Dr. Peter Boorman – CV

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Research Interests.....

Extragalactic astrophysics

- AGN obscured fraction, evolution & feedback

- The Supermassive Black Hole spin census

- AGN in dwarf galaxies

Theoretical & computation - Cosmic X-ray Background population synthesis

- Monte Carlo radiative transfer modelling

- Big data analysis and machine learning methods

- X-ray spectroscopic modelling & imaging analysis

Observational - Large optical & infrared surveys

- (Astro)statistical techniques for fitting models to data



Professional Experience

09/2019-present Postdoctoral researcher: Astronomical Institute of the Czech Academy of Sciences

06/2019-09/2019 MoleGazer Data Analyst: STFC Impact Acceleration Accounts grant to analyse the temporal evolution of naevi into melanoma in medical images using astronomical photometric techniques and machine learning algorithms

Education.....

10/2015–07/2019 Ph.D. in Astrophysics, Advisor: Prof. Poshak Gandhi, University of Southampton 10/2011–07/2015 Masters in Physics, Advisor: Prof. Stefano Moretti, University of Southampton Result: 1st Class Honours & top of year

Tants & Awards.....

2020 Springer Thesis Award - www.phys.soton.ac.uk/news/6711

2017 £4,500 prize funding to organize a conference - sites.google.com/site/broadbandlook/home

2016–2018 £1,700 of Travel Grants from Royal Astronomical Society and the Institute of Physics to present conference contributed talks in Zürich & Chile

July 2015 Most Outstanding Performance: Ranked top of my Masters year (127 students total) at University of Southampton - www.phys.soton.ac.uk/news/4744

♀ Notable Activities.....

June 2020 Textbook co-author: wrote the X-ray imaging section of the Tutorial Guide to X-ray and Gamma-ray Astronomy - link.springer.com/book/10.1007/978-981-15-6337-9

Aug 2020 Team Leader for the Lindau online Sciathon: led efforts to write a paper highlighting steps needed for a mutually respectful publishing process - sciathon.org/project/group-su/

July 2019 Lindau Nobel Laureate Attendee: Nominated & selected as 1/580 young researchers from 89 countries to attend the 69th Lindau Nobel Laureate Meeting with 39 Nobel Laureates

2016–present *Lead-analyst:* for the *NuSTAR* Local AGN N_H Distribution (Legacy) Survey

Jan 2016 Press Release: at the American Astronomical Society Winter Dallas Meeting

★ Skills.....

Developer Python, tcl

Expert LATEX, Xspec, PyXspec, Sherpa, DS9, tcsh, Mac, unix, Topcat, Windows

Experienced git, Fortran, Aladin, bash, HTML

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Languages English (native), French (basic)

International Collaborations & Memberships.....

- 2021–present *Member of the Athena/X-IFU consortium:* testing spin constraints with high-resolution X-ray spectroscopy
- 2019–present *Member of the SHIVA Team:* Searching for a Holistic Interpretation of Variable Accretion
- 2019-present Lindau Nobel Laureate Alumni
- 2015–present *Member of the NuSTAR AGN Science team:* worldwide collaboration for AGN-related research using the *NuSTAR* satellite
- 2019–present *Member of the GATOS Team:* Galaxy Activity, Torus, and Outflows Survey
- 2016–present Memberships: Royal Astronomical Society & Institute of Physics

♣ Teaching Experience & Student Supervision.....

- 2020–present *Master thesis supervisor*: Masaryk University, Brno, Czechia
- 2021-present Project co-supervisor: Indian Institute of Science Education and Research Mohali, India
 - Aug 2021 *Bayesian X-ray Analysis:* Led two lectures & tutorials on Bayesian X-ray Analysis at the Chandra Data Science workshop 2021
 - Jul 2021 *Statistical tools for X-ray spectral fitting:* Gave a lecture about X-ray spectral fitting and Bayesian X-ray Analysis in Hradec Nad Moravicí, Czechia
 - May 2021 *AGN lecture series:* Contributed to the Prague AGN lecture series with lectures on AGN obscuration & AGN identification
 - Nov 2019 *NuSTAR Data Analysis workshop:* gave a week-long data analysis workshop to the Slovakia Institute of Technology for *NuSTAR* data analysis and products extraction
 - 2016–2018 *Demonstrator:* University of Southampton undergraduate Python Computer Labs & Electromagnetism, responsible for helping students with problems and marking assessments

☑ Academic Service & Outreach

- Oct-Dec 2021 Seminar co-organiser: Prague AGN seminar series pragueagn.wordpress.com/seminars
 - July 2019 Youtube interview: about my work at the 69th Nobel Laureate Lindau Meeting
 - 2015, 2019 *Conference local organiser:* XCalibur 2019 international high-resolution X-ray spectroscopy workshop & TORUS2015 international conference
 - Feb 2019 *Outreach seminar:* Presented my black hole research to the Basingstoke Astronomical Society basingstokeas.org.uk
 - 2018 Academic paper referee: ApJ, ApJ Letters, Astrophysics & Space Science, MDPI
 - Sep 2018 *DataKind UK DataDive:* volunteered at a two day collaborative event in Southampton to explore data provided by charities
 - July 2018 Astrotweeps: spent a week describing my research on the Astrotweeps Twitter account
 - 2016–2019 Departmental organiser: Accretion meetings, Journal Clubs & weekly seminars
 - July 2018 Nature Community writer: Nature Community article about NuSTAR
 - 2016–2019 *Planetarium presenter:* Gave numerous Soton Astrodome shows to audiences of all ages about observational astronomy

Q Awarded Observing Time

(>2 Ms space-based, >130 hours ground-based)

- 2020 e-MERLIN; Boorman, P. et al., 36 hours B & B-5 Priority
- 2020 NuSTAR; Boorman, P. et al., 200 ks Priority A, 100 ks Priority B
- 2020 Swift; Boorman, P., Target of Opportunity, 7 ks
- 2020 NuSTAR; Boorman, P., Directors Discretionary Time, 40 ks

- 2016–2019 NuSTAR Legacy Survey; Gandhi, P., Boorman, P. et al., NuLANDS, 972.1 ks
 - 2019 XMM-Newton; Boorman, P. et al., 150 ks Priority B, 150 ks Priority C
 - 2019 SALT; Boorman, P. et al., 7.5 hours Priority 3
 - 2018 XMM-Newton; **Boorman**, **P.** et al., 126 ks Priority C
 - 2016 XMM-Newton; Boorman, P. et al., 126 ks Priority C
 - 2021 JWST; Rosario, D., Hönig, S., Burtscher, L. et al., 19.3 hours
 - 2021 JWST; Shimizu, T. et al., 34 hours
 - 2020 XMM-Newton; Svoboda, J. et al., 110 ks Priority B
 - 2020 XMM-Newton + NuSTAR; Greenwell, C. et al., 28 + 50 ks Priority B
- 2019, 2020 VISIR; Asmus, D. et al., 90 hours Rank B
- 2019, 2020 VLA; Borkar, A. et al., 19 hours, Priority C
 - 2020 X-SHOOTER; Asmus, D. et al., 15.3 hours, Filler time
 - 2017 NuSTAR; LaMassa, S. et al., 40 ks Priority A

(Highlighted) Presentations

(contributed, seminars, lectures & talks)

Press Release

American Astronomical Society Winter Meeting (featured in global media outlets;

Jan 2016 NASA/JPL, The Guardian, The Independent, The Daily Mail, University of Southampton, Durham University)

Invited

Nov-2021 _{MSSL}

Mar 2018 ESO Headquarters Chile - Local hard X-ray selected AGN across the multi-wavelength spectrum

Jun 2017 Sussex University Astronomy Department

Contributed talks, Seminars & Lectures

Feb-2021 Advanced Technologies Research Institute, Slovakia Sandwich Workshop Contributed

Jul-2020 Online, Swift/BAT AGN Spectroscopic Survey meeting Contributed

Nov-2019 Vila Lanna, Prague AGN Spectral States workshop Contributed

Sep-2019 Bologna, X-ray Astronomy 2019

Sep-2019 MSSL, New Results in X-ray Astronomy and Athena Consortium Meeting Contributed

Dec-2018 *Contributed Chile, Puerto Varas, TORUS2018*

Apr-2018 University of Southampton, From Micrometres to Megaparsecs

Contributed

Sep-2017 Contributed Durham University, New Results in X-ray Astronomy and Athena Consortium Meeting

Sep-2016 Contributed	MSSL, New Results in X-ray Astronomy and Athena Consortium Meeting
Feb-2016 Contributed	ETH, Zürich X-ray View of Black Hole Activity in the Local Universe
Nov-2021 Seminar	Brno, Czechia, Masaryk University, Constitutional Seminar
Mar-2020 Seminar	Astronomical Institute of the Czech Academy of Sciences, Institutional Seminar
Mar-2020 Seminar	Brno, Czechia, Masaryk University
Feb-2020 Seminar	ESA Madrid, European Space Agency Centre
Feb-2020 Seminar	Charles University, Prague
Jun-2019 Seminar	Astronomical Institute of the Czech Academy of Sciences, Prague
Dec-2018 Seminar	Santiago, Universidad Diego Portales de Chile
Oct-2018 Seminar	BHI, Cambridge, Boston Black Hole Initiative
Jul-2018 Seminar	University of Hertfordshire astronomy department
May-2018 Seminar	University of Portsmouth, Institute of Cosmology and Gravitation
Mar-2018 Seminar	Santiago, Pontificia Universidad Católica de Chile
Nov-2016 Seminar	University of Southampton, AstroGrav
Aug-2021 <i>Lectures</i>	Chandra Data Science Bayesian X-ray Analysis lectures & tutorial (online)
May-2021 <i>Lectures</i>	Online lectures on AGN obscuration & identification to Masters & PhD students from Czechia
Nov-2020 <i>Lecture</i>	IISER Mohali, Punjab, India, Introduction to Compton-thick AGN (online)
Nov-2019 <i>Lectures</i>	Slovakia Institute of Technology week-long NuSTAR tutorial workshop

Publication List

(24 Total, 265 Citations, h-index: 11)

Papers (first author or significant contribution)

9. LeMMINGs IV: The X-ray properties of a statistically-complete sample of the nuclei in active and inactive galaxies from the Palomar sample

Williams, D. R. A., Pahari, M., Baldi, R. D., McHardy, I. M., Mathur, S., Beswick, R. J., Beri, A., Boorman, P. et al. 2021, MNRAS.tmp.3026W

- 8. *A candidate optically quiescent quasar lacking narrow emission lines* Greenwell, C., Gandhi, P., Stern, D., **Boorman, P.** *et al.* 2021, MNRAS, 503L, 80
- 7. BAT AGN Spectroscopic Survey-XXIII. A New Mid-Infrared Diagnostic for Absorption in Active Galactic Nuclei

Pfeifle, R., Ricci, C., Boorman, P. et al. 2021, arXiv-210204412

- 6. Multi-phase environment of Centaurus A galaxy Borkar, A., Adhikari, T. P., Różańska, A., Markowitz, A. G., **Boorman, P.** et al. 2020, MNRAS, 500, 3536
- 5. Local AGN survey (LASr): I. Galaxy sample, infrared colour selection, and predictions for AGN within 100 Mpc

Asmus, D., Greenwell, C. L., Gandhi, P., Boorman, P. et al. 2020, MNRAS, 494, 1784

- 4. NuSTAR Uncovers an Extremely Local Compton-thick AGN in NGC 4968 LaMassa, S., Yaqoob, T., **Boorman, P.** et al. 2019, ApJ, 887, 173
- 3. *An Iwasawa-Taniguchi effect for Compton-thick AGN* **Boorman P.**, Gandhi P., Baloković M., Brightman M. *et al.* 2018, MNRAS, 477, 3775
- 2. Chandra Reveals Heavy Obscuration and Circumnuclear Star Formation in Seyfert 2 Galaxy NGC 4968 LaMassa, S., Yaqoob, T., Levenson, N., **Boorman**, **P.** et al. 2017, ApJ, 835, 91
- 1. *IC* 3639 A New Bona Fide Compton-Thick AGN Unveiled by NuSTAR **Boorman**, P., Gandhi, P. Harrison, F., Ricci, C., Stern, D. et al. 2016, ApJ, 833, 245

Papers (co-authored)

- 15. Compton-Thick AGN in the NuSTAR era VII. A joint NuSTAR, Chandra and XMM-Newton analysis of two nearby, heavily obscured sources
 - Traina, A., Marchesi, S., Vignali, C., Torres-Albà, N., Ajello, M., Pizzetti, A., Silver, R., Zhao, X., Ananna, T., Baloković, M., **Boorman**, **P.** *et al.* 2021, ApJ, 922, 159
- 14. Compton-Thick AGN in the NuSTAR era VI: The observed Compton-thick fraction in the Local Universe Torres-Albà, N., Marchesi, S., Zhao, X., Ajello, M., Silver, R., Ananna, T. T., Baloković, M., Boorman, P. et al. 2021, ApJ, 922, 252
- 13. The Galaxy Activity, Torus, and Outflow Survey (GATOS). II. Torus and polar dust emission in nearby Seyfert galaxies
 - Alonso-Herrero, A., García-Burillo, S., Hönig, S. F., García-Bernete, I., Ramos Almeida, C., González-Martín, O., López-Rodríguez, E., **Boorman**, **P.** *et al.* 2021, A&A, 652A, 99
- 12. The Galaxy Activity, Torus, and Outflow Survey (GATOS). I. ALMA images of dusty molecular tori in Seyfert galaxies
 - García-Burillo, S., Alonso-Herrero, A., Ramos Almeida, C., González-Martín, O., Combes, F., Usero, A., Hönig, S., Querejeta, M., Hicks, E. K. S., Hunt, L. K., Rosario, D., Davies, R., **Boorman, P.** et al. 2021, A&A, 652A, 98
- 11. NuSTAR Survey of Obscured Swift/BAT-selected Active Galactic Nuclei: II. Median High-energy Cutoff in Seyfert II Hard X-ray Spectra

- Baloković, M., Harrison, F. A., Madejski, G., Comastri, A., Ricci, C., Annuar, A., Ballantyne, D. R., **Boorman, P.** *et al.* 2020, ApJ, 905, 41
- 10. NuSTAR Observations of Four Nearby X-ray Faint AGN: Low Luminosity or Heavy Obscuration?
 Annuar, A., Alexander, D. M., Gandhi, P., Lansbury, G. B., Asmus, D., Balokovic, M., Ballantyne, D. R., Bauer, F. E., Boorman, P. et al. 2020, MNRAS, 497, 229
- 9. Unveiling the 100 pc scale nuclear radio structure of NGC 6217 with e-MERLIN and the VLA Williams, D., McHardy, I., Baldi, R., Beswick, R., Argo, M., Beri, A., **Boorman, P.** et al. 2019, MNRAS, 486, 4962
- 8. The NuSTAR Extragalactic Surveys: Source Catalog and the Compton-thick Fraction in the UDS Field Masini, A., Civano, F., Comastri, A., Fornasini, F., Ballantyne, D. R., Lansbury, G., Treister, E., Alexander, D., Boorman, P. et al. 2018, ApJ, 235, 17
- 7. The Phoenix galaxy as seen by NuSTAR Masini, A., Comastri, A., Puccetti, S., Baloković, M., Gandhi, P., Guainazzi, M., Bauer, F., Boggs, S., **Boorman, P.** et al. 2017, A&A, 597, 100
- 6. X-Ray Bolometric Corrections for Compton-thick AGN Brightman, M., Baloković, M., Ballantyne, D., Bauer, F., **Boorman, P.** et al. 2017, ApJ, 844, 10
- 5. The weak Fe fluorescence line and long-term X-ray evolution of the Compton-thick active galactic nucleus in NGC 7674
 - Gandhi, P., Annuar, A., Lansbury, G., Stern, D., Alexander, D., Bauer, F., Bianchi, S., Boggs, S., Boorman, P. G. et al. 2017, MNRAS, 467, 4606.
- 4. The X-Ray Reflection Spectrum of the Radio-loud Quasar 4C 74.26 Lohfink, A., Fabian, A., Ballantyne, D., Boggs, S., **Boorman, P.** et al. 2017, ApJ, 841, 80
- 3. Broad-band X-ray spectral analysis of the Seyfert 1 galaxy GRS 1734-292
 Tortosa, A., Marinucci, A., Matt, G., Bianchi, S., La Franca, F., Ballantyne, D., Boorman, P. et al. 2017, MNRAS, 466, 4193
- 2. A New Compton-thick AGN in our Cosmic Backyard: Unveiling the Buried Nucleus in NGC 1448 with NuSTAR Annuar, A., Alexander, D., Gandhi, P., Lansbury, G., Asmus, D., Ballantyne, D., Bauer, F., Boggs, S., Boorman, P. et al. 2017, ApJ, 836, 165
- 1. *NuSTAR Observations of WISE J1036*+0449, a Galaxy at $z \sim 1$ Obscured by Hot Dust Ricci, C., Assef, R., Stern, D., Nikutta, R., Alexander, D., Asmus, D., Ballantyne, D., Bauer, F., Blain, A., Boggs, S., **Boorman, P.** *et al.* 2017, ApJ, 835, 105

Books

- 2. The Accretion and Obscured Growth of Supermassive Black Holes First Constraints on the Local Heavily Obscured AGN Fraction with NuSTAR
 - **Boorman, P.,** 2021, ISBN: 978-3-030-603-60-1, Springer, Cham, (2021)
- 1. Tutorial Guide to X-ray and Gamma-ray Astronomy: Data Reduction and Analysis, Chapter 7: Data Analysis Alston, W., Boorman, P., Bulgarelli, A., Parker, M., 2020, Edited by Cosimo Bambi. ISBN: 978-981-15-6336-2, Springer, pp.229