Curriculum Vitae – Ingo P. Waldmann

PERSONAL INFORMATION

Waldmann, Ingo Peter
ORCID: 0000-0002-4205-5267
Date of birth: 18th July 1986
Nationality: German
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RESEARCH FOCUS

My expertise is in Bayesian modelling and information theory applied to exoplanetary atmospheric measurements. In particular, I have pioneered techniques for the data analysis of very low signal observations and the de-correlation of non-linear, correlated systems. These include the use of supervised and unsupervised machine learning, deep neural networks for pattern recognition, non-linear component separation and information geometry to map high-dimensional probability spaces. My work finds application both in the data analysis of weak signals and the modelling of complex atmospheres of extrasolar planets.

EDUCATION

2009 - 2012   PhD in Astrophysics
Dept. Physics & Astronomy, University College London, UK
Advisors: Prof. Tinetti, Dr. Fossey
My thesis entitled "Of 'Cocktail Parties' and Exoplanets" pioneered the data analysis of exoplanetary time series and spectra using unsupervised machine learning algorithms. I finished my PhD within 2.5 years (1.5 years ahead of schedule)
Awards: The 'Jon Darius Memorial Prize' for best annual PhD thesis of the Faculty.

2005 - 2009   M.Sci. & B.Sci in Astropysics & Planetary Sciences,
Mathematical & Physical Science Faculty, Dept. of Natural Science, University College London, UK
Degree awarded: First Class Honours
Awards: 1) Brian Duff Memorial Prize for best Master thesis in Physics. 2) Natural Science Award for best final year performance in the Mathematical and Physical Sciences.

CURRENT POSITION

2014 - present Senior Research Associate & Lecturer at UCL
Outline: Science and Project lead on de-correlation of observational data using machine-learning; Project lead on radiative transfer inverse retrieval modelling.
Funding body: UK Space Agency, European Research Council (ExoLights/ExoMol)

PREVIOUS POSITIONS

2014   NASA Fellow (NPP) at NASA-Jet Propulsion Laboratory
Outline: Chief developer of data analysis framework for the NASA/FINESSE space mission and the JPL-NMT/NESSI exoplanet survey. I decided to decline this fellowship in favour of my work for the European Space Agency – EChO space mission concept.
Funding body: NASA

2012 – 2014   Research Associate at UCL
Outline: Key developer & science lead of the European Space Agency's EChO space-mission concept's end-to-end mission simulator.
Funding body: UK Space Agency

FELLOWSHIPS & AWARDS
- NASA Postdoctoral Fellowship (2014)
- Jon Darius Memorial Prize for Outstanding Postgraduate Research: awarded for the best PhD thesis in Physics.
- Brian Duff Memorial Prize for best Masters Thesis in Physics: awarded for the best Masters thesis in Physics.
- STFC Postgraduate Studenship
- Natural Science Award for best final year performance

SUPERVISION OF GRADUATE AND POST-GRADUATE STUDENTS
2012 – 2016   Marco Rocchetto (PhD, Dept. Physics & Astronomy, UCL)
2014 – 2017   Angelos Tsiaras (PhD, Dept. Physics & Astronomy, UCL)
2016 – 2019   Tiziano Tsiaras &Mario Damiano (PhD, Dept. Physics & Astronomy, UCL)
2013 – 2016   Giuseppe Morello (co-supervised PhD, Dept. Physics & Astronomy, UCL)
2012 – 2015   Ryan Varley co-supervised PhD, Dept. Physics & Astronomy, UCL)
2012 – present Supervised 5 Masters project (2 of which currently)

CURRENT PROJECT LEADS:
- Data analysis group leader of ESA/M4 Ariel space-mission concept.
- Data analysis group leader of UK Twinkle space-mission concept.
- Chief UK contact for atmospheric modelling for the JWST/MIRI consortium.
- Chief UK contact for atmospheric modelling for the US/UK EXCITE high-altitude balloon consortium.
- Chief-designer of the data analysis framework for the JPL-NMT/NESSI exoplanet survey instrument

RECENT PRESS RELEASES:
"Dreaming of Atmospheres", Royal Astronomical Society - UCL 2016 press release; e.g.:
- Over 30 news articles in 4+ languages.
- http://www.dailymail.co.uk/sciencetech/article-3666639/Meet-Robert-alien-hunting-AI-Smart-software-scour-exoplanets-signs-life.html
- https://blogs.nvidia.com/blog/2016/08/01/deep-learning-will-speed-search-for-extraterrestrial-life
- https://www.sciencedaily.com/releases/2016/06/160627214628.htm
- http://www.popsci.com/how-scientists-will-use-artificial-intelligence-to-find-aliens

"Detection of an Atmosphere Around the Super-Earth 55 Cancri e",
European Space Agency - UCL 2016 press release:
- Over 200 news articles in 12+ languages; e.g.:
- http://www.forbes.com/sites/bridaineparnell/2016/02/17/super-earths-atmosphere-detected-for-the-first-time-and-its-dry-hot-and-poisonous/\#172a04591879
- http://www.bbc.co.uk/news/science-environment-35586936
- http://www.seeker.com/hubble-studies-super-earth-atmosphere-for-first-time-1770881884.html
- https://www.spacetelescope.org/news/heic1603/

TEACHING ACTIVITIES
2016   Lecturer at the Como Summer School on Exoplanets, Como, Italy
2015 – 2017   Course convenor & Lecturer: Astronomy Dissertations (PHAS1514/2523) – UCL, UK
2012 – 2015   Course convenor & Lecturer: Exoplanets and Spectroscopy (PHAS2525) – UCL, UK
2014   Lecturer at the International ATIC winter school for Atmospheric Physics, Lethbridge, Canada
2011 – 2012   Lecturer at the European Research Course on Atmospheres (ERCA), Uni. Grenoble,

France

ORGANISATION OF SCIENTIFIC MEETINGS
2016   Organiser of the James Webb Space Telescope – MIRI consortium atmospheric modelling group, 20 participants, hosted at UCL.

2012 - 2016   Co-organiser of ARIEL and EChO consortium meetings, over 15 in various EU countries, between 30 – 150 participants.

INSTITUTIONAL RESPONSIBILITIES
2012 – 2016   Graduate Student Advisor, of 6 PhD level and 5 Masters level students, UCL, UK

2012 – 2015   Organiser of Departmental Astrophysics Seminars, UCL, UK

2016 – 2018   Member of Faculty Large Scale Computing Committee; Astrophysics PDRA representative, UCL, UK

2012 – 2015   Member of a Staff/Student Departmental Committee; PDRA representative, UCL, UK

COMMISSIONS OF TRUST
2016   Science and Technology Funding Council (STFC) University Grant referee, UK

2014 - present   William Herschel Telescope proposal referee, UK

2012 – present   Referee for the following journals: Astrophysical Journal, Astronomical Journal, Astronomy & Astrophysics, ICARUS, Proceedings of the Royal Society

MEMBERSHIPS OF SCIENTIFIC SOCIETIES
2007 – present   Fellow of the Royal Astronomical Society

2009 – present   Member of the American Astronomical Society

2009 – present   Member of the European Geophysical Union

2007 – present   Fellow of the British Astronomical Association

MAJOR COLLABORATIONS
- James Webb Space Telescope – MIRI atmospheric modelling consortium, UK representative
- European Space Agency - ARIEL consortium member and Data analysis lead
- NASA/JPL - FINESSE consortium, atmospheric modelling UK representative
- European Space Agency – EChO consortium member and mission end-to-end modelling lead

LANGUAGES
German (native), English (bilingual), Spanish (proficient), French (beginner)

TALKS & SEMINARS:
- **45+ talks at international conferences, lectures and seminars (21 invited) from 2010 - present**
- International ATIC winter school for Atmospheric Physics (PhD/PDRA Level) lecturer (Lethbridge, Canada). Topics: 1) Machine learning in spectroscopic data analysis, 2) atmospheric spectroscopy - 2014
- European Research Course on Atmospheres (PhD/PDRA level) lecturer (Grenoble, France). Topics: 1) Atmospheric spectroscopy of exoplanets, 2) Low and high-resolution data analysis of ground and space based exoplanetary observations - 2011 & 2012
- Chaired sessions at various international conferences and meetings (e.g. Committee on Space Research/COSPAR , American Astronomical Society – DPS, Europlanet, Royal Astronomical Society National Astronomy Meeting, European Space Agency – EChO and ARIEL meetings)

Selected Invited Talks and Seminars
- *Re-Works conference on machine learning (Amsterdam, Netherlands) – shed. June 2017*
- Uni. Bern Seminar (Bern, Switzerland) - Nov. 2016
- Uni. Arizona Seminar (Tuscon, USA) - Oct. 2016
- Como Summer School (Como, Italy) - June 2016
- Harvard CfA Seminar (Boston, USA) - Apr. 2016
- Laboratoire d'Astrophysique de Bordeaux Seminar (Bordeaux, France) - Mar. 2016
- Centre Energie Atomique (CEA) seminar (Paris, France) - Feb. 2016
- Institute d'Astrophysique Paris colloquium (Paris, France) - 2015
- NASA/Goddard Space Center seminar (Washington, USA) - 2015
- ExoMol conference, keynote talk (London, UK) - 2015
- Royal Astronomical Society: Twinkle workshop (London, UK) - 2015
- Remote Sensing of Exoplanets winter school (Lethbridge, Canada; two lectures) - 2014
- IAP seminar (Paris, France) - 2014
- COSPAR invited talk (Bangkok, Thailand) - 2013
- Rutherford Appleton Laboratories seminar (Oxfordshire, UK) - 2013
- Max Planck Institute for Astronomy (Heidelberg, Germany) - 2013
- Centre for Inverse Processes (London, UK) - 2013
- Gaia meeting (Turin) - 2012
- Queen Mary University Phyiscs seminar - 2012
- European Research Course on Atmospheres (Grenoble, France; two lectures) - 2012
- European Research Course on Atmospheres (Grenoble, France; one lecture) - 2011
- UCL Astrophysics Seminar (London, UK) - 2011
- IEEC invited seminar (Barcelona) - 2010