Garreth Martin

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INFO

Address :
Steward Observatory
University of Arizona
933 N Cherry Ave
Tucson
Arizona
USA

EDUCATION

PhD in Astrophysics
University of Hertfordshire
2015 – 2019

MPhys in Astrophysics
University of Hertfordshire
2011 – 2015
First Class with Honours
Average grade 81%

SKILLS

PROGRAMMING
Advanced
Python • IDL • Matlab • Shell • LaTeX
Proficient
Fortran • Yorick • HTML • SQL

TOOLS
Git • Linux • DS9 • MS Office • Noise Chisel • SExtractor • SUNRISE / SUNSET

AFFILIATIONS

Member of the Institute of Physics
Fellow of the Royal Astronomical Society
Member of the European Astronomical Society

LINKS

Website: **garrethmartin.github.io**
Orchid: **0000-0003-2939-8668**
ArXiv: **a/martin_g_1**
ADS: **nThU2Yw3SUytqSYjksZ8uA**

SUMMARY

I am a postdoctoral fellow working at Steward Observatory/KASI, where I develop methods for the study of low surface-brightness and ultra-diffuse galaxies, try to understanding evolutionary mechanisms of galaxies as a function of their surface-brightness and work on solutions for dealing with immense data volumes. I work at the interface between observational and theoretical astronomy, making predictions and developing theoretical tools for the effective exploitation of next generation instruments. My work spans an array of disciplines, combining state-of-the-art hydrodynamical simulations and survey data with machine-learning techniques.

EXPERIENCE

KASI-ARIZONA JOINT POSTDOCTORAL FELLOW
2019 – present | Korea Astronomy and Space Science Institute / University of Arizona

BALZAN FELLOW
May – August 2019 | New College, University of Oxford

PHD STUDENT
2015 – 2019 | University of Hertfordshire | **Supervisor** : Dr Sugata Kaviraj
Thesis title : On the key processes that drive galaxy evolution

- Studying the role of mergers and black holes on evolution of galaxies
- Using machine-learning and statistical techniques to develop theoretical tools and make predictions for effectively exploiting next-generation instruments

SUMMER STUDENT
April – July 2015 | University of Hertfordshire | **Supervisor** : Dr Marc Sarzi

- Developed tools to perform spectro-photometric SED fitting combining IFU data from MUSE with UV photometry

TEACHING
Nov 2016 – Mar 2018 **'Programming' teaching assistant**

- Taught students Python and Matlab for scientific programming
- Assisted students with programming exercises during practicals

Nov 2016 – Mar 2017 **'Physics of Stars' demonstrator**

- Assisted students at the University's Bayfordbury teaching observatory
- Instructed students in the use of 16-inch telescopes and data reduction
- Practicals included open cluster CMDs, exoplanet transits and imaging PN

Nov 2015 – Mar 2017 **'Cosmology and Large Scale Structure' demonstrator**

- Assisted students with practicals and taught a range of cosmological topics
- Practicals included calculating the Hubble constant, the mass of lensing clusters

OUTREACH
Jun 2016 **Big Bang Fair – Newmarket**

- Demonstrated physical concepts by helping children do simple experiments

2015 – 2019 **Bayfordbury Observatory public open evenings**

- Organised activities for a mix of children, adults and amateur astronomers
- Explained astronomy concepts to people from a range of backgrounds and ages

RESEARCH INTERESTS

- **Simulations** : cosmological simulations of galaxy evolution • post-processing • mock observations • theoretical predictions
- **Galaxies** : morphological evolution • the emergence of the Hubble sequence • low surface-brightness and ultra-diffuse galaxies • the role of galaxy mergers • the role of AGN
- **Big data** : large surveys • unsupervised machine-learning techniques

CONFERENCE TALKS AND SEMINARS

CAR Friday Lunch Talk in Hertfordshire, UK, October 2019 (invited talk)
Ramses User Meeting in Copenhagen, Denmark, September 2019 (contributed talk)
LSST community workshop / galaxies science collaboration meeting in Tucson, USA, August 2019 (invited talk)
Astronomy Group Lunchtime Talk in St Andrews, UK, February 2019 (invited talk)
Cosmology Group Seminar in Jerusalem, Israel, January 2019 (invited seminar)
Ramses User Meeting in Lyon, France, September 2018 (contributed talk)
The Bewildering Nature of Ultra-diffuse Galaxies in Leiden, Netherlands, August 2018 (invited talk)
Santa Cruz Galaxy Workshop in Santa-Cruz, USA, August 2018 (contributed talk)
Wetton Workshop – Data Driven Discovery in the era of Large Data in Oxford, UK, June 2018 (contributed talk)
National Astronomy Meeting / European Week of Astronomy in Liverpool, UK, April 2018 (contributed talk)
From Micrometers to Megaparsecs in Southampton, UK, March 2018 (contributed talk)
Black hole formation and growth in Saas-Fee, Switzerland, January 2018 (poster)
New frontiers in Galaxy Evolution Modelling in London, UK, October 2017 (invited talk)
Ramses User Meeting in Nice, France, September 2017 (contributed talk)
A Broadband Look at Astrophysical Processes in Southampton, UK, March 2017 (poster)
National Astronomy Meeting in Hull, UK, July 2017 (contributed talk)
Galaxy Evolution Seminar in Oxford, UK, June 2017 (invited seminar)
Ramses User Meeting in Paris, France, October 2016 (contributed talk)
Deconstructing Galaxies at Cosmic Noon in Leiden, Netherlands, August 2016 (contributed talk)

SCIENTIFIC ORGANISING COMMITTEES

Galaxy-Black Hole Co-evolution: Observational and Theoretical Perspectives National Astronomy Meeting in Lancaster, UK, July 2019

GRANTS AND AWARDS

2019 University Student Trust PGR conference funding, £460
2018 Balzan travelling fellowship, New College, Oxford (May – July 2019) – accommodation and subsistence for 10 weeks.
2018 Royal Astronomical Society small grants scheme, £600
2017 Royal Astronomical Society small grants scheme, £375
2016 Royal Astronomical Society small grants scheme, £400
2015 University of Hertfordshire Patrick Moore Prize for best overall performance in cohort
2012 University of Hertfordshire Scholarship, £1500

MAJOR COLLABORATIONS

2017 – present Junior associate LSST galaxies collaboration (full LSST data rights)
2016 – present ANR SPIN(e) – Cosmic origin of Hubble sequence
2016 – present Member of the Horizon simulation project

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PUBLICATIONS

PUBLISHED

Galaxy morphological classification in deep-wide surveys via unsupervised machine learning, **Martin G.,** Kaviraj S., Hocking A., Geach J., Accepted for publication in MNRAS pending minor corrections

Forming massive spheroidal galaxies via single minor mergers, Jackson R. A., Martin G., Kaviraj S., Laigle C., Devriendt J. E. G., Dubois Y., Pichon C., Jackson R. A., **Martin G.** , Kaviraj S., Laigle C., Devriendt J. E. G., Dubois Y., Pichon C., MNRAS in press.

AGN in dwarf galaxies: frequency, triggering processes and the plausibility of AGN feedback, Kaviraj S., **Martin G.** and Silk J., MNRAS, 489, L12

A flat trend of star-formation rate with X-ray luminosity of galaxies hosting AGN in the SCUBA-2 Cosmology Legacy Survey, Ramasawmy J., Stevens J., **Martin G.** , Geach J. E., MNRAS, 486, 4320

* The formation and evolution of low-surface-brightness galaxies, **Martin G.** , Kaviraj S., Laigle C., Devriendt J. E. G., Dubois Y., Pichon C., 2019 MNRAS, 485, 796.

* The role of mergers in driving morphological transformation over cosmic time, **Martin G.** , Kaviraj S., Devriendt J. E. G., Dubois Y., Pichon C., 2018 MNRAS, 480, 2266.

* Normal black holes in bulge-less galaxies: the largely quiescent, merger-free growth of black holes over cosmic time, **Martin G.** , Kaviraj S., Volonteri M., Simmons B. D., Devriendt J. E. G., Lintott C. J., Smethurst R. J., Dubois Y., Pichon C., 2018, MNRAS, 476, 2810.

Identifying the progenitors of present-day early-type galaxies in observational surveys: correcting 'progenitor bias' using the Horizon-AGN simulation, **Martin G.** , Kaviraj S., Devriendt J. E. G., Dubois Y., Pichon C., Laigle C., 2018, MNRAS, 474, 3140.

* The limited role of galaxy mergers in driving stellar mass growth over cosmic time, **Martin G.** , Kaviraj S., Devriendt J. E. G, Dubois Y., Laigle C., Pichon C., 2017, MNRAS letters, 472, L50.

SUBMITTED AND IN PREPARATION

When Galaxies Align, Bate J., Chisari N. E., **Martin G.** , Codis S., Laigle C., Dubois Y., Devriendt J. E. G., Slyz A., Kaviraj S., Pichon C., Miller S., submitted to MNRAS.

Why do extremely massive discs exist today?, Jackson R. A., **Martin G.** , Kaviraj S., Laigle C., Devriendt J. E. G., Dubois Y., Pichon C., Shabala S., in prep.

Observational and systematic bias effects on the stellar mass function and implications for the stellar mass - halo mass relation, **Martin, G.** , Devriendt J. E. G., Laigle C., et al., in prep.