

# Matthias Gritschner

## CURRICULUM VITAE RESUME

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### RESEARCH INTERESTS

The evolution of the turbulent ISM and filament formation.  
Molecular cloud core formation and star formation.  
Star cluster and galaxy enrichment. Galaxy interactions.  
Computational astrophysics. Ionization and radiative transfer.

### APPOINTMENTS AND EDUCATION

since 10.2014: Joint Position: ISM-SPP Secretary of the DFG priority programme 1573 and Postdoctoral Researcher (50/50) at the University Observatory Munich  
10.2013 - 09.2014: Feodor-Lynen Return Fellowship at the University Observatory Munich  
10.2011 - 09.2013: Feodor-Lynen Postdoctoral Fellow at the University of California, Santa Cruz  
10.2009-09.2011: Kavli Postdoctoral Fellow at the Kavli Institute for Astronomy and Astrophysics at Peking University, Beijing  
06.2009-09.2009: Postdoctoral Researcher at the University Observatory Munich  
06.2009: PhD in Astrophysics, Ludwig-Maximilians University, Munich with distinction (summa cum laude):  
“Ionization and Triggered Star Formation in Turbulent Molecular Clouds”,  
Supervisor: Prof. Dr. Andreas Burkert

### AWARDS AND GRANTS

2016 Co-I ALMA Cycle 4 project “Pillars of Destruction: Probing Cloud Destruction and Triggered Star Formation in the Pillars of Carina” (successful, 2016.1.00101.S)  
2015 Co-I ESO-MUSE project “Testing triggered star formation with MUSE observations of outflows from pillars in the Carina Complex” (successful, 096.C-0574(A))  
2013 Feodor-Lynen Return Fellowship of the Humboldt Foundation  
2011 Feodor-Lynen Fellowship of the Humboldt Foundation  
2011 National Science Foundation of China Special Grant to support “The International Summer Institute for Modelling in Astrophysics” ( $\approx 10\,000$  USD)  
2010 National Science Foundation of China Research Grant ( $\approx 31\,000$  USD)  
2010 China National Postdoctoral Fund Grant ( $\approx 10\,000$  USD)  
2009 Award “Universe PhD Thesis 2009 (Theory)” of the Excellence Cluster “Origin and Structure of the Universe” (4 000 Euro)

### LANGUAGES

German (native), English (fluent), Spanish (intermediate), Italian (basic), Mandarin Chinese (basic)

### PROGRAMMING LANGUAGES

Fortran90 (advanced), C/C++ (advanced), IDL (advanced), Python (intermediate), HTML (basic)

## PRESENTATIONS AT CONFERENCES AND WORKSHOPS

In total, I have presented 42 talks and colloquia and 3 posters. Selected presentations:

- *EPOS 2016 - Focus group 'Filaments'* "The Formation and (geometrical) Fragmentation of Filaments", Ringberg, Germany 2016
- *The Soul of Massive Star Formation* "Stellar Feedback and Triggered Stars - Where are the Soulmates?", Puerto Varras, Chile 2015
- *ISIMA 2014 - Gravitational Dynamics* "Gravitational Collapse", Toronto, Canada 2014
- *Probes of Dark Matter on Galaxy Scales* "Explaining the Velocity Dispersion of Dwarf Galaxies by Mass Loss during the First Collapse", Monterey, USA 2013
- *Mind the Gap* "The Evolution of Molecular Clouds under the Influence of Ionizing Radiation", Cambridge, UK 2013
- *Photoevaporation in Astrophysical Systems* "The Many Scales of Triggered Star Formation", Stockholm, Sweden 2013
- *The Labyrinth of Star Formation* "Triggering Star Formation - From the Pillars of Creation to the Formation of our Solar System", Crete, Greece 2012
- *The Milky Way in the Herschel Era* "Photoionization and Triggered Star Formation in SPH simulations", Rome, Italy 2011
- *Timber Cove III - Astronomy, Cosmochemistry and Astromaterials* "The formation of our solar system - a nearby supernova as trigger", Fort Ross, USA 2011
- *The 4th East Asia Numerical Astrophysics Meeting* "SPH and Ionization", Taipei, Taiwan 2010
- *IAU Symposium 270: Computational Star Formation* "Pillars, jets and dynamical features", Barcelona, Spain 2010 (invited)
- *From Stars to Galaxies* "The Effect of Ionizing Feedback on Turbulent Molecular Clouds", Gainesville, USA 2010
- *Numerical Astrophysics and its Role in Star Formation* "Ionization and Triggered Star Formation", Cardiff, UK 2009
- *Next Generation of Computational Models in Galaxy Formation: From Protostellar Cores to Disk Galaxies* "Ionisation and Triggered Star Formation", Zurich, Switzerland 2007
- *IAU Symposium 237: Triggered Star Formation in a Turbulent ISM* "Triggered Star Formation in the Environment of Young Massive Stars", Prague, Czech Republic 2006

## TEACHING EXPERIENCE

- September 2013 - current graduate/undergraduate co-supervision at the University Observatory Munich
- July 2011: Participation/student supervision at the "The International Summer Institute for Modelling in Astrophysics" in Beijing, China
- July 2010: Participation/student supervision at the "The International Summer Institute for Modelling in Astrophysics" in Santa Cruz, California
- October 2009 - September 2011: PhD student co-supervision at the KIAA, PKU, Beijing
- February 2008 - September 2009: Diploma student supervision at the LMU Munich
- September 2005-July 2008: Astrophysical student practical supervision at the LMU Munich
- April 2005 - August 2005: Supervision of exercises in "Theoretical Physics I: Theoretical Mechanics" at the LMU Munich
- October 2000 - March 2001: Supervision of exercises in: "Mathematics for Physicists" at the University of Regensburg

## PROFESSIONAL ACTIVITIES

- Department Service:
  - since 2015: Organizer of the new weekly filaments meeting at the University Observatory, Munich
  - 2012-2013: One of two postdoc representatives at the University of California, Santa Cruz
  - 2012-2013: Organization of the daily astro-ph at the University of California, Santa Cruz
  - 2010-2011: One of two organizers of the astrophysics lunch talk at Peking University
- Conference Organization:
  - Feb. 2017: Organization of “The Physics of the ISM - 6 years of ISM-SPP 1573: what have we learned?” in Cologne, Germany
  - Sept. 2016: Organization of the Splinter Meeting “Turbulence and Magnetic Fields in the ISM” at the annual meeting of the German Astronomical Society in Bochum, Germany
  - April 2015: Organization of the “ISM-SPP Period II Kick-off School/Workshop” in Freising, Germany
  - March 2015: LOC of the workshop “Structure of Filaments in molecular clouds and their relation to the star-formation processes” in Munich, Germany
  - Feb. 2014: Organization of the annual workshop of the CAST group in Kochel, Germany
  - July 2011: LOC of the “The International Summer Institute for Modelling in Astrophysics” in Beijing, China
- Refereeing:
  - since 2009: I have refereed 7 papers for international journals (ApJ, ApJ Letters, MNRAS)

## PUBLIC OUTREACH

- Radio interview for the Australian radio station ABC science.
- Phone interview for Science News, Articles in Science News for Kids and Science News for Students
- Co-author of popular science books:
  - “Physics for the waistcoat pocket”, Harald Lesch & das Quot-Team, Piper-Verlag, 10/2003, 125 pages, in German; translated to Korean, Italian and Dutch, second edition
  - “Quantum mechanics for the waistcoat pocket”, Harald Lesch & das Quot-Team, Piper-Verlag, 10/2007, 125 pages, in German, second edition

# Publications of Matthias Gritschneider

## First Author

- Gritschneider, M.; Heigl, S.; Burkert, A. “*Oscillating Filaments: I - Oscillation and Geometrical Fragmentation*”, 2016, ApJ accepted, arXiv:1604.00378
- Gritschneider, M.; Burkert, A. “*The return of the proplyds - understanding the dynamics of ionization triggered stars*”, 2014, MNRAS, Vol 438, 2
- Gritschneider, M.; Lin, D. N. C. “*Explaining the Observed Velocity Dispersion of Dwarf Galaxies by Baryonic Mass Loss during the First Collapse*”, 2013, ApJ, Vol 765, 38
- Gritschneider, M.; Lin, D. N. C. “*The Role of  $\theta$  Oph in the Formation and Evolution of the Pipe Nebula - Is Star Formation Ever Isolated?*”, 2012, ApJ Letters, Vol 754, L13
- Gritschneider, M.; Lin, D. N. C.; Murray, S. D.; Yin, Q.-Z.; Gong, M.-N. “*The Supernova Triggered Formation and Enrichment of Our Solar System*”, 2012, ApJ, Vol 745, 22
- Gritschneider, M.; Burkert, A.; Naab, T.; Walch, S. “*Detailed numerical simulations on the formation of pillars around HII regions*”, 2010, ApJ, Vol 723, 971
- Gritschneider, M.; Naab, T.; Walch, S.; Burkert, A.; Heitsch, F. “*Driving turbulence and triggering star formation by ionizing radiation*”, 2009, ApJ Letters, Vol 694, L26
- Gritschneider, M.; Naab, T.; Burkert, A.; Walch, S.; Heitsch, F.; Wetzstein, M. “*iVINE - Ionization in the parallel tree/SPH code VINE: First results on the observed age spread around O-stars*”, 2009, MNRAS, Vol 393, 21

Total Citations: 263

## Contributing Author

- A. F. McLeod, M. Gritschneider, J. E. Dale, A. Ginsburg, P. D. Klaassen, J. C. Mottram, T. Preibisch, S. Ramsay, M. Reiter, L. Testi “*Connecting the dots: a correlation between ionizing radiation and cloud mass-loss rate traced by optical integral field spectroscopy*”, 2016, MNRAS, Vol 462, 3537
- Zhou, T.; Huang, C. X.; Lin, D. N. C.; Gritschneider, M.; Lau, H. “*On the IMF in a Triggered Star Formation Context*”, 2015, ApJ, Vol 808, 1
- McLeod, A. F.; Dale, J. E.; Ginsburg, A.; Ercolano, B.; Gritschneider, M.; Ramsay, S.; Testi, L. “*The Pillars of Creation revisited with MUSE: gas kinematics and high-mass stellar feedback traced by optical spectroscopy*”, 2015, MNRAS, Vol 450, 1
- Ercolano, B.; Dale, J. E.; Gritschneider, M.; Westmoquette, M. “*Synthetic observations of simulated Pillars of Creation*”, 2012, MNRAS, Vol 420, 141
- Ercolano, B.; Gritschneider, M. “*Ionisation feedback in star formation simulations: The role of diffuse fields*”, 2011, MNRAS, Vol 413, 401
- Walch, S.; Burkert, A.; Naab, T.; Gritschneider, M. “*Protostellar disks formed from turbulent cores*”, 2010, MNRAS, Vol 402, 2253
- Walch, S.; Burkert, A.; Naab, T.; Gritschneider, M. “*Protostellar disks formed from rigidly rotating cores*”, 2009, MNRAS, Vol 400, 13
- Kitsionas, S.; Klessen, R.; Federrath, C.; Schmidt, W.; Price, D.; Dursi, J.; Gritschneider, M.; Walch, S.; Piontek, M.; Kim, J.; Jappsen, A.-K.; Cieliegielag, P.; Mac Low, M.-M. “*Algorithmic comparisons of decaying, isothermal, compressible turbulence*”, 2009, A&A, Vol 508, 541
- Nides, C.; Birk, G.T.; Gritschneider, M.; Lesch, H. “*Radio emission and particle acceleration in plerionic supernova remnants*”, 2004, A&A, Vol 423, 13

Total Citations: 181