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|---|---|
| Name: | Dr Thorsten (Thor) Tepper García |
| Address: | Provided upon request |
| Mobile: | Provided upon request |
| Email: | ttepperg @ gmail.com |
| Web: | http://www.thorsten.mx |
| Coding: | https://bitbucket.org/tepper/ |


**Spoken Languages**

German (native) – Spanish (native) – English (Academic IELTS score 8.5/9) – Italian (fluent)

*Any text highlighted in blue colour is a *clickable* hyperlink. Some of these require a browser and an active internet connection.

### Referees

Provided upon request

## About Me

I am a professional astrophysicist specialised on computer simulations and theory. My everyday activities include working in Linux and macOS environments, coding in different programming languages to run simulations on high-performance computing systems, analyse and visualise simulation data (→ Projects), and writing research reports (→ Publications). I'm passionate about discovering and learning new things every day. And I'm also an avid athlete. One noteworthy fact about me: There is a mathematical function of relevance in the field of Astrophysics that bears my name (→ Wikipedia entry). Recently, I was appointed to work on a project which, being outside my field of past expertise, has allowed to expand my knowledge considerably (→ Professional Experience). I'm currently affiliated to the Sydney Institute for Astrophysics (SIfA) as Research Fellow working on the field of Galactic Seismology.

## Key Strengths

- +15 years experience in numerical simulations, data analysis and visualisation
- High-performance computing on distributed- and shared memory systems
- Proficiency in computer programming, data structures and algorithms.
- Understanding of procedural and object-oriented programming languages
- Experience with Web Development and related tools
- Skilled with organisational and people management skills

## Technical Skills

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|---|---|
| Operating systems: | Linux, macOS |
| Programming languages: | python; also C, fortran (all serial and parallel) |
| Data visualisation: | matplotlib, gnuplot |
| Web development: | html, css, Javascript (front/back), D3, React (VR/360), A-Frame |
| Other: | LaTeX, Version control (git), High-Performance Computing (cloud, clusters) |

## Professional Experience (continues on next page)

Dec 2021 –

**Research Fellow in Galactic Seismology**
Sydney Institute for Astrophysics (SIfA), University of Sydney, Australia

With a view to the GALAH Survey and the Gaia Survey Data Release 3, I'm conducting in-depth studies of the response of the Galactic stellar and gaseous discs to the perturbation triggered by a crossing satellite. To this end, I design, run, and analyse state-of-art N-body and hydrodynamical simulations (→ Projects). My tasks include, among others,

- Written and verbal communication of my research results in peer-reviewed journals and specialised conferences and workshops
- Supervision of students at the undergraduate and graduate levels
- Organisation of research seminars and other services to the research community

Jul 2020 – Dec 2021

**Research Fellow in Sustainability**
Centre for Integrated Sustainability Analysis, University of Sydney, Australia

As part of the project *Open Analysis to Address Slavery in Supply Chains* (OAASIS), I developed single-handedly and from scratch a web-tool, dubbed spaJS, to educate the general public about the nature of multi-tier supply chains with the ultimate goal to raise awareness about the risks of *Modern Slavery* in today's global economy. Among other attributes, spaJS makes use of WebWorkers to complete computationally intensive task in the background without blocking the browser's main window. My activities relied heavily on the use of:

- HTML, CSS, Javascript, ReactJS, ReactVR / React360, A-Frame, D3 (certified by LinkedInLearning and the University of Sydney)
- Web Developer Tools and minifying (uglyfying) tools, etc.
- Multi-Regional Input-Output analysis, and metrics to quantify economic, environmental, and social footprints

Recently, we gave a presentation to the OASSIS funding body, The Physics Foundation at The University of Sydney (→ Zoom Recording)

*Note that during this time I continued to be affiliated to the Sydney Institute for Astronomy where I conduct my research as an astrophysicist.*
The OAASIS project, in particualar spaJS, was nationally recognised for its innovation at the Anti-Slavery Australia Freedom Award 2023.

Jan 2015 – Jun 2020 **Postdoctoral Research Associate in Astrophysics**
Sydney Institute for Astronomy, University of Sydney, Australia

My research focused on two different aspects of galaxy evolution: 1) the study of gas accretion onto galaxies; 2) the dynamical evolution of galaxies. I have addressed both these tasks using computer simulations, whose analysis and visualisation requires dealing with vast volumes of data (typically $\sim$ 1 TB). The results of my research during this period have been reported in a number of publications by high-impact peer-reviewed journals (→ Publications). My main activities working within a team of 2-3 people included:

- Design, execution, and analysis of N-body- and magneto/hydrodynamic simulations of galaxies using multi-processor (Open MPI) applications (Fortran90) ran on High-Performance Computing facilities (batch system: PBS)
- Development of a Python code for calculations of two-body orbit integration with mass evolution (→ Bitbucket Repo)
- Development of analysis and visualisations tools[1] using Python, Fortran90, and C
- GUI development with Python (TKinter, Matplotlib) (→ Bitbucket Repo)
- Designing and maintaining a dedicated website to showcase my projects (→ Projects)
- Organisation and participation at international conferences and seminars (→ Service and Engagement)
- Supervision of undergraduate and graduate students (→ Supervision)
- Multi-media support for a science press release (→ Media)

Jun 2014 – Dec 2015 **Australian Research Council Super Science Fellow**
Sydney Institute for Astronomy, University of Sydney, Australia

My tasks centred around a numerical study of the Magellanic Stream using fluid-dynamical simulations. The outcome of this research is featured in publication by a high-impact peer-reviewed journal (→ Publications). My activities included:

- Development of analysis and visualisation tools[1] in C
- Development of C code to generate fractal gas distributions (→ Bitbucket Repo)
- Development of a C code to generate stable initial conditions of gaseous disc embedded in external gravitational potentials (→ Bitbucket Repo)

[1] Codes available upon request

Sep 2010 – May 2014 **Postdoctoral Researcher**
Institut für Physik und Astronomie, Universität Potsdam, Germany

My project focused on the analysis of the gaseous, extended haloes of galaxies in the Local and Near Universe with an aim to weighing the total mass of galaxies in an attempt to close the total baryon budget. My activities included:

- Development of optimisation tools in Fortran90 to fit non linear models (Levenberg-Marquardt) to spectral data (→ Bitbucket Repo)
- Development of analysis and visualisation tools using Fortran90 and the highly efficient HDF5 file format[1]
- Visualisation and analysis of large volumes of data extracted from cosmological hydrodynamical simulations (→ Projects)
- Supervision of undergraduate and graduate students (→ Supervision)
- Preparation of lectures, tutorials, and seminars (→ Teaching)

Jan 2008 – Aug 2010 **Teaching and Research Assistant**
Institut für Physik und Astronomie, Universität Potsdam, Germany

My activities included, but were not limited to:

- Supervision of undergraduate and graduate students (→ Supervision)
- Preparation of lectures, tutorials, and seminars (→ Teaching)
- Organisation of outreach events

## Education

2007 **Ph.D. in Astrophysics** (*Magna Cum Laude*)
Georg-August Universität, Göttingen, Germany
Thesis title: *The stochastic intergalactic attenuation and its impact on high redshift galaxies* (→ online record)
Advisor: Prof. Dr. Uta Fritze-von Alvensleben

The main contribution of my thesis project is the discovery of an approximation to the well-known Voigt-Hjerting function that describes the profile of spectral (absorption) lines, widely used in the field of quasar absorption line analysis (→ Wikipedia | → Publications). A second publication can be found here. My tasks during my PhD included, but were not limited to:

- Design, execution, and analysis of Monte-Carlo Simulations
- Development in Fortran90 of simulation codes and analysis tools
- Participation in international conferences and seminars
- Supervision of tutorials and laboratory training at the undergraduate level

2004 **Master of Sciences in Astrophysics** (With honours)
Georg-August Universität, Göttingen, Germany
Thesis title: *Modelling the effect intergalactic hydrogen absorption on galaxy spectra* (German)
Advisor: Prof. Dr. Uta Fritze-von Alvensleben

2001 **Bachelor of Sciences in Physics** (*Summa Cum Laude* and *Highest Cumulative Average*)
Universidad de las Américas, Puebla, México
Thesis title: *Supersymmetry and the constants of motion of a 2D harmonic oscillator* (Spanish)
Advisor: Dr. Gerardo F. Torres del Castillo

The findings of my B.Sc. thesis were published in a peer-reviewed journal (→ Publications).

## Affiliations

- Member of the *Australian National Institute for Theoretical Astrophysics* (ANITA) since 2016
- Member of the Galactic ASKAP (→ GASKAP) Survey, Australia
- Member of the Galactic Archaeology with HERMES (→ GALAH) Survey, Australia
- Member of the Hector Survey (→ Hector), Australia
- Member of the Centre of Excellence for All Sky Astrophysics in Three Dimensions (→ Astro-3D), Australia
- Member of the *Astronomical Society of Australia* (ASA) since 2016
- Reviewer for the *Astronomy & Astrophysics* Journal (A&A)
- Reviewer for the *Monthly Notices of the Royal Astronomical Society* Journal (MNRAS)
- Reviewer for the *Astrophysical Journal* (ApJ)
- Member of the *International Astronomical Union* (IAU) since 2016
- Former member of the *German Physical Society* (DPG) 2010 – 2016
- Former member of the *German Astronomical Society* (AG) 2008 – 2014
- Former member of the *German Research Society* (DFG) 2007 – 2014

## Awards | Grants

- 975 000 SU (**AUD 39,000 in-kind**) at the Australian National Computational Infrastructure (NCI) for high-performance computing ADACS 2025 (Q1/Q2) (PI: Thor Tepper García , CI: Joss Bland-Hawthorn)
- 1000 000 SU (**AUD 40,000 in-kind**) at the Australian National Computational Infrastructure (NCI) for high-performance computing NCMAS 2021 (project ID: ca64; PI: Joss Bland-Hawthorn, CI: Thor Tepper García)
- 1000 000 SU (**AUD 40,000 in-kind**) at the Australian National Computational Infrastructure (NCI) for high-performance computing NCMAS 2021 (project ID: ca64; PI: Joss Bland-Hawthorn, CI: Thor Tepper García)
- Innovation Award at the Anti-Slavery Australia Freedom Award 2023, as part of the OAASIS team,
- 200 000 SU (**AUD 8,000 in-kind**) at the Australian National Computational Infrastructure (NCI) for high-performance computing through the ADAPTER Scheme 2023 / Q2 (PI: Thor Tepper-García; CI: Joss Bland-Hawthorn, Oscar Agertz)
- 170 000 SU (**AUD 6,800 in-kind**) at the Australian National Computational Infrastructure (NCI) for high-performance computing through the ADAPTER Scheme 2023 / Q1 (PI: Thor Tepper-García; CI: Joss Bland-Hawthorn)
- 240 000 SU (**AUD 9,600 in-kind**) at the Australian National Computational Infrastructure (NCI) for high-performance computing through the ADAPTER Scheme 2022 / Q4 (PI: Thor Tepper-García; CI: Joss Bland-Hawthorn)
- 170 000 SU (**AUD 6,800 in-kind**) at the Australian National Computational Infrastructure (NCI) for high-performance computing through the Sydney Informatics Hub (SIH) HPC Allocation Scheme 2022 / Q4 (PI: Thor Tepper-García; CI: Joss Bland-Hawthorn)
- 170 000 SU (**AUD 6,800 in-kind**) at the Australian National Computational Infrastructure (NCI) for high-performance computing through the Sydney Informatics Hub (SIH) HPC Allocation Scheme 2022 / Q3 (PI: Thor Tepper-García; CI: Joss Bland-Hawthorn)
- 400 000 SU (**AUD 16,000 in-kind**) at the Australian National Computational Infrastructure (NCI) for high-performance computing through the Sydney Informatics Hub (SIH) HPC Allocation Scheme 2022 / Q2 (PI: Thor Tepper-García; CI: Joss Bland-Hawthorn)
- 300 000 SU (**AUD 12,000 in-kind**) at the Australian National Computational Infrastructure (NCI) for high-performance computing through the Sydney Informatics Hub (SIH) HPC Allocation Scheme 2022 / Q1 (PI: Thor Tepper-García)
- 500 000 SU (**AUD 20,000 in-kind**) at the Australian National Computational Infrastructure (NCI) for high-performance computing NCMAS 2021 (project ID: wy59; PI: Joss Bland-Hawthorn, CI: Thor Tepper García)
- 12 million SU (**AUD 540,233 in-kind**) at NCI for high-performance computing until 2020 (project ID: dr86; PIs: Joss Bland-Hawthorn, Geraint Lewis; CIs: Thor Tepper García, Asger Grønnow)
- 400 000 SU (**AUD 16,000 in-kind**) for quarters 1/2 2018 at the Australian National Computational Infrastructure (NCI) for high-performance computing (project ID: aa8; PI: Asger Grønnow; CI: Thor Tepper García)
- 500 000 SU (**AUD 20,000 in-kind**) for quarters 3/4 2017 at the Australian National Computational Infrastructure (NCI) for high-performance computing (project ID: aa8; PI: Asger Grønnow; CI: Thor Tepper García)
- 500 000 SU (**AUD 20,000 in-kind**) for quarters 1/2 2017 at the Australian National Computational Infrastructure (NCI) for high-performance computing (project ID: aa8; PI: Asger Grønnow; CI: Thor Tepper García)
- 500 000 SU (**AUD 20,000 in-kind**) for quarters 3/4 2016 at the Australian National Computational Infrastructure (NCI) for high-performance computing (project ID: aa8; PI: Asger Grønnow; CI: Thor Tepper García)

- Lichtenberg-Foundation research grant (**EUR 70,000**) 2004-2005
- Research grant (**EUR 40,000**) from the Mexican Council of Science and Technology (CONACYT) 2001
- Medal for the highest cumulative average (9.9/10) of graduates, School of Science, 2001, UDLA
- Jenkins Scholarship of Excellence (**MXN 300,000**), 1996-2001, Universidad de las Américas-Puebla, México

## Service and Engagement

2022 Member of the *Australian National Institute for Theoretical Astrophysics* (ANITA) Steering Committee, Astronomical Society of Australia

2022 Co-organiser (Co-chair) of the weekly SIfA Research Seminar Series, University of Sydney, Australia

2018 Co-organiser (Chair SOC) of the Gas Accretion Workshop II, Sydney, Australia

2017 Co-organiser (LOC) of the Hunstead Workshop on Galaxian Processes, University of Sydney, Australia

2017 Co-organiser (LOC) of the Astroparticle Physics Lectures (Guest: Maarten de Jong), University of Sydney, Australia; *Specific task: Audio-Visual (AV) support throughout the event, live streaming.*

2017 Co-organiser (LOC) of the second series of the Hunstead Lectures (Guest: David Hogg), University of Sydney, Australia; *Specific task: Audio-Visual (AV) support throughout the event, live streaming.*

2016 Co-organiser of the Early Career Research Workshop, Sydney, Australia

2016 Organiser (Chair SOC) of the Gas Accretion Workshop, Sydney, Australia

2016 Co-organiser (LOC) of the first series of the Hunstead Lectures (Guest: Mark Krumholz), University of Sydney, Australia; *Specific task: Audio-Visual (AV) support throughout the event, live streaming.*

2016 Organiser of the HPC parallel session adjacent to the 50th ASA Meeting, Sydney, Australia

2016 Co-organiser (LOC) for the 50th Astronomical Society of Australia (ASA) Meeting, Sydney, Australia; *Major co-organiser with specific task of providing Audio-Visual (AV) support throughout the event, live streaming.*

2016 Co-organiser of the weekly seminar *Astro Morning Tea* at SIfA

2015 First Attack Fire Training to serve as Fire Warden at SIfA, University of Sydney, Australia

## Teaching

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|---|---|
| 2021 | **Guest Lecturer**: An Introduction to Structural Path Analysis, The University of Sydney, 2 hr 1 hr tutorial (→ Recording and Slides) |
| 2007 – 2014 | **Teaching Assistant**: *Experimental Physics I*, Universität Potsdam; 2 hr p/week |
| 2011 | **Lecturer**: *Computational Physics*, Universität Potsdam; 2 hrs p/week |
| 2010 – 2011 | **Teaching Assistant**: *Experimental Physics II*, Universität Potsdam; 2 hr p/week |
| 2009 | **Lecturer**: *Introduction to Relativistic Astrophysics and Cosmology II*, Universität Potsdam; 4 hr p/week |
| 2008 | **Lecturer**: *Introduction to Relativistic Astrophysics and Cosmology I*, Universität Potsdam; 4 hr p/week |
| 2005 – 2006 | **Teaching Assistant**: *Experimental Physics I*, Universität Göttingen; 2 hr p/week |
| 2005 | **Teaching Assistant**: *Introduction to Astro- and Geophysics*, Universität Göttingen; 2 hr p/week |

## Supervision

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|---|---|
| 2021 - | Co-supervision of Ms Hillary Davis (Masters, The University of Sydney) |
| 2021 - | Co-supervision of Ms Nabomita Roy Mukty (PhD, The University of Sydney) |
| 2021 | Co-supervision of Ms Maria Djuric and Mr Oliver Ashton (Honours, The University of Sydney) |
| 2019 | Supervision of several undergraduate Physics students (years 1-3, completed, The University of Sydney) |
| 2015 - 2018 | Co-supervision of Mr Asger Grønnow's PhD project (completed, The University of Sydney) |
| 2018 | Co-supervision of Mr Geoff Herkes' SSP project (completed, The University of Sydney) |
| 2016 | Co-supervision of Ms Ana Alves Andrade's TSP project (completed, The University of Sydney) |
| 2011 - 2014 | Co-supervision of Mr Dominik Hildebrandt's PhD project (completed, Universität Potsdam) |
| 2010 - 2013 | Co-supervision of Ms Nadja Draganova's PhD project (completed, Universität Potsdam) |
| 2010 | Supervision of Ms Nadine Giesse's Diploma (Master) project (completed, Universität Potsdam) |

## List of *selected* (one per year) talks

| | |
|---|---|
| 2022 | ASTRO-3D Zoom Colloquium Series, Sydney, Australia (Invited) |
| 2022 | ANITA workshop, Macquarie University, Sydney, Australia (Contributed) |
| 2021 | Guest Lecture at the Centre for Integrated Sustainability Analysis, Sydney, Australia |
| 2018 | Gas accretion onto Galaxies II, University of Sydney, Sydney, Australia (Invited) |
| 2017 | Hunstead Workshop on Galaxian Processes, University of Sydney, Sydney, Australia (Invited) |
| 2016 | Workshop RAMSES *Users Meeting*, Paris, France (Contributed) |
| 2015 | Conference *Multi-wavelength dissection of galaxies*, Sydney, Australia (Invited) |
| 2014 | *The Periphery of Disks* Conference, Sydney, Australia |
| 2013 | *Galaxy Zoo* Conference, Sydney, Australia |
| 2012 | CosmoComp Workshop *Star Formation and Chemical Enrichment*, Trieste, Italy (Invited) |
| 2011 | AG Meeting *Surveys & Simulations: The real and virtual Universe*, Heidelberg, Germany |
| 2009 | AG Meeting *Deciphering the Universe through Spectroscopy*, Potsdam, Germany |
| 2006 | IAU Symposium No. 235 *Galaxy Evolution Across the Hubble Time*, Prague, Czech Republic |
| 2012 | Conference *UV Astronomy: HST and Beyond*, Kauai, USA |
| 2010 | AG Meeting *Zooming in: The Cosmos at High Resolution*, Bonn, Germany |
| 2009 | Workshop *The Chemical Enrichment of the Intergalactic Medium*, Lorentz Center, Leiden, The Netherlands |
| 2009 | *Missing Baryons Conference*, University of Sydney, Sydney, Australia |
| 2008 | JENAM 2008 Symposium *Deconvolving Galaxy Evolution from High Redshift Surveys*, Vienna, Austria |
| 2008 | XXIV IAP Colloquium *Far Away: Light in the Young Universe at Redshift beyond Three*, Paris, France |
| 2006 | IAU Symposium No. 235 *Galaxy Evolution Across the Hubble Time*, Prague, Czech Republic |
| 2005 | IAU Colloquium No. 199 *Probing Galaxies Through Quasar Absorption Lines*, 2005, Shanghai, China |

## Non-Professional Achievements

| | |
|---|---|
| Advanced Open Water Diver | PADI certified Diver No. 12010V3499 |
| Running Bests | Berlin Marathon 2011 (42K): 3h12m41s |
| | → official result (race number: 27269) |
| | Berlin Half Marathon 2012 (21K): 1h28m12s |
| | → official result (race number: 18912) |
| | Potsdamer Schlösserlauf (14K): 00h55m07s |
| | → official result (race number: 848) |
| Climbing / Bouldering | UIAA grading: VI+ – VII- / B grading: B6 |
| Snowboarding | Black diamond level |