DIRAC Institute
University of Washington
3910 15th Ave NE
Seattle WA 98195
+1 917 214 5580
dhuppenk@uw.edu
huppenkothen.org
dhuppenkothen

Daniela Huppenkothen

Curriculum Vitae

Experience

Associate Director and DIRAC Fellow — 2017–present
DIRAC Institute, University of Washington, USA

Data Science Fellow — 2017–present
eScience Institute, University of Washington, USA

James Arthur Postdoctoral Fellow — 2016–2017
Center for Cosmology and Particle Physics &
Center for Data Science, New York University, USA

Moore-Sloan Data Science Postdoctoral Fellow — 2014–2017
Center for Data Science, New York University, USA

Education

PhD Astronomy & Astrophysics — 2010–2014
Anton Pannekoek Institute for Astronomy, University of Amsterdam, The Netherlands
Thesis: *A New Statistical Toolbox for Studying Variability in Fast Transients*
Supervisors: Dr Anna Watts and Prof Michiel van der Klis

MSc Astronomy & Astrophysics — 2008–2010
Anton Pannekoek Institute for Astronomy, University of Amsterdam, The Netherlands

BSc Geosciences & Astrophysics — 2005–2008
Jacobs University Bremen, Germany

Publications

24 refereed; 1 in press; 6 non-refereed. List attached.

Presentations

11 invited, 18 seminars and 13 contributed. List attached.

External Grants

Science PI: NASA Astrophysics Data Analysis Program — 2017
Accurate Black Hole Spin Measurements with ABC
$385,000

PI; Fermi Guest Investigator Program — 2016
Unravelling Solar Flare Variability with Fermi/GBM
$55,000

PI; LSSTC Enabling Science Program — 2015
Astro Hack Week 2015
$5,000

Honours and Awards

HSP Huygens scholarship covering tuition and a living stipend 2008-2010

Scholarship awarded by "Studienstiftung des Deutschen Volkes" (German National Academic Foundation) 2005-2010
€200 per month for study-related expenses

Merit-based scholarship awarded by Jacobs University Bremen 2005-2008
€7500 per year for tuition costs

Member of "President's List" (students with GPA better than 1.5) 2005-2008

Award of the Deutsche Physikalische Gesellschaft (German Society of Physicists) for best graduating student in physics 2005

Software

Stingray
Lead developer of open-source Python time series methods library for astronomy: http://github.com/StingraySoftware/stingray

Magnetron
Bayesian Hierarchical Inference for X-ray light curves: http://ascl.net/1502.014

BayesPSD
Bayesian time series methods for detection of periodic signals: https://github.com/dhuppenkothen/BayesPSD

Teaching

Lectures

Astro Hack Week 2017
Taught a lecture on data visualization to an audience of researchers at all academic ranks

LSST Data Science Fellowship Program 2017
Taught two lectures on data visualization and interpretability of machine learning algorithms to an audience of graduate students

IMPRS Heidelberg Summer School on Astrostatistics and Data Mining 2016
Gave five lectures and three problem classes on Bayesian and frequentist statistics, counting statistics, time series analysis and Fourier methods to an audience of graduate students and postdocs

Astro Hack Week 2015 2015
Taught workshop on exploratory data analysis and visualization to researchers of all academic ranks

Astro Hack Week 2014 2014
Taught workshop on classical statistics to researchers of all academic ranks

Deutsche Schülerakademie 2012
Devised and lectured ten-day course in astronomy for gifted high-school students

Teaching Assistant Posts

- Accretion Flows (M.Sc. course), University of Amsterdam 2008–2014
- Astrophysics II (B.Sc. course), University of Amsterdam
- Introduction to Astronomy and Cosmology (B.Sc. course), University of Amsterdam
- Fluid Dynamics, (M.Sc. course), University of Amsterdam
- Geosciences and Astrophysics II (B.Sc. course), Jacobs University Bremen

Research Supervision

Margaret Lazzarini, graduate student — 2018-present
Project title: "Accurate Black Hole Spin Measurements through ABC"

Christina Lindberg, post-bacchalaurete student — 2018-present
Project title: "Precise Measurements of Asteroid Periods using Gaussian Processes"

Chris Ick, Fermi Guest Investigator Programme student — 2017-present
Project title: "Unravelling Solar Flare Variability with Fermi/GBM"

Himanshu Mishra, Google Summer of Code — 2016
Project title: "A Library of Time Series methods"

Viviana Meerstra, BSc project — 2012
Project title: "Timing analysis of gamma-ray bursts using Bayesian statistics"

Oliver Gurney-Champion, MSc project — 2011
Project title: "Modeling of the ionizing effects of black holes on their environment"

Mentoring

NYAS Project *1000 Girls, 1000 Futures*: mentored a female high school students interested in the natural sciences — 2016-2017

Project *CyberMentor*: mentored two female high school students interested in the natural sciences — 2011-2012

Service to the Community

Invited referee for Nature, ApJ, MNRAS, A&A — 2013-present

Scientific Organizing Committee, Astro Hack Week — 2018
http://astrohackweek.org/2018/

Mini-Symposium Chair, SciPy — 2018
https://scipy2018.scipy.org/

Scientific Organizing Committee, Python in Astronomy — 2018
http://openastronomy.org/pyastro/2018/

Chair, DIRAC Postdoctoral Fellows Hiring Committee — 2018
http://astrohackweek.org/2018/

Scientific Organizing Committee, Astro Hack Week — 2017
http://astrohackweek.org/2017/

Program Committee, JupyterCon — 2017

Scientific Organizing Committee, Python in Astronomy — 2017
http://openastronomy.org/pyastro/2017/

Scientific Organizing Committee, Astro Hack Week — 2016
http://astrohackweek.org/2016/

Organizer, NYU Center for Data Science Lunch Seminar Series — 2016

Chair, Scientific Organizing Committee, Astro Hack Week — 2015
http://astrohackweek.org/2015/

Scientific Organizing Committee, Astro Hack Week — 2014
http://astrohackweek.org/2014/

Organizer, Journal Club at the Astronomical Institute of the University of Amsterdam — 2013-2015

Local Organizing Committee, LOFT Science Meeting — 2011

Local Organizing Committee, 2nd Summer School on Multiwavelength Astronomy, Amsterdam — 2010

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Publications

Lead Author

Hack Weeks as a Model for Data Science Education and Collaboration
Huppenkothen, D. et al.; *Proceedings of the National Academy of Sciences* (in press)

On the Statistical Properties of Cospectra
Huppenkothen, D. & Bachetti, M.; *Astrophys. J. Sup.* 236 p.11pp (2018)

Exploring the Long-Term Evolution of GRS 1915+105
Huppenkothen, D. et al.; *Mon. Not. R. Astron. Soc.* 466 p.2364-2377. (2017)

Detection of Very Low-Frequency Quasi-Periodic Oscillations in the 2015 Outburst of V404 Cygni
Huppenkothen, D. et al.; *Astrophys. J.* 834 17 pp. (2017)

Dissecting magnetar variability with Bayesian hierarchical models
Huppenkothen, D. et al.; *Astrophys. J.* 810 22 pp. (2015)

Quasi-periodic Oscillations in Short Recurring Bursts of Magnetars SGR 1806-20 and SGR 1900+14 Observed with RXTE
Huppenkothen, D. et al.; *Astrophys. J.* 795 114 pp. (2014)

Intermittency and Lifetime of the 625 Hz Quasi-periodic Oscillation in the 2004 Hyperflare from the Magnetar SGR 1806-20 as Evidence for Magnetic Coupling between the Crust and the Core
Huppenkothen, D. et al..; *Astrophys. J.* 793 129 pp. (2014)

Quasi-Periodic Oscillations in the Short Recurring Bursts of the Soft Gamma Repeater J1550-5418
Huppenkothen, D. et al..; *Astrophys. J.* 787 128 pp. (2014)

Quasi-Periodic Oscillations and Broadband Variability in Short Magnetar Bursts
Huppenkothen, D. et al.; *Astrophys. J.* 768 87 pp. (2013)

Contributing Author

Detection of non-thermal X-ray emission in the lobes and jets of Cygnus A
de Vries, M.; Wise, M. W.; Huppenkothen, D. et al.; *Mon. Not. R. Astron. Soc.* 478 p.4010-4029 (2018).

No Time for Dead Time: Use the Fourier Amplitude Differences to Normalize Dead-time-affected Periodograms
Bachetti, M. & Huppenkothen, D.; *Astrophys. J.* 853 6 pp. (2018)

The rotational phase dependence of magnetar bursts
Elenbaas, C.; Watts. A.L.; Huppenkothen, D.; *Mon. Not. R. Astron. Soc.* 476 p.1271-1285 (2018)

APO Time-resolved Color Photometry of Highly Elongated Interstellar Object 1I/'Oumuamua
Bolin, B. et al.; including Huppenkothen, D.; *Astrophys. J.* 852 10 pp. (2018)

Magnetar giant flare high-energy emission
Elenbaas, C.; Huppenkothen, D. et al.; *Mon. Not. R. Astron. Soc.* 471 p.1856-1872 (2017)

X-ray and radio observations of the magnetar SGR J1935+2154 during its 2014, 2015, and 2016 outbursts
Younes, G. et al, including Huppenkothen, D.; *Astrophys. J.* 847 15 pp. (2017)

Burst and Outburst Characteristics of Magnetar 4U 0142+61
Gögüs, E. et al., including Huppenkothen, D.; *Astrophys. J.* 835 8 pp. (2017)

Magnetar-like X-Ray Bursts from a Rotation-powered Pulsar, PSR J1119-6127
Gögüs, E. et al., including Huppenkothen, D.; *Astrophys. J. Letters* 829 7 pp. (2016)

False periodicities in quasar time-domain surveys
Vaughan, S. et al., including Huppenkothen, D.; *Mon. Not. R. Astron. Soc.* 461 3145 pp. (2016)

The wind nebula around magnetar Swift J1834.9-0846
Younes, G. et al., including Huppenkothen, D.; *Astrophys. J.* 824 12 pp. (2016)

The Five Year Fermi/GBM Magnetar Burst Catalog
Collazzi, A.C. et al., including Huppenkothen, D.; *Astrophys. J. Sup.* 218 11 pp. (2015)

Time Resolved Spectroscopy of SGR J1550-5418 for the Fermi/GBM Bursts
Younes, G. et al., including Huppenkothen, D.; *Astrophys. J.* 785 52 pp. (2014)

The Outflow History of Two Herbig-Haro Jets in RCW 36: HH1042 and HH1043
Ellerbroek, A.M. et al., including Huppenkothen, D.; *Astron. Astrophys.* 551 A5 pp. (2013)

Detection of Spectral Evolution in the Bursts Emitted During the 2008-2009 Active Episode of SGR J1550-5418
von Kienlin, A. et al., including Huppenkothen, D.; *Astrophys. J.* 755 150 pp. (2012)

Using the X-ray Morphology of Young Supernova Remnants to Constrain Type, Ejecta Distribution and Chemical Mixing
Lopez, L.A. et al., including Huppenkothen, D.; *Astrophys. J.* 732 114 pp. (2011)

Typing Supernova Remnants Using X-ray Line Emission Morphologies
Lopez, L.A. et al., including Huppenkothen, D.; *Astrophys. J.* 706 106 pp. (2009)

Non-refereed

ZTF Bright Transient Survey Classifications
Graman, M.L. et al., including Huppenkothen, D.; *Astronomer's Telegram* 11745 (2018)

The LOFT mission concept: a status update
Feroci, M et al., including Huppenkothen, D.; *Proceedings of the SPIE* 9905 20 pp. (2016)

eXTP – enhanced X-ray Timing and Polarimetry Mission
Zhang, S.N. et al., including Huppenkothen, D.; *Proceedings of the SPIE* 9905 16 pp. (2016)

Python in Astronomy 2016 Unproceedings
Robitaille, T. et al., including Huppenkothen, D.; DOI: 10.5281/zenodo.56793

FERMI/Gamma-ray Burst Monitor upper limits assuming a magnetar origin for the repeating Fast Radio Burst source, FRB 121102
Younes, G. et al., including Huppenkothen, D.; Astronomer's Telegram, 8781

New Methods for Timing Analysis of Transient Events, Applied to Fermi/GBM Magnetar Bursts
Huppenkothen, D. et al.; Proceedings of the 4th International Fermi Symposium, 2013, arXiv: 1303.1370

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Presentations

Invited

Bayesian Inference for X-ray Timing 2018
42nd COSPAR Scientific Assembly, Pasadena, CA, USA

Data Science: Notes from an Emerging Field 2018
Open Questions in Astrophysics, Copenhagen, Denmark

Machine Learning in the Age of Survey Astronomy 2018
XMM-Newton 2018 Science Workshop, Madrid, Spain

From Asteroids to Black Holes: Data Science in Time Domain Astronomy 2018
University of Washington Data Science Summit, Seattle, WA, USA

Classifying Black Hole States: Lessons Learned in Machine Learning 2018
231st Meeting of the American Astronomical Society

The Whole is Greater than the Sum of its Parts: Better Inference Through Bayesian Hierarchical Modelling 2017
16th Meeting of the High-Energy Astrophysics Division of the American Astronomical Society

Time Series Analysis for a Multiwavelength Future 2016
HAP Workshop: Monitoring the Non-Thermal Universe, Cochem, Germany

Timing V404 Cygni during its 2015 outburst 2016
11th INTEGRAL Conference, Amsterdam, The Netherlands

Ripples in a Stormy Sea: Quasi-Periodic Oscillations in the Fermi Gamma-Ray Burst Monitor 2015
6th International Fermi Symposium, Arlington, VA, USA

Probing Neutron Star Physics with Quasi-Periodic Oscillations in Magnetar Bursts 2015
Spring Meeting of the American Physical Society, Baltimore, MD, USA

Magnetars, QPOs and the Neutron Star Crust 2014
FUSTIPEN Topical Meeting "Structure of the neutron star crust: experimental and observational signatures", Caen, France

Colloquia & Seminars

Fun Statistics with Fourier Spectra 2018
Harvard-California Astrostatistics Collaboration Seminar, Center for Astronomy, Harvard University, USA

X-ray Astronomy in the Era of Data Science 2018
Physics Colloquium, University of Delaware, USA

Data Science for X-ray Astronomy 2017
Astronomy Colloquium, University of Washington, USA

Wrong But Useful: Statistics and Machine Learning for High-Energy Astrophysics 2017
Physics Colloquium, Rheinisch-Technische Universität Aachen, Germany

How to Time a Black Hole: Time series Analysis for the Multi-Wavelength Future 2017
Astronomy Seminar, Technical University Dortmund, Germany

Improving Candidate Selection for Academic Conferences and Beyond 2017
Seminar at the European Space Research and Technology Centre (ESTEC), The Netherlands

Exploring the Long-Term Evolution of Black Holes with Machine Learning 2017
Leiden Faculty colloquium

How to Time a Black Hole: Unravelling fundamental physics with X-ray variability 2017
Chodera Lab Seminar, Memorial Sloan-Kettering Cancer Center, USA

How to Time a Black Hole: Time Series Analysis for the Multi-Wavelength Future 2017
Astronomy Seminar, University of Würzburg, Germany

Why your field needs a hack week 2016
BIDS Data Science Lecture Series, University of California Berkeley, USA

Exploring the Violent Universe: A Data Science Approach to X-ray Astronomy 2016
The 4th Annual DC/VA/MD Summer Astrophysics Meeting, George Washington University, Washington, DC, USA

Timing Black Holes: Unravelling Fundamental Physics with X-ray Variability 2016
Statistics colloquium, University of Auckland, New Zealand

Exploring the Violent Universe: A Data-Driven Approach to X-ray Astronomy 2015
Physics colloquium, George Washington University, Washington, DC, USA

Are magnetar short bursts caused by star quakes? Using burst variability to constrain magnetar physics 2015
HEAD lunch seminar, Center for Astrophysics, Harvard University, Cambridge, MA, USA

Unravelling Magnetar Variability: A data-driven approach to X-ray timing 2015
Chandra X-ray Telescope Grou, MIT, Cambridge, MA, USA

Searching the Haystack of Magnetar Bursts 2014
SPIMAX Seminar, University of Oxford, Oxford, UK

A Zoo of Magnetar Bursts: Understanding Magnetar Variability 2013
Monash University, Melbourne, Australia

Assessing the Impact of UV/X-ray Emission from Accreting Black Holes on the ISM 2010
Colloquium, Dr. Karl Remeis-Sternwarte Bamberg, Germany

Contributed

Here Be Dragons: Effective (X-ray) Timing with the Cospectrum 2018
231st Meeting of the American Astronomical Society, Washington DC, USA

Entrofy your Cohort 2017
Moore-Sloan Data Science Summit

Using Python to Study Black Holes 2016
PyGotham 2016, New York, USA

Detection of Low-Frequency Quasi-Periodic Oscillations in the 2015 Outburst of V404 Cygni 2016
15th Meeting of the High Energy Astrophysics Division of the American Astronomical Society, Naples, FL, USA

Entrofy: Participant Selection Made Easy 2016
Python in Astronomy 2016, University of Washington, Seattle, USA

Quasi-periodic Oscillations in V404 Cygni 2015
Time Domain Astrophysics with Swift, Clemson, SC, USA

New Statistical Tools for Studying Variability in Transient Light Curves 2015
Hot-Wiring the Transient Universe IV, Santa Barbara, CA, USA

New Methods To Understand Variability in Astrophysical Transients 2013
Maximum Entropy and Bayesian Inference, Canberra, Australia

Timing Transients: New Methods To Understand Transient Variability 2013
Astroinformatics 2013, Sydney, Australia

Timing Transients: Understanding Magnetar Variability 2013
Explosive Transients, Lighthouses of the Universe, Santorini, Greece

Understanding Magnetar Variability: A Magnetar Burst Zoology 2013
NS2013: Latest Results from the Neutron-Star Laboratory, Amsterdam, The Netherlands

New Methods for Timing Analysis of Transient Events 2012
NOVA Network 3 Meeting, Nijmegen, The Netherlands

New Methods for Timing Analysis of Transient Events 2012
4th International Fermi Symposium, Monterey, CA, USA