

# Peter Boorman

📍 Astronomický ústav AV ČR, Praha, Czechia

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

✍ 24 papers 👍 259 citations 📈 h-index: 11 💬 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](http://www.phys.soton.ac.uk/news/6711)

2017 **£4,500 prize funding to organize a conference** - [sites.google.com/site/broadbandlook/home](https://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](http://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](https://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/](https://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,  $\text{\LaTeX}$ , tcl

**Expert** Xspec, PyXspec, Sherpa, tcsh, Mac, unix, Topcat, git, Windows  
**Experienced** Fortran, Aladin, DS9, bash, HTML  
**Languages** English (native), French (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.....

Aug 2021 **Bayesian X-ray Analysis:** Led two 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 Moravici, Czechia  
 May 2021 **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

**24 Total, 259 Citations, h-index: 11**.....

## Papers

24. *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 arXiv-2111.09077
23. *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
22. *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
21. *The Galaxy Activity, Torus, and Outflow Survey (GATOS). II. Torus and polar dust emission in nearby Seyfert galaxies*  
Alonso-Herrero, A., García-Burillo, S., Hönic, S. F., García-Bernete, I., Ramos Almeida, C., González-Martín, O., López-Rodríguez, E., **Boorman, P. et al.** 2021 A&A, 652A, 99.
20. *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., Hönic, S., Querejeta, M., Hicks, E. K. S., Hunt, L. K., Rosario, D., Davies, R., **Boorman, P. et al.** 2021 A&A, 652A, 98.
19. *A candidate optically quiescent quasar lacking narrow emission lines*  
Greenwell, C., Gandhi, P., Stern, Daniel, **Boorman, P. et al.** 2021 MNRAS, 503L, 80.
18. *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.
17. *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.
16. *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., Annular, A., Ballantyne, D. R., **Boorman, P. et al.** 2020 ApJ, 905, 41.
15. *NuSTAR Observations of Four Nearby X-ray Faint AGN: Low Luminosity or Heavy Obscuration?*  
Annular, 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.
14. *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.

13. *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.
11. *An Iwasawa-Taniguchi effect for Compton-thick AGN*  
**Boorman P.**, Gandhi P., Baloković M., Brightman M. et al. 2018, MNRAS, 477, 3775.
10. *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.
9. *X-Ray Bolometric Corrections for Compton-thick AGN*  
Brightman, M., Baloković, M., Ballantyne, D., Bauer, F., **Boorman, P.** et al. 2017, ApJ, 844, 10.
8. *The weak Fe fluorescence line and long-term X-ray evolution of the Compton-thick active galactic nucleus in NGC 7674*  
Gandhi, P., Annur, A., Lansbury, G., Stern, D., Alexander, D., Bauer, F., Bianchi, S., Boggs, S., **Boorman, P. G.** et al. 2017, MNRAS, 467, 4606.
7. *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.
6. *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.
5. *A New Compton-thick AGN in our Cosmic Backyard: Unveiling the Buried Nucleus in NGC 1448 with NuSTAR*  
Annur, A., Alexander, D., Gandhi, P., Lansbury, G., Asmus, D., Ballantyne, D., Bauer, F., Boggs, S., **Boorman, P.** et al. 2017, ApJ, 836, 165.
4. *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.
3. *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.
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.

## 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

## 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

Nov-2021 *MSSL, UK Mullard Space Science Laboratory seminar*  
**Seminar**

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

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

## Contributed

Jul-2021  
**Contributed** *Chandra Data Science 2021 Bayesian X-ray Analysis tutorials*

Jul-2021  
**Contributed** *Hradec nad Moravicí Bayesian X-ray Analysis lecture & tutorial*

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

Jul-2020  
**Contributed** *Online, Swift/BAT AGN Spectroscopic Survey (BASS) meeting talk*

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

Sep-2019  
**Contributed** *Bologna X-ray Astronomy 2019*

Sep-2019  
**Contributed** *Mullard Space Science Laboratory (MSSL) New Results in X-ray Astronomy and Athena Consortium Meeting*

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

Apr-2018  
**Contributed** *University of Southampton, From Micrometres to Megaparsecs*

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, Zurich X-ray View of Black Hole Activity in the Local Universe*

## Posters

Jun-2021  
**Poster** *EAS EAS NuLANDS poster*

Jul-2019  
**Poster** *Winchester Xcalibur High-resolution X-ray Spectroscopy Meeting*

Jun-2019  
**Poster** *Lindau Inselhalle 69th Lindau Nobel Laureate Meeting*

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

Feb-2017  
**Poster** *Burlington House, RAS, Timing and Spectroscopy in the New Era of X-ray Astronomy*

Nov-2016  
**Poster** *Caltech HEX-P and NuSTAR Science Meeting*

## Seminars

Mar-2020  
**Seminar** *Astronomical Institute of the Czech Academy of Sciences, Astronomical Institute of the Czech Academy of Sciences, Institutional Seminar*

Mar-2020  
**Seminar** *Brno, Czechia, Masaryk University seminar*

Feb-2020  
**Seminar** *ESAC Madrid, European Space Agency Centre seminar*

- Feb-2020  
**Seminar** *Charles University, Prague, Czechia, Charles University seminar*
- Nov-2019  
**Seminar** *Sporilov, Prague, Cologne-Prague meeting seminar*
- Jun-2019  
**Seminar** *Astronomical Institute of the Czech Academy of Sciences Prague seminar*
- Dec-2018  
**Seminar** *Santiago, Universidad Diego Portales de Chile seminar*
- Oct-2018  
**Seminar** *BHI, Cambridge, Boston Black Hole Initiative seminar*
- Oct-2018  
**Seminar** *MIT, Boston, Cambridge, Boston, MIT High Energy Meeting seminar*
- Jul-2018  
**Seminar** *University of Hertfordshire, University of Hertfordshire departmental seminar*
- May-2018  
**Seminar** *University of Portsmouth, Institute of Cosmology and Gravitation seminar*
- Mar-2018  
**Seminar** *Santiago, Pontificia Universidad Católica de Chile seminar*
- Nov-2016  
**Seminar** *University of Southampton AstroGrav seminar*

## Lectures

- Aug-2021  
**Lecture** *Chandra Data Science Bayesian X-ray Analysis lectures & tutorial*
- May-2021  
**Lecture** *Astronomical Institute of the Czech Academy of Sciences, Prague lecture on AGN identification*
- May-2021  
**Lecture** *Astronomical Institute of the Czech Academy of Sciences, Prague lecture on AGN obscuration*
- Nov-2020  
**Lecture** *IISER Mohali, Punjab, India, Introduction to Compton-thick AGN*
- Nov-2019  
**Lecture** *Slovakia Institute of Technology NuSTAR tutorial workshop*

## Talks

- Jun-2020  
**Talk** *University of Oxford, England, SPI-MAX talk*
- Nov-2019  
**Talk** *MPE, Garching, MPE Kaffeerunde*
- Oct-2018  
**Talk** *Harvard CfA, Cambridge, Boston, CfA QSO Tea Talk*
- Oct-2017  
**Talk** *University of Cambridge, Cambridge Bun Club Talk*
- Nov-2016  
**Talk** *Caltech, Caltech talk to the NuSTAR group*

## Outreach

- Apr-2020  
**Outreach** *Online Skype a Scientist*
- Jun-2019  
**Outreach** *Lindau Inselhalle Interview at the 69th Lindau Nobel Laureate Meeting*
- Mar-2019  
**Outreach** *University of Southampton 3 Minute Thesis competition*

Feb-2019 *Basingstoke Astronomy Society Outreach seminar*  
***Outreach***

Oct-2016 *University of Southampton David Gross STAG (Southampton Theory Astrophysics and Gravity)*  
***Outreach*** *Nobel lecture*

Jan-2016 *University of Southampton, > 20 Soton Astrodome shows (Click the link for more information*  
***Outreach*** *about the mobile planetarium)*