### **Brooke D. Simmons**

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# **Professional Summary**

- Principal interests: galaxy evolution, supermassive black holes, black hole-galaxy co-evolution, change-detection in astrophysics and earth observation, pattern detection, data science
- Expert in citizen/community science as a facility for data analysis and discovery
- Expert on parametric image decomposition, quantified visual morphology, multi-wavelength AGN analysis
- Active Collaborations: COSMOS, CANDELS, 4MOST-TiDES & AGN, Zooniverse (Transient Group lead), Galaxy Zoo (Deputy PI), Galaxy Zoo Bar Lengths (PI), The Planetary Response Network (PI)

# **Employment**

Aug 2021 – present	Reader, Lancaster University
Sep 2018 – Aug 2021	Lecturer, Lancaster University
Dec 2015 – Sep 2018	Einstein Fellow, UC San Diego

Jun 2012 – Dec 2015 Postdoctoral Researcher, University of Oxford

#### **Education**

2003 – 2007;	Ph.D., Astronomy, Yale University — Advisor: C. Megan Urry
2011 – 2012	Black Hole Growth and Host Galaxy Co-Evolution Over 8 Billion Years of Cosmic Time
2007 – 2011	On leave (family reasons)
2002 – 2003	M.S. & M. Phil, Astronomy, Yale University
2001	A.B., Astrophysical Sciences, Princeton University (honors)

#### **Awards**

Feb 2021	UKRI Future Leaders Fellowship
Jan 2019	Royal Astronomical Society Group Achievement Award: Galaxy Zoo
Dec 2015	Einstein Fellowship
Jan 2014	Henry Skynner Junior Research Fellowship, Balliol college, Oxford
Oct 2012	Junior Research Fellowship, Worcester College, Oxford
Jun 2012	James Martin Fellowship, Oxford Martin School, Oxford

# **Invited Talks**

Dr. Simmons is regularly	y invited to give astrop	physics seminars and collogi	juia. Other recent in	vited talks include:

Sep 2021	"Machine Learning in Disaster Management", Alan Turing Institute, London
Feb 2019	"Citizen Science and the UN Sustainable Development Goals", Amnesty International, London
Oct 2018	"Improving Algorithms with the Zooniverse", Machine Learning and Data Sharing to Combat the
	Illegal Wildlife Trade, Zoological Society of London
Jun 2017	"Galaxy Zoo: Past & Future", Surveying the Cosmos 2017
Aug 2016	"Merger-Free Galaxy Evolution & Black Hole Growth", Fellows At The Frontiers 2016

Funding Awarded as PI

Feb 2021	UKRI: "Leading the Next Generation of Data-Driven Discoveries", £1.5M
Jan 2020	BBSRC: "Innovative Digital Citizen Science: Active Learning for Disaster Relief", £20,000
Jun 2019	STFC-IAA/Lancaster: "Astrophysical Analysis Tools for Disaster Relief & Resilience", £22,000
Apr 2019	STFC: "Crowdsourcing and Machine Learning for Disaster Relief and Resilience", £212,000
Prior to joining Lancaster: 4 NASA awards (US\$649,000 combined), 1 ESA award (€175,000)	

#### **Telescope Proposals Awarded**

as PI

Telescope proposals awarded include 101 orbits on the Hubble Space Telescope (GO-14606), 1 night on Keck/KCWI, 7.5 hr of Band A on Gemini-S/GMOS, 15 hr on IRAM-30m, and 34 nights combined on multiple 2-4m class telescopes.

# **Teaching**

Dr Simmons is an HEA Fellow (awarded by AdvanceHE in the UK). Specific teaching duties include:

Mar 2019 – present Course Convenor, multiple course modules (Lancaster University)

Oct 2012 – Dec 2015 Tutor, 4th-year Astrophysics (University of Oxford)
Jan 2008 – Dec 2010 Professional tutor in math, science, reading, writing

Sep 2001 – Jan 2005 Teaching Fellow, multiple course modules (Yale University)
Jan 2001 – May 2001 Teaching Assistant, "The Universe" (Princeton University)

## **Student Supervision**

Dr. Simmons has supervised 4 PhD students, and supervised 3 MSc, 16 MPhys, and 8 undergraduate students. They include J. Butterworth, H. Child, R. Cochrane, J. Craig, S. Dicker, I. L. Garland, A. Griffin, A. Han, T. Hutchinson, B. Kushkuley, C. Lawson, T. Melvin, D. O'Ryan, A. Schooneveld, J. Shanahan, M. Silcock, J. Smith, A. Tapia, M. Thorne, J. Makechemu.

#### **Postdoctoral Supervision**

Klaas Wiersema, October 2021 – May 2023 (now permanent academic, U. Hertfordshire)

Danil Kuzin, September 2019 - present

### **Public Dialogue**

Dr Simmons regularly gives invited public talks and contributes to blogs and social media.

Select Media Coverage

The Guardian, "Volunteers Worldwide Aided Rescue Efforts After Dorian"25th Oct, 2019Nature, "Citizen scientists aid Ecuador earthquake relief"3rd May, 2016Nature, "Crisis Mappers Turn To Citizen Scientists"19th Nov, 2014Sky & Telescope, "Citizen Scientists Probe Early Galaxies"29th Sep, 2014

# **Interdisciplinary Roles**

Founder, Zooniverse Analysis Group

A data science collaboration; partnerships in Computer Science, Economics, Information Science, Ecology *Founder*, Zooniverse Transient Group

Detection of changes in time-series data, with particular emphasis on machine-human classification systems *Principal Investigator*, The Planetary Response Network

Crisis response. Primary partners: Rescue Global, Oxford Machine Learning Research Group, ESA, Planet

Publications as Lead or Supervising Author

As a permanent academic, it is my policy that papers from my group will be led by a student or postdoc wherever possible.

- 13. "Galaxy Zoo DESI: large-scale bars as a secular mechanism for triggering AGN"

  I. L. Garland, M. Walmsley, M. Silcock, L. Potts, J. Smith, B. D. Simmons, C. Lintott, R. J. Smethurst, J. Dawson, W. C. Keel, K. B. Mantha, K. L. Masters, D. O'Ryan, J. Popp, M. Thorne, MNRAS, submitted
- 12. "Improving Deep Ensembles by Estimating Confusion Matrices", **D. Kuzin**, O. Isupova, S. Reece, **B. D. Simmons**, submitted
- 11. "Harnessing the Hubble Space Telescope Archives: A Catalogue of 21,926 Interacting Galaxies" **D. O'Ryan,** B. Merín, **B. D. Simmons,** A. Vojteková, A. Anku, M. Walmsley, **I. L. Garland**, T. Géron, W. C. Keel, S. Kruk, C. J. Lintott, K. B. Mantha, K. L. Masters, J. Reerink, R. J. Smethurst, and **M. Thorne**, 2023, ApJ, 948, 1, 40 (22 pp.)
- "The most luminous, merger-free AGN show only marginal correlation with bar presence"
   I. Garland, M. Fahey, B. D. Simmons, R. J. Smethurst, C. J. Lintott, J. Shanahan, M. Silcock, J. Smith, W. C. Keel, A. Coil, T. Géron, K. L. Masters, D. O'Ryan, M. R. Thorne, and K. Wiersema, 2023, MNRAS, 522, 211-225
- 9. "Disaster, Infrastructure and Participatory Knowledge: The Planetary Response Network" **B. D. Simmons**, *et al.* (15 authors), 2022, Citizen Science: Theory & Practice, 7(1): 21, pp. 1-16
- 8. "Disaster mapping from satellite images: damage detection from crowdsourced point labels" **D. Kuzin,** O. Isupova, **B. D. Simmons,** C. Lintott, S. Reece, 2021, in 3rd Workshop on Artificial Intelligence for Humanitarian Assistance and Disaster Response (NeurIPS 2021). arxiv:2111.03693 (10 pp.)
- 7. "Supermassive black holes in disk-dominated galaxies outgrow their bulges and co-evolve with their host galaxies"
  - B. D. Simmons, R. J. Smethurst, and C. Lintott, 2017, MNRAS, 470, 1559-1569
- 6. "Galaxy Zoo: Quantitative Visual Morphological Classifications for 48,000 galaxies from CANDELS" **B. D. Simmons**, C. Lintott, K. W. Willett, K. L. Masters, *et al.* (46 authors), 2017, MNRAS, 464, 4420-4447
- "Galaxy Zoo: CANDELS Barred Disks and Bar Fractions"
   B. D. Simmons, T. Melvin, C. Lintott, K. L. Masters, et al. (K. J. Jek: 36th of 42 authors), 2014, MNRAS, 445, 3466-3474
- 4. "Galaxy Zoo: Bulgeless Galaxies With Growing Black Holes" **B. D. Simmons**, *et al.* (**A. Han**: 5th of 11 authors), 2013, MNRAS, 429, 2199-2211
- 3. "Moderate-luminosity Growing Black Holes from 1.25 < *z* < 2.7: Varied Accretion in Disk-Dominated Hosts" **B. D. Simmons**, C. M. Urry, K. Schawinski, C. Cardamone, and E. Glikman, 2012, ApJ, 761, 75 (10 pp.)
- 2. "Obscured GOODS AGN and Their Host Galaxies at z < 1.25: The Slow Black Hole Growth Phase" **B. D. Simmons**, J. Van Duyne, C. M. Urry, E. Treister, A. M. Koekemoer, N. A. Grogin, and the GOODS Team, 2011, ApJ, 734, 121 (16 pp.)
- 1. "The Accuracy of Morphological Decomposition of Active Galactic Nucleus Host Galaxies" **B. D. Simmons** and C. M. Urry, 2008, ApJ, 683, 644-658

Publications in Zooniverse Analysis Group and Zooniverse Transients Group roles

- 14. "Short timescale imaging polarimetry of geostationary satellite Thor-6: the nature of micro-glints" **K. Wiersema** *et al.* (**Simmons**: 10<sup>th</sup> of 11 authors), 2022, ASR, 70, 10, 3003-3015
- 13. "Camera settings and biome influence the accuracy of citizen science approaches to camera trap image classification", N. Egna *et al.* (**Simmons**: 7<sup>th</sup> of 26 authors), 2020, Ecology & Evolution, 10, 21, p. 11954-11965
- 12. "Rapid Post Disaster Damage Mapping with Satellite Imagery, Citizen Scientists and Machine Learning" O. Isupova, D. Kuzin, **B. D. Simmons**, S. Reece, 2019, DwD-GCRF-UKADR-DRG-UKCDR International Conference, 2019
- 11. "Everyone counts? Design considerations in online citizen science" H. Spiers, *et al.* (**Simmons**: 4<sup>th</sup> of 7 authors), 2019, JCOM, 18(01), A04 (32 pp.)
- 10. "Getting Connected: An Empirical Investigation of the Relationship Between Social Capital and Philanthropy Among Online Volunteers", J. Cox, E. Y. Oh, **B. D. Simmons**, et al. (8 authors), 2018, NVSQ, 48(2), 1-23

- 9. "Exposing the Science in Citizen Science: Fitness to Purpose and Intentional Design", J. K. Parrish, H. Burgess, J. F. Weltzin, L. Fortson, A. Wiggins, **B. D. Simmons**, 2018, Integr. Comp. Biol., icy032 (11 pp.)
- 8. "Integrating Human And Machine Intelligence In Galaxy Morphology Classification Tasks", M. Beck, *et al.* (**Simmons**: 7<sup>th</sup> of 11 authors), 2018, MNRAS, 476, 5516-5534
- 7. "The K2-138 System: A Near-Resonant Chain of Five Sub-Neptune Planets Discovered by Citizen Scientists", J. L. Christiansen, *et al.* (Simmons: 6<sup>th</sup> of 27 authors), 2018, AJ, 155, 57 (9 pp.)
- 6. "Doing good online: The changing relationships between motivations, activity and retention among online volunteers", J. Cox, E. Y. Oh, **B. D. Simmons**, *et al.* (8 authors), 2018, NVSQ, 47(5), 1031-1056
- 5. "A transient search using combined human and machine classifications" D. Wright, *et al.* (**Simmons**: 18th of 26 authors), 2017, MNRAS, 472, 1315-1323
- 4. "Assessing Data Quality In Citizen Science" M. Kosmala, A. Wiggins, A. Swanson, **B. D. Simmons**, 2016, Front. Ecol. Environ., 14(10): 551–560
- 3. "Science Learning via Participation in Online Citizen Science" K. L. Masters, E. Y. Oh, J. Cox, *et al.* (**Simmons**: 4<sup>th</sup> of 8 authors), 2016, JCOM, 15(03), A07 (33 pp.)
- 2. "Playing with science: Exploring how game activity motivates users' participation on an online citizen science platform", A. Greenhill, *et al.* (**Simmons**: 5<sup>th</sup> of 9 authors), 2015, Aslib Jour. Info. Mgmt, 68, 306-325
- 1. "Defining and measuring success in online citizen science: A case study of Zooniverse projects" J. Cox, E-Y. Oh, **B. D. Simmons**, *et al.* (8 authors), 2015, CISE, 17, 28-41

#### Publications as Major Contributing Author

- 34. "Galaxy Zoo DESI: Detailed morphology measurements for 8.7M galaxies in the DESI Legacy Imaging Surveys", M. Walmsley, et al. (I. L. Garland, D. O'Ryan, B. D. Simmons, E. Baeten, C. Macmillan: 10<sup>th</sup>, 12<sup>th</sup>, 14<sup>th</sup>, 15<sup>th</sup> and 16<sup>th</sup> of 16 authors), 2023, MNRAS, 523, 4768-4786
- 33. "Searching for the Role of Mergers in Fast and Early SMBH Growth: Morphological Decomposition of Quasars and Their Hosts at z ~ 4.8", M. O. Thomas, O. Shemmer, B. Trakhtenbrot, P. Lira, H. Netzer, **B. D. Simmons**, and N. Ilan, 2023, ApJ, 955, 1, 15 (17 pp.)
- 32. "Supermassive black holes in merger-free galaxies have higher spins which are preferentially aligned with their host galaxy", R. Beckmann, R. J. Smethurst, **B. D. Simmons**, A. Coil, Y. Dubois, **I. L. Garland**, C. J. Lintott, G. Martin, S. Peirani, and C. Pichon, 2023, MNRAS, in press
- 31. "Evidence for non-merger co-evolution of galaxies and their supermassive black holes", R. J. Smethurst, R. Beckmann, **B. D. Simmons**, A. Coil, J. Devriendt, Y. Dubois, **I. L. Garland**, C. J. Lintott, G. Martin, and S. Peirani, 2023, MNRAS, in press
- 30. "A Dual QSO At Cosmic Noon", E. Glikman, R. Langgin, M. A. Johnstone, I. Yoon, J. M. Comerford, B. D. Simmons, M. Lacy, and J. M. O'Meara, 2023, ApJL, 951, 1, L18 (8 pp.)
- 29. "Gems of the Galaxy Zoos a Wide-Ranging *Hubble Space Telescope* Gap-Filler Program", W. C. Keel, et al. (**B. D. Simmons, J. Shanahan, I. L. Garland** and **D. O'Ryan**: 7<sup>th</sup>, 12<sup>th</sup>, 14<sup>th</sup> and 16<sup>th</sup> of 16 authors), 2022, AJ, 163, 150 (17pp)
- 28. "Quantifying the Poor Purity and Completeness of Morphological Samples Selected by Galaxy Colour", R. J. Smethurst, K. L. Masters, **B. D. Simmons**, et al. (**I. L. Garland** and **D. O'Ryan**: 4<sup>th</sup> and 9<sup>th</sup> of 10 authors), 2022, MNRAS, 510, 4126-4133
- 27. "Galaxy Zoo DECaLS: Detailed Visual Morphology Measurements from Volunteers and Deep Learning for 314,000 Galaxies", M. Walmsley, et al. (Simmons, E. Baeten and C. Macmillan: 14th, 17th and 18th of 18 authors), 2022, MNRAS, 509, 3966-3988
- 26. "Kiloparsec-scale AGN Outflows and Feedback in Merger-Free Galaxies", R. J. Smethurst, **B. D. Simmons**, et al. (**J. Shanahan** and **I. L. Garland**: 9th and 10th of 10 authors), 2021, MNRAS, 507, 3985-3997
- 25. "Galaxy Zoo Builder: Four-Component Photometric decomposition of Spiral Galaxies Guided by Citizen Science", T. Lingard, et al. (**Simmons** and **E. Baeten**: 6<sup>th</sup> and 10<sup>th</sup> of 10 authors), 2020, ApJ, 900, 2 (18 pp.)
- 24. "Galactic Conformity in both Star Formation and Morphological Properties", J. A. Otter, K. L. Masters, **B. D. Simmons**, C. J. Lintott, 2020, MNRAS, 492, 2722-2730
- 23. "Secularly powered outflows from AGN: the dominance of non-merger driven supermassive black hole growth", R. J. Smethurst, **B. D. Simmons**, C. J. Lintott, **J. Shanahan**, A. Coil, W. C. Keel, E. Glikman, E. C. Moran, K. L. Masters, C. M. Urry, K. W. Willett, 2019, MNRAS, 489, 4016-4031

- 22. "SNITCH: Seeking a simple, informative star formation history inference tool", R. J. Smethurst, M. Merrifield, C. J. Lintott, K. L. Masters, **B. D. Simmons**, *et al.* (10 authors), 2019, MNRAS, 484, 3590-3603
- 21. "Galaxy Zoo: constraining the origin of spiral arms", R. Hart, S. Bamford, W. C. Keel, S. Kruk, K. L. Masters, B. D. Simmons, R. J. Smethurst, 2018, MNRAS, 478, 932-949
- 20. "Normal black holes in bulge-less galaxies: the largely quiescent, merger-free growth of black holes over cosmic time"
  - G. Martin, S. Kaviraj, M. Volonteri, B. D. Simmons, et al. (9 authors), 2018, MNRAS, 476, 2801-2812
- 19. "Galaxy Zoo: Secular evolution of barred galaxies from structural decomposition of multi-band images" S. Kruk, C. Lintott, S. Bamford, K. Masters, **B. D. Simmons**, *et al.* (12 authors), 2018, MNRAS, 473, 4731-4753
- 18. "Galaxy Zoo: Finding offset discs and bars in SDSS galaxies"
  S. J. Kruk, C. J. Lintott, **B. D. Simmons**, S. Bamford, *et al.* (12 authors), 2017, MNRAS, 469, 3363-3373
- 17. "Morphology and the Color-Mass Diagram As Clues to Galaxy Evolution at z ~ 1" M. C. Powell, C. M. Urry, C. Cardamone, **B. D. Simmons**, *et al.* (7 authors), 2017, ApJ, 835, 22 (10 pp.)
- 16. "Galaxy Zoo: Morphological Classifications for 120,000 Galaxies in HST Legacy Imaging" K. W. Willett, *et al.* (**Simmons**: 7<sup>th</sup> & **Han**: 15<sup>th</sup> & **Melvin**: 17<sup>th</sup> of 21 authors), 2016, MNRAS, 464, 4176-4203
- 15. "Galaxy Zoo: Evidence for rapid, recent quenching across a population of AGN host galaxies" R. J. Smethurst, C. Lintott, **B. D. Simmons**, *et al.* (11 authors), 2016, MNRAS, 463, 2986-2996
- 14. "Major Mergers Host the Most Luminous Red Quasars at *z* ~ 2: A *Hubble Space Telescope* WFC3/IR Study" E. Glikman, **B. D. Simmons**, M. Mailly, K. Schawinski, C. M. Urry, M. Lacy, 2015, ApJ, 806, 218 (24 pp.)
- 13. "Radio Galaxy Zoo: host galaxies and radio morphologies derived from visual inspection" J. Banfield, *et al.* (**Simmons**: 7<sup>th</sup> of 36 authors), 2015, MNRAS, 453, 2326-2340
- 12. "Galaxy Zoo: Evidence For Diverse Star Formation Histories Through The Green Valley" R. J. Smethurst, C. J. Lintott, **B. D. Simmons**, et al. (13 authors), 2015, MNRAS, 450, 435-453
- 11. "Galaxy Zoo: The dependence of the star formation-stellar mass relation on spiral disk morphology" K. W. Willett, K. Schawinski, **B. D. Simmons**, *et al.* (**Melvin**: 7<sup>th</sup> of 13 authors), 2015, MNRAS, 449, 820-827
- "The Green Valley is a Red Herring: Galaxy Zoo reveals two evolutionary pathways towards quenching of star formation in early- and late-type galaxies"
   K. Schawinski, C. M. Urry, B. D. Simmons, et al. (15 authors), 2014, MNRAS, 440, 889-907
- 9. "Galaxy Zoo: Evolution of the bar fraction over the last eight billion years from HST-COSMOS" **T. Melvin**, *et al.* (**Simmons:** 5<sup>th</sup> of 14 authors), 2014, MNRAS, 438, 2882-2897
- 8. "Galaxy Zoo 2: detailed morphological classifications for 304,122 galaxies from the Sloan Digital Sky Survey" K. W. Willett, *et al.* (Simmons: 5<sup>th</sup> & Melvin: 11<sup>th</sup> of 18 authors), 2013, MNRAS, 435, 2835-2860
- 7. "Major Galaxy Mergers Only Trigger the Most Luminous AGN" E. Treister, K. Schawinski, C. M. Urry, and **B. D. Simmons**, 2012, ApJL, 758, 39 (5 pp.)
- 6. "Heavily Obscured Quasar Host Galaxies at *z* ~ 2 are Disks, Not Major Mergers" K. Schawinski, **B. D. Simmons**, C. M. Urry, E. Treister, and E. Glikman, 2012, MNRAS Letters, 425, L61-L65
- 5. "Bolometric Luminosities and Eddington Ratios of X–ray Selected AGN in the XMM-COSMOS Survey" E. Lusso, A. Comastri, **B. D. Simmons**, *et al.* (27 authors), 2012, MNRAS, 425, 623-640
- 4. "Evidence for Three Accreting Black Holes in a Galaxy at z ~ 1.35: A Snapshot of Recently Formed Black Hole Seeds?" K. Schawinski, C. M. Urry, E. Treister, **B. D. Simmons**, P. Natarajan, and E. Glikman, 2011, ApJL, 743, 37 (6 pp.)
- 3. "HST WFC3/IR Observations of AGN Hosts at z ~ 2: Supermassive Black Holes Grow in Disk Galaxies" K. Schawinski, E. Treister, C. M. Urry, C. N. Cardamone, **B. D. Simmons**, and S. K. Yi, 2011, ApJL, 727, 31 (6 pp.)
- 2. "Do Moderate-Luminosity Active Galactic Nuclei Suppress Star Formation?" K. Schawinski, **B. D. Simmons**, *et al.* (**B. Kushkuley**: 7th of 7 authors), 2009, ApJL, 692, L19-L23
- 1. "Active Galactic Nucleus Host Galaxy Morphologies in COSMOS"

  J. M. Gabor, C. D. Impey, K. Jahnke, **B. D. Simmons**, *et al.* (17 authors), 2009, ApJ, 691, 705-722

#### Team Publications as Contributing Author

38. "Transfer learning for galaxy feature detection: Finding Giant Star-forming Clumps in low redshift galaxies using Faster R-CNN", J. Popp, *et al.* (Simmons: 11<sup>th</sup> of 11 authors), submitted

- 37. "Galaxy Zoo: Kinematics of strongly and weakly barred galaxies", T. Géron, et al. (Simmons: 6<sup>th</sup> of 11 authors), 2023, MNRAS, 521, 1775-1793
- 36. "Signatures of Feedback in the Spectacular Extended Emission Region of NGC 5972", T. Harvey, *et al.* (Simmons: 11<sup>th</sup> of 13 authors), 2023, MNRAS, 526, 4174-4191
- 35. "Galaxy Zoo: Clump Scout Design and first application of a two-dimensional aggregation tool for citizen science", H. Dickinson, *et al.* (Simmons: 11<sup>th</sup> of 12 authors), 2022, MNRAS, 517, 5882-5911
- 34. "Noise reduction on single-shot images using an autoencoder", O. J. Bartlett, D. M. Benoit, K. A. Pimbblet, B. D. Simmons, and L. Hunt, 2023, MNRAS, 521, 6318-6329
- 33. "Galaxy And Mass Assembly: Galaxy Zoo spiral arms and star formation rates", R. Porter-Temple, *et al.* (Simmons: 14<sup>th</sup> of 14 authors), 2022, MNRAS, 515, 3875-3882
- 32. "Galaxy Zoo: Clump Scout: Surveying the Local Universe for Giant Star-forming Clumps", D. Adams, *et al.* (Simmons: 7th of 8 authors), 2022, ApJ, 931, 16 (18 pp.)
- 31. "Practical Galaxy Morphology Tools from Deep Supervised Representation Learning", M. Walmsley, *et al.* (Simmons: 12<sup>th</sup> of 12 authors), 2022, MNRAS, 513, 1581-1599
- 30. "Observations of the Initial Formation and Evolution of Spiral Galaxies at 1 < z < 3 in the CANDELS Fields", B. Margalef-Bentabol, *et al.* (Simmons:  $7^{th}$  of 7 authors), 2022, MNRAS, 511, 1502-1517
- 29. "Galaxy Zoo: Stronger bars facilitate quenching in star forming galaxies", T. Géron, et al. (Simmons: 6<sup>th</sup> of 7 authors), 2021, MNRAS, 507, 4389-4408
- 28. "Galaxy Zoo: 3D -- Crowd-sourced Bar, Spiral and Foreground Star Masks for MaNGA Target Galaxies", K. Masters, *et al.* (Simmons: 16<sup>th</sup> of 18 authors), 2021, MNRAS,507, 3923-3935
- 27. "Extending the evolution of the stellar mass size relation at  $z \le 2$  to low stellar mass galaxies from HFF and CANDELS", K. Nedkova, *et al.* (Simmons:  $22^{nd}$  of 26 authors), 2021, MNRAS, 506, 928-956
- 26. "Galaxy Zoo Builder: Morphological dependence of spiral galaxy pitch angle", T. Lingard, *et al.* (Simmons and E. Baeten: 6<sup>th</sup> and 9<sup>th</sup> of 9 authors), 2021, MNRAS, 504, 3364-3374
- 25. "An old stellar population or diffuse nebular continuum emission discovered in green pea galaxies" L. Clarke, *et al.* (Simmons: 12<sup>th</sup> of 12 authors), 2021, ApJL, 912, 22 (6 pp.)
- 24. "Investigating Clumpy Galaxies in SDSS Stripe82 using Galaxy Zoo" V. Mehta, *et al.* (Simmons: 10<sup>th</sup> of 10 authors), 2021, ApJ, 912, 49 (16 pp.)
- 23. "The X-ray and radio activity of typical and luminous Ly $\alpha$  emitters from z~2 to z~6: evidence for a diverse, evolving population", J. Calhau, *et al.* (Simmons: 7<sup>th</sup> of 8 authors), 2020, MNRAS, 493, 3341-3362
- 22. "Galaxy Zoo: Probabilistic Morphology through Bayesian CNNs and Active Learning" M. Walmsley, *et al.* (Simmons: 11<sup>th</sup> of 12 authors), 2020, MNRAS, 491, 1554-1574
- 21. "Galaxy Zoo: unwinding the winding problem observations of spiral bulge prominence and arm pitch angles suggest local spiral galaxies are winding"

  K. L. Masters, *et al.* (Simmons: 8th of 11 authors), 2019, MNRAS, 487, 1808-1820
- 20. "Galaxy Zoo: Morphological Classification of Galaxy Images from the *Illustris* Simulation" H. Dickinson, *et al.* (Simmons: 10<sup>th</sup> of 16 authors), 2018, ApJ, 853, 194 (10pp.)
- 19. "Radio Galaxy Zoo: Compact and extended radio source classification with deep learning" V. Lukic, *et al.* (Simmons: 7<sup>th</sup> of 7 authors), 2018, MNRAS, 476, 246-260
- 18. "Major Merging History in CANDELS. I. Evolution of the Incidence of Massive Galaxy-Galaxy Pairs from z = 3 to  $z \sim 0$ ", K. Mantha, *et al.* (Simmons: 14<sup>th</sup> of 41 authors), 2018, MNRAS, 475, 1549-1573
- 17. "Evidence For Merger-Driven Growth in Luminous, High-z, Obscured AGN in the CANDELS/COSMOS Field", J. Donley, *et al.* (Simmons: 22<sup>nd</sup> of 30 authors), 2018, ApJ, 853, 63 (12 pp.)
- 16. "The First Post-Kepler Brightness Dips of KIC 8462852" T. S. Boyajian, et al. (Simmons: 161st of 199 authors), 2018, ApJL, 853, 8 (14 pp.)
- 15. "Radio Galaxy Zoo: A Search for Hybrid Morphology Radio Galaxies" A. D. Kapinska, *et al.* (Simmons: 17<sup>th</sup> of 17 authors), 2017, AJ, 154, 253 (16 pp.)
- 14. "Galaxy Zoo and SPARCFIRE: constraints on spiral arm formation mechanisms from spiral arm number and pitch angles", R. Hart, *et al.* (Simmons: 9<sup>th</sup> of 10 authors), 2017, MNRAS, 472, 2263-2279
- 13. "Galaxy Zoo: the interplay of quenching mechanisms in the group environment" R. Smethurst, *et al.* (Simmons: 8<sup>th</sup> of 8 authors), 2017, MNRAS, 469, 3670-3687

- 12. "Galaxy Zoo: major mergers are not a significant quenching pathway" A. Weigel, *et al.* (Simmons: 12<sup>th</sup> of 13 authors), 2017, ApJ, 845, 145 (28 pp.)
- 11. "Galaxy Zoo: comparing the demographics of spiral arm number and a new method for correcting redshift bias", R. Hart, *et al.* (Simmons: 10<sup>th</sup> of 11 authors), 2016, MNRAS, 461, 3663-3682
- 10. "Faint COSMOS AGN at z~3.3 I. Black Hole Properties and Constraints on Early Black Hole Growth" B. Trakhtenbrot, *et al.* (Simmons: 10<sup>th</sup> of 10 authors), 2016, ApJ, 825, 4 (17 pp.)
- 9. "An over-massive black hole in a typical star forming galaxy, 2 billion years after the Big Bang" B. Trakhtenbrot, *et al.* (Simmons: 9th of 9 authors), 2015, Science, 349, 168-171
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