

## Kaitlin M. Kratter

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### CONTACT INFORMATION

Dept. of Astronomy  
University of Arizona  
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*Languages:* English, French

### RESEARCH INTERESTS

Astrophysical fluids, binaries, computational astrophysics, dynamics, star and planet formation

### EDUCATION

**University of Toronto**, Toronto, ON, Canada

Ph.D., Astronomy and Astrophysics, Nov. 2010

- Dissertation Topic: "Accretion Disks and the Formation of Stellar Systems"
- Advisor: Christopher D. Matzner

**Barnard College, Columbia University**, New York, New York USA

B.A., Astrophysics, May 2005

- graduated Magna Cum Laude, Phi Beta Kappa

### EMPLOYMENT

**Assistant Professor**, University of Arizona, Tucson, AZ, USA

2014 - present

**Hubble Fellow**, JILA / CU Boulder, Boulder, CO, USA

2012 - 2013

**ITC Postdoctoral Fellow**, Harvard-Smithsonian CfA, Cambridge, MA, USA

2010 - 2012

### HONORS AND AWARDS

Visiting Scholar, MPIA, Heidelberg,  
Visiting Scientist, UCSC Kavli Workshop,  
Tinsley Visiting Scholar (UT Austin)

Summer 2017

June 2016

May 2016

### SUPERVISION EXPERIENCE

*Graduate Students:*

Adam Sutherland (UofA, 2016-), Michael Hammer (UofA, 2015-), Sarah Morrison (UofA, NESSF fellow, PhD 2017), Rachel Smullen (UofA, 2014-), Anjali Tripathi (Harvard Univ., 2011-2014), Dr. Diego Munoz (Harvard Univ. PhD Aug. 2013)

*Undergraduates:*

Kirk Hendricks (UofA, 2016), Reagan Leimbach (UofA, 2015), Terrance Pat (UofA, 2014) Peter Jumper (Harvard 2012)

*Post-docs:*

-Independent Fellowship: Robin Dong 2016-

-Independent Fellowship: Maxwell Moe 2015-

-Independent Fellowship: Min-Kai Lin 2014-2016

### SYNERGISTIC ACTIVITIES

- Planned and hosted 100+ person conference: Star and Planet Formation in the Southwest, Oracle, AZ, March 2015 focused on connecting graduate students and post-docs in the southwest with leading senior experts in the field. SPF2 planned for March 2018.

- Wrote public science article for the local newspaper (Arizona Daily Star Science Section, Jan 21 2018)

- Participate in panel discussions for middle and high school girls on science, and give public talks at Kartchner Caverns, UofA, and Pima Community College.

## PUBLICATIONS

† Student Advised

‡ Non-advisee grad student

\* Authored as graduate student

## REFEREED ARTICLES

- 2018** Moe. M., and **Kratter**. K. M., “Dynamical Formation of Close Binaries in the Pre-Main Sequence Phase”, *accepted in ApJ*, 2018
- 2017** **Kratter**, K. M., “Constraints from Planets in Binaries”, *Astrophysics and Space Science Library*, ed. Pessah, M. and Gressel, O., 445, 2017.
- ‡**2017** Cox, E. G. , Harris, R. J. , Looney, L. W. , Chiang, H.-F., Chandler, C. , **Kratter**, K. , Li, Z.-Y. , Perez, L. , Tobin, J. J., “ Protoplanetary Disks in  $\rho$  Ophiuchus as Seen from ALMA” , *In ApJ*, volume 851, pp. 83, 2017.
- ‡**2017** Baehr, H. and Klahr, H. and **Kratter**, K. M., “ The Fragmentation Criteria in Local Vertically Stratified Self-gravitating Disk Simulations”, *In ApJ*, volume 848, pp. 40, 2017.
- †**2017** Smullen, R. A. and **Kratter**, K. M., “ The fate of debris in the Pluto-Charon system, ” *In MNRAS*, volume 466, pp. 4480-4491, 2017.
- †**2017** Hammer, M. , **Kratter**, K. M. and Lin, M.-K., “ Slowly-growing gap-opening planets trigger weaker vortices,” *In MNRAS*, volume 466, pp. 3533-3543, 2017.
- ‡**2017** MacGregor, M. A. , Wilner, D. J. , Czekala, I. , Andrews, S. M. ,Dai, Y. S. , Herczeg, G. J. , **Kratter**, K. M. , Kraus, A. L. , Ricci, L. , Testi, L., “ ALMA Measurements of Circumstellar Material in the GQ Lup System, ” *In ApJ*, volume 835, pp. 17, 2017.
- 2016** Tobin, J. J. , **Kratter**, K. M. , Persson, M. V. , Looney, L. W. , Dunham, M. M. , Segura-Cox, D., Li, Z.-Y. , Chandler, C. J., Sadavoy, S. I., Harris, R. J., Melis, C., Pérez, L. M., “ A triple protostar system formed via fragmentation of a gravitationally unstable disk,” *In Nature*, volume 538, pp. 483-486, 2016.
- †**2016** Smullen, R. A., **Kratter** K. M., Shannon, A, “ Planet scattering around binaries: ejections, not collisions” *In MNRAS*, volume 461, pp. 1288-1301, 2016.
- 2016** K. M. **Kratter** and Lodato G., “ Gravitational Instabilities in Circumstellar Disks”, *In ARA&A*, volume 54, pp. 271-311, 2016.
- ‡**2016** Wagner, K. and Apai, D. and Kasper, M. and **Kratter**, K. and McClure, M. and Robberto, M. and Beuzit, J.-L., “ Direct imaging discovery of a Jovian exoplanet within a triple-star system,” *In Science*, volume 353, pp. 673-678, 2016.
- †**2016** S. J. Morrison, K. M. **Kratter**, “Orbital Stability of Multi-planet Systems: Behavior at High Masses”, *In ApJ*, vol. 823, pp. 118, 2016.
- †**2016** R. A. Smullen, K. M. **Kratter**, A. Shannon, “Planet Scattering Around Binaries: Ejections, Not Collisions”, *In MNRAS*, 2016.
- 2016** M.-K. Lin, K. M. **Kratter**, “On the gravitational stability of gravito-turbulent accretion disks”, *In ApJ*, V 824, pp 91, 2016.
- 2016** J. J. Tobin, L. W. Looney, Z.-Y. Li, C. J. Chandler, M. M. Dunham, D. Segura-Cox, S. I. Sadavoy, C. Melis, R. J. Harris, K. **Kratter**, L. Perez, “The VLA Nascent Disk and Multiplicity Survey of Perseus Protostars (VANDAM). II. Multiplicity of Protostars in the Perseus Molecular Cloud”, *In ApJ*, vol. 818, pp. 73, 2016.
- 2016** D. M. Segura-Cox, R. J. Harris, J. J. Tobin, L. W. Looney, Z.-Y. Li, C. Chandler, K. **Kratter**, M. M. Dunham, S. Sadavoy, L. Perez, C. Melis, “The VLA Nascent Disk and Multiplicity Survey: First Look at Resolved Candidate Disks around Class 0 and I Protostars in the Perseus Molecular Cloud”, *In ApJ*, vol. 817, pp. L14, 2016.
- 2016** J. M. Stone, A. J. Skemer, K. M. **Kratter**, T. J. Dupuy, L. M. Close, J. A. Eisner, J. J. Fortney, P. M. Hinz, J. R. Males, C. V. Morley, K. M. Morzinski, K. Ward-Duong, “Adaptive Optics imaging of VHS 1256-1257: A Low Mass Companion to a Brown Dwarf Binary System”, *In ApJ*, vol. 818, pp. L12, 2016.

- 2016 T. J. Dupuy, K. M. **Kratter**, A. L. Kraus, H. Isaacson, A. W. Mann, M. J. Ireland, A. W. Howard, D. Huber, “Orbital Architectures of Planet-hosting Binaries. I. Forming Five Small Planets in the Truncated Disk of Kepler-444A”, In *ApJ*, vol. 817, pp. 80, 2016.
- 2015 E. G. Cox, R. J. Harris, L. W. Looney, D. M. Segura-Cox, J. Tobin, Z.-Y. Li, L. Tychoniec, C. J. Chandler, M. M. Dunham, K. **Kratter**, C. Melis, L. M. Perez, S. I. Sadavoy, “High-resolution 8 mm and 1 cm Polarization of IRAS 4A from the VLA Nascent Disk and Multiplicity (VANDAM) Survey”, In *ApJ*, vol. 814, pp. L28, 2015.
- 2015 K. I. Lee, M. M. Dunham, P. C. Myers, J. J. Tobin, L. E. Kristensen, J. E. Pineda, E. I. Vorobyov, S. S. R. Offner, H. G. Arce, Z.-Y. Li, T. L. Bourke, J. K. Jørgensen, A. A. Goodman, S. I. Sadavoy, C. J. Chandler, R. J. Harris, K. **Kratter**, L. W. Looney, C. Melis, L. M. Perez, D. Segura-Cox, “Mass Assembly of Stellar Systems and Their Evolution with the SMA (MASSES). Multiplicity and the Physical Environment in L1448N”, In *ApJ*, vol. 814, pp. 114, 2015.
- †2015 S. Sallum, K. B. Follette, J. A. Eisner, L. M. Close, P. Hinz, K. **Kratter**, J. Males, A. Skemer, B. Macintosh, P. Tuthill, V. Bailey, D. Defrère, K. Morzinski, T. Rodigas, E. Spalding, A. Vaz, A. J. Weinberger, “Accreting protoplanets in the LkCa 15 transition disk”, In *Nature*, vol. 527, pp. 342-344, 2015.
- †2015 A. Tripathi, K. M. **Kratter**, R. A. Murray-Clay, M. R. Krumholz, “Simulated Photoevaporative Mass Loss from Hot Jupiters in 3D”, In *ApJ*, vol. 808, pp. 173, 2015.
- 2015 K. M. **Kratter**, “Star formation: Sibling rivalry begins at birth”, In *Nature*, vol. 518, pp. 173-174, 2015.
- †2015 D. J. Muñoz, K. **Kratter**, M. Vogelsberger, L. Hernquist, V. Springel, “Stellar orbit evolution in close circumstellar disc encounters”, In *MNRAS*, vol. 446, pp. 2010-2029, 2015.
- 2015 J. J. Tobin, M. M. Dunham, L. W. Looney, Z.-Y. Li, C. J. Chandler, D. Segura-Cox, S. I. Sadavoy, C. Melis, R. J. Harris, L. M. Perez, K. **Kratter**, J. K. Jørgensen, A. L. Plunkett, C. L. H. Hull, “The VLA Nascent Disk and Multiplicity (VANDAM) Survey of Perseus Protostars. Resolving the Sub-arcsecond Binary System in NGC 1333 IRAS2A”, In *ApJ*, vol. 798, pp. 61, 2015.
- †2014 D. J. Muñoz, K. **Kratter**, V. Springel, L. Hernquist, “Planet-disc interaction on a freely moving mesh”, In *MNRAS*, vol. 445, pp. 3475-3495, 2014.
- 2014 K. G. Stassun, A. Scholz, T. J. Dupuy, K. M. **Kratter**, “The Impact of Chromospheric Activity on Observed Initial Mass Functions”, In *ApJ*, vol. 796, pp. 119, 2014.
- 2014 H. Sana, J.-B. Le Bouquin, S. Lacour, J.-P. Berger, G. Duvert, L. Gauchet, B. Norris, J. Olofsson, D. Pickel, G. Zins, O. Absil, A. de Koter, K. **Kratter**, O. Schnurr, H. Zinnecker, “Southern Massive Stars at High Angular Resolution: Observational Campaign and Companion Detection”, In *ApJS*, vol. 215, pp. 15, 2014.
- 2014 K. M. **Kratter**, A. Shannon, “Planet packing in circumbinary systems”, In *MNRAS*, vol. 437, pp. 3727-3735, 2014.
- 2013 W. Welsh, S. Bloemen, K. Conroy, L. Doyle, D. C. Fabrycky, E. B. Ford, N. Haghighipour, D. Huber, S. Kane, B. Kirk, V. Kostov, K. **Kratter**, T. Mazeh, J. Orosz, J. Pepper, A. Prsa, A. Shporer, G. Windmiller, “Kepler’s Unparalleled Exploration of the Time Dimension”, In *ArXiv e-prints*, 2013.
- 2013 L. K. Harding, G. Hallinan, Q. M. Konopacky, K. M. **Kratter**, R. P. Boyle, R. F. Butler, A. Golden, “Spin-orbit alignment in the very low mass binary regime. The L dwarf tight binary 2MASSW J0746425+200032AB”, In *A&A*, vol. 554, pp. A113, 2013.
- 2012 H. B. Perets, K. M. **Kratter**, “The Triple Evolution Dynamical Instability: Stellar Collisions in the Field and the Formation of Exotic Binaries”, In *ApJ*, vol. 760, pp. 99, 2012.

- 2012** K. G. Stassun, K. M. **Kratter**, A. Scholz, T. J. Dupuy, “An Empirical Correction for Activity Effects on the Temperatures, Radii, and Estimated Masses of Low-mass Stars and Brown Dwarfs”, In *ApJ*, vol. 756, pp. 47, 2012.
- 2012** K. G. Stassun, K. M. **Kratter**, A. Scholz, T. J. Dupuy, “Correcting for Activity Effects on the Temperatures, Radii, and Estimated Masses of Low-Mass Stars and Brown Dwarfs”, In *ArXiv e-prints*, 2012.
- 2012** C. Conroy, K. M. **Kratter**, “Runaway Stars and the Escape of Ionizing Radiation from High-redshift Galaxies”, In *ApJ*, vol. 755, pp. 123, 2012.
- 2012** A. N. Youdin, K. M. **Kratter**, S. J. Kenyon, “Circumbinary Chaos: Using Pluto’s Newest Moon to Constrain the Masses of Nix and Hydra”, In *ApJ*, vol. 755, pp. 17, 2012.
- 2012** K. M. **Kratter**, H. B. Perets, “Star Hoppers: Planet Instability and Capture in Evolving Binary Systems”, In *ApJ*, vol. 753, pp. 91, 2012.
- 2011** K. M. **Kratter**, R. A. Murray-Clay, “Fragment Production and Survival in Irradiated Disks: A Comprehensive Cooling Criterion”, In *ApJ*, vol. 740, pp. 1, 2011.
- 2011** M.-K. Lin, M. R. Krumholz, K. M. **Kratter**, “Spin-down of protostars through gravitational torques”, In *MNRAS*, vol. 416, pp. 580-590, 2011.
- 2010** S. S. R. Offner, K. M. **Kratter**, C. D. Matzner, M. R. Krumholz, R. I. Klein, “The Formation of Low-mass Binary Star Systems Via Turbulent Fragmentation”, In *ApJ*, vol. 725, pp. 1485-1494, 2010.
- \*2010** K. M. **Kratter**, R. A. Murray-Clay, A. N. Youdin, “The Runts of the Litter: Why Planets Formed Through Gravitational Instability Can Only Be Failed Binary Stars”, In *ApJ*, vol. 710, pp. 1375-1386, 2010.
- \*2010** K. M. **Kratter**, C. D. Matzner, M. R. Krumholz, R. I. Klein, “On the Role of Disks in the Formation of Stellar Systems: A Numerical Parameter Study of Rapid Accretion”, In *ApJ*, vol. 708, pp. 1585-1597, 2010.
- \*2008** K. M. **Kratter**, C. D. Matzner, M. R. Krumholz, “Global Models for the Evolution of Embedded, Accreting Protostellar Disks”, In *ApJ*, vol. 681, pp. 375-390, 2008.
- \*2007** K. M. **Kratter**, L. M. Carter, D. B. Campbell, “An expanded view of Lada Terra, Venus: New Arecibo radar observations of Quetzalpetlatl Corona and surrounding flows”, In *Journal of Geophysical Research (Planets)*, vol. 112, pp. E04008, 2007.
- \*2007** S. Hinkley, B. R. Oppenheimer, R. Soummer, A. Sivaramakrishnan, Jr. L. C. Roberts, J. Kuhn, R. B. Makidon, M. D. Perrin, J. P. Lloyd, K. **Kratter**, D. Brenner, “Temporal Evolution of Coronagraphic Dynamic Range and Constraints on Companions to Vega”, In *ApJ*, vol. 654, pp. 633-640, 2007.
- \*2006** K. M. **Kratter**, C. D. Matzner, “Fragmentation of massive protostellar discs”, In *MNRAS*, vol. 373, pp. 1563-1576, 2006.

#### CONFERENCE PAPERS

- 2016** J. J. Tobin, L. W. Looney, Z.-Y. Li, C. J. Chandler, M. M. Dunham, D. Segura-Cox, E. G. Cox, R. J. Harris, C. Melis, S. I. Sadavoy, L. Pérez, K. **Kratter**, “Revolutionizing our View of Protostellar Multiplicity and Disks: The VLA Nascent Disk and Multiplicity (VANDAM) Survey of the Perseus Molecular Cloud”, In *EAS Publications Series*, vol. 75, pp. 273-276, 2016.
- 2014** E. Bechter, A. Bechter, J. R. Crepp, M. Berg, J. Carroll, K. Collins, T. Corpuz, R. Ketterer, E. Kielb, R. Stoddard, J. Eisner, B. S. Gaudi, P. Hinz, K. **Kratter**, G. Macela, A. Quirrenbach, M. Skrutskie, A. Sozzetti, C. E. Woodward, B. Zhao, “The iLocator Doppler Spectrometer”, In *Search for Life Beyond the Solar System. Exoplanets, Biosignatures & Instruments*, pp. P3.65, 2014.

- 2012** K. M. **Kratter**, “The Formation and Evolution of Massive Binaries”, In Proceedings of a Scientific Meeting in Honor of Anthony F. J. Moffat, vol. 465, pp. 451, 2012.
- 2011** H. B. Perets, K. M. **Kratter**, “Formation of Compact Binaries in Destabilised Evolved Triples”, In Evolution of Compact Binaries, vol. 447, pp. 61, 2011.
- 2011** K. M. **Kratter**, “The Formation of Close Binaries”, In Evolution of Compact Binaries, vol. 447, pp. 47, 2011.
- \*2008** K. M. **Kratter**, M. R. C. D. K. Matzner, “Embedded, Accreting Disks in Massive Star Formation”, In Massive Star Formation: Observations Confront Theory, vol. 387, pp. 262, 2008.
- \*2007** K. **Kratter**, “Global Models for the Evolution of Embedded Accreting Protostellar Disk”, In Star Formation, Then and Now, 2007.
- \*2006** R. Soummer, B. R. Oppenheimer, S. Hinkley, A. Sivaramakrishnan, R. B. Makidon, A. Digby, D. Brenner, J. Kuhn, M. D. Perrin, Jr. L. C. Roberts, K. **Kratter**, “The Lyot project coronagraph: data processing and performance analysis”, In EAS Publications Series, vol. 22, pp. 199-212, 2006.

CONFERENCES /  
SCHOLARLY  
PRESENTATIONS

- *Seminar*: “The tools for stellar and planetary dynamics”, Applied Math Seminar, University of Arizona, Jan 2018
- *Colloquium*: “Three Puzzles in Star and Planet Formation, Harvard-Smithsonian CfA, Sept. 2017
- *Lecture*: “The formation of microlensing planets,” Sagan Workshop, Pasadena, CA, August, 2017
- *Colloquium*: “Problems Star and Planet Formation, Lund University, Sweden, June 2017
- *Colloquium*: “Disks and Binaries”, Princeton University, April 2017
- *Invited Review, Conf*: “The theory of planets in binaries,” Cambridge Conference on Binaries, Cambridge, UK, July 2016
- *Invited Scholar*: Kavli Summer Workshop on Exoplanet Atmospheres, UC Santa Cruz, June-July 2016
- *Seminar*: “Gravitational Instability in Star and Planet Formation,” UT Austin, May 2016
- *Colloquium*: “Planets in Binary Star Systems,” UT Austin, May 2016
- *Invited, Conf*: “Planets in Binaries,” Workshop on Young Disks and Planetary Systems, Sant Cugat, Spain, April 2016
- *Invited, Conf*: “Binaries in Massive Star Formation,” From Stars to Massive Stars, Gainesville, FL, April 2016
- *Lecture*: “The formation of wide orbit planets,” Sagan Workshop, Pasadena, CA, July, 2015
- *Lecture*: “Planets and Gravitational Instability?” Sagan Workshop, Pasadena, CA, July, 2015
- *Seminar*: “Planets in Binaries,” Institute for Advanced Studies, Princeton, NJ, June 2015
- *Colloquium*: “What we can learn from planets in binaries,” Hertzberg Insitute for Astrophysics, Victoria, Canada, April 2015
- *Colloquium*: Univ. Massachusetts, Amherst, Dec. 2014
- *Colloquium*: MIT, Dec. 2014
- *Seminar*: “What we can learn from planets in binary systems,” Yale Center for Astronomy and Astrophysics, New Haven, CT, Nov 2014
- *Invited, Conf*: “The boundary of planet formation and binary formation,” Circumstellar Disks and Planet Formation, Univ. of Michigan, Oct, 2014
- *Colloquium*: LPL, University of Arizona, Sep. 2014
- *Colloquium*: University of Toronto, Sep. 2014
- *Invited, Conf*: “The connection between star formation and planet formation, including binaries,” The Disk in Connection to Planet Formation, Beijing, China, August 2014
- *Invited, Conf*: “Circumbinary Planets: Unsolving Problems in Astrophysics,” Unsolved Problems in Astrophysics, Budapest, Hungary July 2014
- *Invited Plenary, Conf*: “Planet (or binary?) formation around cool stars,” Cool Stars 18, Flagstaff, AZ, May 2014

- *Invited, Conf:* “Circumbinary Planets: At home and abroad,” Division of Dynamical Astronomy, Philadelphia, PA, April 2014
- *Invited Review, Conf:* “The Formation of Herbig Ae/Be Stars,” The Missing Link in Star Formation, Santiago, Chile, April, 2014
- *Colloquium:* Lowell Observatory, Feb. 2014