [ADS Link](#) |

Murray, C. E., et al., 2024, *Scylla. I. A Pure-parallel, Multiwavelength Imaging Survey of the ULLYSES Fields in the LMC and SMC*, ApJS 275 5 [ADS Link](#) |

Chastenet Jere, , et al., 2024, *JWST MIRI and NIRCam observations of NGC 891 and its circumgalactic medium*, A&A 690 A348 [ADS Link](#) |

Katsioli, S., et al., 2023, *The stratification of ISM properties in the edge-on galaxy NGC 891 revealed by NIKA2*, A&A 679 A7 [ADS Link](#) |

Casasola, V., et al., 2022, *The resolved scaling relations in DustPedia: Zooming in on the local Universe*, A&A 668 A130 [ADS Link](#) |

Roman-Duval, J., et al., 2022, *METAL: The Metal Evolution, Transport, and Abundance in the Large Magellanic Cloud Hubble Program. IV. Calibration of Dust Depletions versus Abundance Ratios in the Milky Way and Magellanic Clouds and Application to Damped Ly $\alpha$  Systems*, ApJ 935 105 [ADS Link](#) |

Bianchi, S., et al., 2022, *Dust emissivity in resolved spiral galaxies*, A&A 664 A187 [ADS Link](#) |

Scicluna, P., et al., 2022, *The Nearby Evolved Stars Survey II: Constructing a volume-limited sample and first results from the James Clerk Maxwell Telescope*, MNRAS 512 1091 [ADS Link](#) |

Roman-Duval, J., et al., 2022, *METAL: The Metal Evolution, Transport, and Abundance in the Large Magellanic Cloud Hubble Program. III. Interstellar Depletions, Dust-to-Metal, and Dust-to-Gas Ratios versus Metallicity*, ApJ 928 90 [ADS Link](#) |

Smith, M. W. L., et al., 2021, *The HASHTAG Project: The First Submillimeter Images of the Andromeda Galaxy from the Ground*, ApJS 257 52 [ADS Link](#) |

Nersesian, A., et al., 2021, *Probing the spectral shape of dust emission with the DustPedia galaxy sample*, MNRAS 506 3986 [ADS Link](#) |

Roman-Duval, J., et al., 2021, *METAL: The Metal Evolution, Transport, and Abundance in the Large Magellanic Cloud Hubble Program. II. Variations of Interstellar Depletions and Dust-to-gas Ratio within the LMC*, ApJ 910 95 [ADS Link](#) |

Nersesian, A., et al., 2020, *High-resolution, 3D radiative transfer modelling. V. A detailed model of the M51 interacting pair*, A&A 643 A90 [ADS Link](#) |

Baes, M., et al., 2020, *Nonparametric galaxy morphology from UV to submm wavelengths*, A&A 641 A119 [ADS Link](#) |

De Looze, I., et al., 2020, *JINGLE - IV. Dust, H I gas, and metal scaling laws in the local Universe*, MNRAS 496 3668 [ADS Link](#) |

Viaene, S., et al., 2020, *High-resolution, 3D radiative transfer modelling. IV. AGN-powered dust heating in NGC 1068*, A&A 638 A150 [ADS Link](#) |

Verstocken, S., et al., 2020, *High-resolution, 3D radiative transfer modelling. II. The early-type spiral galaxy M 81*, A&A 637 A24 [ADS Link](#) |

Nersesian, A., et al., 2020, *High-resolution, 3D radiative transfer modelling. III. The DustPedia barred galaxies*, A&A 637 A25 [ADS Link](#) |

Dobbels, W., et al., 2020, *Predicting the global far-infrared SED of galaxies via machine learning techniques*, A&A 634 A57 [ADS Link](#) |

Casasola, V., et al., 2020, *The ISM scaling relations in DustPedia late-type galaxies: A benchmark study for the Local Universe*, A&A 633 A100 [ADS Link](#) |

Gao, Y., et al., 2019, *Estimating the Molecular Gas Mass of Low-redshift Galaxies from a Combination of Mid-infrared Luminosity and Optical Properties*, ApJ 887 172 [ADS Link](#) |

Lamperti, I., et al., 2019, *JINGLE - V. Dust properties of nearby galaxies derived from hierarchical Bayesian SED fitting*, MNRAS 489 4389 [ADS Link](#) |

Bianchi, S., et al., 2019, *Dust emissivity and absorption cross section in DustPedia late-type galaxies*, A&A 631 A102 [ADS Link](#) |

Smith, M. W. L., et al., 2019, *JINGLE, a JCMT legacy survey of dust and gas for galaxy evolution studies: II. SCUBA-2 850  $\mu$ m data reduction and dust flux density catalogues*, MNRAS 486 4166 [ADS Link](#) |

Davies, J. I., et al., 2019, *DustPedia: the relationships between stars, gas, and dust for galaxies residing in different environments*, A&A 626 A63 [ADS Link](#) |

Nersesian, A., et al., 2019, *Old and young stellar populations in DustPedia galaxies and their role in dust heating*, A&A 624 A80 [ADS Link](#) |

De Vis, P., et al., 2019, *A systematic metallicity study of DustPedia galaxies reveals evolution in the dust-to-metal ratios*, A&A 623 A5 [ADS Link](#) |

Mosenkov, A. V., et al., 2019, *Dust emission profiles of DustPedia galaxies*, A&A 622 A132 [ADS Link](#) |

Bianchi, S., et al., 2018, *Fraction of bolometric luminosity absorbed by dust in DustPedia galaxies*, A&A 620 A112 [ADS Link](#) |

Saintonge Ame, , et al., 2018, *JINGLE, a JCMT legacy survey of dust and gas for galaxy evolution studies - I. Survey overview and first results*, MNRAS 481 3497 [ADS Link](#) |

Eales, S. A., et al., 2018, *The causes of the red sequence, the blue cloud, the green valley, and the green mountain*, MNRAS 481 1183 [ADS Link](#) |

- Rho, J., et al., 2018, *A dust twin of Cas A: cool dust and 21  $\mu$ m silicate dust feature in the supernova remnant G54.1+0.3*, MNRAS 479 5101 [ADS Link](#) |
- Dunne, L., et al., 2018, *The unusual ISM in blue and dusty gas-rich galaxies (BADGRS)*, MNRAS 479 1221 [ADS Link](#) |
- Mosenkov, A. V., et al., 2018, *HERschel Observations of Edge-on Spirals (HEROES). IV. Dust energy balance problem*, A&A 616 A120 [ADS Link](#) |
- Rigby, A. J., et al., 2018, *A NIKA view of two star-forming infrared dark clouds: Dust emissivity variations and mass concentration*, A&A 615 A18 [ADS Link](#) |
- Beeston, R. A., et al., 2018, *GAMA/H-ATLAS: the local dust mass function and cosmic density as a function of galaxy type - a benchmark for models of galaxy evolution*, MNRAS 479 1077 [ADS Link](#) |
- De Vis, P., et al., 2017, *Using dust, gas and stellar mass-selected samples to probe dust sources and sinks in low-metallicity galaxies*, MNRAS 471 1743 [ADS Link](#) |
- Casasola, V., et al., 2017, *Radial distribution of dust, stars, gas, and star-formation rate in DustPedia face-on galaxies*, A&A 605 A18 [ADS Link](#) |
- Davies, J. I., et al., 2017, *DustPedia: A Definitive Study of Cosmic Dust in the Local Universe*, PASP 129 044102 [ADS Link](#) |
- De Vis, P., et al., 2017, *Herschel -ATLAS: revealing dust build-up and decline across gas, dust and stellar mass selected samples - I. Scaling relations*, MNRAS 464 4680 [ADS Link](#) |
- Bianchi, S., et al., 2017, *The Herschel Virgo Cluster Survey. XX. Dust and gas in the foreground Galactic cirrus*, A&A 597 A130 [ADS Link](#) |
- Eales, S., et al., 2015, *H-ATLAS/GAMA: quantifying the morphological evolution of the galaxy population using cosmic calorimetry*, MNRAS 452 3489 [ADS Link](#) |
- Rowlands, K., et al., 2014, *Herschel-ATLAS: properties of dusty massive galaxies at low and high redshifts*, MNRAS 441 1017 [ADS Link](#) |
- Pearson, E. A., et al., 2013, *H-ATLAS: estimating redshifts of Herschel sources from sub-mm fluxes*, MNRAS 435 2753 [ADS Link](#) |
- Bourne, N., et al., 2013, *Herschel-ATLAS: correlations between dust and gas in local submm-selected galaxies*, MNRAS 436 479 [ADS Link](#) |
- Agius, N. K., et al., 2013, *GAMA/H-ATLAS: linking the properties of submm detected and undetected early-type galaxies - I.  $z \leq 0.06$  sample*, MNRAS 431 1929 [ADS Link](#) |
- Lopez-Caniego, M., et al., 2013, *Mining the Herschel-Astrophysical Terahertz Large Area Survey: submillimetre-selected blazars in equatorial fields*, MNRAS 430 1566 [ADS Link](#) |
- Gomez, H. L., et al., 2012, *A Cool Dust Factory in the Crab Nebula: A Herschel Study of the Filaments*, ApJ 760 96 [ADS Link](#) |

Gomez, H. L., et al., 2012, *Dust in historical Galactic Type Ia supernova remnants with Herschel*, MNRAS 420 3557  
[ADS Link](#) |