

Peter Boorman

📍 Astronomický ústav AV ČR, Praha, Czechia

🌐 peterboorman.com ✉ boorman@asu.cas.cz 📧 pboorm 🆔 0000-0001-9379-4716 🐦 @boorm

✍ 23 papers 👍 245 citations 📈 h-index: 9 💬 45 presentations

> Research Interests

Extragalactic astrophysics

- AGN obscured fraction, evolution & feedback
- AGN in dwarf galaxies
- The Supermassive Black Hole spin distribution

Theoretical & computation

- Cosmic X-ray Background population synthesis
- Monte Carlo radiative transfer modelling
- Big data analysis and machine learning methods

Observational

- X-ray reflection spectroscopy
- Optical spectroscopy and modelling
- Infrared photometric surveys



🎓 Education

10/2015–07/2019 **Ph.D.** in Astrophysics, Advisor: Prof. Poshak Gandhi, University of Southampton

10/2011–07/2015 **Bachelors + Masters** in Physics, University of Southampton
Result: 1st Class Honours & top of year

🏢 Employment History

09/2019–present **Postdoctoral researcher:** at the 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

🏆 Grants & 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 contributed talks in Zürich & Chile

July 2015 **Most Outstanding Performance:** Ranked top of 127 physics masters students at the 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 nourish a mutually respectful publishing process with researchers - sciathon.org/project/group-su/

July 2019 **Lindau Nobel Laureate Attendee:** Nominated & Selected 1/580 young researchers from 89 countries to attend the 69th Lindau Nobel Laureate Meeting in July 2019 with 39 Nobel Laureates of physics

2016–present **Lead-analyst for the NuLANDS Survey** with *NuSTAR*, *Swift*, *XMM-Newton*, *Chandra* & *Suzaku*

Jan 2016 **Press Release:** American Astronomical Society Winter Meeting

2016 **Finalist:** Nationwide I'm a Scientist competition

★ Skills

Developer Python, \LaTeX , tcl

Expert Xspec, PyXspec, Sherpa, tcsh, Mac, unix, Topcat, git, Windows
Experienced Fortran, Aladin, DS9, bash, HTML
Languages English (native), French (intermediate), Spanish (basic), Czech (basic)

International Collaborations & Memberships.....

2021–present **Member of the Athena/X-IFU consortium**
 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.
 2016–2019 **Founded & chaired:** University of Southampton Accretion Group
 2016–present **Memberships:** Royal Astronomical Society & Institute of Physics

Teaching Experience.....

Jul 2021 **Gave a lecture entitled Statistical tools for X-ray spectral fitting** in Opava, Czechia
 May 2021 **Contributed to an AGN lecture series:** Gave lectures on AGN obscuration & AGN identification
 Nov 2019 **NuSTAR Data Analysis workshop:** led a week-long data analysis workshop delivered to the Slovakia Institute of Technology for NuSTAR data analysis and products extraction
 2016–2018 **Demonstrator:** University of Southampton undergraduate Python Computer Labs & Electromagnetism courses

Academic Service & Outreach.....

April 2020 **Skype a Scientist:** Answered questions with members of the public about black holes and space.
 July 2019 **Video Interviewee:** Interview available worldwide about my research at the 69th Nobel Laureate Lindau Meeting
 2015, 2019 **Conference local organiser:** XCalibur 2019 international high-resolution X-ray spectroscopy workshop - July 2019 & TORUS 2015 international conference - Sep 2015
 2018 **Academic paper referee:** Astrophysical Journal, Astrophysics & Space Science, MDPI
 Sep 2018 **Charity work:** Led efforts for DataDive hosted by DataKind UK - Southampton
 2016–2019 **Departmental organiser:** Accretion meetings, Journal Clubs & weekly seminars
 2016–2017 **Observing:** Keck/LRIS & Palomar/DBSpec; 3 nights total
 July 2018 **Nature Community writer:** Nature Community article about NuSTAR

Awarded Observing Time.....

2020 NuSTAR; **Boorman, P. et al.**, *Validating a new AGN selection as a means to construct the local census of AGN*, 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; Gandhi, P., **Boorman, P. et al.**, *The NuSTAR Local AGN N_H Distribution Survey, (NuLANDS), NuSTAR Legacy Survey*, 972.1 ks
 2019 XMM-Newton; **Boorman, P. et al.**, *Probing the Extreme X-ray Emission Mechanisms of Green Pea Galaxies*, 150 ks Priority B, 150 ks Priority C
 2019 SALT; **Boorman, P. et al.**, *Resolving AGN obscuration biases with robust optical classifications*, 7.5 hours Priority 3
 2018 XMM-Newton; **Boorman, P. et al.**, *Completing an Unbiased Census of AGN Obscuration*, 126 ks Priority C
 2016 XMM-Newton; **Boorman, P. et al.**, *Quantifying obscuration bias in hard X-ray AGN selection*, 126 ks Priority C

- 2020 *XMM-Newton*; Svoboda, J. *et al.*, *What powers the galaxies with Lyman continuum escape?*, 110 ks Priority B
- 2020 *XMM-Newton + NuSTAR*; Greenwell, C. *et al.*, *Confirmation of a new population of cocooned AGN*, 28 + 50 ks Priority B
- 2019–2020 *VISIR*; Asmus, D. *et al.*, *Toward a truly representative sample of local AGN*, 90 hours Rank B
- 2019 *VLA*; Borkar, A. *et al.*, *Revealing the Elusive Power Source of Green Pea Galaxies*, 19 hours, Priority C
- 2020 *X-SHOOTER*; Asmus, D. *et al.*, *X-SHOOTER follow-up of R90 AGN candidates from LASr*, 15.3 hours, Filler time
- 2017 *NuSTAR*; LaMassa, S. *et al.*, *Modeling the Obscuration Around Extreme AGN NGC 4968*, 40 ks Priority A

Publication List

23 Total, 245 Citations, h-index: 9.....

Papers

1. *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 arXiv-2109.00572
2. *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 arXiv-2109.00599
3. *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.
4. *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.
5. *A candidate optically quiescent quasar lacking narrow emission lines*
Greenwell, C., Gandhi, P., Stern, Daniel, **Boorman, P.** *et al.* 2021 MNRAS, 503L, 80.
6. *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, accepted, arXiv-210204412.
7. *Multi-phase environment of Centaurus A galaxy*
Borkar, A., Adhikari, T. P., Róžańska, A., Markowitz, A. G., **Boorman, P.** *et al.* 2020 MNRAS, 500, 3536.
8. *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.
9. *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.
10. *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.
11. *NuSTAR Uncovers an Extremely Local Compton-thick AGN in NGC 4968*
LaMassa, S., Yaqoob, T., **Boorman, P.** *et al.* 2019, ApJ, 887, 173.
12. *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.
13. *An Iwasawa-Taniguchi effect for Compton-thick AGN*
Boorman P., Gandhi P., Baloković M., Brightman M. *et al.* 2018, MNRAS, 477, 3775.

14. *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.
15. *X-Ray Bolometric Corrections for Compton-thick AGN*
Brightman, M., Baloković, M., Ballantyne, D., Bauer, F., **Boorman, P.** et al. 2017, ApJ, 844, 10.
16. *The weak Fe fluorescence line and long-term X-ray evolution of the Compton-thick active galactic nucleus in NGC 7674*
Gandhi, P., Annun, A., Lansbury, G., Stern, D., Alexander, D., Bauer, F., Bianchi, S., Boggs, S., **Boorman, P. G.** et al. 2017, MNRAS, 467, 4606.
17. *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.
18. *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.
19. *A New Compton-thick AGN in our Cosmic Backyard: Unveiling the Buried Nucleus in NGC 1448 with NuSTAR*
Annun, A., Alexander, D., Gandhi, P., Lansbury, G., Asmus, D., Ballantyne, D., Bauer, F., Boggs, S., **Boorman, P.** et al. 2017, ApJ, 836, 165.
20. *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.
21. *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.
22. *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.
23. *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.

Books

1. *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)
2. *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

Presentations, Seminars & Press Releases

45 Total.....

Press Releases

Jan 2016 *American Astronomical Society Winter Meeting* (featured in global media outlets; NASA/JPL, The Guardian, The Independent, The Daily Mail, University of Southampton, Durham University)

Invited

Feb 2021 **Contributed** *Advanced Technologies Research Institute (Slovakia) - Sandwich Workshop*

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

Jun 2017 **Seminar** *Sussex University Astronomy Department, UK*

Contributed & Seminars

Jun 2021 **Poster** *European Astronomical Society annual meeting*

Nov 2020 **Seminar** *IISER, Mohali, Punjab, India*

- Jun 2020 **Seminar** SPI-MAX, University of Oxford, UK
- Mar 2020 **Seminar** Charles University, Prague
- Mar 2020 **Seminar** Masaryk University, Brno, Czechia
- Feb 2020 **Seminar** European Space Agency Center, Madrid, Spain
- Mar 2020 **Contributed** Ondřejov Astronomical Institute of the Czech Academy of Sciences, Czechia
- Nov 2019 **Contributed** AGN Spectral States workshop, Vila Lanna
- Nov 2019 **Seminar** Cologne–Prague Meeting, Prague Astronomical Institute, Czechia
- Nov 2019 **Talk** High Energy Kaffeerunde, Max Planck Institute for Extraterrestrial Physics, Garching, Germany
- July 2019 **Talk** Max Planck Institute for Extraterrestrial Physics Infrared Group, Garching, Germany
- July 2019 **Poster** XCalibur High-resolution X-ray Spectroscopy Meeting, Winchester, UK
- July 2019 **Poster** 69th Lindau Nobel Laureate Meeting, Germany
- Jun 2019 **Seminar** Prague Relativistic Astrophysics Group, Prague Astronomical Institute, Czechia
- Dec 2018 **Contributed** TORUS2018 meeting, Puerto Varas, Chile
- Dec 2018 **Seminar** Universidad Diego Portales, Santiago, Chile
- Oct 2018 **Talk** Harvard Centre for Astrophysics Quasar Tea, Cambridge, Boston
- Oct 2018 **Seminar** Harvard Black Hole Initiative, Cambridge, Boston
- Oct 2018 **Seminar** MIT High Energy Group Meeting, Cambridge, Boston
- July 2018 **Seminar** University of Hertfordshire, UK
- May 2018 **Seminar** Institute for Cosmology & Gravitation, University of Portsmouth, UK
- Mar 2018 **Seminar** Pontificia Universidad Católica, Santiago, Chile
- Apr 2018 **Contributed** From Micrometres to Megaparsecs, University of Southampton, UK
- Oct 2017 **Talk** Bun Club Talk, Institute of Astronomy, University of Cambridge, UK
- Sep 2017 **Contributed** New Results in X-ray Astronomy & Athena Consortium Meeting, University of Durham, UK
- Sep 2017 **Poster** New Results in X-ray Astronomy & Athena Consortium Meeting, University of Durham, UK
- Feb 2017 **Poster** Timing and Spectroscopy in the New Era of X-ray Astronomy, Royal Astronomical Society Specialist Discussion Meeting, Burlington House, UK

Nov 2016 *AstroGrav Seminar*, University of Southampton, UK
Seminar

Nov 2016 *NuSTAR group*, Caltech, USA
Seminar

Nov 2016 *HEX-P Concept & NuSTAR Science Meeting*, Caltech, USA
Poster

Oct 2016 *David Gross Nobel Lecture*, University of Southampton, UK
Poster

Sep 2016 *New Results in X-ray Astronomy*, Mullard Space Science Laboratory, UK
Contributed

Feb 2016 *X-ray View of Black Hole Activity in the Local Universe*, ETH, Zürich
Contributed

Outreach

Mar 2019 *Three-Minute Thesis*, University of Southampton, UK
Outreach Talk

Feb 2019 *Basingstoke Astronomy Society*, UK
Outreach Talk

2016–present *> 20 University of Southampton Astrodome shows*, University of Southampton, UK
Planetarium Shows