Christopher Clark

Curriculum Vitæ

Galaxy Evolution | Interstellar Medium | Evolved Stars | Data Pipelines

Contact Information

Address: Space Telescope Science Institute
3700 San Martin Drive
Baltimore, MD 21218
United States of America

Telephone: (+1) 410 338 6813
Website: cjrclark.uk
Email: cclark@stsci.edu
orcid: 0000-0001-7959-4902

Science Highlights

Clark et al. (*subm.*) **Exploring dust properties at extreme low densities around Local Group galaxies**
With custom *Herschel* reductions for Local Group galaxies, combined in Fourier space with *Planck*, IRAS, and COBE data, I exploring dust properties down to densities 2 orders of magnitude lower than previously possible.

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; found variations versus density that ran counter to predictions from models.

Clark et al. (2015) **Uncovering a previously-overlooked population of blue and dusty gas-rich galaxies**
Assembling the first blind *Herschel* galaxy sample at low-z, I found it dominated by a class of intermediately-evolved galaxies sharing an unusual set of traits; HI-dominated but metal-rich, with very little attenuation despite having abundant dust and plentiful star-formation.

Academic History

2018–Present | Postdoctoral Fellow | Space Telescope Science Institute
Supervisor: Dr Julia Roman-Duval | (+1) 410 338 4351 | duval@stsci.edu

2014–2018 | Postdoctoral Research Associate | Cardiff University
Supervisor: Prof Jonathan Davies | (+44) 29 2087 5255 | jonathan.davies@astro.cf.ac.uk

2011–2015 | PhD Astronomy | Cardiff University | ADS Link to Thesis
Thesis: *On the Origins of Cosmic Dust and the Evolution of Nearby Galaxies with Herschel*
Supervisor: Prof Haley Gomez | (+44) 29 2087 4058 | haley.gomez@astro.cf.ac.uk

2007–2011 | MPhys Astrophysics (with honours, upper division, 2nd class) | Cardiff University
4th-year project: *Searching with Herschel for Dust Created by Kepler's Supernova*
3rd-year project: *Stacking Submillimetre-Undetected Elliptical Galaxies in BLAST Observations*

Teaching & Mentoring

Courses Taught

2016–2017 *Computational Skills for Problem Solving* | Lab teacher, 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

Students Mentored

2015–2016 **Jennifer Millard** | Master's project primary supervisor, Cardiff University
Stacking Far-Infrared Observations of High Galactic Latitude Stars

2015–2016 **Franziska Zaunig** | Master's project co-supervisor, Cardiff University
Mapping Star Formation in the Galactic Plane

2014–2015 **Rhian Miles** | Undergraduate project co-supervisor, Cardiff University
Evolved Stars in Herschel-ATLAS

2014–2015 **Lewyse Lee** | Undergraduate project co-supervisor, Cardiff University
Evolved Stars in Herschel-ATLAS

2014–2015 **Jennifer Millard** | Undergraduate project co-supervisor, Cardiff University
Evolved Stars in Herschel-ATLAS

Grants & Awards

2021 **$113 800** | NASA/USRA
SOFIA Observer Grant (Program 09-0030)

2020 **$92 000** | NASA/STScI
Hubble Space Telescope General Observer Grant (Program 16222)

2019 **1000 TB hrs** | National Science Foundation
Computing time awarded by NSF's XSEDE supercomputing facility

2016 **£12 205** | Data Innovation Research Institute
Seedcorn Fund | *Astronomical Oncology – Astronomical Image Analysis Techniques for Cancer Microscopy*

2013 **£400** | Cardiff University
Bessie Jones Prize for Most Outstanding Research Student

2007 **£4 000** | Institute of Physics
IoP Undergraduate Bursary

Observing Programmes

SOFIA **PI: 12 hours**
- 2020 **PI** | *An Unambiguous Measurement of Carbon Depletion, via 158μm [CII] Absorption*

Hubble **PI: 6 orbits** | Co-I: 577 orbits
- 2020 **PI** | *Extinction Mapping in Leo P: The Lowest-Metallicity ISM in the Local Universe*
- 2019 *Scylla: A Parallel Multi-Headed Attack on Dust Evolution in ULLYSES Galaxies*
- 2019 *METAL-Z: Metal Evolution, Transport, and Abundance at Low metallicity (Z)*

IRAM 30 m **PI: 19 hours** | Co-I: 215 hours | Nights at telescope: 6
- 2018–present *IMEGIN: Interpreting the Millimetre Emission of Galaxies with IRAM and NIKA2*
- 2017 **PI** | *A Pilot Study for Nearby Galaxy Observations with NIKA2*
- 2014 *A New Population of Dust-Rich Galaxies with Extreme H_2/Dust Ratios?*

JCMT Architect: 780 hours | Co-I: 1000+ hours | Nights at telescope: 22
- 2017–present *NESS: the Nearby Evolved Stars Survey*
- 2016–present *JINGLE: JCMT dust and gas In Nearby Galaxies Legacy Exploration*
- 2013 *A New Population of Dusty Blue Galaxies*

Mopra 22 m Co-I: 150 hours | Nights at telescope: 7
- 2012 *Mapping Molecular Gas in Fornax Cluster Galaxies*

Selected Scholarly Presentations

2019 **Seminar** | *The Quest For The Missing Flux*
East Asian Observatory | Hilo

2019 **Talk** | *The First Maps of κ_d in Nearby Galaxies*
Linking the Milky Way and Nearby Galaxies | Helsinki

2019 **Seminar** | *The First Maps of κ_d in Nearby Galaxies*
University College London | London

2018 **Talk** | *The First Maps of κ_d in Nearby Galaxies*
Cosmic Dust: Origin, Applications & Implications | Copenhagen

2018 **Symposium Chair** | *The ISM as a Window onto Galaxy Evolution*
European Week of Astronomy and Space Science 2018 | Liverpool

2017 **Seminar** | *The Guilty Secrets of Dust in Nearby Galaxies*
East Asian Observatory | Hilo

2015 **Talk** | *Young, Blue, and Cold: Blind Surveys of Nearby Galaxies with Herschel-ATLAS*
RAS National Astronomical Meeting | Llandudno

2015 **Talk** | *Young, Blue, and Cold: Blind Surveys of Nearby Galaxies with Herschel-ATLAS*
Gas, Dust, and Star-Formation in Galaxies from the Local to Far Universe | Crete

2014 **Talk** | *One Aperture Forward, Two Apertures Back: Multiwavelength Photometry of Nearby Galaxies*
BBECss 2015 | Exeter

2013 **Talk** | *A Blind Survey of the Local Dusty Universe with Herschel-ATLAS*
The Universe Explored By Herschel | Noordwijk

2013 **Talk** | *Smoking Supernovæ*
BBECss 2015 | Bristol

2013 **Talk** | *A Blind Survey of the Local Dusty Universe with Herschel-ATLAS*
RAS National Astronomy Meeting | St Andrews

2013 **Talk** | *Dust in Historical Supernova Remnants with Herschel*
RAS National Astronomy Meeting | St Andrews

Technical Skills

Programming Languages	Python, IDL, R, FORTRAN90
Other Computing	Git, Bash, Slurm, LaTeX, XSEDE, TFLearn
Astronomical Tools	HIPE, TOpCaT, SWarp, Montage, DS9, Glue, SIAP/STAP, Kappa, STILTS, SPLAT
Data Experience	GALEX, *Hubble*, SDSS, SkyMapper, DSS, VISTA, UKIRT, 2MASS, COBE, WISE, *Spitzer*, IRAS, *Herschel*, JCMT, ALMA, *Planck*, Mopra, IRAM, VLA

Community Service

2021–Present	Research Computing Forum, STScI
2020	Review Panellist, ROSES Grant Panel, NASA
2020	Panel Support, *Hubble* time allocation committee, STScI/NASA
2020	Co-organiser, JWST Proposal Planning Workshop, University of Maryland
2019–Present	Referee, Astronomy & Astrophysics
2017–Present	External reviewer, time allocation committee, James Clerk Maxwell Telescope
2015–Present	Referee, Monthly Notices of the Royal Astronomical Society
2018–2020	Organiser, Galaxies Journal Club & Talk Series, STScI
2018–2020	Organiser, Friday Science Coffee, STScI
2018	Chair of organising committee, EWASS 2018 symposium *The ISM as a Window onto Galaxy Evolution*
2016–2017	Organiser, astronomy colloquia, Cardiff University
2015	Local organising committee, *Science & Technology Facilities Council Summer School in Astronomy 2015*
2014–2015	Organising committee, *Bristol-Bath-Exeter-Cardiff Student Seminars*

Selected Public Outreach

2019–Present	Coordinator of science education activities, *Soaring Eagles Learning Camp*, Baltimore
2019–Present	Co-organiser, *Astronomy on Tap*, Baltimore
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	Volunteer, *Science After Hours* @ Techniquest, Institute of Physics
2015	Public talk, *The Origins of Stardust*, Society for Popular Astronomy
2014	Interviewee, *Science Cafe*, BBC Radio Wales
2012–2014	Volunteer, *BBC Stargazing Live*, National Museum of Wales
2012–2013	Volunteer, *The Christmas Lectures*, Cardiff University
2013	Volunteer, *The Big Bang Fair*, ESA
2012	Public talk, *Smoking Supernovæ*, Bridgend Astronomical Society
2012	Science writer, Cardiff University Students' Union newspaper *Gair Rhydd*

Publications

First Author

Clark, C. J. R., et al., 2021, *The Quest for the Missing Dust: I – Restoring Large Scale Emission in Herschel Maps of Local Galaxies*, submitted for publication ApJ ADS Link |

Clark, C. J. R., et al., 2019, *The First Maps of κ_d – the Dust Mass Absorption Coefficient – in Nearby Galaxies, with DustPedia*, MNRAS 489 5256 ADS Link |

Clark, C. J. R., et al., 2018, *DustPedia: Multiwavelength Photometry and Imagery of 875 Nearby Galaxies in 42 Ultraviolet–Microwave Bands*, A&A 609 A37 ADS Link |

Clark, C. J. R., et al., 2016, *An Empirical Determination of the Dust Mass Absorption Coefficient, κ_d, Using the Herschel Reference Survey*, MNRAS 459 1646 ADS Link |

Clark, C. J. R., et al., 2015, *Herschel-ATLAS: The Surprising Diversity of Dust-Selected Galaxies in the Local Submillimetre Universe*, MNRAS 452 397 ADS Link |

Clark, C. J. R., 2015, *On the Origins of Cosmic Dust and the Evolution of Nearby Galaxies with the Herschel Space Observatory*, PhD Thesis ADS Link |

Non-Peer-Reviewed

Clark, C. J. R., et al., 2019, *Astro2020: Unleashing the Potential of Dust Emission as a Window onto Galaxy Evolution*, Science white paper, Astro2020 Decadal Survey on Astronomy & Astrophysics ADS Link |

Clark, C. J. R., et al., 2014, *A Blind Survey of the Local Dusty Universe with Herschel-ATLAS*, in proceedings of 'The Life Cycle of Dust in the Universe', PoS LCDU2013 073 ADS Link |

Co-Author

Scicluna, I., et al., *The Nearby Evolved Stars Survey II: Constructing a volume-limited sample and first results from the James Clerk Maxwell Telescope*, submitted for publication in MNRAS ADS Link |

Nersesian, A., et al., *Probing the spectral shape of dust emission with the DustPedia galaxy sample*, submitted for publication in A&A ADS Link |

Roman-Duval, J., et al., *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*, accepted for publication in ApJ ADS Link |

Nersesian, A., et al., 2020, *High-resolution, 3D radiative transfer modelling. V. A detailed model of the M 51 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 μm 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 |

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 |

Bianchi, S., et al., 2018, *Fraction of bolometric luminosity absorbed by dust in DustPedia galaxies*, A&A 620 A112 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 μm 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 |