

# JAEHAN BAE

## Curriculum Vitae

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Department of Terrestrial Magnetism  
Carnegie Institution for Science  
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### EMPLOYMENT

- Postdoctoral Fellow** 09/2017 –  
Department of Terrestrial Magnetism, Carnegie Institution for Science,  
Washington, DC, USA
- Postdoctoral Fellow** 05/2017 – 08/2017  
Department of Astronomy, University of Michigan, Ann Arbor, MI, USA
- Research Associate** 04/2008 – 06/2011  
Korea Astronomy and Space Science Institute, Daejeon, South Korea

### EDUCATION

- Ph.D. in Astronomy & Astrophysics** 09/2011 – 04/2017  
University of Michigan, Ann Arbor, MI, USA  
Advisor: Prof. Lee Hartmann  
Thesis title: Studies of Young, Star-forming Circumstellar Disks
- M.S. in Astronomy** 03/2006 – 02/2008  
Seoul National University, Seoul, South Korea  
Advisor: Prof. Woong-Tae Kim  
Thesis title: Properties of Interstellar Turbulence Driven by Localized  
Explosive Sources
- B.S. in Astronomy with highest GPA** 03/2002 – 02/2006  
Seoul National University, Seoul, South Korea  
Advisor: Prof. Woong-Tae Kim  
Thesis title: Kelvin-Helmholtz Instability in Ionized, Incompressible  
Fluids

### GRANTS AND AWARDS

- Vera Rubin Postdoctoral Fellowship** 02/2017  
Carnegie Institution for Science
- ROSES-2016 Emerging Worlds (\$180,000, PI: Hartmann)** 12/2016  
NASA
- Rackham Graduate Student Research Grant (\$3,000)** 09/2016  
University of Michigan
- Rackham Dissertation Fellowship** 05/2016  
University of Michigan
- Rackham Conference Travel Grant (\$558, \$1,050, \$800)** 2015, 2016, 2017  
University of Michigan
- Astronomy Preview Weekend Poster Prize Winner** 11/2015  
University of Michigan
- BK Research Fellowship** 03/2006 – 02/2008  
National Research Foundation of Korea

Undergraduate Scholarship for Academic Excellence  
Seoul National University

03/2002 – 02/2006

## PUBLICATIONS

21 published/accepted papers (13 as first author), 270 total citations as of Aug. 30, 2018

Source: SAO/NASA ADS ([link](#))

### First Author

13. **Bae, J.**, Pinilla, P. & Birnstiel, T., “Diverse Protoplanetary Disk Morphology Produced by a Jupiter-mass Planet,” 2018, accepted to *The Astrophysical Journal Letters* [ADS]
12. **Bae, J.**, & Zhu, Z., “Planet-driven Spiral Arms in Protoplanetary Disks: II. Implications”, 2018, *The Astrophysical Journal*, 859, 119 [ADS]
11. **Bae, J.**, & Zhu, Z., “Planet-driven Spiral Arms in Protoplanetary Disks: I. Formation Mechanism”, 2018, *The Astrophysical Journal*, 859, 118 [ADS]
10. **Bae, J.**, Zhu, Z., & Hartmann, L., “On the Formation of Multiple Concentric Rings and Gaps in Protoplanetary Disks”, 2017, *The Astrophysical Journal*, 850, 201 [ADS]
9. **Bae, J.**, Nelson, R. P., & Hartmann, L., “The Spiral Wave Instability Induced by a Giant Planet: I. Particle Stirring in the Inner Regions of Protoplanetary Disks”, 2016, *The Astrophysical Journal*, 833, 126 [ADS]
8. **Bae, J.**, Nelson, R. P., Hartmann, L., & Richard, S., “Self-destructing Spiral Waves: Global Simulations of a Spiral-wave Instability in Accretion Disks”, 2016, *The Astrophysical Journal*, 829, 13 [ADS]
7. **Bae, J.**, Zhu, Z., & Hartmann, L., “Planetary Signatures in the SAO 206462 (HD 135344B) Disk: A Spiral Arm Passing Through Vortex?”, 2016, *The Astrophysical Journal*, 819, 134 [ADS]
6. **Bae, J.**, Hartmann, L., & Zhu, Z., “Are Protoplanetary Disks Born With Vortices? – Rossby Wave Instability Driven by Protostellar Infall”, 2015, *The Astrophysical Journal*, 805, 15 [ADS]
5. **Bae, J.**, Hartmann, L., Zhu, Z., & Nelson, R. P., “Accretion Outbursts in Self-gravitating Protoplanetary Disks”, 2014, *The Astrophysical Journal*, 795, 61 [ADS]
4. **Bae, J.**, Hartmann, L., Zhu, Z., & Gammie, C., “The Long-term Evolution of Photoevaporating Protoplanetary Disks”, 2013, *The Astrophysical Journal*, 774, 57 [ADS]
3. **Bae, J.**, Hartmann, L., Zhu, Z., & Gammie, C., “Variable Accretion Outbursts in Protostellar Evolution”, 2013, *The Astrophysical Journal*, 764, 141 [ADS]
2. **Bae, J.-H.**, Kim, K.-T., Yoon, S.-Y., et al., “A Multi-Epoch, Simultaneous Water and Methanol Maser Survey Toward Intermediate-Mass Young Stellar Objects”, 2011, *The Astrophysical Journal Supplement Series*, 196, 21 [ADS]
1. **Bae, J.-H.**, & Byun, D.-Y., “Analysis of KVN 21m Radio Antenna Optics using Ray-Tracing Method”, 2009, *Journal of Astronomy and Space Sciences*, 26, 187 [ADS]

Co-Author

8. De Rosa, G., Fausnaugh, M. M., Grier, C. J., et al., “Velocity-resolved Reverberation Mapping of Five Bright Seyfert 1 Galaxies”, 2018, accepted to *The Astrophysical Journal*, [ADS]
7. Teague, R., **Bae, J.**, Bergin, E. A., et al., “A Kinematical Detection of Two Embedded Jupiter-mass Planets in HD 163296”, 2018, *The Astrophysical Journal Letters*, 860, 12 [ADS]
6. Hartmann, L., & **Bae, J.**, “How do T Tauri Stars Accrete?”, 2018, *Monthly Notices of the Royal Astronomical Society*, 474, 88 [ADS]
5. Herczeg, G. J., Johnstone, D., Mairs, S., et al., “How do stars gain their mass? A JCMT/SCUBA-2 Transient Survey of Protostars in Nearby Star Forming Regions”, 2017, *The Astrophysical Journal*, 849, 43 [ADS]
4. Niinuma, K., Lee, S.-S., Kino, M., et al., “VLBI Observations of Bright AGN Jets with the KVN and VERA Array (KaVA): Evaluation of Imaging Capability”, 2014, *Publications of the Astronomical Society of Japan*, 66, 103 [ADS]
3. Matsumoto, N., Hirota, T., Sugiyama, K., et al., “The First Very Long Baseline Interferometry Image of a 44 GHz Methanol Maser with the KVN and VERA Array (KaVA)”, 2014, *The Astrophysical Journal*, 789, 1 [ADS]
2. Lee, S.-S., Byun, D.-Y., Oh, C. S., et al., “Single-Dish Performance of KVN 21 m Radio Telescopes: Simultaneous Observations at 22 and 43 GHz”, 2011, *Publications of the Astronomical Society of Pacific*, 123, 1398 [ADS]
1. Kim, K.-T., Byun, D.-Y., Je, D.-H., et al., “100-GHz Band Test Observations of the KVN 21 m Radio Telescopes”, 2011, *Journal of the Korean Astronomical Society*, 44, 81 [ADS]

**RESEARCH INTERESTS**

protoplanetary disks, planet-disk interaction, hydrodynamic/magnetohydrodynamic instabilities, planet formation, accretion disks, FU Orionis objects, exoplanets

**ACCEPTED COMPUTATION PROPOSALS**

<b>XSEDE Startup Allocation</b>	08/2018
“An Investigation of Planet-induced Gap Opening in Three Dimensions”	
PI: Bae, 5,000 GPU hours	
<b>NASA Pleiades</b>	10/2017
“Propagating Spiral Waves in Protoplanetary Disks”,	
Co-I (PI: Hartmann), 24,250 Service Units	
<b>XSEDE Research Allocation</b>	03/2017
“Three-dimensional Local Isothermal Hydrodynamic Simulations of the	
Spiral Wave Instability in Astrophysical Disks”	
Co-I (PI: Hartmann), 22,365 GPU hours	
<b>NASA Pleiades</b>	01/2017
“Propagating Spiral Waves in Protoplanetary Disks”	
Co-I (PI: Hartmann), 400,000 Service Units	
<b>XSEDE Startup Allocation</b>	09/2015
“Investigating Protostellar Accretion Outbursts in Three Dimensions”	
Co-I (PI: Hartmann), 150,000 Service Units	

ACCEPTED OBSERVATION PROPOSALS

<b>ALMA Cycle 6</b> (Filler Priority) “Substructures in Small Protoplanetary Disks”, Co-I (PI: Zhang)	07/2018
<b>VLT MUSE Science Verification</b> “Morphology and dynamics of two T Tauri disks, planet formation sites”, Co-I (PI: Girard)	06/2018
<b>Gemini Large Program</b> “Scattered Light Imaging of YSOs: Probing the Fundamental Stages of Planet Formation”, Co-I (PI: Monnier)	06/2016
<b>JCMT Survey</b> “A Transient Search for Variable Protostars: How Do Stars Gain Their Mass?”, Co-I (PI: Herczeg)	11/2015
<b>ALMA Cycle 3</b> (Filler Priority) “Searching for Infall-Disk Interactions in HL Tau”, <b>PI: Bae</b>	08/2015

OBSERVING EXPERIENCE

<b>MDM Observatory</b> Spectroscopic monitoring of AGNs, 6 nights	03/2012
<b>Korean VLBI Network</b> Water and methanol maser survey of young stellar objects, 50+ nights	06/2009 – 04/2011
<b>Seoul Radio Astronomy Observatory</b> Molecular line survey of young stellar objects, 4 nights	04/2009

TEACHING/MENTORING EXPERIENCE

<b>Research Advisor</b> Co-advised an undergraduate research project with Prof. Lee Hartmann	Fall 2015
<b>Graduate Student Instructor</b> Led two Astro 361 (Astronomical Techniques) lab sections	Fall 2015
<b>Graduate Student Instructor</b> Led four Astro 101 (Introductory Astronomy: The Solar System and the Search for Life Beyond Earth) discussion sections	Winter 2012

PROFESSIONAL SERVICE

<b>Panelist</b> NASA Earth and Space Science Fellowship	
<b>External Reviewer</b> NASA Emerging Worlds NASA Exoplanet Research Program	
<b>Journal Referee</b> The Astrophysical Journal, Monthly Notices of the Royal Astronomical Society, Astrophysics and Space Science, Astronomy and Computing	
<b>Scientific Organizing Committee</b> 7th National Capital Area Disks Meeting	
<b>UM Astronomy Undergraduate Poster Competition Panelist</b>	04/2016
<b>UM Astronomy Graduate Student Representative</b>	09/2014 – 08/2015
<b>UM Department Star Formation Journal Club Organizer</b>	09/2014 – 08/2015

## OUTREACH

**IAU-Sponsored Public Exoplanet Naming Contest** 12/2014 – 10/2015  
 Led a community effort in Ann Arbor, MI, with supports from Ann Arbor Hands-On Museum. We finished in Top 3 for a vote for 51 Pegasi. (ctrl+f to search for ann arbor at <http://nameexoworlds.iau.org/statistics>)

## PAST AND UPCOMING PRESENTATIONS

**Contributed Talk**, 7th National Capital Area Disks Meeting, Johns Hopkins University, Baltimore, MD 09/2018

**Seminar Talk**, DTM Seminar, Carnegie DTM, Washington, DC 06/2018

**Seminar Talk**, Exoplanet, Star and Planet Formation Seminar, STScI, Baltimore, MD 05/2018

**Seminar Talk**, DTM Support Staff Lunch & Learn, Carnegie DTM, Washington, DC 03/2018

**Contributed Talk**, Star and Planet Formation in the Southwest, Oracle, AZ 03/2018

**Colloquium**, University of Wyoming, Laramie, WY 02/2018

**Colloquium**, Southwest Research Institute, Boulder, CO 02/2018

**Seminar Talk**, NASA Goddard Extrasolar Planets Seminar, NASA Goddard Space Flight Center, Greenbelt, MD 01/2018

**Contributed Talk**, 231th American Astronomical Society Meeting, Washington, DC 01/2018

**Poster**, The origin of galaxies, stars, and planets in the era of ALMA, Caltech, Pasadena, CA 11/2017

**Poster**, Gordon Research Conference, Mount Holyoke College, South Hadley, MA 06/2017

**Contributed Talk**, Gordon Research Seminars, Mount Holyoke College, South Hadley, MA 06/2017

**Dissertation Talk**, 229th American Astronomical Society Meeting, Grapevine, TX 01/2017

**Seminar Talk**, Harvard/CfA Stars & Planets Seminar, CfA, Boston, MA 11/2016

**Seminar Talk**, MKI/EAPS Exoplanet Tea, MIT, Boston, MA 11/2016

**Seminar Talk**, SFIR Seminar, Princeton University, Princeton, NJ 10/2016

**Contributed Talk**, Workshop on Young Solar Systems, Sant Cugat, Spain 04/2016

**Poster**, Gordon Research Conference, Mount Holyoke College, South Hadley, MA 06/2015

**Contributed Talk**, Frontier in Star Formation, University of Michigan, Ann Arbor, MI 06/2015

**Poster**, Research Computing Symposium, University of Michigan, Ann Arbor, MI 11/2014

**Poster**, Circumstellar Disks and Planet Formation Conference, University of Michigan, Ann Arbor, MI 10/2014

**Colloquium**, Korea Astronomy and Space Science Institute, Daejeon, Korea 06/2014

**Poster**, Research Computing Symposium, University of Michigan, Ann Arbor, MI 11/2013

**Poster**, Gordon Research Conference, Mount Holyoke College, South Hadley, MA 06/2013

**Poster**, Star Formation through Spectroimaging at High Angular Resolution, ASIAA, Taipei, Taiwan 06/2011

**Contributed Talk**, Korean Astronomical Society Meeting, Chungbuk National University, Cheongju, Korea 04/2011

**Contributed Talk**, Korean Astronomical Society Meeting, Kyung-Ju, Korea 04/2008