

# Amelia Fraser-McKelvie

*Extragalactic Astronomer*

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## Work Experience

- Jun 2020– Present **Postdoctoral Research Associate**, *University of Western Australia, Perth, Australia*, Using large IFU surveys (SAMI, MaNGA) coupled with HI gas information to understand morphology growth in galaxies from both a chemical evolution and kinematic point of view.  
Supervisor: Dr Luca Cortese.
- 2017–2020 **Postdoctoral Research Associate**, *University of Nottingham, Nottingham, U.K.*, Working within the MaNGA group. Research included galaxy evolution and quenching, spatially-resolved components within galaxies and their stellar populations and gas properties.  
Supervisors: Prof Alfonso Aragón-Salamanca, Prof Mike Merrifield.
- 2013–2017 **PhD in Observational Astronomy**, *Monash University, Melbourne, Australia*.  
Thesis title: Photometric and Spectroscopic Observations of Star Formation in Nearby Galaxies.  
Supervisors: A/Prof Michael J. I. Brown, Dr Kevin Pimbblet.

## Publications

I have eleven first-author publications, and twenty co-authorships (plus one under review). I have published first-author work in both the Monthly Notices of the Royal Astronomical Society (MNRAS; impact factor of 5.107), and the MNRAS Letters (impact factor 5.521).

32. **Fraser-McKelvie, A.**, Cortese, L., van de Sande, J., Scott N., Catinella, B., Croom, S., Groves, B., Bryant, J., Sweet, S., Medling, A., Colless, M., Bland-Hawthorn, J., Goodwin, M., Lawrence, J., Lorente, N., Owers, M., Richards, S. (2021) "A SAMI and MaNGA view on the stellar kinematics of galaxies on the star-forming main sequence", *MNRAS*, 503, 4992.
31. **Fraser-McKelvie, A.**, Merrifield, M., Aragón-Salamanca, A., Peterken, T., Kraljic, K., Masters, K., Stark, D., Fragkoudi F., Smethurst, R., Fraser Boardman, N., Drory, N., Lane, R. (2020) "SDSS-IV MaNGA: The link between bars and the early cessation of star formation in spiral galaxies", *MNRAS*, 499, 1116.
30. **Fraser-McKelvie, A.**, Aragón-Salamanca, A., Merrifield, M., Masters, K., Nair, P., Emsellem, E., Kraljic, K., Krishnarao, D., Andrews, B., Drory, N., Neumann, J. (2020) "SDSS-IV MaNGA: Spatially resolved star formation in barred galaxies", *MNRAS*, 495, 4158.
29. **Fraser-McKelvie, A.**, Merrifield, M., Aragón-Salamanca, A. (2019) "From the Outside Looking in: What can Milky Way Analogues Tell us About the Star Formation Rate of Our Own Galaxy?", *MNRAS*, 489, 5030.
28. **Fraser-McKelvie, A.**, Merrifield, M., Aragón-Salamanca, A., Peterken, T., Masters, K., Krawczyk, C., Andrews, B., Knapen, J., Kruk, S., Schaefer, A., Smethurst, R., Riffel, R., Brownstein, J., Drory, N., (2019) "SDSS-IV MaNGA: Stellar Population Gradients Within Barred Galaxies", *MNRAS*, 488, L6.
27. **Fraser-McKelvie, A.**, Aragón-Salamanca, A., Merrifield, M., Tabor, M., Bernardi, M., Drory, N., Parikh, T., Argudo-Fernández, M. (2018) "SDSS-IV MaNGA: The Formation Sequence of S0 Galaxies", *MNRAS*, 481, 5580.

26. **Fraser-McKelvie, A.**, Brown, M. J. I., Pimbblet, K. A., Dolley, T., Bonne, N., (2018) "Multiple Mechanisms Quench Passive Spiral Galaxies", *MNRAS*, 474, 1909.
25. **Fraser-McKelvie, A.**, Brown, M. J. I., Pimbblet, K. A., Dolley, T., Crossett, J. P., Bonne, N., (2016) "A Photometrically and Spectroscopically Confirmed Population of Passive Spiral Galaxies", *MNRAS*, 462, 11.
24. **Fraser-McKelvie, A.**, Pimbblet, K. A., Penny, S. J., Brown, M. J. I., (2016) "The Many Assembly Histories of Massive Void Galaxies as Revealed by Integral Field Spectroscopy", *MNRAS*, 459, 754.
23. **Fraser-McKelvie, A.**, Brown, M. J. I., Pimbblet, K. A., (2014) "The Rarity of Star Formation in Brightest Cluster Galaxies as Measured by WISE", *MNRAS*, 444, L63.
22. **Fraser-McKelvie, A.**, Pimbblet, K. A., Lazendic-Galloway, J., (2011) "An Estimate of the Electron Density of Filaments of Galaxies at  $z \sim 0.1$ ", *MNRAS*, 415, 1961.
21. van de Sande, J.,...**Fraser-McKelvie, A.**, et al. "The SAMI galaxy survey: towards an optimal classification of galaxy stellar kinematics", *MNRAS*, *submitted*.
20. Croom, S., ... **Fraser-McKelvie, A.**, et al. (2021) "The SAMI galaxy survey: the third and final data release", *MNRAS*, *accepted*.
19. Xiang, K., Nataf, D., Athanassoula, E., Zakamska, N., Rowlands, K., Masters, K., **Fraser-McKelvie, A.**, Drory, N., Kraljic, K. (2021) "Buckling bars in nearly face-on galaxies observed with MaNGA", *ApJ*, *accepted*.
18. Johnston, E., Aragón-Salamanca, A., **Fraser-McKelvie, A.**, Merrifield, M., Häussler, B., Coccato, L., Jaffé, Y., Cortesi, A., Chies-Santos, A., Rodríguez Del Pino, B., Sheen, Y-K., (2021) "Formation of S0s in extreme environments II: the star-formation histories of bulges, discs and lenses", *MNRAS*, 500, 4193.
17. Lin, L., Li, C., Cheng, D., Wang, E., Xiao, T., Bureau, M., **Fraser-McKelvie, A.**, Masters, K., Lin, L., Wake, D., Hao, L., (2020), "SDSS-IV MaNGA: the indispensable roles of bars in enhancing the central star formation of low- $z$  galaxies", *MNRAS*, 499, 1406.
16. Krishnarao, D., Tremonti, **Fraser-McKelvie, A.**, Kraljic, K., Boardman, N., Masters, K., Benjamin, R., Haffner, L. M., Jones, A., Pace, Z., Zasowski, G., Bershad, M., Bizyaev, D., Brinkmann, J., Brownstein, J., Drory, N., Pan, K., Zhang, K., (2020) "The Effect of Bars on the Ionized ISM: Optical Emission Lines from Milky Way Analogs", *ApJ*, 898, 116.
15. Greener, M., Aragón-Salamanca, A., Merrifield, M., Peterken, T., **Fraser-McKelvie, A.**, Masters, K., Krawczyk, C., Boardman, N., Boquien, M., Andrews, B., Brinkmann, J., Drory, N. (2020) "SDSS-IV MaNGA: spatially resolved dust attenuation in spiral galaxies", *MNRAS*, 495, 2305.
14. Peterken, T., Merrifield, M., Aragón-Salamanca, A., **Fraser-McKelvie, A.**, Avila-Reese, V., Riffel, R., Knapen, J., Drory, N. (2020) "SDSS-IV MaNGA: Excavating the fossil record of stellar populations in spiral galaxies", *MNRAS*, 495, 3387.

13. Peterken, T., **Fraser-McKelvie, A.**, Aragón-Salamanca, A., Merrifield, M., Kraljic, K., Knapen, J., Riffel, R., Brownstein, J., Drory, N. (2019) "Time-slicing spiral galaxies with SDSS-IV MaNGA", *MNRAS*, 489, 1338.
12. Boardman, N., Zasowski, G., Seth, A., Newman, J., Andrews, B., Bershad, M., Bird, J., Chiappini C., Fielder, C., **Fraser-McKelvie, A.**, Jones, A., Licquia, T., Masters, K., Minchev, I., Schiavon, R., Brownstein, J., Drory, N., Lane, R. (2020) "Milky Way analogues in MaNGA: multiparameter homogeneity and comparison to the Milky Way", *MNRAS*, 491, 3672.
11. Pimblet, K. A., Crossett, J. P., **Fraser-McKelvie, A.**, (2019) "Heterogeneity of Inverted Calcium II H:K Ratio Cluster Galaxies", *MNRAS*, 490, 455.
10. Parkash, V., Brown, M. J. I., Jarrett, T. H., **Fraser-McKelvie, A.**, Cluver, M. E., (2019) "HI Galaxies with Little Star Formation: an Abundance of LIERs", *MNRAS*, 485, 3169.
9. Parikh, T., Thomas, D., Maraston, C., Westfall, K. B., Lian, J., **Fraser-McKelvie, A.**, Andrews, B. H., Drory, N., Meneses-Goytia, S., (2019) "SDSS-IV MaNGA: local and global chemical abundance patterns in early-type galaxies", *MNRAS*, 483, 3420.
8. Tabor, M., Merrifield, M., Aragón-Salamanca, A., **Fraser-McKelvie, A.**, Peterken T., Smethurst, R., Drory N., Lane R. R., (2019) "SDSS-IV MaNGA: Full Spectroscopic Bulge-Disc Decomposition of MaNGA Early-Type Galaxies", *MNRAS*, 485, 1546.
7. Smethurst, R., Merrifield, M., Lintott, C., Masters, K., **Fraser-McKelvie, A.**, Peterken, T., Boquien, M., Riffel, R., Drory, N., (2019) "SNITCH: Seeking a Simple, Informative Star Formation History Inference Tool", *MNRAS*, 484, 3590.
6. Gordon, Y. A., Pimblet, K. A., Owers, M., Kaviraj, S., O'Dea, C., Walmsley, M., Baum, S., Crossett, J., **Fraser-McKelvie, A.**, Lintott, C., Pierce, J., (2019) "Major-Mergers Trigger Inefficient Black Hole Accretion in Low-Mass Radio Galaxies", *ApJ*, 878, 88.
5. Aguado, D. S., ... **Fraser-McKelvie, A.**, ... et al., (2019), "The Fifteenth Data Release of the Sloan Digital Sky Surveys: First Release of MaNGA Derived Quantities, Data Visualisation Tools and Stellar Library", *ApJS*, 240, 23.
4. Usher, C., Beckwith, T., Bellstedt, S., Alabi, A., Chevalier, L., Pastorello, N., Cerulo, P., Dalgleish, H., **Fraser-McKelvie, A.**, Kamann, S., Penny, S., Foster, C., McDermid, R., Schiavon, R., Villaume, A., (2019) "The WAGGS project - II. The reliability of the calcium triplet as a metallicity indicator in integrated stellar light", *MNRAS* 482, 1275.
3. Usher, C., Pastorello, N., Bellstedt, S., Alabi, A., Cerulo, P., Chevalier, L., **Fraser-McKelvie, A.**, Penny, S., Foster, C., McDermid, R., Schiavon, R., Villaume, A (2017) "The WAGGS project - I. The WiFeS Atlas of Galactic Globular cluster Spectra", *MNRAS*, 468, 3828.
2. Childress, M. J., Tucker, B. E., Yuan, F., Scalzo, R., Ruiter, A., Seitzzahl, I., Zhang, B., Schmidt, B., Anguiano, B., Aniyani, S., Bayliss, D. D. R., Bento, J., Bessell, M., Bian, F., Davies, R., Dopita, M., Fogarty, L., **Fraser-McKelvie, A.**, Freeman, K., Kuruwita, R., Medling, A. M., Murphy, S. J., Murphy, S. J., Owers,

M., Panther, F., Sweet, S. M., Thomas, A. D., Zhou, G., (2016) "The ANU WiFeS SuperNovA Program (AWSNAP)", *PASA*, 33, 55.

1. Pimblett, K. A., Shabala, S. S., Haines, C. P., **Fraser-McKelvie, A.**, Floyd, D. J. E., (2013) "The Drivers of AGN Activity in Galaxy Clusters: AGN Fraction as a Function of Mass and Environment" *MNRAS*, 429, 1827.

#### Non-Refereed

2. **Fraser-McKelvie, A.**, Merrifield, M., Aragón-Salamanca, A., Masters, K., the MaNGA team (2020) "Properties of barred galaxies in the MaNGA galaxy survey", *Conference Proceedings of IAUS 353*, 226.
1. Hansen, S., Conselice, C., **Fraser-McKelvie, A.**, Ferreira, L., (2020) "Retrieving internal kinematics of galaxies with deep learning using single-band optical images", *RNAAS*, 4, 185.

### Awards, Scholarships, and Grants

- 2018 **RAS Ongoing Grants Scheme**, *Royal Astronomical Society*, (£760).  
Funding to establish the Trailblazing Women in Astronomy Lecture Series, a series of lectures delivered by prominent female astronomers with the aim of inspiring and engaging junior female and minority astronomers.
- 2016 **Postgraduate Publication Award**, *Monash University*, (\$6600).  
Funding to publish work submitted as part of my thesis.
- 2013-2016 **Australian Postgraduate Award (APA)**, (\$25000 per annum).
- 2013-2015 **J. L. William Fellowship**, *Monash University School of Physics*, (\$5000 per annum).  
APA topup awarded to the top PhD student commencing in physics each year.
- 2012 **Summer Vacation Scholarship**, *Monash University School of Physics*, (\$2700).  
A paper was written and published from this work.
- 2011 **Summer Vacation Scholarship**, *Monash University School of Mathematical Sciences*, (\$2700).  
Skills in computer coding and presentation developed.
- 2007 **Women in Engineering Bursary**, *Monash University Department of Mechanical and Aerospace Engineering*, (\$2000).  
Awarded to the top 10 female students commencing engineering studies each year.

### Conference Presentations

#### Talks

- July 2021 **The Royal Astronomical Society's National Astronomy Meeting**, *Online conference, hosted by the University of Bath, U.K.*, **Oral presentation**.  
"A kinematic view of the link between internal structure growth and galaxy quenching"
- July 2021 **The Astronomical Society of Australia Annual Science Meeting**, *Online conference, hosted by the University of Melbourne*, **Oral presentation**.  
"Live Fast and Die Young: Do Bars Kill Galaxies?"
- June 2021 **European Astronomical Society Annual Meeting**, *Online conference, hosted by Leiden University*, **Oral presentation**.  
"The Stellar Kinematics of Galaxies on the Star-Forming Main Sequence"
- December 2020 **Linking the Galactic and Extragalactic - Stellar Dynamics and Stellar Populations of the Milky Way and its Siblings**, *Online conference, hosted by the University of Sydney and ASTRO 3D*, **Oral presentation**.  
"From the Outside Looking In: What Can Milky Way Analogues Tell us About the Star Formation Rate of Our Own Galaxy?"

- July 2019 **IAU Symposium 353: Galactic Dynamics in the Era of Large Surveys**, *Shanghai, China*, **Oral presentation**.  
"Temporal Insights into the Secular Evolution of Bars from the MaNGA Galaxy Survey."
- June 2019 **SDSS Collaboration Meeting**, *Ensenada, Mexico*, **Oral Presentation**.  
"Age-Dating Stellar Population Trends in Milky Way Analogues."
- March 2019 **The Life and Death of Starforming Galaxies**, *Perth, Australia*, **Oral presentation**.  
"The Formation Sequence of S0 Galaxies."
- June 2018 **SDSS Collaboration Meeting**, *Seoul, South Korea*, **Oral presentation**.  
"The Formation Sequence of S0 Galaxies."
- May 2018 **Galactic Rings: Signposts of Secular Evolution in Disk Galaxies**, *Tuscaloosa, Alabama*, **Oral presentation**.  
"The stellar populations of bars in MaNGA galaxies."
- December 2017 **MaNGA Collaboration Meeting**, *Campeche, Mexico*, **Oral presentation**.  
"The Bulges and Disks of S0 Galaxies."
- July 2017 **RAS National Astronomy Meeting**, *Hull, U.K.*, **Oral presentation**.  
"Multiple Mechanisms Quench Passive Spiral Galaxies."
- July 2015 **The Many Pathways to Galaxy Growth**, *Prato, Italy*, **Oral presentation**.  
"Star Formation in Local Universe Brightest Cluster Galaxies."
- September 2014 **Evolving Galaxies in Evolving Environments**, *Bologna, Italy*, **Oral Presentation**.  
"The Rarity of Star Formation in Local Universe BCGs".

#### Posters

- April 2021 **GalSpec21**, *Virtual Meeting, organised by ESO*, **Poster Presentation**.
- September 2016 **The Changing Face of Galaxies**, *Hobart, Australia*, **Poster Presentation**.
- July 2015 **Royal Astronomical Society National Astronomy Meeting**, *Llandudno, Wales*, **Poster Presentation**.
- July 2014 **Astronomical Society of Australia Annual Scientific Meeting**, *Macquarie University, Australia*, **Poster Presentation**.

#### Invited Seminars

- July 2021 **Max Planck Institute for Extraterrestrial Physics**, Optical and interpretive astronomy (OPINAS) group seminar.
- April 2021 **Monash University, Aus**, Departmental seminar.
- Nov 2020 **University of Leicester, U.K.**, Departmental seminar.
- June 2019 **The Open University, U.K.**, Departmental seminar.
- April 2019 **University of Sydney, Aus**, Departmental seminar.
- April 2019 **Australian National University, Aus**, Departmental seminar.
- March 2019 **Swinburne University, Aus**, Departmental colloquium.
- March 2019 **University of Melbourne, Aus**, Departmental seminar.
- Jan 2019 **University of Oxford, U.K.**, Galaxy evolution seminar.
- Nov 2018 **University of Leeds, U.K.**, Departmental seminar.
- June 2018 **University of Hertfordshire, U.K.**, Departmental seminar.
- April 2018 **University of Bristol, U.K.**, Departmental seminar.

#### Collaboration Memberships

- 2020- Present **Sydney-AAO Multi-object Integral field spectrograph (SAMI) Galaxy Survey**, *Team member.*
- 2020- Present **Hector Galaxy Survey**, *Science team member.*
- 2020- Present **The ARC Centre of Excellence in All Sky Astrophysics in 3 Dimensions (ASTRO 3D)**, *Affiliate Member.*
- 2020- Present **Sloan Digital Sky Survey - IV**, *Mapping Nearby Galaxies at APO (MaNGA) Galaxy Survey*, External collaborator.
- 2017-2020 **Sloan Digital Sky Survey - IV**, *Mapping Nearby Galaxies at APO (MaNGA) Galaxy Survey*, Institutional team member.

## Leadership & Service to the Community

- 2020- Present **Chair, ASTRO 3D International Seminars Committee**, *Responsible for organising the ECR Astronomers in Australia Seminar Series, a series that aims to help junior Australian astronomers advertise themselves in Covid times by giving them the opportunity to present conference-style talks to a wide audience in an online format.*
- 2021- Present **ICRAR-UWA Equity, Diversity and Inclusion committee**, *Gender diversity officer, Role involves supporting women at ICRAR-UWA at the student and ECR stages, raising awareness of LGBTIA+ issues, and ensuring a bias-free working environment. Specific tasks so far have included collating hiring statistics to set a benchmark at ICRAR/UWA with the goal of increasing the fraction of women across all levels in the department..*
- 2019-2020 **MaNGA Science Committee Member**, *Responsible for providing guidance on survey data products and software needs and usage, collaborating on "big-idea" topics that require multi-pronged efforts, coordinating work on similar topics and resolving potential conflicts, triggering projects to exploit science opportunities or address widespread needs, and followup observations, internal meetings, and international conferences.*
- 2017- Present **Referee**, *for the Astrophysical Journal, Astronomy & Astrophysics, and the Monthly Notices of the Royal Astronomical Society.*
- 2019 **Referee**, *telescope proposals for the Isaac Newton Telescope.*

## Recent Voluntary Training

- 2021 **Dealing with difficult behaviours**, *Organised by UWA.*
- 2021 **Unconscious bias**, *Organised by UWA.*
- 2021 **Cultural awareness training**, *SBS cultural training.*
- 2021 **Becoming an effective supervisor**, *Organised by ASTRO 3D.*

## Professional Memberships

- 2013- Present **Astronomical Society of Australia**, *Member.*
- 2017-2020 **Royal Astronomical Society**, *Fellow.*

## Software Skills

### Programming Languages

- Proficiency with Python (including Astropy, Numpy, Scipy, Matplotlib), MATLAB and command line languages such as Awk. Experience with IDL, R and SQL.

### Other Software

- Proficiency with astronomical software packages such as IRAF/pyRAF, ds9, GAIA, Topcat, L<sup>A</sup>T<sub>E</sub>X, pPXF, GANDALF, Starlight, along with Mac OSX, Linux and Windows platforms and common software such as Microsoft Office.

## Student Supervision & Teaching Experience

- 2021- Present **Ph.D. student, co-supervisor**, *University of Western Australia*, A. Ristea.
- 2020- Present **Masters student, co-supervisor**, *University of Western Australia*, J. Pinto-Correia, Project title: 'Rotation curves of SAMI galaxies'.
- 2018-2019 **Masters students, primary supervisor**, *University of Nottingham*, N. Russell & R. Williams, Project title: 'Estimating the rate of star formation in spiral galaxies'.
- 2017-2018 **Masters students, primary supervisor**, *University of Nottingham*, L. Watt & J. Falconer, Project title: 'Are low mass passive spiral galaxies an environmental phenomenon?'.
- 2011-2017 **Teaching associate**, *Monash University*, Teaching 2nd and 3rd year undergraduate labs and tutorials.

## Selected Outreach & Mentoring

- 2020 **Science Cafe**, *STEM professional*, A day in which year 10 students can meet STEM professionals and network with them about future career choices.
- 2020 **Nottingham Festival of Science & Curiosity**, *Library Talk*: 'What have we learnt from human spaceflight?', A public talk aimed at non-experts of retirement age.
- 2019 **Pint of Science**, **U. K.**, *Talk*: 'The Science of Space Flight', Science talks in pubs across the UK aimed at interested members of the public.
- 2019 **Frontiers in Physics Panel Member**, *University of Nottingham*, Participant in a panel on careers in physics aimed at undergraduate physicists.
- 2018 **Blog post for Galaxy Zoo**, *Online at <https://blog.galaxyzoo.org/2018/07/17/finding-bars-in-galaxy-zoo-3d/>*, A blog post aimed at informing and engaging the public.
- 2018 **Talk: How to Write a Paper**, *University of Nottingham PhD student journal club*, A presentation on tips and tricks for writing and submitting journal articles.

## Selected Organisational Experience

- 2020- Present **ASTRO 3D International Seminars Committee**, *Chair*, This role involves leading a committee of seven to organise a seminar series aimed at advertising Australian PhD students and postdocs to an international audience.
- 2017-2020 **University of Nottingham's weekly astronomy seminar series**, *Organiser*, Putting together a balanced (gender, subject, career stage) seminar series for the Nottingham astronomy group, and organising speaker travel.
- 2020 **RAS Trailblazing Women in Astronomy Lecture Series**, *Founder and organiser*, A series of seminars given by prominent women in astronomy to staff and students of universities all over England. The aim is to inspire and engage female PhD students and junior staff by interacting with a highly accomplished astronomer in their field, encouraging them to continue their studies or career in astronomy. I was the founder of this series, secured funding for the inaugural event, advertised to British astronomers, and ran the event on the day.

## Education

- 2012 **Honours degree of Bachelor of Science (First Class)**, *Monash University, Melbourne, Australia*, Supervisor: Dr Kevin Pimbblet.  
Thesis title: The Morphological Properties of Filaments of Galaxies.

- 2007-2011 **Bachelor of Aerospace Engineering (with Honours) and Bachelor of Science**, *A double degree, Monash University, Melbourne, Australia.*  
Science majors: Applied Mathematics, Astrophysics
- 2005-2006 **Victorian Certificate of Education**, *Warrandyte High School, Melbourne, Australia.*

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## Observing Experience

- 2014-2018 **WiFeS Integral Field Spectrograph**, *ANU's 2.3m telescope, Siding Spring Observatory, NSW.*  
36 nights on this telescope, 25 of which I was PI for with a mixture on onsite and remote observing. Tasks involved target selection under changing conditions, observing, and troubleshooting both hardware and software problems.
- 2012 **GAMA observing run**, *AAT, Siding Spring Observatory, NSW.*  
6 nights, responsible for redshifting.