

# CURRICULUM VITAE

## Personal data

Name: Michael Mathias Schulreich  
Born: 1985, in Vienna, Austria  
Nationality: Austrian  
Phone: +49 (0)30 314 22093  
E-mail address: [schulreich@astro.physik.tu-berlin.de](mailto:schulreich@astro.physik.tu-berlin.de)  
Website: <https://astro.physik.tu-berlin.de/~schulreich>



## Education and work experience

since 12/2015 Postdoctoral researcher and lecturer at the Center for Astronomy and Astrophysics (ZAA), Technische Universität (TU) Berlin, Germany

9/2009–11/2015 PhD studies in Physics at TU Berlin, Germany  
PhD thesis: “Numerical Investigations on the Link between the  $^{60}\text{Fe}$  Anomaly in a Deep-Sea Ferromanganese Crust and the Formation of the Local Bubble”  
Degree: **Dr. rer. nat.**, passed with distinction (*summa cum laude*)

1/2009–7/2012 Research assistant at the ZAA

3/2007–10/2008 Diploma studies of Astronomy at the University of Vienna, Austria  
Diploma thesis: “Plasma Physical Processes and Formation of Structures in Groups and Clusters of Galaxies”  
Degree: **Mag. rer. nat.**, passed with distinction (and maximum GPA)

6/2006–2/2007 Alternative civilian service at the Documentation Center of Austrian Resistance (DÖW), Vienna, Austria

10/2003–8/2006 Bachelor studies of Astronomy at the University of Vienna, Austria  
Bachelor thesis: “About Interstellar Magnetic Fields, their Properties and their Formation through the Galactic Dynamo”  
Degree: **Bakk. rer. nat.**, passed with distinction

9/1995–6/2003 Bundesrealgymnasium “Bertha von Suttner - Schulschiff”, Vienna, Austria  
General qualification for university entrance (“*Matura*”), passed with distinction (and maximum GPA)

## Conferences and workshops

2023 Supernova remnants in complex environments  
Leiden, the Netherlands  
9–13 Oct 2023 (Invited talk)

96th Annual Meeting of the German Astronomical Society  
Berlin, Germany  
11–15 Sep 2023 (Invited plenary talk)

- Seminar of the Interstellar Medium\* Group at Space Telescope Science Institute  
 Baltimore, USA  
 9 Mar 2023 (Invited talk)
- 2022 Challenges and Innovations in Computational Astrophysics IV  
 Online  
 21–23 Nov 2022
- Introduction to GPU Programming using CUDA  
 Online  
 14–17 Nov 2022
- 2021 International Summer School on the Interstellar Medium of Galaxies, from the Epoch of Reionization to the Milky Way  
 Online  
 12–23 Jul 2021
- 2020 93th Annual Meeting of the German Astronomical Society  
 Online  
 21–25 Sep 2020 (Talk)
- 2018 Searching for the sources of Galactic cosmic rays  
 Paris, France  
 11–14 Dec 2018 (Invited talk)
- Seminar of the Erlangen Centre for Astroparticle Physics  
 Erlangen, Germany  
 6 Jun 2018 (Invited talk)
- Astrophysical Shocks  
 Potsdam, Germany  
 5–7 Mar 2018 (Invited talk)
- 2017 Three elephants in the gamma-ray sky: Loop I, the Fermi bubbles, and the Galactic center excess  
 Garmisch-Partenkirchen, Germany  
 21–24 Oct 2017 (Invited talk)
- International Symposium on Trends in Big Data  
 Berlin, Germany  
 29 Jun 2017
- Gaia* Data Workshop  
 Berlin, Germany  
 2–3 Mar 2017
- Physics of the interstellar medium  
 Berlin, Germany  
 25 Jan 2017 (Talk)
- 2016 Sources of Galactic cosmic rays  
 Paris, France  
 7–9 Dec 2016 (Invited talk)

- 89th Annual Meeting of the German Astronomical Society  
Bochum, Germany  
12–16 Sep 2016 (Talk)
- Virtual Observatory Workshop  
Berlin, Germany  
28 Jun 2016
- Supernova remnants – an odyssey in space after stellar death  
Chania, Crete, Greece  
6–11 Jun 2016 (Talk)
- OpenMP and OpenACC GPU Directives for Parallel Accelerated Supercomputers – an alternative to CUDA from Cray perspective  
Stuttgart, Germany  
17–18 Mar 2016
- 2015 4th Potsdam-Berlin Astronomical Colloquium  
Potsdam, Germany  
20 Feb 2015 (Talk)
- 2014 Superbubbles, H I holes and Supershells  
Freising, Germany  
10–12 Nov 2014 (Invited talk)
- 78th Annual Meeting of the German Physical Society (DPG) and DPG Spring Meeting  
Berlin, Germany  
17–21 Mar 2014 (Talk)
- 2013 86th Annual Meeting of the German Astronomical Society  
Tübingen, Germany  
24–27 Sep 2013 (Poster presentation)
- 527th WE Heraeus-Seminar on Plasma and Radiation Environment in Atmospheres and Implications for the Habitability of Extrasolar Planets  
Bad Honnef, Germany  
10–15 Mar 2013 (Talk)
- German Physical Society Spring Meeting  
Jena, Germany  
25 Feb–1 Mar 2013 (Talk)
- 2012 85th Annual Meeting of the German Astronomical Society  
Hamburg, Germany  
24–28 Sep 2012 (Talk)
- Brainstorming Workshop on Hot Plasmas in Laboratory and Space  
Berlin, Germany  
21 Sep 2012 (Talk)
- 2011 84th Annual Meeting of the German Astronomical Society  
Heidelberg, Germany  
19–23 Sep 2011 (Two poster presentations)

- 2010 AstroSim Summer School on Computational Astrophysics  
Toruń, Poland  
12–23 Jul 2010
- Introduction to Computational Fluid Dynamics Workshop  
Stuttgart, Germany  
15–19 Mar 2010
- PostGraduate School on MHD Dynamos in Laboratory and Astrophysical Plasmas  
Bochum, Germany  
15–19 Feb 2010
- Parallel Programming Workshop, MPI and OpenMP  
Jülich, Germany  
11–13 Jan 2010
- 2009 82th Annual Meeting of the German Astronomical Society  
Potsdam, Germany  
21–25 Sep 2009 (Talk)
- Joint Annual Meeting of the Swiss Physical Society, Austrian Physical Society, and Austrian Society for Astronomy and Astrophysics  
Innsbruck, Austria  
2–4 Sep 2009 (Invited talk; diploma award ceremony)
- 2008 Joint European and National Astronomy Meeting (JENAM) 2008  
Vienna, Austria  
8–12 Sep 2008

## Publications

- 2023 (\*) “Numerical studies on the link between radioisotopic signatures on Earth and the formation of the Local Bubble, II. Advanced modelling of interstellar  $^{26}\text{Al}$ ,  $^{53}\text{Mn}$ ,  $^{60}\text{Fe}$ , and  $^{244}\text{Pu}$  influxes as traces of past supernova activity in the solar neighbourhood”  
Schulreich, M. M., Feige J., & Breitschwerdt, D.  
**Astron. Astrophys.** (accepted)
- 2022 (\*) “The time-dependent Rayleigh–Taylor instability in interstellar shells and supershells, including the eROSITA bubbles”  
Schulreich, M. M. & Breitschwerdt, D.  
**Mon. Not. R. Astron. Soc.**, 509, 716
- 2019 “Near-Earth supernova explosions: evidence, implications, and opportunities”  
Fields, B., Ellis, J. R., et al. (incl. Schulreich, M. M.)  
**Astro2020 science white paper**, arXiv:1903.04589
- 2018 “A Way Out of the Bubble Trouble?—Upon Reconstructing the Origin of the Local Bubble and Loop I via Radioisotopic Signatures on Earth”  
Schulreich, M. M., Breitschwerdt, D., Feige, J. & Dettbarn, C.  
**Galaxies**, 6, 26
- 2017 “Numerical studies on the link between radioisotopic signatures on Earth

and the formation of the Local Bubble, I.  $^{60}\text{Fe}$  transport to the solar system by turbulent mixing of ejecta from nearby supernovae into a locally homogeneous interstellar medium”

Schulreich, M. M., Breitschwerdt, D., Feige, J. & Dettbarn, C.

**Astron. Astrophys.**, 604, A81

“The link between the Local Bubble and radioisotopic signatures on Earth”  
Feige, J., Breitschwerdt, D., Wallner, A., Schulreich, M. M., Kinoshita, N., Paul, M., Dettbarn, C., Fifield, L. K., Golser, R., Honda, M., Linnemann, U., Matsuzaki, H., Merchel, S., Rugel, G., Steier, P., Tims, S. G., Winkler, S. R. & Yamagata, T.

**JPS Conf. Proc.**, 14, 010304

2016 (\*) “The locations of recent supernovae near the Sun from modelling  $^{60}\text{Fe}$  transport”

Breitschwerdt, D., Feige, J., Schulreich, M. M., de Avillez, M. A., Dettbarn, C. & Fuchs, B.

**Nature**, 532, 73

2015 “Numerical Investigations on the Link between the  $^{60}\text{Fe}$  Anomaly in a Deep-Sea Ferromanganese Crust and the Formation of the Local Bubble”

Schulreich, M. M.

**PhD thesis**, TU Berlin

2011 (\*) “Astrophysical bow shocks: an analytical solution for the hypersonic blunt body problem in the intergalactic medium

Schulreich, M. M. & Breitschwerdt, D.

**Astron. Astrophys.**, 531, A13

## Awards and honors

2009 Diploma Award of the Austrian Society of Astronomy and Astrophysics

2003–2008 Merit-based scholarship of the University of Vienna (each year)

## Selected expert services

since 2018 Referee for various astronomical journals, e.g., *Astrophys. J.*, *Mon. Not. R. Astron. Soc.*, *Astrophys. Space Sci.*

## Teaching record

winter term 2023/24 Lab course on “Numerical Methods in Astrophysics”, TU Berlin

Contribution to lecture series on “Modern Methods in Physical Research”, TU Berlin

summer term 2023 Lab course on “Numerical Methods in Astrophysics”, TU Berlin

winter term 2022/23 Lab course on “Numerical Methods in Astrophysics”, TU Berlin

Seminar on “The Cosmic Matter Cycle – Current Research Topics” (with D. Breitschwerdt), TU Berlin

Contribution to lecture series on “Modern Methods in Physical Research”, TU Berlin

summer term 2022 Lab course on “Numerical Methods in Astrophysics”, TU Berlin

winter term 2021/22 Lab course on “Numerical Methods in Astrophysics”, TU Berlin  
 Seminar on “The Cosmic Matter Cycle – Current Research Topics” (with D. Breitschwerdt), TU Berlin  
 Contribution to lecture series on “Modern Methods in Physical Research”, TU Berlin

summer term 2021 Lab course on “Numerical Methods in Astrophysics”, TU Berlin

winter term 2020/21 Lab course on “Numerical Methods in Astrophysics”, TU Berlin  
 Seminar on “The Cosmic Matter Cycle – Current Research Topics” (with D. Breitschwerdt), TU Berlin  
 Contribution to lecture series on “Modern Methods in Physical Research”, TU Berlin

summer term 2020 Lab course on “Numerical Methods in Astrophysics”, TU Berlin  
 Seminar on “The Cosmic Matter Cycle – Current Research Topics” (with D. Breitschwerdt), TU Berlin

winter term 2019/20 Lecture on “Physics of the Interstellar and Intergalactic Medium”, TU Berlin  
 Lecture on “Astrophysical Fluid Mechanics”, TU Berlin

summer term 2019 Lab course on “Numerical Methods in Astrophysics”, TU Berlin  
 Seminar on “The Cosmic Matter Cycle – Current Research Topics” (with D. Breitschwerdt), TU Berlin

summer term 2018 Seminar on “The Cosmic Matter Cycle – Current Research Topics” (with D. Breitschwerdt), TU Berlin

summer term 2017 Lecture on “Astrophysical Fluid Mechanics”, TU Berlin  
 Seminar on “The Cosmic Matter Cycle – Current Research Topics” (with D. Breitschwerdt), TU Berlin

summer term 2012 Seminar on “High-Energy Astrophysics” (with D. Breitschwerdt), TU Berlin

winter term 2011/12 Seminar on “The Cosmic Matter Cycle – Current Research Topics” (with D. Breitschwerdt), TU Berlin

summer term 2011 Seminar on “The Cosmic Matter Cycle – Current Research Topics” (with D. Breitschwerdt), TU Berlin

winter term 2010/11 Seminar on “Dark Energy – The Dark Side of the Universe” (with D. Breitschwerdt), TU Berlin

summer term 2010 Seminar on “Star Formation” (with D. Breitschwerdt), TU Berlin

winter term 2009/10 Seminar on “Galaxy Evolution” (with D. Breitschwerdt), TU Berlin

summer term 2009 Seminar on “Radiation Processes in Physics and Astronomy” (with D. Breitschwerdt), TU Berlin

## Supervised theses

- 2023 Hydrodynamical simulations on the origin and evolution of the *eROSITA* bubbles (Master thesis by Tassilo Scheffler)
- 2021 Numerical calculations of superbubbles according to Kompaneets' approximation (Bachelor thesis by Sebastian Wullrich)
- Numerical studies on the magnetic field structure in the vicinity of superbubbles and the impact of the magnetic field on their dynamical evolution (Master thesis by Frederik Berberich)
- 2019 Hydromagnetic astrophysical bow shocks (Bachelor thesis by Jakob Neef)
- Analytical solutions of the blunt body problem in the context of stellar bow shocks (Bachelor thesis by Philip Knospe)

## Conference organizations

- 9/2023 Member of the Local Organizing Committee of the 96th Annual Meeting of the German Astronomical Society
- 9/2020 Co-Organizer of the splinter meeting "Confronting simulations of the interstellar medium with observations and measurements" at the 93th Annual Meeting of the German Astronomical Society

## Public outreach

- since 2009 Participation in various public outreach activities at TU Berlin
- 10/2005 Participation in a public outreach activity at the University of Vienna

## Professional memberships

- since 2022 International Astronomical Union (IAU)
- since 2019 European Astronomical Society (EAS)
- since 2008 German Astronomical Society (AG)

## Miscellaneous

- Languages: German (first language)  
English (fluent)  
Latin (basic knowledge)
- Software: Programming in FORTRAN, PYTHON, and C  
Parallel programming with MPI, OPENMP, and OPENACC  
Symbolic mathematics with MATHEMATICA and DERIVE  
Data visualization with YT, VAPOR, PARAVIEW, VISIT, and GNU PLOT  
Graphic design with the AFFINITY suite

Berlin, 2 Oct 2023