

Sam P. Vaughan

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Employment

- 2023 – Present ♦ **Astro^{3D} Postdoctoral Research Fellow in Data Intensive Astronomy, Macquarie University**
Supervisor: Prof. Richard McDermid
I work on Data Intensive Astronomy within the Astro^{3D} Centre of Excellence, as well as being Target Selection Coordinator for the Hector Galaxy Survey.
- 2019 – 2023 ♦ **Astro^{3D} Postdoctoral Research Associate, University of Sydney**
Supervisor: Prof. Scott Croom
I study the stellar populations of nearby galaxies using the SAMI galaxy survey and am working on preparations for the upcoming Hector galaxy survey.

Education

- 2015 – 2019 ♦ **DPhil in Astrophysics, University of Oxford**
Supervisor: Prof. Roger Davies
A study of stellar populations in the last 5 billion years using Integral Field Spectroscopy
- 2011 – 2015 ♦ **MPhys in Physics, New College, University of Oxford.**
First Class Honours.
2012: College Exhibition awarded for exam performance (£300)
2013-2015: College Scholarship awarded for exam performance (£300 p.a.)
- 2014 – 2015 ♦ **Masters Thesis, University of Oxford**
Supervisor: Prof. Chris Lintott
The star formation histories of SDSS galaxies with Galaxy Zoo

Supervision

- PhD Students ♦ **2020 – Present: Yifan Mai**
Galaxy Evolution in the past 5 Gyrs
Co-supervised with Prof. Scott Croom
- Honours Students ♦ **2022 – Present Desheng Wang**
Galaxy Kinematics as a function of environment
Co-supervised with Prof. Scott Croom
- Undergraduate Students
- ♦ **2023** Lachlan Barnes
What kind of stars were galaxies made of 3 billion years ago?
 - ♦ **2021** Joel Shortland & Oliver Oayda
The Morphology-Density relation in the MAGPI survey
Co-supervised with Dr. Carline Foster
 - ♦ **2019 – 2020** Yifan Mai
The relationship between galaxy spin and the motion of its neighbours
Co-supervised with Prof. Scott Croom

Supervision (continued)

- ◇ **2019** Samuel Eames
Milky Way analogues in the SAMI Survey
Co-supervised with Dr. Nic Scott
- ◇ **2018** Chloe James-Turner
Galaxy Kinematics in the densest environments
Co-supervised with Roger Davies

Teaching

- 2020 – 2022 ◇ **University of Sydney**
Course Coordinator: Online module “*OLE 1640: From the Big Bang to Darkness*”.
150+ students enrolled each semester.
- 2016-2018 ◇ **St Catherine’s College, University of Oxford**
Tutor for second year Mathematical Methods for Physicists
- 2017-2018 ◇ **Undergraduate Lab Demonstrator**
Astrophysics computing lab
- ◇ **UK Astronomy Olympiad Lecturer**
Galaxies course

Skills

- Computing ◇ Python, Bash scripting, Linux/UNIX operating systems, \LaTeX , R
- ◇ High performance computing on parallelised hardware using MPI
- ◇ Version control and collaborative software development using Git and Github
- ◇ Python data analysis pipelines (numpy, scipy, matplotlib, probabilistic programming tools) and basic machine learning workflow (Tensorflow, scikit-learn, Keras)
- Observing ◇ 55 nights experience, split between the VLT, Chile (3 nights with KMOS), the AAT, Australia (5 nights with the KOALA IFU, 43 with Hector) and Palomar observatory, USA (4 nights with the SWIFT IFU)

Service

- 2021 – 2022 ◇ Sydney Institute for Astronomy Seminar Organiser
- June 2021 ◇ One of eight postdocs selected to represent Astro^{3D} during the Australian Research Council’s mid-term review of the centre.
- 2020 – 2022 ◇ Member of the Astro^{3D} junior early career researcher committee.
- 2017 – Present ◇ Invited referee for The Astrophysical Journal and the Monthly Notices of the Royal Astronomical Society

Research Publications

I have a total of 335 citations with an h-index of 10. Articles marked with * are publications by my students. The most up-to-date list of my publications can be found [here](#).

Peer Reviewed Journal Articles

- 1 **Vaughan**, S. P., Barone, T. M., Croom, S. M., Cortese, L., D’Eugenio, F., Brough, S., ... Richards, S. N. (2022, October). The SAMI galaxy survey: Galaxy size can explain the

offset between star-forming and passive galaxies in the mass-metallicity relationship. *516*(2), 2971–2987. doi:[10.1093/mnras/stac2304](https://doi.org/10.1093/mnras/stac2304). arXiv: [2208.06939](https://arxiv.org/abs/2208.06939) [astro-ph.GA]

- 2 **Vaughan**, S. P., Tiley, A. L., Davies, R. L., Prichard, L. J., Croom, S. M., Bureau, M., ... Jarvis, M. J. (2020). K-CLASH: Strangulation and ram pressure stripping in galaxy cluster members at $0.3 < z < 0.6$. *Monthly Notices of the Royal Astronomical Society*. doi:[10.1093/mnras/staa1837](https://doi.org/10.1093/mnras/staa1837)
- 3 **Vaughan**, S. P., Davies, R. L., Zieleniewski, S., & Houghton, R. C. W. (2018a). The stellar population and initial mass function of NGC 1399 with MUSE. *Monthly Notices of the Royal Astronomical Society*. doi:[10.1093/mnras/sty1434](https://doi.org/10.1093/mnras/sty1434)
- 4 **Vaughan**, S. P., Davies, R. L., Zieleniewski, S., & Houghton, R. C. W. (2018b). Radial measurements of IMF-sensitive absorption features in two massive ETGs. *Monthly Notices of the Royal Astronomical Society*. doi:[10.1093/mnras/stx3199](https://doi.org/10.1093/mnras/stx3199)
- 5 *Mai, Y., **Vaughan**, S. P., Croom, S. M., & ... (2022, July). The SAMI Galaxy Survey: The relationship between galaxy rotation and the motion of neighbours. *Monthly Notices of the Royal Astronomical Society*. doi:[10.1093/mnras/stac1841](https://doi.org/10.1093/mnras/stac1841)
- 6 Watson, P. J., ..., **Vaughan**, S. P., & ... (2022, July). The SAMI Galaxy Survey: the link between $[\alpha/\text{Fe}]$ and kinematic morphology. *513*(4), 5076–5087. doi:[10.1093/mnras/stac1221](https://doi.org/10.1093/mnras/stac1221). arXiv: [2204.12630](https://arxiv.org/abs/2204.12630) [astro-ph.GA]
- 7 Barone, T. M., ..., **Vaughan**, S. P., & ... (2022, May). The LEGA-C and SAMI galaxy surveys: quiescent stellar populations and the mass-size plane across 6 Gyr. *512*(3), 3828–3845. doi:[10.1093/mnras/stac705](https://doi.org/10.1093/mnras/stac705). arXiv: [2107.01054](https://arxiv.org/abs/2107.01054) [astro-ph.GA]
- 8 Watson, P. J., ... **Vaughan**, S. P., & ... (2022, February). The SAMI Galaxy Survey: trends in $[\alpha/\text{Fe}]$ as a function of morphology and environment. *510*(1), 1541–1556. doi:[10.1093/mnras/stab3477](https://doi.org/10.1093/mnras/stab3477). arXiv: [2106.01928](https://arxiv.org/abs/2106.01928) [astro-ph.GA]
- 9 Fraser-McKelvie, A., ..., **Vaughan**, S., & ... (2022, February). The SAMI Galaxy Survey: the drivers of gas and stellar metallicity differences in galaxies. *510*(1), 320–333. doi:[10.1093/mnras/stab3430](https://doi.org/10.1093/mnras/stab3430). arXiv: [2111.11627](https://arxiv.org/abs/2111.11627) [astro-ph.GA]
- 10 van de Sande, J., **Vaughan**, S. P., Cortese, L., & ... (2021, August). The SAMI Galaxy Survey: a statistical approach to an optimal classification of stellar kinematics in galaxy surveys. *505*(2), 3078–3106. doi:[10.1093/mnras/stab1490](https://doi.org/10.1093/mnras/stab1490). arXiv: [2011.08199](https://arxiv.org/abs/2011.08199) [astro-ph.GA]
- 11 Prichard, L. J., **Vaughan**, S. P., & Davies, R. L. (2019). Unravelling the origin of the counter-rotating core in IC 1459 with KMOS and MUSE. *Monthly Notices of the Royal Astronomical Society*. doi:[10.1093/mnras/stz1191](https://doi.org/10.1093/mnras/stz1191)
- 12 Tiley, A. L., **Vaughan**, S. P., Stott, J. P., Davies, R. L., Prichard, L. J., Bunker, A., ... Ansarinejad, B. (2020). K-CLASH: spatially resolving star-forming galaxies in field and cluster environments at $z = 0.2-0.6$. *Monthly Notices of the Royal Astronomical Society*. doi:[10.1093/mnras/staa1418](https://doi.org/10.1093/mnras/staa1418)
- 13 Foster, C., Mendel, J. T., Lagos, C. D. P., Wisnioski, E., ..., **Vaughan**, S. P., & (2020). The MAGPI Survey – science goals, design, observing strategy, early results and theoretical framework. *arXiv e-prints*. arXiv: [2011.13567](https://arxiv.org/abs/2011.13567)
- 14 Poetrodjojo, H., Groves, B., Kewley, L. J., Sweet, S. M., ..., **Vaughan**, S., & ... (2021). The SAMI Galaxy Survey: reconciling strong emission line metallicity diagnostics using metallicity gradients. *Monthly Notices of the Royal Astronomical Society*. doi:[10.1093/mnras/stab205](https://doi.org/10.1093/mnras/stab205)

- 15 Croom, S. M., Taranu, D. S., van de Sande, J., Lagos, C. D. P., ..., & **Vaughan**, S. P. (2021, August). The SAMI Galaxy Survey: the role of disc fading and progenitor bias in kinematic transitions. *505*(2), 2247–2266. doi:[10.1093/mnras/stab1494](https://doi.org/10.1093/mnras/stab1494). arXiv: [2105.10179](https://arxiv.org/abs/2105.10179) [astro-ph.GA]
- 16 Croom, S. M., Owers, M. S., Scott, N., Poetrodjojo, H., Groves, B., ..., & **Vaughan**, S. P. (2021). The SAMI Galaxy Survey: the third and final data release. *Monthly Notices of the Royal Astronomical Society*. doi:[10.1093/mnras/stab229](https://doi.org/10.1093/mnras/stab229)
- 17 van de Sande, J., Croom, S. M., Bland-Hawthorn, J., ..., & **Vaughan**, S. P. (2021, December). The SAMI galaxy survey: Mass and environment as independent drivers of galaxy dynamics. *508*(2), 2307–2328. doi:[10.1093/mnras/stab2647](https://doi.org/10.1093/mnras/stab2647). arXiv: [2109.06189](https://arxiv.org/abs/2109.06189) [astro-ph.GA]
- 18 Parikh, T., Thomas, D., Maraston, C., Westfall, K. B., ..., **Vaughan**, S., & ... (2018). SDSS-IV MaNGA: The Spatially Resolved Stellar Initial Mass Function in 400 Early-Type Galaxies. *Monthly Notices of the Royal Astronomical Society*. doi:[10.1093/mnras/sty785](https://doi.org/10.1093/mnras/sty785). eprint: [1803.08515](https://arxiv.org/abs/1803.08515)
- 19 Zieleniewski, S., Houghton, R. C. W., Thatte, N., Davies, R. L., & **Vaughan**, S. P. (2017). Radial gradients in initial mass function sensitive absorption features in the Coma brightest cluster galaxies. *Monthly Notices of the Royal Astronomical Society*. doi:[10.1093/mnras/stw2712](https://doi.org/10.1093/mnras/stw2712)
- 20 Banfield, J. K., Andernach, H., Kapińska, A. D., ..., **Vaughan**, S., & ... (2016). Radio Galaxy Zoo: discovery of a poor cluster through a giant wide-angle tail radio galaxy. *Monthly Notices of the Royal Astronomical Society*. doi:[10.1093/mnras/stw1067](https://doi.org/10.1093/mnras/stw1067)

Presented Talks

- 2022 ◇ **Scanning galactic barcodes: The stellar populations of nearby galaxies from spatially resolved spectroscopy**, Swinburne University invited colloquium, Australia
- 2021 ◇ **Scanning galactic barcodes: The stellar populations of nearby galaxies from spatially resolved spectroscopy**, Monash University invited colloquium, Australia
 ◇ **Stellar Metallicities and Galaxy Quenching in the SAMI Survey**, University of Melbourne invited colloquium, Australia
- 2020 ◇ **Stellar Populations in the SAMI galaxy survey**, Astro^{3D} Science meeting (online)
 ◇ **KCLASH- the field and cluster environments at $z \sim 0.5$** , 236th American Astronomical Society meeting (online)
- 2018 ◇ **KCLASH- the field and cluster environments at $z \sim 0.5$** , “KMOS@5” workshop, ESO headquarters, Garching, Germany
 ◇ **KCLASH- the field and cluster environments at $z \sim 0.5$** , International Astronomical Union general assembly, Vienna
 ◇ **The Initial Mass Function in Early Type Galaxies**, Oxford Galaxy Evolution Seminar (1hr), Oxford, UK
- 2017 ◇ **Radial IMF measurements in NGC 1399**, Royal Astronomical Society specialist discussion meeting, London, UK
 ◇ **The IMF and stellar populations of early-type galaxies**, “Thirty Minute Talk” series at ESO Vitacura, Santiago, Chile
 ◇ **MUSEings on the IMF in NGC 1399**, National Astronomy Meeting, Hull, UK
- 2016 ◇ **The Iron Hydride Molecule in Early Type Galaxies**, The Universal Problem of the Non-Universal IMF: Lorentz Centre, Leiden, Netherlands

Presented Talks (continued)

- ◇ **The IMF in two nearby Massive Galaxies** National Astronomy Meeting, Nottingham, UK

References

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