

CHRISTOPHER CLARK

CURRICULUM VITÆ (OCTOBER 2021)

GALAXY EVOLUTION | INTERSTELLAR MEDIUM | EVOLVED STARS | DATA PIPELINES

CONTACT INFORMATION

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SCIENCE HIGHLIGHTS

- Clark et al. (2021) **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 explore dust properties down to densities 10 times lower than previously possible, showing for the first time that dust persists at these lowest densities.
- 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; H I-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: <i>On the Origins of Cosmic Dust and the Evolution of Nearby Galaxies with Herschel</i> Supervisor: Prof Haley Gomez (+44) 29 2087 4058 haley.gomez@astro.cf.ac.uk
2007–2011	MPhys ASTROPHYSICS (with honours, upper division, 2 nd class) CARDIFF UNIVERSITY 4 th -year project: <i>Searching with Herschel for Dust Created by Kepler's Supernova</i> 3 rd -year project: <i>Stacking Submillimetre-Undetected Elliptical Galaxies in BLAST Observations</i>

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 158 μ m [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 H₂/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, FORTRANgo
OTHER COMPUTING	Git, Bash, Slurm, \LaTeX , XSEDE, TFLearn
ASTRONOMICAL TOOLS	HIPE, TOPCaT, SWarp, Montage, DS9, Glue, SIAP/STAP, Kappa, STILTS, SPLAT
DATA EXPERIENCE	GALEX, <i>Hubble</i> , 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

2021–PRESENT	Member, Research Computing Forum, STScI
2020	Review Panellist, ROSES Grant Panel, NASA
2020	Panel Support, <i>Hubble</i> 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 <i>The ISM as a Window onto Galaxy Evolution</i>
2016–2017	Organiser, astronomy colloquia, Cardiff University
2015	Local organising committee, <i>Science & Technology Facilities Council Summer School in Astronomy 2015</i>
2014–2015	Organising committee, <i>Bristol-Bath-Exeter-Cardiff Student Seminars</i>

SELECTED PUBLIC OUTREACH

2019–PRESENT	Coordinator of science education activities, <i>Soaring Eagles Learning Camp</i> , Baltimore
2019–PRESENT	Co-organiser, <i>Astronomy on Tap</i> , Baltimore
2017–2018	Volunteer, <i>Physics In A Field</i> @ The Royal Welsh Show, Institute of Physics
2017	Public talk, <i>Herschel: Revealing the Dusty Universe Near & Far</i> , Manchester Students' Union Astronomy Society
2016	Public talk, <i>The Origins of Stardust</i> , Monmouth Astronomical Research Society
2015	Volunteer, <i>Science After Hours</i> @ Techniquet, Institute of Physics
2015	Public talk, <i>The Origins of Stardust</i> , Society for Popular Astronomy
2014	Interviewee, <i>Science Cafe</i> , BBC Radio Wales
2012–2014	Volunteer, <i>BBC Stargazing Live</i> , National Museum of Wales
2012–2013	Volunteer, <i>The Christmas Lectures</i> , Cardiff University
2013	Volunteer, <i>The Big Bang Fair</i> , ESA
2012	Public talk, <i>Smoking Supernovæ</i> , Bridgend Astronomical Society
2012	Science writer, Cardiff University Students' Union newspaper <i>Gair Rhydd</i>

PUBLICATIONS

FIRST AUTHOR	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> , accepted for publication in ApJ ADS Link
	Clark, C. J. R., et al., 2019, <i>The First Maps of κ_d – the Dust Mass Absorption Coefficient – in Nearby Galaxies, with DustPedia</i> , MNRAS 489 5256 ADS Link
	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 ADS Link
	Clark, C. J. R., et al., 2016, <i>An Empirical Determination of the Dust Mass Absorption Coefficient, κ_d, Using the Herschel Reference Survey</i> , MNRAS 459 1646 ADS Link
	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 ADS Link
	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 ADS Link
NON-PEER-REVIEWED	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 ADS Link
	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 ADS Link
CO-AUTHOR	Scicluna, I., et al., <i>The Nearby Evolved Stars Survey II: Constructing a volume-limited sample and first results from the James Clerk Maxwell Telescope</i> , submitted for publication in MNRAS ADS Link
	Smith, M. W. L., et al., <i>The HASHTAG project: The First Submillimeter Images of the Andromeda Galaxy from the Ground</i> , submitted for publication in ApJS ADS Link
	Nersesian, A., et al., <i>Probing the spectral shape of dust emission with the DustPedia galaxy sample</i> , submitted for publication in A&A ADS Link
	Roman-Duval, J., et al., 2021, <i>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</i> , ApJ 910 95 ADS Link
	Nersesian, A., et al., 2020, <i>High-resolution, 3D radiative transfer modelling. V. A detailed model of the M 51 interacting pair</i> , A&A 643 A90 ADS Link
	Baes, M., et al., 2020, <i>Nonparametric galaxy morphology from UV to submm wavelengths</i> , A&A 641 A119 ADS Link
	De Looze, I., et al., 2020, <i>JINGLE - IV. Dust, H I gas, and metal scaling laws in the local Universe</i> , MNRAS 496 3668 ADS Link
	Viaene, S., et al., 2020, <i>High-resolution, 3D radiative transfer modelling. IV. AGN-powered dust heating in NGC 1068</i> , A&A 638 A150 ADS Link

- Nersesian, A., et al., 2020, *High-resolution, 3D radiative transfer modelling. III. The DustPedia barred galaxies*, A&A 637 A25 [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](#) |
- Dobbels, W., et al., 2020, *Predicting the global far-infrared SED of galaxies via machine learning techniques*, A&A 634 A57 [ADS Link](#) |
- Casola, 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](#) |
- Bianchi, S., et al., 2019, *Dust emissivity and absorption cross section in DustPedia late-type galaxies*, A&A 631 A102 [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](#) |
- Smith, M. W. L., et al., 2019, *JINGLE, a JCMT legacy survey of dust and gas for galaxy evolution studies: II. SCUBA-2 850 μ 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](#) |
- 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 μ 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](#) |
- Bourne, N., et al., 2013, *Herschel-ATLAS: correlations between dust and gas in local submm-selected galaxies*, MNRAS 436 479 [ADS Link](#) |
- Pearson, E. A., et al., 2013, *H-ATLAS: estimating redshifts of Herschel sources from sub-mm fluxes*, MNRAS 435 2753 [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](#) |