

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 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](#), [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 invited to give astrophysics seminars and colloquia. Other recent invited talks include:

Feb 2019 “Using Citizen Science to achieve 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
June 2017 “Galaxy Zoo: Past & Future”, Surveying the Cosmos 2017
Aug 2016 “Merger-Free Galaxy Evolution & Black Hole Growth”, Fellows At The Frontiers 2016
Feb 2015 “The Scientific Impact of Galaxy Zoo”, AAAS Meeting, San Jose

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
Oct 2016 NASA: “Secular Black Hole Growth and Feedback in Merger-Free Galaxies”, US\$119,000

Dec 2015	NASA: Einstein Fellowship, US\$330,000
Feb 2015	ESA: Crowdsourcing For Observations From Satellites, €175,000
Sep 2011	NASA: AGN Hosts at $z \sim 2$, US\$100,000
Sep 2005	NASA: Host Galaxies and SEDs of Luminous AGN, US\$100,000

Telescope Proposals Awarded

as PI

Summer 2019	IRAM-30m: Fuelling and Feedback in Merger-Free Quasar Host Galaxies (15 hours)
2018B	Keck: KCWI integral field spectroscopy of merger-free quasars with outflows (1 night)
2016-2018	<i>HST</i> Cycle 24 SNAP: ACS imaging of merger-free AGN host galaxies (101 targets observed)
2016-2018	Lick: Kast spectra of bulgeless quasar candidates (22 nights)
2014B	DCT: Ultra-deep imaging of bulgeless galaxies (3 nights)
2014A	INT: IDS long-slit spectra of bulgeless quasar candidates (3 nights)
2013A	Gemini-S: GMOS long-slit spectroscopy of bulgeless AGN host galaxies (7.5 hr, Band A)
2013A	WIYN: NIR & Optical imaging of bulgeless AGN host galaxies (6 nights)

Teaching

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

Mar 2019 – present	Lecturer, multiple course modules (Lancaster University)
Oct 2012 – Dec 2015	Tutor, 4th-year Astrophysics (University of Oxford)
Jan 2008 – Dec 2010	Self-employed as professional tutor in math, science, reading /writing
Sept 2001 – Jan 2005	Teaching Fellow, multiple course modules (Yale University)
Jan – May 2001	Teaching Assistant (Princeton University): “The Universe”

Student Supervision

Dr. Simmons has supervised 4 PhD students and supervised 1 MSc, 10 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, A. Tapia, M. Thorne.

Postdoctoral Supervision

Danil Kuzin, September 2019 – present

Public Dialogue

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

Select Media Coverage

<i>The Guardian</i> , “ Volunteers Worldwide Aided Rescue Efforts After Dorian ”	25 th Oct, 2019
<i>Nature</i> , “ Citizen scientists aid Ecuador earthquake relief ”	3 rd May, 2016
<i>Nature</i> , “ Crisis Mappers Turn To Citizen Scientists ”	19 th Nov, 2014
<i>Sky & Telescope</i> , “ Citizen Scientists Probe Early Galaxies ”	29 th 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](#)

Refereed Publications

Note: candidate and supervised names in bold

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.

9. "Disaster, Infrastructure and Participatory Knowledge: The Planetary Response Network"
B. D. Simmons, *et al.* (15 authors), 2021, submitted
8. "Disaster mapping from satellite images: damage detection from crowdsourced point labels"
D. Kuzin, O. Isupova, **B. D. Simmons**, C. Lintott, S. Reece, 2021, submitted
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
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
5. "Galaxy Zoo: CANDELS Barred Disks and Bar Fractions"
B. D. Simmons, T. Melvin, C. Lintott, K. L. Masters, *et al.* (42 authors), 2014, *MNRAS*, 445, 3466
4. "Galaxy Zoo: Bulgeless Galaxies With Growing Black Holes"
B. D. Simmons, *et al.* (**A. Han**: 5th of 11 authors), 2013, *MNRAS*, 429, 2199
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
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
1. "The Accuracy of Morphological Decomposition of Active Galactic Nucleus Host Galaxies"
B. D. Simmons and C. M. Urry, 2008, *ApJ*, 683, 644

Publications in Zooniverse Analysis Group and Zooniverse Transients Group roles

13. "Camera settings and biome influence the accuracy of citizen science approaches to camera trap image classification", N. Egna *et al.* (**Simmons**: 7th 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**: 4th of 7 authors), 2019, *JCOM*, 18(01), A04
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*, doi:10.1177/0899764018794905
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
8. "Integrating Human And Machine Intelligence In Galaxy Morphology Classification Tasks", M. Beck, *et al.* (**Simmons**: 7th of 11 authors), 2018, *MNRAS*, 476, 5516
7. "The K2-138 System: A Near-Resonant Chain of Five Sub-Neptune Planets Discovered by Citizen Scientists", J. L. Christiansen, *et al.* (**Simmons**: 6th of 27 authors), 2018, *AJ*, 155, 57
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
5. "A transient search using combined human and machine classifications"
D. Wright, *et al.* (**Simmons**: 18th of 26 authors), 2017, *MNRAS*, 472, 1315
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**: 4th of 8 authors), 2016, *JCOM*, 15(03), A07
2. "Playing with science: Exploring how game activity motivates users' participation on an online citizen science platform", A. Greenhill, *et al.* (**Simmons**: 5th of 9 authors), 2015, *Aslib Jour. Info. Mgmt*, 68, 306

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

Publications as Major Contributing Author

27. “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), submitted
26. “Galaxy Zoo DECaLS: Detailed Visual Morphology Measurements from Volunteers and Deep Learning for 314,000 Galaxies”, M. Walmsley, *et al.* (**Simmons**: 8th of 11 authors), 2021, *MNRAS*, in press
25. “Galaxy Zoo Builder: Four-Component Photometric decomposition of Spiral Galaxies Guided by Citizen Science”, T. Lingard, *et al.* (**Simmons**: 7th of 9 authors), 2020, *ApJ*, 900, 2
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
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
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
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
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
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
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
17. “Morphology and the Color-Mass Diagram As Clues to Galaxy Evolution at $z \sim 1$ ”
M. C. Powell, C. M. Urry, C. Cardamone, **B. D. Simmons**, *et al.* (7 authors), 2017, *ApJ*, 835, 22
16. “Galaxy Zoo: Morphological Classifications for 120,000 Galaxies in HST Legacy Imaging”
K. W. Willett, *et al.* (**Simmons**: 7th & **Han**: 15th & **Melvin**: 17th of 21 authors), 2016, *MNRAS*, 464, 4176
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
14. “Major Mergers Host the Most Luminous Red Quasars at $z \sim 2$: 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
13. “Radio Galaxy Zoo: host galaxies and radio morphologies derived from visual inspection”
J. Banfield, *et al.* (**Simmons**: 7th of 36 authors), 2015, *MNRAS*, 453, 2326
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
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**: 7th of 13 authors), 2015, *MNRAS*, 449, 820
10. “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
9. “Galaxy Zoo: Evolution of the bar fraction over the last eight billion years from HST-COSMOS”
T. Melvin, *et al.* (**Simmons**: 5th of 14 authors), 2014, *MNRAS*, 438, 2882
8. “Galaxy Zoo 2: detailed morphological classifications for 304,122 galaxies from the Sloan Digital Sky Survey”
K. W. Willett, *et al.* (**Simmons**: 5th & **Melvin**: 11th of 18 authors), 2013, *MNRAS*, 435, 2835
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
6. “Heavily Obscured Quasar Host Galaxies at $z \sim 2$ are Disks, Not Major Mergers”
K. Schawinski, **B. D. Simmons**, C. M. Urry, E. Treister, and E. Glikman, 2012, *MNRAS Letters*, 425, 61
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

4. "Evidence for Three Accreting Black Holes in a Galaxy at $z \sim 1.35$: 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
3. "HST WFC3/IR Observations of AGN Hosts at $z \sim 2$: 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
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, 19
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

Team Publications as Contributing Author

28. "Galaxy Zoo: 3D -- Crowd-sourced Bar, Spiral and Foreground Star Masks for MaNGA Target Galaxies", K. Masters, *et al.* (Simmons: 16th of 18 authors), 2021, *MNRAS*, in press
27. "Galaxy Zoo: Stronger bars facilitate quenching in star forming galaxies", T. G eron, *et al.* (Simmons: 6th of 7 authors), 2021, *MNRAS*, in press
26. "Extending the evolution of the stellar mass – size relation at $z \leq 2$ to low stellar mass galaxies from HFF and CANDELS", K. Nedkova, *et al.* (Simmons: 22nd of 26 authors), 2021, *MNRAS*, 506, 928-956
25. "An old stellar population or diffuse nebular continuum emission discovered in green pea galaxies"
L. Clarke, *et al.* (Simmons: 12th of 12 authors), 2021, *ApJL*, 912, 22
24. "Investigating Clumpy Galaxies in SDSS Stripe82 using Galaxy Zoo"
V. Mehta, *et al.* (Simmons: 10th of 10 authors), 2021, *ApJ*, 912, 49
23. "The X-ray and radio activity of typical and luminous Ly  emitters from $z \sim 2$ to $z \sim 6$: evidence for a diverse, evolving population", J. Calhau, *et al.* (Simmons: 7th of 8 authors), 2020, *MNRAS*, 493, 3341
22. "Galaxy Zoo: Probabilistic Morphology through Bayesian CNNs and Active Learning"
M. Walmsley, *et al.* (Simmons: 11th of 12 authors), 2020, *MNRAS*, 491, 1554
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
20. "Galaxy Zoo: Morphological Classification of Galaxy Images from the *Illustris* Simulation"
H. Dickinson, *et al.* (Simmons: 10th of 16 authors), 2018, *ApJ*, 853, 194
19. "Radio Galaxy Zoo: Compact and extended radio source classification with deep learning"
V. Lukic, *et al.* (Simmons: 7th of 7 authors), 2018, *MNRAS*, 476, 246
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: 14th of 41 authors), 2018, *MNRAS*, 475, 1549
17. "Evidence For Merger-Driven Growth in Luminous, High- z , Obscured AGN in the CANDELS/COSMOS Field", J. Donley, *et al.* (Simmons: 22nd of 30 authors), 2018, *ApJ*, 853, 63
16. "The First Post-Kepler Brightness Dips of KIC 8462852"
T. S. Boyajian, *et al.* (Simmons: 161st of 199 authors), 2018, *ApJ*, 853, 8
15. "Radio Galaxy Zoo: A Search for Hybrid Morphology Radio Galaxies"
A. D. Kapinska, *et al.* (Simmons: 17th of 17 authors), 2017, *AJ*, 154, 253
14. "Galaxy Zoo and SPARCFIRE: constraints on spiral arm formation mechanisms from spiral arm number and pitch angles", R. Hart, *et al.* (Simmons: 9th of 10 authors), 2017, *MNRAS*, 472, 2263
13. "Galaxy Zoo: the interplay of quenching mechanisms in the group environment"
R. Smethurst, *et al.* (Simmons: 8th of 8 authors), 2017, *MNRAS*, 469, 3670
12. "Galaxy Zoo: major mergers are not a significant quenching pathway"
A. Weigel, *et al.* (Simmons: 12th of 13 authors), 2017, *ApJ*, 845, 145
11. "Galaxy Zoo: comparing the demographics of spiral arm number and a new method for correcting redshift bias", R. Hart, *et al.* (Simmons: 10th of 11 authors), 2016, *MNRAS*, 461, 3663
10. "Faint COSMOS AGN at $z \sim 3.3$ - I. Black Hole Properties and Constraints on Early Black Hole Growth"
B. Trakhtenbrot, *et al.* (Simmons: 10th of 10 authors), 2016, *ApJ*, 825, 4
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

8. “Stellar Populations of Barred Quiescent Galaxies”
E. Cheung, *et al.* (Melvin, Simmons: 11th and 12th of 13 authors), [2015, ApJ, 807, 36](#)
7. “Galaxy Zoo: the effect of bar-driven fueling on the presence of an active galactic nucleus in disk galaxies”
M. A. Galloway, *et al.* (Melvin, Simmons: 9th and 10th of 10 authors), [2015, MNRAS, 448, 3442](#)
6. “Misalignment between cold gas and stellar components in early-type galaxies”
O. I. Wong, *et al.* (Simmons: 6th of 8 authors), [2015, MNRAS Letters, 447, 3311](#)
5. “Galaxy Zoo: Are bars responsible for the feeding of active galactic nuclei at $0.2 < z < 1.0$?”
E. Cheung, *et al.* (Melvin, Simmons: 17th and 20th of 22 authors), [2015, MNRAS, 447, 506](#)
4. “Galaxy Zoo and ALFALFA: Atomic Gas and the Regulation of Star Formation in Barred Disc Galaxies”
K. L. Masters, *et al.* (Simmons: 7th of 10 authors), [2012, MNRAS, 424, 2180](#)
3. “Chandra Observations of Galaxy Zoo Mergers: Frequency of Binary Active Nuclei in Massive Mergers”
S. H. Teng, *et al.* (Simmons: 11th of 12 authors), [2012, ApJ, 753, 165](#)
2. “The Infrared Light Curve of SN 2011fe in M101 and the Distance to M101”
T. Matheson, *et al.* (Simmons: 39th of 46 authors), [2012, ApJ, 754, 19](#)
1. “AGN Host Galaxies at $z \sim 0.4$ -1.3: Bulge-dominated and Lacking Merger-AGN Connection”
N. A. Grogin, *et al.* (Simmons: 15th of 16 authors), [2005, ApJL, 627, 97](#)