

# Sarah M. R. Jeffreson

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## Employment/education

- 2020–pres. **ITC Fellow, Harvard-Smithsonian Center for Astrophysics, Harvard University**, Cambridge MA, United States
- 2016–2020 **PhD student, International Max Planck Research School for Astrophysics, University of Heidelberg**
- 2015–2016 **MSc, Gonville and Caius College, University of Cambridge**, Cambridge, UK
- 2012–2015 **BA Hons Physics, Gonville and Caius College, University of Cambridge**, Cambridge, UK

## Grants, awards and funding

- 2023 **Scholarly Studies Grant (\$US 10,635)**, *Smithsonian Astrophysical Observatory*, to support an undergraduate student working on the research program entitled 'The influence of superbubble feedback on molecular gas and star formation across galactic environments' (PI Dr Charles Lada, I instigated the proposal and wrote the majority of the grant application)
- 2020 **ITC Fellowship (\$US 360,000)**, *Harvard University*, Independent research fellowship for the research program entitled 'Constraining the molecular cloud lifecycle'
- 2017 **NEON Observing School scholarship (approx. EUR 3500)**, *University of Copenhagen and La Palma Observatory* (success rate of 22%, 16/72)
- 2014 **Research in Industrial Projects for Students scholarship (approx. \$US 10,000)**, *Institute of Pure and Applied Mathematics, UCLA* (success rate 7%, 32/450)
- 2013-2016 **Scholarship for continued academic excellence, Gonville and Caius College, Cambridge University**
- 2013 **Amgen Scholars Programme scholarship (approx. \$US 9,000)**, *Karolinska Institutet* (success rate of 7%, 359/5123)

## Selected refereed publications

A full submitted/refereed publication list can be found at the [SAO/NASA ADS database](#)

Publications that are not yet submitted are available at [my website](#)

2017–pres. 12 first-author/mentored student (\*), 20 total

**\*GalactISM I: galactic outflows and star formation across main-sequence and quenched environments** [Jeffreson, S. M. R.](#), et al. **to be submitted (2023)**

**\*How do spiral arms influence molecular cloud and star formation? Comparing multiple ISM tracers across M33's spiral arm to simulations** Carriera, Courtney, Koch, E. W., [Jeffreson, S. M. R.](#), et al. **to be submitted (2023)**

**\*The evolution and impact of supernova-driven bubbles in main-sequence galactic environments** Angress, A. A., Foley, M., [Jeffreson, S. M. R.](#), et al. **to be submitted (2023)**

**\*Clouds of Theseus: long-lived molecular clouds are composed of short-lived H<sub>2</sub> molecules** [Jeffreson, S. M. R.](#), Semenov, V. A., Krumholz, M. R. **MNRAS submitted (2023)**

**PHANGS-JWST First Results: A Statistical View on Bubble Evolution in NGC 628**, Watkins, E. J., Barnes, A. T. et al. (incl. [Jeffreson, S. M. R.](#)), **ApJ**, **944**, 24 (2023)

**\*Building the molecular cloud population: the role of cloud mergers**, Skarbinski, M. [Jeffreson, S. M. R.](#), Goodman, A. A., **MNRAS** **519**, 1887 (2022)

**\*On the scale-height of the molecular gas disc in Milky Way-like galaxies**, [Jeffreson, S. M. R.](#), Sun, J., Wilson, C. D., **MNRAS**, **515**, 1663 (2022)

**Introducing EMP-Pathfinder: modelling the simultaneous formation and evolution of stellar clusters in their host galaxies**, Reina-Campos, M., Keller, B. W., Kruijssen, J. M. D., et al. (incl. [Jeffreson, S. M. R.](#)), **MNRAS**, **517**, 3144 (2022)

**\*Momentum feedback from marginally-resolved HII regions in isolated disc galaxies**, [Jeffreson, S. M. R.](#), Krumholz, M. R., Fujimoto, Y., et al., **MNRAS**, **505**, 3470 (2021b)

**\*A scaling relation for the molecular cloud lifetime in Milky Way-like galaxies**, [Jeffreson, S. M. R.](#), Keller, B. W., Winter, A. J., et al., **MNRAS** **505**, 1678 (2021a)

**\*The role of galactic dynamics in shaping the physical properties of giant molecular clouds in Milky Way-like galaxies**, [Jeffreson, S. M. R.](#), Kruijssen, J. M. D., Keller, B. W., et al. **MNRAS**, **498**, 385 (2020)

**The lifecycle of molecular clouds in nearby star-forming disc galaxies**, Chevance, M. et al. (incl. SMRJ), **MNRAS**, **493**, 2872 (2020)

**\*On the physical mechanisms governing the cloud lifecycle in the Central Molecular Zone of the Milky Way**, Jeffreson, S. M. R., Kruijssen, J. M. D., Krumholz, M. R., et al. **MNRAS**, **478**, 3380 (2018b)

**\*A general theory for the lifetimes of giant molecular clouds under the influence of galactic dynamics**, Jeffreson, S. M. R., Kruijssen, J. M. D., **MNRAS**, **476**, 3688 (2018a)

**\*The Gaia-ESO Survey: dynamical models of flattened, rotating globular clusters**, Jeffreson, S. M. R., Sanders, J. L., Evans, N. W., Williams, A. A., Gilmore, G. F. et al. **MNRAS**, **469**, 4740 (2017)

## ■ Mentoring/advising

- 2023–pres. **Research advisor**, Aaron Angress (*Sophomore/2nd-year*), Northeastern University co-op, co-advisor Mr. Michael Foley
- 2022–pres. **Research advisor**, Courtney Carriera (*Junior/3rd-year*), Harvard REU Program, co-advisor Dr. Eric Koch
- 2022–2023 **Research advisor**, Adriana Medina (*Sophomore/2nd-year*), Harvard Latino Initiative Program
- 2022–2023 **Research advisor**, to Gorak Rajesh (*Sophomore/2nd-year*), PRISE-Emmanuel Fellowship recipient, co-advisor Dr. Eric Koch
- 2021–2022 **Thesis advisor**, Maya Skarbinski (*Junior/3rd-year*), Harvard University research tutorial in Astrophysics for undergraduates

## ■ Teaching

- 2019 **Experimental Physics II, tutor/marker to class of 20**, *University of Heidelberg*, Electrostatics, Electrodynamics, Electromagnetism, Optics, Special Relativity
- 2018–2019 **Experimental Physics I, tutor/marker to class of 20**, *University of Heidelberg*, Mechanics and Thermodynamics

## ■ Selected talks

- 2017–pres. 12 Invited talks/colloquia/seminars
- Nov. 2023 **Invited colloquium**, University of Massachusetts, Amherst, USA
- Oct. 2023 **Contributed talk—Surveying the Milky Way**, Pasadena, USA
- Jul. 2023 **Invited colloquium**, Argelander Institute for Astronomy, Bonn, Germany
- Jul. 2023 **Invited seminar**, Cologne University, Germany
- Jun. 2023 **Contributed talk—Olympian Symposium: Star formation in the era of JWST**, Paralia Katerini, Greece

- May 2023 **Invited colloquium**, University of Vienna, Austria
- Dec. 2022 **Invited colloquium—Königstuhl Colloquium**, MPA, Heidelberg, Germany
- Oct. 2022 **Invited talk—ITC Luncheon**, Harvard University, USA
- Sep. 2022 **Seminar—Galaxy Group Meeting**, CCA, New York City
- Aug. 2022 **Contributed talk—IAU Symposium 373: Resolving the Rise and Fall of Star formation in Galaxies**, Busan, Korea (online)
- Jul. 2022 **Contributed talk—A holistic view of stellar feedback**, Ascona, Switzerland
- Jun. 2022 **Contributed talk—From Stars to Galaxies II - Connecting our understanding of star and galaxy formation**, Gothenburg, Sweden
- May 2022 **Invited seminar**, McMaster University, Canada
- Apr. 2022 **Invited seminar—MSS Seminar**, University of Wisconsin-Madison, USA (online)
- Jan. 2022 **Invited seminar—MPA Seminar**, Munich, Germany (online)
- Dec. 2021 **Invited seminar**, ANU, Canberra, Australia
- Jul. 2021 **Contributed talk—Ringberg series**, Germany (online)
- May 2021 **ISM 2021: Structure, characteristic scales, and star formation**, Beirut (contributed talk)
- Oct. 2020 **Invited Colloquium—ITC Colloquium**, Harvard University, USA (online)
- Jul. 2020 **ARI Colloquium**, Heidelberg, Germany
- Nov. 2019 **Contributed talk—Harvard-Heidelberg workshop on the Physics of Star Formation: Linking Observations and Simulations**, Cambridge, USA
- Nov. 2019 **Seminar—Hernquist group meeting**, Harvard, USA
- Nov. 2019 **Seminar—SFIR**, Princeton, USA
- Sep. 2019 **Contributed talk—Through Dark Lanes to New Stars, celebrating the career of Prof. Charles Lada**, Crete, Greece
- Jun. 2019 **Contributed talk—Linking the Milky Way and Nearby Galaxies**, Helsinki, Finland
- Jun. 2019 **Blackboard colloquium**, Institute for Theoretical Astrophysics, Heidelberg, Germany
- Nov. 2018 **Contributed talk—Hendrik van de Hulst Centennial Symposium: The Interstellar Medium of Galaxies, Status and Future Perspectives**, Leiden, The Netherlands
- Jul. 2018 **Contributed talk—The Laws of Star Formation: From the Cosmic Dawn to the Present Universe**, Cambridge, UK
- Jun. 2018 **Invited talk—The Multi-Scale Physics of Star Formation and Feedback during Galaxy Formation**, Heidelberg, Germany
- Jun. 2017 **Contributed talk—Galactic Star Formation with Surveys**, Heidelberg, Germany

## Observing time

2017–pres. **Co-investigator on successful ALMA proposals (>50 hours of awarded observing time)**, *Cycles 5-10*, Principal Investigators Eric Koch, Mélanie Chevance and Alexander Hygate

## Scientific leadership and responsibilities held

2023–pres. **ITC Discussion organizing Committee**, *Harvard University*

2022–pres. **Submillimeter Array (SMA) Time Allocation Committee**, *Smithsonian Astrophysical Observatory*

2021–23 **ITC Colloquium organizing Committee**, *Harvard University*

2020, 21, 23 **ITC Fellowship Selection Committee**, *Harvard University*

2023–pres. **CfA Postdoc Committee**, *Harvard & Smithsonian*

2023 **Conference organizing Committee**, *New England Star Formation Workshop*

2022 **Conference organizing Committee**, *Heidelberg-Harvard Star Formation Workshop*, Max Planck Institute for Astronomy

2022 **Conference Local organizing Committee**, *Seeing the Future: Of the Universe, Data, Learning & Digital Scholarship*, Harvard University

2021 **ITC Luncheon organizing Committee**, *Harvard University*

## Outreach

2022 **Public interview: ‘Cosmic Cliffs’ James Webb image**, *Boston Museum of Science (planetarium and social media)*

2021 **Guest lecturer**, for *Ay98 (Research tutorial in Astrophysics for undergraduates)*

2020–pres. **YouTube channel ‘Sarah Jeffreson’**, *short descriptions of some of my papers for a general astronomy audience*

## Refereeing

2023–pres. **Referee**, *The Astrophysical Journal*

2019–pres. **Referee**, *Monthly Notices of the Royal Astronomical Society*

## Programming languages

C/C++, Python, Bash, HTML/CSS