

# Robert J. J. Grand

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## *Curriculum Vitae*

### Personal Information

Name Dr. Robert John James Grand  
Institute(s) Max-Planck-Institute for Astrophysics, Karl-Schwarzschild-Str. 1, D-85748 Garching, Germany  
ORCID ID 0000-0001-9667-1340  
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### Research Employment

11.18 - **Independent Research Fellow**, *Max-Planck Institute for Astrophysics*.  
present Fixed-term staff scientist  
10.14-11.18 **Postdoctoral researcher**, *Heidelberg Institute for Theoretical Studies (HITS), Heidelberg Centre for Astronomy (ZAH)*.  
Employed by ZAH and funded by SFB grant 881 under project A1: "The Milky Way System". Delegated to HITS under guidance of Prof. Dr. Volker Springel.

### Education

10.10-07.14 **PhD at Mullard Space Science Laboratory, University College London**.  
Thesis entitled: "A numerical study of spiral galaxies and dynamical effects of spiral arms", under the supervision of Dr. Daisuke Kawata and Prof. Mark Cropper.  
2009 **Friedrich-Alexander-Universität, Nürnberg**.  
Summer Internship at Friedrich-Alexander-Universität, Nürnberg, 2009, working in the High Energy Gamma Ray detection group for the HESS instrument, 2009.  
2006-2010 **Masters in Physics and Astrophysics, Leeds University, department of Physics & Astronomy, Leeds, 1st class with Honours**.  
with an Erasmus semester at Universität de Valencia, 2009. Project topic: star formation.

### Research Interests and Scientific Achievements

- **Numerical simulations of galaxy formation and evolution.**  
I lead the Auriga project - a modern suite of cosmological zoom simulations with a comprehensive model for galaxy formation. Published the main method paper and first Auriga science paper.
- **Galactic archaeology and chemical evolution.**  
Published a new mechanism for the formation of a Milky Way thin/thick disc dichotomy, and made the first cosmological mock catalogues for ESA's *Gaia* mission.
- **Galactic dynamics.**  
Showed that spiral arms wind-up on dynamical timescales, and that they drive non-axisymmetric kinematic and metallicity patterns, which I verified in NGC 6754 using VLT/MUSE data. Re-derived Milky Way mass estimate based on first study of stellar streams in cosmological MHD simulations.

- **Feedback and gas flows.**

Showed that stellar and black hole feedback can limit the growth of stellar discs of Milky Way mass galaxies for first time.

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## Awards

Prizes **The Alan Johnstone award**, 2013.

Outstanding Scientific Achievement by a Research Student, UCL

**UK National Astronomy Meeting (NAM) Poster Prize**, NAM, 2011.

Grants **Large (>1M CPU hours) computing grants.**

LRZ large project award, 30M CPU hours (2016), CI; STFC Dirac 9th call, 1.28M CPU hours (2017), CI; DECI-13 PRACE award, 8.64M CPU hours (2016), CI

**Research funding grants.**

Flanders Research Foundation (FWO) proposal 2019: "Galaxy evolution: a comparison between simulations and observations on spatially resolved scales" - 312,000 Euro (2 PhD students), CI

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## Outreach and Media

**Auriga Project website**, <https://wwwmpa.mpa-garching.mpg.de/auriga>.

Contains simulation overview, images, movies, publication list and public data release

**Nature research highlight**, 'How galaxies grew', June 19th, 2017.

Nature, Volume 546, Issue 7659

**SET (now STEM) for Britain Exhibition Finalist**, March 17th, 2014.

Presentation to non-scientific and cross-disciplinary audience

**Numerous press releases and scientific news articles.**

including 2 Royal Astronomical Society press releases (2011, 2017)

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## Student supervision

11.18-pres. **PhD Co-supervisor**, Max-Planck-Institute for Astrophysics.

10.16-01.18 **PhD project co-supervisor**, Heidelberg Institute for Theoretical Studies.

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## Refereeing

11.14-pres. Monthly Notices of the Royal Astronomical Society

12.17-pres. Astronomy & Astrophysics

04.18-pres. Astrophysical Journal

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## Scientific responsibilities

06.2019 **Scientific Organising Committee & session chair**, EWASS symposium: 'The dynamics of disc galaxies'.

02.2018 **Conference session organiser & Keynote speaker**, Heidelberg Astronomical Convention.

02.2017 **Conference session convenor & organiser**, Heidelberg Astronomical Convention.

2017-pres. **STFC Dirac Resource Allocation Committee Peer Review.**

2013 **Journal club organiser**, MSSL, UCL.

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## Conference talks and Seminars

**43 talks, of which 22 are invited**, listing those from 12.2018 - 11.2019.

- 11.2019 Conference, 'First Shanghai Assembly on Cosmology and Galaxy Formation', Shanghai, China (invited)
- 10.2019 Conference, 'The Milky Way 2019: LAMOST and other leading surveys', Three Gorges University, China (invited)
- 09.2019 Conference, Clues meeting 2019, Lyon (invited)
- 06.2019 Conference, EWASS 2019 'The dynamics of disc galaxies', Lyon
- 05.2019 Conference/workshop, 'Dynamical Models for Stars and Gas in Galaxies in the Gaia Era', KITP UCSB
- 03.2019 Conference, 'Constraining the formation history of galaxies with signatures of accretion events', La Serena, Chile (invited)
- 02.2019 Seminar, Aarhus University (invited)
- 12.2018 Conference, 'Computational galaxy formation 2018', Leiden (invited)

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## Publications (as of July 2019)

**47 peer-reviewed articles**, 13 first author, ([ADS link](#) for published papers).

**1412 citations**, 586 first author.

**h-index: 22.**

### Top 5 1st author papers

- **Grand et al. 2017, MNRAS, 467, 179**, (106 citations).  
'The Auriga Project: the properties and formation mechanisms of disc galaxies across cosmic time'
- **Grand et al. 2016, MNRAS, 459, 199**, (64 citations).  
'Vertical disc heating in Milky Way-sized galaxies in a cosmological context'
- **Grand et al. 2013, A&A, 553A, 77**, (48 citations).  
'Spiral arm pitch angle and galactic shear rate in N-body simulations of disc galaxies'
- **Grand et al. 2012b, MNRAS, 426, 167**, (75 citations).  
'Dynamics of stars around spiral arms in an N-body/SPH simulated barred spiral galaxy'
- **Grand et al. 2012a, MNRAS, 421, 1529**, (119 citations).  
'The dynamics of stars around spiral arms'

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## Main Collaborators

Volker Springel, Simon White, Carlos Frenk, Daisuke Kawata, Rüdiger Pakmor, Adrian Jenkins, Noam Libeskind, Alis Deason, Azadeh Fattahi, Facundo Gómez, Federico Marinacci