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Daniela Huppenkothen

Curriculum Vitae

Experience

Moore-Sloan Data Science Postdoctoral Fellow — 2014–present
New York University

Education

PhD Astronomy & Astrophysics — 2010–2014
University of Amsterdam, The Netherlands
Title: *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
University of Amsterdam, The Netherlands

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

Research Interests

- High-energy transient phenomena, black holes, neutron stars
- Bayesian inference and Bayesian hierarchical modeling for X-ray data analysis
- Machine learning; Hidden Markov Models and related methods
- Open-source software development for X-ray data analysis
- Non-stationary time series in astronomy

Publications

14 refereed; 2 under review; 4 non-refereed. List attached.

Presentations

3 invited, 9 seminars and 11 contributed. List attached.

External Grants

Fermi Guest Investigator Program — 2016
Unravelling Solar Flare Variability with Fermi/GBM
USD 55K

LSSTC Enabling Science Program — 2015
Astro Hack Week 2015
USD 5K

Honours and Awards

HSP Huygens scholarship — 2008-2010

Scholarship awarded by "Studienstiftung des Deutschen Volkes" (German National Academic Foundation) — 2005-2010

Merit-based scholarship awarded by Jacobs University Bremen — 2005-2008

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

Teaching

Lectures

IMPRS Heidelberg Summer School on Astrostatistics and Data Mining — 2016
Gave 5 lectures and 3 exercise sessions on Bayesian/frequentist statistics, counting statistics, time series analysis and Fourier methods

Astro Hack Week 2015 — 2015
Workshop on exploratory data analysis and visualization

Astro Hack Week 2014 — 2014
Workshop on classical statistics

Deutsche Schülerakademie — 2012
Devised and lectured 10-day course in astronomy

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

Himanshu Mishra, Google Summer of Code — 2016

Viviana Meerstra, BSc project — 2012

Oliver Gurney-Champion, BSc project — 2011

Mentoring

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

Service to the Community

Referee — 2013-present
Nature, The Astrophysical Journal, Monthly Notices of the Royal Astronomical Society, Astronomy & Astrophysics

Scientific Organizing Committee, Python in Astronomy — 2017

Scientific Organizing Committee, Astro Hack Week — 2016

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

Chair, Scientific Organizing Committee, Astro Hack Week — 2015

Scientific Organizing Committee, Astro Hack Week — 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

Professional Memberships

- International Astrostatistics Association.
- American Astronomical Society
- Deutsche Physikalische Gesellschaft (German Society of Physicists)

Skills

Programming

- *Python* plus scientific stack (*Numpy*, *SciPy*, *AstroPy*, *pandas*, *scikit-learn*, etc).
- Code management (*git*), issue tracking (*GitHub*), continuous integration (*Travis*).
- Code examples: http://github.com/dhuppenkothen.

Methods

- Bayesian inference, frequentist statistics, model comparison, hierarchical modeling
- Time series analysis methods: Fourier analysis and (quasi-)periodicity detection.
- Machine learning for time series applications: Hidden Markov Models, Gaussian Processes

Management

- Lead developer of open-source *Python* time series methods library for astronomy http://github.com/StingraySoftware/stingray.
- Primary organizer of Astro Hack Week 2015, ran both SOC and LOC.

Languages

- German (native), English (fluent), French (intermediate), Dutch (intermediate).

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Publications

Refereed

Lead Author

Detection of Very Low-Frequency Quasi-Periodic Oscillations in the 2015 Outburst of V404 Cygnis
Huppenkothen, D et al.; *Astrophys. J.* submitted

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
D. Huppenkothen 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

Magnetar Behavior of a Rotation Powered Pulsar, PSR J1119-6127
Gögüs, E. et al., including Huppenkothen, D.; accepted for publication in *ApJL*

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

eXTP – enhanced X-ray Timing and Polarimetry Mission
Zhang, S.N. et al., including Huppenkothen, D.; arXiv: 1607.08823

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

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

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

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