

# Mattia Sormani

## Curriculum Vitae

Dipartimento di Scienza e Alta Tecnologia  
University of Insubria  
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### Summary

I am an Associate Professor of theoretical astrophysics at the University of Insubria in Como, Italy. My main research interest is understanding the dynamics, star formation and evolution of galaxies, in particular our own, the Milky Way. My research uses a variety of tools, ranging from purely analytical calculations to massive numerical simulations on high-performance computing facilities. I am the PI of the ERC StG project “GalFlow” to study the inward transport of matter in the Galactic centre.

### Personal Details

**Date of birth:** 6th January 1988

**Citizenship:** Italian

**Civil status:** Married, 2 children (Stella, born 11.08.2018, Francesco, born 03.08.2021)

### Employment

<b>University of Insubria</b> <i>Associate Professor</i>	Como, Italy 04/2024–
<b>University of Surrey</b> <i>Assistant Professor &amp; Royal Society University Research Fellow</i>	Guildford, UK 06/2023–03/2024
<b>University of Heidelberg</b> <i>Postdoctoral researcher</i>	Heidelberg, Germany 09/2016–05/2023
<b>Bain &amp; Company</b> <i>Business consultant</i>	Milan, Italy 11/2015–05/2016

### Education

**University of Oxford, Balliol College** Oxford, UK  
*DPhil in Astrophysics* 2012–2016

- Thesis: “Understanding the large-scale dynamics of the interstellar medium in barred galaxies”
- Supervisors: Prof. John Magorrian & Prof. James Binney

**University of Pisa & Scuola Normale Superiore** Pisa, Italy  
*Bachelor & Master in Theoretical Physics* 2007–2012

- Thesis: “Gravothermal catastrophe: The dynamical stability of a fluid model”
- Supervisor: Prof. Giuseppe Bertin
- Final grade: 110/110 cum laude (Uni Pisa), 70/70 cum laude (SNS)

#### Internships:

- Scuola Internazionale Superiore di Studi Avanzati (SISSA), Trieste, Italy 2011
- Stanford Linear Accelerator Center (SLAC), Stanford, CA, USA. Summer Exchange Student 2010

## External Funding

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<b>Excellence attractiveness grant, Cariplo Foundation</b> <i>University of Insubria, Como, Italy</i> <ul style="list-style-type: none"><li>Title: «Determining the 3D distribution of the interstellar medium in the Galactic centre».</li></ul>	<b>€300,000</b>	2024-2029
<b>ERC Starting Grant 2023</b> <i>University of Insubria, Como, Italy</i> <ul style="list-style-type: none"><li>Title: «GalFlow: The Milky Way as key to understanding the inward transport of matter to the centre of galaxies»</li></ul>	<b>€1,499,281</b>	2024-2029
<b>Royal Society University Research Fellowship</b> <i>University of Oxford, UK – transferred to the University of Surrey</i> <ul style="list-style-type: none"><li>Title: «Structure and dynamics of the Milky Way's Nucleus»</li><li>I resigned from this award after approximately 1 year to move to the University of Insubria.</li></ul>	<b>£1,040,357</b>	2023-2028

## Honours & Awards

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<b>Ernst Patzer Award</b> <i>Max Planck Institute for Astronomy, Heidelberg, Germany</i> <ul style="list-style-type: none"><li>This award goes annually to the best refereed publications by young astronomy researchers in Heidelberg. I received it for the paper “A theoretical explanation of the Central Molecular Zone asymmetry” (MNRAS,475,2383).</li></ul>	<b>€2000</b>	2018
<b>Clarendon Fund D.Phil scholarship &amp; Jowett Scholarship</b> <i>University of Oxford &amp; Balliol College</i> <ul style="list-style-type: none"><li>3-years fully-funded doctoral scholarship. Very competitive (success rate 7%) awarded only at Oxford University on the basis of academic excellence.</li></ul>	<b>~£60,000</b>	2012
<b>Selected for the SLAC/INFN Summer Exchange Program</b> <i>Stanford Linear Accelerator Centre (SLAC), CA, USA</i> <ul style="list-style-type: none"><li>This program promotes the exchange of students in science between Italy and USA. I was one of the four students selected across Italy.</li></ul>	<b>\$6550</b>	2010
<b>Undergraduate scholarship</b> <i>Scuola Normale Superiore (SNS), Pisa, Italy</i> <ul style="list-style-type: none"><li>Admitted to the undergraduate program at SNS through a selective national contest (success rate 5%).</li></ul>	<b>5-years full scholarship</b>	2007
<b>Bronze Medal at the XXXVIII International Physics Olympiad</b> <i>Isfahan, Iran</i>		2007
<b>Gold Medal at the Italian Physics Olympiad</b> <i>Senigallia, Italy</i>		2007

## Scientific Habilitations

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<b>Abilitazione Scientifica Nazionale</b> <i>Settore Concorsuale 02/C1 – II Fascia</i>	Valid from to	02/10/2022 02/10/2032
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## Teaching

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<b>Heidelberg University</b> <i>Co-lecturer of the M.Sc. Course “Astrophysical Fluid Dynamics”</i>	Heidelberg, Germany 2017 and 2022
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- Wrote set of lecture notes + problem sets
- Gave lectures + tutorials.

## University of Oxford

Oxford, UK

Tutor for the following courses

2013-2015

- 4th year M.Sc. Theory Option (Physics Department). Subject: quantum theory and statistical physics
- 1st year Electromagnetism (Jesus College). Stood out as “excellent” tutor in JCR feedback session
- 2nd year Electromagnetism (Oriel College). Also graded collection examination.

## Supervision

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### 1 Postdoc:

- *Amery Gratton*. University of Surrey (11/2013-03/2024).

### 5 PhD Students:

- *Junia Goeller*. Heidelberg University, Germany. Project: «Star formation and feedback prescription in simulations of the Milky Way disc». Co-supervised with Prof. Ralf Klessen (2021-2023).
- *Glen Hunter*. Heidelberg University, Germany. Project: «Star formation in the Galactic Centre». Co-supervised with Prof. Ralf Klessen. (2020-now). **1 paper\***
- *H Perry Hatchfield*. University of Connecticut, USA. Project: «Simulations of molecular clouds in the Galactic Center». Co-supervised with Prof. Cara Battersby (2018-2022). **1 paper\***
- *Robin Tress*. Heidelberg University, Germany. Project: «ISM dynamics in simulated galaxies: bridging the scales». Co-supervised with Prof. Ralf Klessen (2016-2021). **3 papers\***
- *Matthew Ridley*. University of Oxford, UK. Project: «Gas Dynamics in the Galactic Centre». Co-supervised with Prof. John Magorrian (2016-2018). **1 paper\***

### 1 Master Student:

- *Yash Mandowara*. Heidelberg University, Germany. Project: «Formation of Arm Spurs/Feathers in Local Simulations of the Wiggle Instability». Co-supervised with Prof. Ralf Klessen (2019-2021). **1 paper\***

### 1 Bachelor Student:

- *Jan Beckmann*. Heidelberg University, Germany. Project: «Interpretation of 21cm HI all-sky surveys using 2D simulations of the Milky Way». Co-supervised with Prof. Ralf Klessen (2021-2022).

\*Only includes papers first-authored by the student under my supervision.

## Organisation of Meetings

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**SOC member** of the Harvard-Heidelberg workshop «*Physics of Star Formation: From Galactic scales to protostellar disks*». Website: <https://tinyurl.com/z6ttn3rx>. 2022

**Principal organiser & SOC member** of the international workshop «*The Puzzles of the Galactic centre*». I have successfully applied and obtained 9960 euro from the SFB 881 board in Heidelberg to organise this workshop. Website: <https://tinyurl.com/53nxncp4>. 2022

**Co-organiser** of the online talk series *CMZOOM*: a talk series focusing on star formation in the Central Molecular Zone. Recoded talks available at <https://tinyurl.com/6zfhbkst>. 2020-2022

**Organiser** of the *star formation group meetings* at the Institute for Theoretical Astrophysics, Heidelberg University, Germany 2020-2021

**Co-organiser** of the *ECOGAL collaboration journal club* at the Institute for Theoretical Astrophysics, Heidelberg University, Germany 2020-2022

## Other Academic Activities

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**Committee member** for hiring PhD students at the Institute for Theoretical Astrophysics, Heidelberg University, Germany 2020-2021

**Referee** for more than 30 articles on A&A, MNRAS, ApJ, Am.J.Phys, Science 2015-now  
**Co-Investigator** with >1000 hrs of accepted observational proposals across ALMA, JWST, VLA, GBT 2017-now

## Community service

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**Postdoc Representative** at the Institute for Theoretical Astrophysics, Heidelberg University, Germany. 2019-2022

**Student Representative** (“Ministro della Mensa”) for the quality of food in the canteen of the Scuola Normale Superiore, Pisa, Italy. 2010

## Outreach

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**Outreach activity for high school students and the general public** Italy  
*This includes:* 2009–now

- Seminars at Liceo Scientifico Galileo Galilei on quantum mechanics, relativity, least-action principle, the Milky Way Galaxy. The recording of my latest seminar is publicly available at (in italian): <https://www.galileierba.edu.it/progetto-astrofili-pal/>
- Outreach seminar for the cycle “Parole e Stelle” organised by the Comune di Sormano in collaboration with Università dell’Insubria (2022)
- Special in-depth Webinar for the release of the first image of SgrA\* by the EHT collaboration, INAF, Italy. Recording available at (in italian): <https://www.youtube.com/watch?v=WtKLvKY390o>

**Abdus Salam International Centre for Theoretical Physics** Trieste, Italy  
*Coach for the Italian International Physics Olympiads (IPhO) Team* 2010-2015

- IPhO are an international competition for high school students based on problem solving
- Gave lectures on problem solving, crafted problems used in training and in final team selection test
- Subjects: special relativity, classical mechanics, electromagnetism

**Royal Society Summer Science Exhibition** London, UK  
*Carlton House Terrace* 2014

- Presented the work of the Oxford dynamics group to the general public and to Royal Society Fellows
- Prepared flyer for the exhibit of Oxford dynamics group «StarTracks»

## International Research Collaborations

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### Group Collaborations:

- Star Formation Theory Group, Institute for Theoretical Astrophysics, Heidelberg University, Germany (*Klessen, Glover*)
- Galactic Dynamics Group, Oxford University, UK (*Binney, Magorrian*)
- Galactic Nuclei Group, Max Planck Institute For Astronomy, Heidelberg, Germany (*Neumayer*)
- Star Formation in the Galactic Centre group, University of Connecticut, USA (*Battersby*)
- Galactic Centre Group, IAA, Granada, Spain (*Schödel*)
- Galaxies and Cosmology Group, Observatoire de la Côte d’Azur, Nice, France (*Schultheis*)
- Hot Milk: The Hot Phase of the Milky Way Group, Osservatorio Astronomico di Brera (INAF-OAB), Merate, Italy (*Ponti*)

### International Consortia:

- **Work-package leader** of the **ACES** collaboration. ACES (the ALMA CMZ Exploration Survey) is a Large Program ALMA survey of the Milky Way’s Central Molecular Zone (overall PI: Steve Longmore) that is observing all the dense (column density  $> 10^{22} \text{ cm}^{-2}$ ) gas in the CMZ in various molecular lines with ALMA at unprecedented resolution ( $1.5'' \sim 0.05 \text{ pc}$  at the Galactic centre). The collaboration has more than hundred members and is subdivided into four WP (WP1: Data; WP2: Fundamental Measurements; WP3: Chemistry & Physical modelling; WP4: Theory and

Simulations). Each WP has two leads and I co-lead WP4. The goal of WP4 is to develop a unified simulation framework for comparison with the ALMA data. since 2021

- **Member** of the **PHANGS** collaboration. PHANGS (Physics at High Angular Resolution in Nearby Galaxies) aims to use high resolution observations of nearby galaxies with several telescopes, including ALMA, Hubble, VLT, and JWST to understand the interplay of the small-scale physics of gas and star formation with galactic structure and galaxy evolution. Within the collaboration I led a project to determine the bar-driven inflow rates in nearby galaxies.

Website: <https://sites.google.com/view/phangs/home> since 2019

- **Member** of the **ECOGAL** collaboration. ECOGAL is an ERC synergy grant aimed at understanding the Galactic ecosystem that involves collaboration with 4 institutions: CEA in Paris-Saclay, INAF in Rome, ESO in Garching and ITA in Heidelberg. Within the collaboration I led a project to construct an accurate Milky Way gravitational potential that will be used for the ISM simulations, and I co-supervise two PhD students. Website: <http://www.ecogal.eu>. since 2019

- **Member** of the **THOR-GC** collaboration. THOR-GC is an extension towards the Galactic centre regions of THOR, the HI/OH/Recombination line survey (PIs: M. Rugel, H. Beuther). My role is to provide simulations for comparison with the observations. since 2018

- **Member** of the Collaborative Research Centre **SFB-881**. This collaboration was supported by the German Research Foundation to study the structure and origin of the Milky Way.

Website: <https://sfb881.zah.uni-heidelberg.de/index.html>. 2016-2022

## Skills

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**Languages:** Italian (mother tongue), English

**Programming:** C/C++, python, mathematica

**Simulations:** Arepo, Pluto

## Letters of Reference

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- Prof. James Binney, University of Oxford binney@thphys.ox.ac.uk
- Prof. Ralf Klessen, University of Heidelberg klessen@uni-heidelberg.de
- Prof. John Magorrian, University of Oxford john.magorrian@physics.ox.ac.uk

## Presentations

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### Summary:

- **66** scientific talks (**40** invited), of which:
  - **25** talks at international conferences & workshops (**15** invited)
  - **41** seminars/colloquia at universities & research institutions (**25** invited)

### CONFERENCES & WORKSHOPS:

<b>Invited Talk</b>	Workshop «IAStrophysical waves», Institute for Advanced Study, Princeton, USA <ul style="list-style-type: none"><li>▪ «Nuclear rings are the inner edge of a gap around the Lindblad resonance»</li></ul>	<b>2025</b> <b>(planned)</b>
<b>Invited Review</b>	European Astronomical Society (EAS) Annual Meeting, Special Session 40 «Bar and spiral pattern speeds across galactic discs», Padova, Italy <ul style="list-style-type: none"><li>▪ «The bar and spiral pattern speeds of the Milky Way»</li></ul>	<b>2024</b> <b>(planned)</b>
<b>Invited Talk</b>	LXV Congresso della SAIt - Società Astronomica Italiana, INAF Osservatorio Astronomico di Capodimonte, Italy <ul style="list-style-type: none"><li>▪ «The centre of the Milky Way»</li></ul>	<b>2024</b> <b>(planned)</b>

Talk	Conference «Cosmic Chemical Evolution: a conference in honour of Francesca Matteucci», Palinuro, Italy ▪ «The Milky Way's nuclear stellar disc»	<b>2024 (planned)</b>
Talk	Conference «The Milky Way is not an island: The halo of the Galaxy and its satellites», Sexten, Italy ▪ «Analytic rotating models of the circumgalactic medium»	<b>2024</b>
<b>Invited Review</b>	Conference «Surveying the Milky Way: The Universe in Our Own Backyard», Caltech, Pasadena, California ▪ «The Galactic centre: theory review»	<b>2023</b>
Talk	Conference «The Galactic bulge and beyond», Isola d'Elba, Italy ▪ «The hearth of the Galactic bulge: the nuclear stellar disc»	<b>2023</b>
<b>Invited Talk</b>	Conference «Galactic Bars: Driving and Decoding Galaxy Evolution», Granada, Spain ▪ «Fuelling nuclear rings and the bar-driven build up of nuclear stellar discs»	<b>2023</b>
<b>Invited Review</b>	Galactic Center Workshop 2023, Granada, Spain ▪ «Star formation and feedback in the Galactic centre»	<b>2023</b>
<b>Invited Talk</b>	Workshop «Theory meets Observations: Star Formation Physics Probed in Nearby Galaxies», Heidelberg, Germany ▪ «What is the goal of simulations: reproducing reality or numerical experiments?»	<b>2022</b>
<b>Invited Talk</b>	ESO Workshop «Inward Bound: Bulges from High Redshifts to the Milky Way», Garching, Germany ▪ «Formation of nuclear discs and rings in simulations» <i>Recording available at: <a href="https://www.youtube.com/watch?v=-rWdJWbFfbM">https://www.youtube.com/watch?v=-rWdJWbFfbM</a></i>	<b>2022</b>
<b>Invited Talk</b>	ECOGAL Workshop, Paris, France ▪ «Large-scale simulations of the Milky Way»	<b>2021</b>
<b>Invited Talk</b>	Ringberg Workshop «Puzzles of Star Formation», Ringberg Castle, Germany ▪ «Two puzzles about star formation in the Galactic centre»	<b>2021</b>
<b>Invited Talk</b>	ECOGAL post-processing workshop, Heidelberg, Germany (online) ▪ «Analysing gas flows in the central parts of the Milky Way»	<b>2021</b>
<b>Invited Review</b>	MW-Gaia Workshop on the Galactic Centre and Inner Galaxy, Heidelberg, Germany (online) ▪ «Galactic centre: gas inflow and star formation»	<b>2021</b>
Talk	Heidelberg-Harvard workshop «Physics of Star Formation: From Milky Way clouds to protostellar disks» (online) ▪ «Galactic centre: gas inflow and star formation»	<b>2020</b>
Talk	Conference «New Horizons in Galactic Center Astronomy and Beyond», Yokohama, Japan ▪ «The geometry of the gas surrounding the central molecular zone: on the origin of localised molecular clouds with extreme velocity dispersions»	<b>2019</b>
<b>Invited Review</b>	European Week of Astronomy and Space Science (EWASS), Lyon, France ▪ «Gas dynamics in the Milky Way»	<b>2019</b>

<b>Invited Talk</b>	Workshop «The Multi-Scale Physics of Star Formation and Feedback during Galaxy Formation», Heidelberg, Germany ▪ «The CMZ in context: Understanding the gas dynamics in the central 3 kpc of the Milky Way»	<b>2018</b>
Talk	Conference «Galactic Rings: Signposts of Secular Evolution in Disk Galaxies», The University of Alabama, Tuscaloosa, Alabama ▪ «On the origin of nuclear rings»	<b>2018</b>
Talk	Conference «Piercing the Galactic Darkness: Stellar populations in the highly extinguished regions of the Milky Way», MPIA, Heidelberg, Germany ▪ «Understanding the gas dynamics in the Galactic centre»	<b>2017</b>
Talk	Conference «The role of gas in galaxy dynamics», Valletta, Malta ▪ «Galactic shocks instabilities and their consequences for the central regions of the Milky Way»	<b>2017</b>
<b>Invited Talk</b>	Workshop «Disk Instabilities across Cosmic Scales», Sexten, Italy ▪ «A theoretical explanation for the Central Molecular Zone asymmetry»	<b>2017</b>
Talk	European Week of Astronomy and Space Science (EWASS), Prague, Czech Republic ▪ «Unsteady flow makes the Central Molecular Zone asymmetric»	<b>2017</b>
Talk	Conference «The Physics of the ISM. 6 years of ISM-SPP 1573: what have we learned?», University of Cologne, Germany ▪ «Gas dynamics in the Central Molecular Zone»	<b>2017</b>

#### **DEPARTMENT SEMINARS & COLLOQUIA:**

<b>Invited Seminar</b>	University of Milan, Italy ▪ «The Galactic centre»	<b>2024 (planned)</b>
<b>Invited Colloquium</b>	Munich Joint Astronomy Colloquium, Germany ▪ «The Galactic centre on 'large' scales»	<b>2024</b>
<b>Invited Colloquium</b>	Phangs Colloquium (online) ▪ «Fuelling the nuclear ring of NGC 1097»	<b>2024</b>
<b>Invited Seminar</b>	Mullard Space Science Laboratory (MSSL), University College London, UK ▪ «Nuclear rings are the inner edge of a gap around the Lindblad resonance»	<b>2024</b>
<b>Invited Seminar</b>	University of Insubria, Como, Italy ▪ «The Galactic centre: a unique astrophysical target»	<b>2024</b>
<b>Invited Colloquium</b>	University of Durham, UK ▪ «The Galactic centre: a remarkable astrophysical system»	<b>2024</b>
<b>Invited Seminar</b>	University of Milan-Bicocca, Italy ▪ «The Galactic centre: a remarkable astrophysical system»	<b>2024</b>
Solicited Seminar	Oxford Dynamics group meeting, University of Oxford, UK ▪ «Nuclear rings are the inner edge of a gap around the Lindblad resonance»	<b>2023</b>

<b>Invited Colloquium</b>	UCLA Astronomical colloquium, CA, USA ▪ «The Galactic centre on 'large' scales»	<b>2023</b>
<b>Invited Colloquium</b>	Research Center for Astronomy of the Academy of Athens, Greece ▪ «Dynamics of nuclear rings»	<b>2023</b>
<b>Invited Colloquium</b>	INAF Trieste, Italy ▪ «Structure and dynamics of the Galactic centre»	<b>2023</b>
<b>Invited Colloquium</b>	École polytechnique fédérale de Lausanne (EPFL), Switzerland ▪ «The Galactic centre: structure and dynamics of a unique astrophysical target»	<b>2022</b>
<b>Invited Colloquium</b>	Max Planck Institute for Radio Astronomy, Bonn, Germany ▪ «The Galactic centre: structure and dynamics of a unique astrophysical target»	<b>2022</b>
<b>Invited Seminar</b>	University of Surrey, UK ▪ «The Galactic centre: structure and dynamics of a unique astrophysical target»	<b>2022</b>
<b>Invited Seminar</b>	University of Bologna, Italy ▪ «Dynamical modelling of the Milky Way's Nuclear Stellar Disc»	<b>2022</b>
<b>Invited Seminar</b>	Special in-depth Webinar for the release of the first image of SgrA* by the EHT collaboration, INAF, Italy ▪ «Structure and dynamics of the Galactic centre (in italian)» <i>Recording available at: <a href="https://www.youtube.com/watch?v=WtKLvKY39D0">https://www.youtube.com/watch?v=WtKLvKY39D0</a></i>	<b>2022</b>
Solicited Seminar	Ringberg Virtual Seminar Series ▪ «Dynamical modelling of the Milky Way's Nuclear Stellar Disc» <i>Recording available at: <a href="https://youtu.be/q-gTBHgh4Wc">https://youtu.be/q-gTBHgh4Wc</a></i>	<b>2022</b>
<b>Invited Seminar</b>	Theoretical AstroPhysics Including Relativity (TAPIR) seminar, Caltech, USA ▪ «Gas dynamics, inflow and star formation in the central regions of the Milky Way»	<b>2022</b>
<b>Invited Colloquium</b>	Heidelberg Joint Astronomical Colloquium, Heidelberg, Germany ▪ «Gas dynamics, inflow and star formation in the central regions of the Milky Way» <i>Recording available at: <a href="https://youtu.be/aEnJM3dpEp4">https://youtu.be/aEnJM3dpEp4</a></i>	<b>2021</b>
<b>Invited Colloquium</b>	Osservatorio Astronomico di Brera, Merate (CO), Italy ▪ «Gas dynamics, inflow and star formation in the central regions of the Milky Way»	<b>2021</b>
Solicited Seminar	Cambridge Dynamics group meeting, University of Cambridge, UK (online) ▪ «Modelling of the Milky Way's Nuclear Stellar Disc»	<b>2021</b>
Solicited Seminar	SFB 881 seminar - the Milky Way system, Heidelberg (online) ▪ «The nucleus of the Milky Way: gas inflow, star formation & stellar dynamics»	<b>2021</b>
Solicited Seminar	PHANGS dynamics working group, Heidelberg, Germany (online) ▪ «Simulations of the Milky Way's Central Molecular Zone»	<b>2020</b>
Solicited Seminar	TIMER collaboration group meeting ▪ «Dynamical Modelling of Nuclear Stellar Discs»	<b>2020</b>



<b>Invited Colloquium</b>	Virtual Astronomy Seminar, University of Connecticut, USA (online) ▪ «Gas dynamics, inflow and star formation in the innermost 3 kpc of the Milky Way»	<b>2020</b>
Solicited Seminar	ECOGAL collaboration seminar series (online) ▪ «The gravitational potential of the Milky Way»	<b>2020</b>
<b>Invited Colloquium</b>	American Museum of Natural History, New York, USA (online) ▪ «Understanding the gas dynamics in the central 3 kpc of the Milky Way»	<b>2020</b>
<b>Invited Colloquium</b>	Königstuhl Colloquium, Max Planck Institute for Astronomy (MPIA), Heidelberg, Germany (online) ▪ «Understanding the gas dynamics in the central 3 kpc of the Milky Way»	<b>2020</b>
Solicited Seminar	Galactic Nuclei group meeting, MPIA, Heidelberg, Germany ▪ «Dynamical Modelling of the Milky Way's Nuclear Stellar Disc»	<b>2020</b>
<b>Special Seminar</b>	As part of the interviews for the position of Associate Professor of Theoretical Astrophysics, University of Oxford, UK ▪ «Understanding the gas dynamics in the central 3 kpc of the Milky Way»	<b>2019</b>
<b>Special Colloquium</b>	Awarding ceremony of the Ernst Patzer Prize, MPIA, Heidelberg, Germany ▪ «A theoretical explanation for the Central Molecular Zone asymmetry»	<b>2018</b>
<b>Invited Colloquium</b>	General colloquium, Strasbourg Observatory, France ▪ «Understanding the gas dynamics in the central 3 kpc of the Milky Way»	<b>2018</b>
Seminar	Galaxy Coffee, MPIA, Heidelberg, Germany ▪ «Why Rings??»	<b>2018</b>
<b>Invited Colloquium</b>	Arcetri Observatory general colloquium ▪ «Understanding the gas dynamics in the central 3 kpc of the Milky Way»	<b>2018</b>
Solicited Seminar	SFB retreat, Kloster schoental, Germany ▪ «Gas dynamics in the Central Molecular Zone»	<b>2017</b>
Seminar	ITA blackboard colloquium, Heidelberg, Germany ▪ «Christmas thermodynamics: Solve the riddle!»	<b>2017</b>
Seminar	Galaxy coffee, MPIA, Heidelberg ▪ «Periodicity makes galactic shocks unstable»	<b>2017</b>
Solicited Seminar	SFB 881 seminar - the Milky Way system, Institute for theoretical physics, Heidelberg ▪ «Periodicity makes galactic shocks unstable»	<b>2017</b>
Seminar	ITA blackboard colloquium, Heidelberg, Germany ▪ «Periodicity makes galactic shocks unstable»	<b>2017</b>
Seminar	Galaxy coffee, MPIA, Heidelberg, Germany ▪ «A model for periodic blazars»	<b>2016</b>
Seminar	ITA blackboard colloquium, Heidelberg, Germany ▪ «A model for periodic blazars»	<b>2016</b>

## Publications

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### Summary:

- 1 peer-reviewed review article
- 83 articles in major peer-reviewed journals (20 as 1st author, 9 as 2nd author)
- 6 articles first-authored by students under my guidance
- >2200 citations (>700 as 1st author)
- H-index: 25 (14 as 1st author)

Source: the SAO/NASA Astrophysics Data System (<https://ui.adsabs.harvard.edu/>)

### Reviews:

- [1] Henshaw, J. D., Barnes, A. T., Battersby, C., Ginsburg, A., **Sormani**, M. C., and Walker, D. L., "Star Formation in the Central Molecular Zone of the Milky Way", *Protostars and planets vii*, Vol. 534, edited by Inutsuka, S., Aikawa, Y., Muto, T., Tomida, K., and Tamura, M., *Astronomical Society of the Pacific Conference Series* (2023), 83.

### Publications in major peer-review journals:

- [83] Nieuwmunster, N., Schultheis, M., **Sormani**, M., Fragkoudi, F., Nogueras-Lara, F., Schödel, R., and McMillan, P., "Orbital analysis of stars in the nuclear stellar disc of the Milky Way", accepted in *A&A*, arXiv:2403.00761 (2024).
- [82] Williams, T. G. et al. "PHANGS-JWST: Data Processing Pipeline and First Full Public Data Release", accepted in *ApJS*, arXiv:2401.15142 (2024).
- [81] Sun, J. et al. "Hidden Gems on a Ring: Infant Massive Clusters and Their Formation Timeline Unveiled by ALMA, HST, and JWST in NGC 3351", accepted in *ApJ*, arXiv:2401.14453 (2024).
- [80] Sanders, J. L., Kawata, D., Matsunaga, N., **Sormani**, M. C., Smith, L. C., Minniti, D., and Gerhard, O., "The epoch of the Milky Way's bar formation: dynamical modelling of Mira variables in the nuclear stellar disc", *MNRAS* 530, 2972–2993 (2024).
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