Curriculum vitae: Dr Elizabeth Jayne Watkins

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Current employment: Postdoctoral researcher at Zentrum für Astronomie der Universität Heidelberg supervised by Dr Kathryn Kreckel

Education:

PhD in Astrophysics	October 2016–April 2020 at Cardiff University
Thesis title:	The Impact Of Stellar Feedback On The Host Star-Forming Clouds
Supervisor:	Dr Nicolas Peretto
Scholarships:	STFC studentship grant
MSc Astrophysics	October 2015–September 2016 at Cardiff University
Dissertation title:	Investigating the impact of stellar feedback on G316.75, a massive star forming ridge
Degree Classification:	Distinction
Scholarships:	1. Cardiff University Master's Excellence Scholarship 2. Full tuition fee scholarship
BSc Astrophysics	October 2012–June 2015 at Cardiff University
Degree Classification:	First with honours
Scholarships:	Cardiff University Scholarship

Skills & experiences:

Computing skills	Python (highly proficient), Linux (proficient), GILDAS (intermediate), Git (intermediate) CASA (basic)
Observing experience	Undertaken an observation run on the JCMT telescope for the project "Dust Polarization Mapping toward Infrared Dark Clouds" PI Patrick Koch.
Awarded telescope time	6.7 h using 12m array, 131.5 h of ACA and TP arrays at ALMA to investigate the kinematics of the high-mass star-forming filament, G316.75. 9.3 h using SOFIA HAWC+ to observe dust polarisation in the high-mass star-forming filament, G316.75

	5.2 h using MUSE VLT to observe ionised gas kinematics and ionised diagnostic lines in the high-mass star-forming filament, G316.75
Training	Attended the IRAM Millimetre Interferometry School at Grenoble in 2018
Teaching experience	Supervising a Masters student 2022-now Demonstrator for Year 1 and 2 undergraduate Python courses 2016–2018
Other experience	Organised star formation group meeting 2018 Organised and run a Journal club 2020–2022

Conference and Seminar presentations:

STScI/JHU Low Density Universe seminar	Characterising superbubbles in nearby galaxies using ALMA and JWST – Oral presentation February 2023
Theory meets observations 2022	Impact of stellar feedback on molecular cloud conditions – Oral presentation December 2022
Heidelberg-Havard workshop on star formation	Characterising superbubbles in nearby galaxies using ALMA and JWST observations – Oral presentation December 2022
Seminar at Cardiff	Constraining feedback models using molecular superbubbles in nearby galaxies & Tracking the evolution of Milky Way molecular clouds – Oral presentation July 2022
EAS	Constraining feedback models using molecular superbubbles in nearby galaxies – Oral presentation June 2022
From Stars to Galaxies II	Characterising superbubbles in nearby galaxies using CO Poster presentation – June 2022 (poster prize winner and received a 10min oral presentation as a prize)
PHANGS team meeting	Characterising molecular Superbubbles in Nearby Galaxies using PHANGS-ALMA 12CO (2-1) – Oral presentation January 2022
Ringberg Workshop/ seminar series	Using the infrared bright fraction to trace molecular cloud evolution in the Milky Way – Oral presentation November 2021
Annual Meeting of the Astronomische Gesellschaf	Identifying Molecular Superbubbles in Nearby Galaxies using PHANGS-ALMA 12CO (2-1) – Oral presentation September 2021
SDSS V Collaboration Meeting	Tracking the evolution of Milky Way molecular clouds – Oral presentation August 2021

SFB Seminar series	Infrared-bright fraction as a tracer for molecular cloud evolution – Oral presentation April 2021
PHANGS team meeting	Identifying Molecular Superbubbles in Nearby Galaxies using PHANGS-ALMA 12CO (2-1) – Oral presentation February 2021
SDSS-IV/V Collaboration Meeting	The impact of O-stars on their parent cloud: gas exhaustion rather than gas ejection – Oral presentation June 2020
ARI heidelberg Colloquium	Feedback from OB-stars on their parent cloud: Gas exhaustion rather than gas ejection – Oral presentation June 2020
Linking the Milky Way and nearby galaxies	The impact of O-stars on their parent cloud: gas exhaustion rather than gas ejection. Oral presentation – June 2019
Cardiff University postgraduate conference:	The impact of O-stars on their parent cloud: gas exhaustion rather than gas ejection. Oral presentation – October 2018
The Olympian Symposium	Investigating how feedback from OB stars impacts G316.75-00.00. Poster presentation – May 2018
EWASS	Investigating how feedback from OB stars impacts G316.75-00.00. Poster presentation – April 2018
Cardiff Galactic Star Formation workshop	Investigating the impact of stellar feedback on G316.75, a massive star forming ridge. Oral presentation – September 2017

References:

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Publication list

First and second author

Quantifying the energetics of molecular superbubbles in PHANGS galaxies – **E. J. Watkins,** K. Kreckel, B. Groves, S. C. O. Glover, B. C. Whitmore, A. K. Leroy, E. Schinnerer7, S. E. Meidt, O.V. Egorov, A. T. Barnes, J. C. Lee et al. subm to A&A (to appear on arXiv 8/9th February 2023)

PHANGS-JWST First Results: A statistical view on bubble evolution in NGC628 – **E. J. Watkins** , A. T. Barnes, K. Henny, H. Kim, K. Kreckel, S. E. Meidt, R. S. Klessen, S. C. O Glover, T. G. Williams, B. W. Keller, A. K. Leroy, E. W. Rosolowsky et al. in press ApJL, arXiv:2212.00811

PHANGS-JWST First Results: Multi-wavelength view of feedback-driven bubbles (The Phantom Voids) across NGC 628 – A. T. Barnes, **E. J. Watkins** , S. E. Meidt, K. Kreckel, S. C. Mattia C R. G. Tress, S. C. O Glover, F. Bigiel, R. Chandar, E. Emsellem, J. C. Lee, A. K. Leroy, K. M. Sandstrom, E. W. Rosolowsky et al. in press ApJL, arXiv:2212.00812

Feedback from OB stars on their parent cloud: Gas exhaustion rather than gas ejection – **E. J. Watkins** , N. Peretto, K. Marsh, & G. A. Fuller, 2019, A&A, 628, A21

Co-author publications

Improving Star Cluster Age Estimates in PHANGS-HST Galaxies and the Impact on Cluster Demographics in NGC 628 – Whitmore, Bradley C., Chandar, Rupali et al. (inc. **Watkins, Elizabeth J.**), 2023, MNRAS

PHANGS-JWST First Results: Massive Young Star Clusters and New Insights from JWST Observations of NGC 1365 – Whitmore, B. C., Chandar, R. et al. (inc. **Watkins, Elizabeth J.**), in press ApJL, arXiv:2212.12039

PHANGS-JWST First Results: Tracing the Diffuse ISM with JWST Imaging of Polycyclic Aromatic Hydrocarbon Emission in Nearby Galaxies – Sandstrom, K. M., Koch, E. W. et al. (inc. **Watkins, Elizabeth J.**), in press ApJL, arXiv:2212.11177

PHANGS-JWST First Results: Mid-infrared emission traces both gas column density and heating at 100 pc scales – Leroy, A. K., Sandstrom, K. et al. (inc. **Watkins, Elizabeth J.**), in press ApJL, arXiv:2212.10574

PHANGS-JWST First Results: Measuring PAH Properties across the multiphase ISM – Chastenet, J., Sutter, J. et al. (inc. **Watkins, Elizabeth J.**), in press ApJL, arXiv:2212.10512

PHANGS-JWST First Results: A Global and Moderately Resolved View of Mid-Infrared and CO Line Emission from Galaxies at the Start of the JWST Era – Leroy, A. K., Bolatto, A. D. et al. (inc. **Watkins, Elizabeth J.**), in press ApJL, arXiv:2212.09774

PHANGS-JWST First Results: Stellar Feedback-Driven Excitation and Dissociation of Molecular Gas in the Starburst Ring of NGC 1365? – Liu, D., Schinnerer, E et al. (inc. **Watkins, Elizabeth J.**), in press ApJL, arXiv:2212.09652

PHANGS-JWST First Results: Rapid Evolution of Star Formation in the Central Molecular Gas Ring of NGC1365 – Schinnerer, E., Emsellem, E. et al. (inc. **Watkins, Elizabeth J.**), in press ApJL, arXiv:2212.09168

PHANGS-JWST First Results: Destruction of the PAH molecules in HII regions probed by JWST and MUSE – Egorov, O.V., Kreckel, K. et al. (inc. **Watkins, Elizabeth J.**), in press ApJL, arXiv:2212.09159

PHANGS-JWST First Results: ISM structure on the turbulent Jeans scale in four disk galaxies observed by JWST and ALMA – Meidt, S. E., Rosolowsky, E. et al. (inc. **Watkins, Elizabeth J.**), in press ApJL, arXiv:2212.06434

PHANGS-JWST First Results: The 21 μm Compact Source Population – Hassani, H., Rosolowsky, E. et al. (inc. **Watkins, Elizabeth J.**), in press ApJL, arXiv:2212.01526

PHANGS-JWST First Results: The Influence of Stellar Clusters on PAHs in Nearby Galaxies – Dale, D. A., Boquien, M. et al. (inc. **Watkins, Elizabeth J.**), in press ApJL, arXiv:2212.00130

PHANGS-JWST First Results: Duration of the early phase of massive star formation in NGC628 – Kim, J., Chevance, M. et al. (inc. **Watkins, Elizabeth J.**), in press ApJL, arXiv:2211.15698

PHANGS-JWST First Results: A combined HST and JWST analysis of the nuclear star cluster in NGC 628 – Hoyer, N., Pinna, F. et al. (inc. **Watkins, Elizabeth J.**), in press ApJL, arXiv:2211.13997

PHANGS-JWST First Results: Dust embedded star clusters in NGC 7496 selected via 3.3 μm PAH emission – Rodriguez, J., Lee, J. et al. (inc. **Watkins, Elizabeth J.**) in press ApJL, arXiv:2211.13426

PHANGS-JWST First Results: Spurring on Star Formation: JWST Reveals Localized Star Formation in a Spiral Arm Spur of NGC 628 – Williams, Thomas G., Sun, Jiayi et al. (inc. **Watkins, Elizabeth J.**), 2022, ApJ 941, L27

Variations in the ΣSFR − Σmol − Σ⋆ plane across galactic environments in PHANGS galaxies – Pessa, I.; Schinnerer, E. et al. (**inc. Watkins, Elizabeth J.**), 2022, A&A 663, A61

A CO isotopologue Line Atlas within the Whirlpool galaxy Survey (CLAWS) – den Brok, Jakob S.; Bigiel, Frank et al. (inc. **Watkins, Elizabeth J.**), 2022, A&A 662, A89

Linking stellar populations to H II regions across nearby galaxies. I. Constraining pre-supernova feedback from young clusters in NGC 1672 – Barnes, A. T., Chandar, R. et al. (inc. **Watkins, Elizabeth J.**), 2022, A&A 662, L6

Planetary nebula luminosity function distances for 19 galaxies observed by PHANGS-MUSE – Scheuermann, Fabian; Kreckel, Kathryn et al. (inc. **Watkins, Elizabeth J.**), 2022 MNRAS 511, 6087

The PHANGS-MUSE survey. Probing the chemo-dynamical evolution of disc galaxies – Emsellem, Eric; Schinnerer, Eva et al. (inc. **Watkins, Elizabeth J.**), 2022, A&A 659, A191

Low-J CO Line Ratios from Single-dish CO Mapping Surveys and PHANGS-ALMA – Leroy, Adam K.; Rosolowsky, Erik et al. (inc. **Watkins, Elizabeth J.**), 2022, ApJ 927, 149

PHANGS-MUSE: The H II region luminosity function of local star-forming galaxies – Santoro, Francesco; Kreckel, Kathryn et al. (inc. **Watkins, Elizabeth J.**), 2022, A&A 658, A188

The PHANGS-HST Survey: Physics at High Angular Resolution in Nearby Galaxies with the Hubble Space Telescope – Lee, Janice C.; Whitmore, Bradley C. et al. (inc. **Watkins, Elizabeth J.**), 2022, ApJS 258, 10

The 2D metallicity distribution and mixing scales of nearby galaxies – Williams, Thomas G.; Kreckel, Kathryn et al. (inc. **Watkins, Elizabeth J.**), 2022, MNRAS 509, 1303

PHANGS-ALMA: Arcsecond CO(2-1) Imaging of Nearby Star-forming Galaxies – Leroy, Adam K.; Schinnerer, Eva et al. (inc. **Watkins, Elizabeth J.**), 2021 ApJS 257, 43

Comparing the pre-SNe feedback and environmental pressures for 6000 H II regions across 19 nearby spiral galaxies – Barnes, A. T.; Glover, S. C. O. et al. (inc. **Watkins, Elizabeth J.**), 2021 MNRAS 508, 5362

Star cluster classification in the PHANGS-HST survey: Comparison between human and machine learning approaches – Whitmore, Bradley C.; Lee, Janice C. et al. (inc. **Watkins, Elizabeth J.**), 2021 MNRAS 506, 5294

PHANGS-ALMA Data Processing and Pipeline – Leroy, Adam K.; Hughes, Annie et al. (inc. **Watkins, Elizabeth J.**), 2021, ApJS 255, 19

Star formation scaling relations at ~100 pc from PHANGS: Impact of completeness and spatial scale – Pessa, I.; Schinnerer, E. et al. (inc. **Watkins, Elizabeth J.**), 2021 A&A 650, A134

The Organization of Cloud-scale Gas Density Structure: High-resolution CO versus 3.6 μm Brightness Contrasts in Nearby Galaxies – Meidt, Sharon E.; Leroy, Adam K. et al. (inc. **Watkins, Elizabeth J.**), 2021, ApJ 913, 113

Applying the Tremaine-Weinberg Method to Nearby Galaxies: Stellar-mass-based Pattern Speeds and Comparisons with ISM Kinematics – Williams, Thomas G.; Schinnerer, Eva et al. (inc. **Watkins, Elizabeth J.**), 2021, AJ 161, 185

GASTON: Galactic Star Formation with NIKA2 - evidence for the mass growth of star-forming clumps – Rigby, A. J.; Peretto, N. et al. (inc. **Watkins, Elizabeth J.**), 2021 MNRAS 502, 4576

Measuring the mixing scale of the ISM within nearby spiral galaxies – Kreckel, Kathryn; Ho, I. -Ting et al. (inc. **Watkins, Elizabeth J.**), 2020, MNRAS 499, 193