

Richard Teague

Curriculum Vitae

CONTACT INFORMATION	Center for Astrophysics 60 Garden Street MS 78 Cambridge, MA, 02138	(+1) 617-495-7259 https://richteague.github.io richard.d.teague@cfa.harvard.edu
CITIZENSHIP	United Kingdom	
RESEARCH EXPERIENCE	Smithsonian Astrophysical Observatory <i>Submillimeter Array Fellow</i>	Sep. 2019 –
	University of Michigan <i>Postdoctoral Researcher</i>	May 2017 – Jul. 2019
	Max-Planck-Institute for Astronomy <i>Postdoctoral Researcher</i>	Jan. 2017 – Apr. 2017
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	Harvard Data Science Initiative Research Fund (\$9,700) <i>Regularized Maximum Likelihood Imaging: A New Method for Detecting Planets</i>	Mar. 2020
	Ernst Patzer Award <i>Awarded for the best refereed publication by a young scientist.</i>	Nov. 2016
	Pre-Honours Certificate of Merit <i>Awarded for top 5% performance in pre-honours exams.</i>	May 2011
	Pre-Honours Certificate of Merit <i>Awarded for top 5% performance in pre-honours exams.</i>	May 2010
PUBLICATION SUMMARY	16 first author papers , including one published in <i>Nature</i> , and 23 co-author papers, totaling 481 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) and 10 hours (30 hours) on the SMA as PI (co-I). A break down of proposals can be found below.	
PROFESSIONAL SERVICES	Advanced Data Analysis Techniques for ALMA SOC <i>NRAO, Charlottesville, Virginia, USA</i> <i>[postponed due to Covid-19]</i>	Oct. 2020

	Visualizing the Kinematics of Planet Formation SOC <i>Flatiron Institute, New York City, USA</i>	Oct. 2019
	Postdoc and Research Scientist DEI Representative <i>Department Diversity, Equity and Inclusion Committee Member</i>	2018 – 2019
	Equi-Tea Organizer <i>Diversity, Equity and Inclusion Journal Club</i>	2018 – 2019
	Stars, Planets and Formation Seminar Organizer <i>Departmental Seminar Series</i>	2018 – 2019
	Conversations on Equity and Inclusion Co-organizer <i>Joint Physics / Astronomy / Space Sciences DEI Colloquium Series</i>	2018 – 2019
	NESSF External Reviewer	2018 –
	Heidelberg MPG Student Workshop Organizer	2016
	PSF Coffee Organizer <i>Departmental Seminar Series</i>	2015 – 2017
	MPIA Student Representative	2015 – 2017
	MPIA Student Workshop Organizer	2015, 2016
	IMPRS Graduate Student Representative	2013 – 2017
	Referee for AAS, A&A, MNRAS and Nature journals	
SUPERVISION	Haochuan Yu Beijing Normal University <i>Undergraduate student.</i>	2020
	Alessandra Canta Harvard University <i>Undergraduate student. Co-supervised with Karin Oberg, Harvard</i>	2020
	Felipe Alcaron University of Michigan <i>Graduate student. Co-supervised with Ted Bergin and Ke Zhang, UMich.</i>	2019 – 2020
	Jenny Calahan University of Michigan <i>Graduate student. Co-supervised with Ted Bergin and Ke Zhang, UMich.</i>	2019 – 2020
	Deryl Long University of Michigan <i>Undergraduate student. Co-supervised with Ted Bergin and Ke Zhang, UMich.</i>	2019
	Case Hazewinkel University of Michigan <i>Undergraduate student. Co-supervised with Ted Bergin, UMich.</i>	2019
	Jeanne Kwon University of Michigan <i>Undergraduate Research Opportunity Program</i>	2018 – 2019
	Julian Penzinger Ludwig Maximilian University <i>Summer student. Co-supervised with Dmitry Semenov, MPIA.</i>	2016, 2018
TALKS & SEMINARS	From Clouds to Planets II: The Astrochemical Link <i>ALMA's 3D View of Planet Formation [postponed due to Covid-19]</i>	October 2020 (invited)

Exoplanets III <i>Kinematical Detection and Characterizing of Protoplanets with ALMA</i>	July 2020
MPIA Königstuhl Colloquium <i>Visualizing the Assembly of Planetary Systems</i>	July 2020
JPL Astrophysics Colloquium <i>Witnessing the Dynamics of Planetary Assembly</i>	November 2019 (invited)
Gordon Research Seminar <i>Unveiling the Dynamics of Planet Formation</i>	June 2019
IAU Symposium 350: Laboratory Astrophysics <i>Tracing The Physical Conditions of Planet Formation with Molecular Excitation</i>	Apr. 2019 (invited)
Planet-Forming Disks <i>Unveiling the Dynamics of Planet Formation</i>	Mar. 2019 (invited)
NAOJ Theoretical Astronomy Seminar <i>Observing the Kinematics of Planet-Disk Interactions with ALMA</i>	Oct. 2018 (invited)
LMU Munich Astronomy Colloquium <i>Using Kinematics to Search for Embedded Protoplanets</i>	Aug. 2018 (invited)
University of Tübingen Astronomy Seminar <i>Kinematical Detections of Embedded Protoplanets</i>	Aug. 2018 (invited)
Astrophysical Frontiers in the Next Decade and Beyond <i>The First Kinematical Detection of Embedded Protoplanets</i>	Apr. 2018
Magnetic Fields or Turbulence <i>A Spatially Resolved Search for Turbulence in TW Hya</i>	Feb. 2018
MPIA Patzer Awards Colloquium <i>Measuring Turbulence in TW Hya with ALMA: Methods and Limitations</i>	Nov. 2016 (invited)
MPIA Königstuhl Colloquium <i>Observing the Earliest Stages of Planet Formation</i>	Nov. 2016 (invited)
Astrochemistry with ALMA Cycle 4 <i>Detecting Turbulence in Protoplanetary Disks</i>	Jun. 2016 (invited)
Sant-Cugat Forum on Astrophysics <i>Turbulence in Protoplanetary Disks: Methods and Limitations</i>	Apr. 2016
Protoplanetary Discussions <i>Turbulence in TW Hya</i>	Mar. 2016
Chemical Diagnostics of Star and Planet Formation <i>Deuterium Fraction in Protoplanetary Disks</i>	Jan. 2015 (invited)
ZAG - IPAG - MPIA Workshop on Planet Formation <i>Deuterium Fraction in DM Tau</i>	Jan. 2015 (invited)

SCHOOL PARTICIPATION	45th Saas-Fee Course <i>From Protoplanetary Disks to Planet Formation</i>	2015
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	Heidelberg Graduate School on Fundamental Physics	2015
	DIANA Protoplanetary Disk School	2014
OBSERVING EXPERIENCE	Sub-Millimeter Array <i>Monthly rota.</i>	2019 –
	MPG/ESO 2.2m <i>14 nights</i>	2016
TEACHING	Wavefront Analysis Laboratory Instructor	2014
SUCCESSFUL TELESCOPE PROPOSALS (AS PI)	SMA PI: Teague, R. , 10 hours, 2020A-S033, A ranked <i>A 3D Exploration of an Edge-On Self-Gravitating Disk</i>	2020
	ALMA PI: Teague, R. , 13.8 hours, 2019.1.01357.S, A ranked <i>Constraining the H2 Surface Density Profile in IM Lup</i>	2019
	ALMA PI: Teague, R. , 3.0 hours, 2019.1.00794.S, B ranked <i>Detecting the Photoevaporative Wind in IM Lup</i>	2019
	ALMA PI: Teague, R. , 33.2 hours, 2019.1.00419.S, B ranked <i>Mapping the 3D Kinematic Structure of Planet Formation</i>	2019
	ALMA PI: Teague, R. , 20.2 hours, 2018.A.00021.S, DDT <i>Confirmation of an Embedded Planet in the Disk of TW Hya</i>	2019
	Magellan/MagAO PI: Teague, R. , 6 hours <i>Searching for Wide Separation Planets in AS 209</i>	2018
	ALMA PI: Teague, R. , 6.7 hours, 2018.1.00980.S, A ranked <i>An Unambiguous Detection of a Magnetic Field in a Protoplanetary Disk</i>	2018
	ALMA PI: Teague, R. , 5.3 hours, 2016.1.00440.S, A ranked <i>Model Independent Study of Turbulence and Temperature in TW Hya</i>	2016
	IRAM PdBI PI: Teague, R. , 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, 30 hours with the SMA , 50 hours with the VLA , two nights with VLT (X-shooter and SPHERE), and 2 nights with Magellan (MagAO/MagAOx).	
PUBLICATIONS (FIRST AUTHOR)	Teague, R. , Hull, C. L. H., Bergin, E. A., et al., ApJ, submitted <i>Sub-mm Polarization in the Disk of TW Hya</i>	
	Teague, R. Loomis, R. A., ApJ, in press. <i>The Excitation Conditions of CN in TW Hya</i>	
	Teague, R. , Jankovic, M. R., Haworth, T. J., et al., MNRAS, 495	

A Three Dimensional View of Gomez's Hamburger

Teague, R., 2019, IAU Proceedings Series, in press.

Tracing The Physical Conditions of Planet Formation with Molecular Excitation

Teague, R., Bae, J., Huang, J., Bergin, E. 2019, ApJL, 884

Spiral Structure in the Gas Disk of TW Hya

Teague, R., Bae, J., Bergin, E. 2019, Nature, 574

Meridional Flows in the Disk Around a Young Star

Teague, R., 2019, Journal of Open Source Software, 4

GoFish: Fishing for Line Observations in Protoplanetary Disks

Teague, R., 2019, RNAAS, 3

Statistical Uncertainties in Moment Maps of Line Emission

Teague, R., 2019, Journal of Open Source Software, 4

eddy: Extracting Protoplanetary Disk Dynamics with Python

Teague, R., Bae, J., Birnstiel, T. & Bergin, E., 2018, ApJ, 868

Evidence For A Vertical Dependence on the Pressure Structure in AS 209

Teague, R. & Foreman-Mackey, D., 2018, RNAAS, 2

A Robust Method to Measure Centroids of Spectral Lines

Teague, R., Henning, T., Guilloteau, S., et al., 2018, ApJ, 864

Temperature, Mass, and Turbulence: A Spatially Resolved Multiband Non-LTE Analysis of CS in TW Hya

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⁺ and DCO⁺ in DM Tauri

(CO-AUTHOR) **Stephens, I. W.**, Fernández-López, M., Li, Z.-H., et al., ApJ, in press

Low Level Carbon Monoxide Line Polarization in two Protoplanetary Disks: HD 142527 and IM Lup)

Hall, C., Dong, R., **Teague, R.**, et al., ApJ, in press

Kinematic Evidence for Gravitational Instability

Long, D. E., Zhang, K., **Teague, R.**, et al., 2020, ApJL, 895

Hints of a Population of Solar System Analog Planets from ALMA

Facchini, S., Benisty, M., Bae, J., et al., 2020, A&A, in press.

Annular substructures in the transition disks around LkCa 15 and J1610

- Garufi, A., Codella, C., Rygl, K., et al., 2020, A&A, 636
ALMA chemical survey of disk-outflow sources in Taurus (ALMA-DOT I)
- Rosotti, G., **Teague, R.**, Dullemond, C., et al., 2020, MNRAS, 495
The Efficiency of Dust Trapping in Ringed Protoplanetary Discs
- 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., 2020, ApJ, 891
A multi-frequency ALMA characterization of substructures in the GM Aur protoplanetary disk
- Rosotti, G., Benisty, M., Juhász, A., et al., 2020, 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 N₂H⁺ 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 0.06×0.05 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