Christopher Clark

Curriculum Vitæ

Galaxy Evolution | Interstellar Medium | Evolved Stars | Data Pipelines

Contact Information

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Science Highlights

Clark et al. (2023) & Clark et al. (2021) **Revealing dramatic evolution in the dust-to-gas ratio in the Local Group**
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 | duval@stsci.edu

2014–2018 | Postdoctoral Research Associate | Cardiff University
Supervisor: Prof Jonathan Davies[†]

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 | Cardiff University
MPhys with honours, upper division, 2nd class

Teaching & Mentoring

Postdocs Supervised

2025–Present **Benjamin Gibson** | Primary supervisor, STScI
2025–Present **Meriem El-Yajouri** | Co-supervisor, STScI
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 **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 teaching assistant, Cardiff University
2011–2012 *Planetary Physics* and *Maths for Physical Science* | Teaching assistant, Cardiff University

Grants & Awards

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

ALMA **PI: 135 hours** | Co-I: 14 hours
2025 (Cycle 21) **PI** | *The $R_{2:1}$ 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) *The Resolved Properties of PAHs at Low Metallicity*
2021 (Cycle 1) *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 158μm [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) *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 *NESS: the Nearby Evolved Stars Survey*

Example Scholarly Presentations

2025 **Talk** | *Strange Dust Properties in Super-Extended AGB Star Dust Shells*
The Dusty Universe: The 5th Pan-Dust Conference | Tucson
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 **Colloquium** | *The First Maps of κ_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

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	JWST, *Hubble*, *Swift*, GALEX, SDSS, SkyMapper, DSS, VISTA, UKIRT, 2MASS, COBE, WISE, *Spitzer*, IRAS, *Herschel*, JCMT, ALMA, *Planck*, Mopra, IRAM, VLA

Community Service

2025	SOC & LOC chair, 2025 Spring Symposium *Inter+Stellar*, 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

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, 240th 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 Publications

Clark, C. J. R., et al., 2025 *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*, AJ 170 8

Clark, C. J. R., et al., 2023 *The Quest for the Missing Dust: II – Two Orders of Magnitude of Evolution in the Dust-to-Gas Ratio Resolved Within Local Group Galaxies*, ApJ 946 42

Clark, C. J. R., et al., 2021, *The Quest for the Missing Dust: I – Restoring Large Scale Emission in Herschel Maps of Local Galaxies*, ApJ 921 35

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

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

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

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

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

First Author Publications (Non Peer-Reviewed)

Clark, C. J. R., et al., 2026, *Using 23 Years of ACS/SBC Data to Understand Backgrounds: Explaining & Predicting Background Variations*, Hubble Space Telescope Instrument Science Report ACS 2026-01

Clark, C. J. R., et al., 2025, *Using 23 Years of ACS/SBC Data to Understand Backgrounds: Significant Reductions in Expected Background Levels*, Hubble Space Telescope Instrument Science Report ACS 2025-04

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

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

Co-Author Publications

Tarantino, J., et al., 2026, *JWST Captures Growth of Aromatic Hydrocarbon Dust Particles in the Extremely Metal-poor Galaxy Sextans A*, Submitted for publication in Nature Astronomy

Lindberg, C. W., et al., 2026, *Scylla VI: Parsec-Scale Dust Extinction Maps in the SMC and LMC*, Submitted for publication in ApJ

Amada, K., et al., 2026, *The Nearby Evolved Stars Survey – IV. Mapping cold gas in the circumstellar envelopes of evolved stars with ^{12}CO and ^{13}CO (J = 1 → 0) emission*, MNRAS 547 2239

Galliano, F., et al., 2025, *Disentangling the Effects of Metallicity and Star Formation Activity on the Dust Properties*, PRIMA General Observer Science Book Volume 2

Galliano, F., et al., 2025, *Self-Consistently Probing the Dust Properties and the ISM Structure of Nearby Galaxies*, PRIMA General Observer Science Book Volume 2

Galliano, F., et al., 2025, *Surveying the Mineralogical Diversity of the ISM*, PRIMA General Observer Science Book Volume 2

Galliano, F., et al., 2025, *Unveiling the Elusive Dust Properties of the Diffuse ISM of Nearby Galaxies*, PRIMA General Observer Science Book Volume 2

Wallstrom, S. H. J., et al., 2025, *The Nearby Evolved Stars Survey: III. First data release of JCMT CO-line observations*, A&A 704 A276

Tarantino, E. J., et al., 2025, *JWST Captures Growth of Aromatic Hydrocarbon Dust Particles in the Extremely Metal-poor Galaxy Sextans A*, arXiv:2512.04060

Galliano, F., et al., 2025, *PRIMA promise of deciphering interstellar dust evolution with observations of the nearby Universe*, JATIS 11 031612

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

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

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

Chastenet, J., et al., 2024, *JWST MIRI and NIRCam observations of NGC 891 and its circumgalactic medium*, A&A 690 A348

Katsioli, S., et al., 2023, *The stratification of ISM properties in the edge-on galaxy NGC 891 revealed by NIKA2*, A&A 679 A7

Casasola, V., et al., 2022, *The resolved scaling relations in DustPedia: Zooming in on the local Universe*, A&A 668 A130

Bianchi, S., et al., 2022, *Dust emissivity in resolved spiral galaxies*, A&A 664 A187

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 Lyα Systems*, ApJ 935 105

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

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

Smith, M. W. L., et al., 2021, *The HASHTAG Project: The First Submillimeter Images of the Andromeda Galaxy from the Ground*, ApJS 257 52

Nersesian, A., et al., 2021, *Probing the spectral shape of dust emission with the DustPedia galaxy sample*, MNRAS 506 3986

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

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

Baes, M., et al., 2020, *Nonparametric galaxy morphology from UV to submm wavelengths*, A&A 641 A119

De Looze, I., et al., 2020, *JINGLE - IV. Dust, H I gas, and metal scaling laws in the local Universe*, MNRAS 496 3668

Viaene, S., et al., 2020, *High-resolution, 3D radiative transfer modelling. IV. AGN-powered dust heating in NGC 1068*, A&A 638 A150

Verstocken, S., et al., 2020, *High-resolution, 3D radiative transfer modelling. II. The early-type spiral galaxy M 81*, A&A 637 A24

Nersesian, A., et al., 2020, *High-resolution, 3D radiative transfer modelling. III. The DustPedia barred galaxies*, A&A 637 A25

Dobbels, W., et al., 2020, *Predicting the global far-infrared SED of galaxies via machine learning techniques*, A&A 634 A57

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

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

Bianchi, S., et al., 2019, *Dust emissivity and absorption cross section in DustPedia late-type galaxies*, A&A 631 A102

Lamperti, I., et al., 2019, *JINGLE - V. Dust properties of nearby galaxies derived from hierarchical Bayesian SED fitting*, MNRAS 489 4389

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

Davies, J. I., et al., 2019, *DustPedia: the relationships between stars, gas, and dust for galaxies residing in different environments*, A&A 626 A63

Nersesian, A., et al., 2019, *Old and young stellar populations in DustPedia galaxies and their role in dust heating*, A&A 624 A80

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

Mosenkov, A. V., et al., 2019, *Dust emission profiles of DustPedia galaxies*, A&A 622 A132

Saintonge, A., 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

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

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

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

Dunne, L., et al., 2018, *The unusual ISM in blue and dusty gas-rich galaxies (BADGRS)*, MNRAS 479 1221

Mosenkov, A. V., et al., 2018, *HERschel Observations of Edge-on Spirals (HEROES). IV. Dust energy balance problem*, A&A 616 A120

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

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

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

Casasola, V., et al., 2017, *Radial distribution of dust, stars, gas, and star-formation rate in DustPedia face-on galaxies*, A&A 605 A18

Davies, J. I., et al., 2017, *DustPedia: A Definitive Study of Cosmic Dust in the Local Universe*, PASP 129 044102

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

Bianchi, S., et al., 2017, *The Herschel Virgo Cluster Survey. XX. Dust and gas in the foreground Galactic cirrus*, A&A 597 A130

Eales, S., et al., 2015, *H-ATLAS/GAMA: quantifying the morphological evolution of the galaxy population using cosmic calorimetry*, MNRAS 452 3489

Rowlands, K., et al., 2014, *Herschel-ATLAS: properties of dusty massive galaxies at low and high redshifts*, MNRAS 441 1017

Bourne, N., et al., 2013, *Herschel-ATLAS: correlations between dust and gas in local submm-selected galaxies*, MNRAS 436 479

Pearson, E. A., et al., 2013, *H-ATLAS: estimating redshifts of Herschel sources from sub-mm fluxes*, MNRAS 435 2753

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

Lopez-Caniego, M., et al., 2013, *Mining the Herschel-Astrophysical Terahertz Large Area Survey: submillimetre-selected blazars in equatorial fields*, MNRAS 430 1566

Gomez, H. L., et al., 2012, *A Cool Dust Factory in the Crab Nebula: A Herschel Study of the Filaments*, ApJ 760 96

Gomez, H. L., et al., 2012, *Dust in historical Galactic Type Ia supernova remnants with Herschel*, MNRAS 420 3557