

# Richard Teague

# Curriculum Vitae

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CITIZENSHIP    United Kingdom

RESEARCH EXPERIENCE    **Smithsonian Astrophysical Observatory**    Sep. 2019 – Apr. 2020  
*Submillimeter Array Fellow*  
**University of Michigan**    May 2017 – Jul. 2019  
*Postdoctoral Researcher*  
**Max-Planck-Institute for Astronomy**    Jan. 2017 – Apr. 2017  
*Postdoctoral Researcher*

EDUCATION    **Max-Planck-Institute for Astronomy**, Heidelberg, Germany  
Ph.D. in Astronomy (Magna Cum Laude)    Oct. 2013 – Jan. 2017  
**University of Edinburgh**, Edinburgh, United Kingdom  
MPhys Astrophysics (First Class Honours)    Sept. 2008 – May 2013

HONOURS & AWARDS    **Ernst Patzer Award**    Nov. 2016  
*Awarded for the best refereed publication by a young scientist.*  
**Pre-Honours Certificate of Merit**    May 2011  
*Awarded for top 5% performance in pre-honours exams.*  
**Pre-Honours Certificate of Merit**    May 2010  
*Awarded for top 5% performance in pre-honours exams.*

PUBLICATION SUMMARY    **13 first author papers**, including one published in *Nature*, and 21 co-author papers, totaling **372 citations**. Data taken from [NASA's ADS](#). A full bibliography can be found at the end of the CV.

OBSERVATIONAL TIME SUMMARY    I have been awarded over **82 hours** (200 hours) of time on ALMA as PI (co-I), **20 hours** (150 hours) on IRAM telescopes as PI (co-I). A break down of proposals can be found at the end of the CV.

PROFESSIONAL SERVICES    **Advanced Data Analysis Techniques for ALMA SOC**    Oct. 2020  
*NRAO, Charlottesville, Virginia, USA*  
**Visualizing the Kinematics of Planet Formation SOC**    Oct. 2019  
*Flatiron Institute, New York City, USA*

	<b>Postdoc and Research Scientist DEI Representative</b>	2018 – 2019
	<i>Department Diversity, Equity and Inclusion Committee Member</i>	
	<b>Equi-Tea Organizer</b>	2018 – 2019
	<i>Diversity, Equity and Inclusion Journal Club</i>	
	<b>Stars, Planets and Formation Seminar Organizer</b>	2018 – 2019
	<i>Departmental Seminar Series</i>	
	<b>Conversations on Equity and Inclusion Co-organizer</b>	2018 – 2019
	<i>Joint Physics / Astronomy / Space Sciences DEI Colloquium Series</i>	
	<b>NESSF External Reviewer</b>	2018 –
	<b>Heidelberg MPG Student Workshop Organizer</b>	2016
	<b>PSF Coffee Organizer</b>	2015 – 2017
	<i>Departmental Seminar Series</i>	
	<b>MPIA Student Representative</b>	2015 – 2017
	<b>MPIA Student Workshop Organizer</b>	2015, 2016
	<b>IMPRS Graduate Student Representative</b>	2013 – 2017
	<b>Referee for AAS, A&amp;A, MNRAS and Nature journals</b>	
SUPERVISION	<b>Felipe Alcaron</b> University of Michigan	2019 –
	<i>Graduate student. Co-supervised with Ted Bergin and Ke Zhang, UMich.</i>	
	<b>Jenny Calahan</b> University of Michigan	2019 –
	<i>Graduate student. Co-supervised with Ted Bergin and Ke Zhang, UMich.</i>	
	<b>Deryl Long</b> University of Michigan	2019
	<i>Undergraduate student. Co-supervised with Ted Bergin and Ke Zhang, UMich.</i>	
	<b>Case Hazewinkel</b> University of Michigan	2019
	<i>Undergraduate student. Co-supervised with Ted Bergin, UMich.</i>	
	<b>Jeanne Kwon</b> University of Michigan	2018 – 2019
	<i>Undergraduate Research Opportunity Program</i>	
	<b>Julian Penzinger</b> Ludwig Maximilian University	2016, 2018
	<i>Summer student. Co-supervised with Dmitry Semenov, MPIA.</i>	
TALKS & SEMINARS	<b>From Clouds to Planets II: The Astrochemical Link</b>	October 2020
	<i>ALMA's 3D View of Planet Formation</i>	(invited)
	<b>JPL Astrophysics Colloquium</b>	November 2019
	<i>Witnessing the Dynamics of Planetary Assembly</i>	(invited)
	<b>Gordon Research Seminar</b>	June 2019
	<i>Unveiling the Dynamics of Planet Formation</i>	
	<b>IAU Symposium 350: Laboratory Astrophysics</b>	Apr. 2019
	<i>Tracing The Physical Conditions of Planet Formation with Molecular Excitation</i>	(invited)

	<b>Planet-Forming Disks</b>	Mar. 2019
	<i>Unveiling the Dynamics of Planet Formation</i>	(invited)
	<b>NAOJ Theoretical Astronomy Seminar</b>	Oct. 2018
	<i>Observing the Kinematics of Planet-Disk Interactions with ALMA</i>	(invited)
	<b>LMU Munich Astronomy Colloquium</b>	Aug. 2018
	<i>Using Kinematics to Search for Embedded Protoplanets</i>	(invited)
	<b>University of Tübingen Astronomy Seminar</b>	Aug. 2018
	<i>Kinematical Detections of Embedded Protoplanets</i>	(invited)
	<b>Astrophysical Frontiers in the Next Decade and Beyond</b>	Apr. 2018
	<i>The First Kinematical Detection of Embedded Protoplanets</i>	
	<b>Magnetic Fields or Turbulence</b>	Feb. 2018
	<i>A Spatially Resolved Search for Turbulence in TW Hya</i>	
	<b>MPIA Patzer Awards Colloquium</b>	Nov. 2016
	<i>Measuring Turbulence in TW Hya with ALMA: Methods and Limitations</i>	(invited)
	<b>MPIA Königstuhl Colloquium</b>	Nov. 2016
	<i>Observing the Earliest Stages of Planet Formation</i>	(invited)
	<b>Astrochemistry with ALMA Cycle 4</b>	Jun. 2016
	<i>Detecting Turbulence in Protoplanetary Disks</i>	(invited)
	<b>Sant-Cugat Forum on Astrophysics</b>	Apr. 2016
	<i>Turbulence in Protoplanetary Disks: Methods and Limitations</i>	
	<b>Protoplanetary Discussions</b>	Mar. 2016
	<i>Turbulence in TW Hya</i>	
	<b>Chemical Diagnostics of Star and Planet Formation</b>	Jan. 2015
	<i>Deuterium Fraction in Protoplanetary Disks</i>	(invited)
	<b>ZAG - IPAG - MPIA Workshop on Planet Formation</b>	Jan. 2015
	<i>Deuterium Fraction in DM Tau</i>	(invited)
SCHOOL PARTICIPATION	<b>45th Saas-Fee Course</b>	2015
	<i>From Protoplanetary Disks to Planet Formation</i>	
	<b>Heidelberg Graduate School on Fundamental Physics</b>	2015
	<b>DIANA Protoplanetary Disk School</b>	2014
OBSERVING EXPERIENCE	<b>Sub-Millimeter Array</b>	2019 –
	<i>Monthly rota.</i>	
	<b>MPG/ESO 2.2m</b>	2016
	<i>14 nights</i>	
TEACHING	<b>Wavefront Analysis Laboratory Instructor</b>	2014

SUCCESSFUL TELESCOPE PROPOSALS (AS PI)	<b>ALMA PI: Teague, R.</b> , 13.8 hours, 2019.1.01357.S, A ranked <i>Constraining the H<sub>2</sub> Surface Density Profile in IM Lup</i>	2019
	<b>ALMA PI: Teague, R.</b> , 3.0 hours, 2019.1.00794.S, B ranked <i>Detecting the Photoevaporative Wind in IM Lup</i>	2019
	<b>ALMA PI: Teague, R.</b> , 33.2 hours, 2019.1.00419.S, B ranked <i>Mapping the 3D Kinematic Structure of Planet Formation</i>	2019
	<b>ALMA PI: Teague, R.</b> , 20.2 hours, 2018.A.00021.S, DDT <i>Confirmation of an Embedded Planet in the Disk of TW Hya</i>	2019
	<b>Magellan/MagAO PI: Teague, R.</b> , 6 hours <i>Searching for Wide Separation Planets in AS 209</i>	2018
	<b>ALMA PI: Teague, R.</b> , 6.7 hours, 2018.1.00980.S, A ranked <i>An Unambiguous Detection of a Magnetic Field in a Protoplanetary Disk</i>	2018
	<b>ALMA PI: Teague, R.</b> , 5.3 hours, 2016.1.00440.S, A ranked <i>Model Independent Study of Turbulence and Temperature in TW Hya</i>	2016
	<b>IRAM PdBI PI: Teague, R.</b> , 19.9 hours, W14BI, C ranked <i>Disk Diagnostics with Deuteration</i>	2014

(AS CO-I) Including over 200 hours with **ALMA**, 150 hours with **IRAM** telescopes, two nights with **VLT** (X-shooter and SPHERE), and a night with **Magellan** (MagAO/MagAOx).

PUBLICATIONS (FIRST AUTHOR)	<b>Teague, R.</b> , 2019, IAU Proceedings Series, in press. <i>Tracing The Physical Conditions of Planet Formation with Molecular Excitation</i>	
	<b>Teague, R.</b> , Bae, J., Huang, J., Bergin, E. 2019, ApJL, 884 <i>Spiral Structure in the Gas Disk of TW Hya</i>	
	<b>Teague, R.</b> , Bae, J., Bergin, E. 2019, Nature, 574 <i>Meridional Flows in the Disk Around a Young Star</i>	
	<b>Teague, R.</b> , 2019, Journal of Open Source Software, 4 <i>Statistical Uncertainties in Moment Maps of Line Emission</i>	
	<b>Teague, R.</b> , 2019, RNAAS, 3 <i>Statistical Uncertainties in Moment Maps of Line Emission</i>	
	<b>Teague, R.</b> , 2019, Journal of Open Source Software, 4 <i>eddy: Extracting Protoplanetary Disk Dynamics with Python</i>	
	<b>Teague, R.</b> , Bae, J., Birnstiel, T. & Bergin, E., 2018, ApJ, 868 <i>Evidence For A Vertical Dependence on the Pressure Structure in AS 209</i>	
	<b>Teague, R.</b> & Foreman-Mackey, D., 2018, RNAAS, 2 <i>A Robust Method to Measure Centroids of Spectral Lines</i>	
	<b>Teague, R.</b> , Henning, T., Guilloteau, S., et al., 2018, ApJ, 864 <i>Temperature, Mass, and Turbulence: A Spatially Resolved Multiband Non-LTE Analysis of CS in TW Hya</i>	

**Teague, R.**, Bae, J., Bergin, E. A., et al., 2018, ApJL, 860  
*A Kinematical Detection of Two Embedded Jupiter-mass Planets in HD 163296*

**Teague, R.**, Semenov, D., Gorti, U., et al., 2017, ApJ, 835  
*A Surface Density Perturbation in the TW Hydrae Disk at 95 au Traced by Molecular Emission*

**Teague, R.**, Guilloteau, S., Semenov, D., et al., 2016, A&A, 592  
*Measuring turbulence in TW Hya with ALMA: methods and limitations*

**Teague, R.**, Semenov, D., Guilloteau, S., et al., 2015, A&A, 574  
*Chemistry in disks. IX. Observations and modelling of HCO<sup>+</sup> and DCO<sup>+</sup> in DM Tauri*

(CO-AUTHOR) Garufi, A., Codella, C., Rygl, K., et al., A&A, submitted  
*ALMA chemical survey of disk-outflow sources in Taurus (ALMA-DOT I)*

Rosotti, G., **Teague, R.**, Dullemond, C., et al., MNRAS, submitted  
*The Efficiency of Dust Trapping in Ringed Protoplanetary Discs*

Long, D. E., Zhang, K., **Teague, R.**, et al., ApJ, submitted  
*Hints of a Population of Solar System Analog Planets from ALMA*

Semenov, D. & **Teague, R.** 2020, Europhysics News, 51  
*Accretion disks around young stars: the cradles of planet formation*

Huang, J., Andrews, S. M., Dullemond, C. P., et al., ApJ, in press.  
*A multi-frequency ALMA characterization of substructures in the GM Aur protoplanetary disk*

Rosotti, G., Benisty, M., Juhász, A., et al., 2019, MNRAS, 491.  
*Spiral arms in the proto-planetary disc HD100453 detected with ALMA*

Bae, J., Zhu, Z., Baruteau, C., et al., 2019, ApJL, 884  
*An Ideal Testbed for Planet-disk Interaction: Two Giant Protoplanets in Resonance Shaping the PDS 70 Protoplanetary Disk*

Isella, A., Benisty, M., **Teague, R.**, et al., 2019, ApJL, 879  
*Detection of Continuum Submillimeter Emission Associated with Candidate Protoplanets*

Gallo, E., **Teague, R.**, Plotkin, R. M., et al., 2019, MNRAS, 488  
*ALMA observations of A0620-00: fresh clues on the nature of quiescent black hole X-ray binary jets*

Schwarz, K., **Teague, R.**, Bergin, E., et al., 2019, ApJL, 876.  
*Line Ratios Reveal N<sub>2</sub>H<sup>+</sup> Emission Originates above the Midplane in TW Hydrae*

Keppler, M., **Teague, R.**, Bae, J., et al., 2019, A&A, 625  
*Highly structured disk around the planet host PDS 70 revealed by high-angular resolution observations with ALMA*

Semenov, D., Favre, C., Fedele, D., et al., 2018, A&A, 617  
*Chemistry in disks. XI. Sulfur-bearing species as tracers of protoplanetary disk physics and chemistry: the DM Tau case*

- Flaherty, K. M., Hughes, A. M., **Teague, R.**, et al., 2018, ApJ, 856  
*Turbulence in the TW Hya Disk*
- Fedele, D., Tazzari, M., Booth, R., et al., 2018, A&A, 610  
*ALMA continuum observations of the protoplanetary disk AS 209. Evidence of multiple gaps opened by a single planet*
- Flock, M., Nelson, R. P., Turner, N. J., et al., 2017, ApJ, 850  
*Radiation Hydrodynamical Turbulence in Protoplanetary Disks: Numerical Models and Observational Constraints*
- Dutrey, A., Guilloteau, S., Piétu, V., et al., 2017, A&A, 607  
*The Flying Saucer: Tomography of the thermal and density gas structure of an edge-on protoplanetary disk*
- Beuther, H., Linz, H., Henning, T., et al., 2017, A&A, 605  
*Multiplicity and disks within the high-mass core NGC 7538IRS1. Resolving cm line and continuum emission at  $0.06 \times 0.05$  resolution*
- Parfenov, S. Y., Semenov, D. A., Henning, T., et al., 2017, MNRAS, 468  
*On the methanol emission detection in the TW Hya disc: the role of grain surface chemistry and non-LTE excitation*
- van Boekel, R., Henning, T., Menu, J., et al., 2017, ApJ, 837  
*Three Radial Gaps in the Disk of TW Hydrae Imaged with SPHERE*
- Haworth, T. J., Ilee, J. D., Forgan, D. H., et al., 2016, PASA, 33  
*Grand Challenges in Protoplanetary Disc Modelling*
- Feng, S., Beuther, H., Semenov, D., et al., 2016, A&A, 593  
*Inferring the evolutionary stages of the internal structures of NGC 7538 S and IRS1 with chemistry*