

# Jeong-Gyu Kim | Curriculum Vitae

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## Employment

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### EACOA Fellow

*Korea Astronomy and Space Science Institute*

**Daejeon, Korea**

10/2021–present

### Lyman Spitzer, Jr. Postdoctoral Fellow

*Department of Astrophysical Sciences, Princeton University*

**Princeton, NJ, USA**

09/2018–08/2021

## Education and Research Experience

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### Seoul National University

*Ph.D. in Astronomy*

*Advisor: Prof. Woong-Tae Kim*

*Thesis Title: Dynamical Evolution of Giant Molecular Clouds Driven by  
UV Radiation Feedback from Massive Stars*

**Seoul, Korea**

08/2018

*M.S. in Astronomy*

02/2012

*B.S. in Astronomy*

02/2010

### Princeton University

*Visiting Student Research Collaborator*

*Mentor: Prof. Eve Ostriker*

**Princeton, NJ, USA**

2014–2016 (2mo/yr)

## Honors

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### EACOA Fellowship

*East Asian Core Observatory Association*

2021–2024

### Lyman Spitzer, Jr. Fellowship

*Princeton University*

2018–2021

### Outstanding Thesis Award

*College of Natural Sciences, Seoul National University*

2018

### National Junior Research Fellowship (Grants obtained as PI: \$41,300/yr)

*National Research Foundation of Korea*

2014–2018

*Project name: “Expansion of Dusty Magnetized H II Regions and Their Dynamic Impact on the Interstellar Medium”*

### SNU Fellowship for the Next Generation of Basic Research

*Seoul National University*

2013

## Scholarship for Superior Academic Performance

*Brain Korea 21*

2012

## Lotte Scholarship

*Full tuition awarded by Lotte Foundation*

2010–2011

## National Scholarship For Science and Engineering

*Full tuition awarded by National Research Foundation of Korea*

2003–2004, 2008–2009

## Research Interests

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Stellar feedback, star formation, lifecycle of molecular clouds, dynamics and thermodynamics of the interstellar medium, physics of grain alignment

## Advising Experience

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- **Nguyen Chau Giang**, PhD student in University of Science & Technology, *Modeling Polarized Thermal Emission from Dust Grains in Protostellar Cores* (PhD Project), co-advised with Prof. Thiem Hoang, 2021–present
- **Nora Linzer**, Princeton PhD student, *Interstellar UV radiation field in TIGRESS simulations* (semester project), co-advised with Prof. Eve Ostriker and Dr. Chang-Goo Kim, 2021–present
- **Lachlan Lancaster**, Princeton PhD student, *Stellar Wind Bubble Expansion in the Turbulent ISM* (thesis project), co-advised with Prof. Eve Ostriker and Dr. Chang-Goo Kim, 2019–present
- **Erin Kado-Fong**, Princeton PhD student, *Diffuse Ionized Gas in Simulations of Multiphase, Star-forming Galactic Disks* (semester project), co-advised with Prof. Eve Ostriker and Dr. Chang-Goo Kim, 2018–2020
- **Nina Filippova**, Princeton undergraduate, *Numerical Magnetohydrodynamics Simulations of Star Formation and Giant Molecular Cloud Destruction* (senior thesis), co-advised with Prof. Eve Ostriker, 2019–2020

## Publications

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### Journal Publications – ADS Search.....

# Led by a student under direct supervision

17. *Photochemistry and Heating/Cooling of the Multiphase Interstellar Medium with UV Radiative Transfer*  
**Kim, J.-G.**, Gong, M., Kim, C.-G., & Ostriker, E. C. *ApJ* submitted
16. *Slow Star Formation in the Milky Way: Theory Meets Observations*  
Evans, Neal J., II, **Kim, J.-G.**, & Ostriker, E. C. 2022, *ApJL*, 929L, 18E
15. *Star Formation Regulation and Self-Pollution by Stellar Wind Feedback*  
Lancaster, L., Ostriker, E. C., **Kim, J.-G.**, & Kim, C.-G. 2021, *ApJL*, 922L, 3L
14. *Efficiently Cooled Stellar Wind Bubbles in Turbulent Clouds: II. Validation of Theory with Hydrodynamic Simulations*  
Lancaster, L., Ostriker, E. C., **Kim, J.-G.**, & Kim, C.-G. 2021, *ApJ*, 914, 90L

13. *Efficiently Cooled Stellar Wind Bubbles in Turbulent Clouds: I. Fractal Theory and Application to Star-Forming Clouds*  
Lancaster, L., Ostriker, E. C., **Kim, J.-G.**, & Kim, C.-G., 2021, ApJ, 914, 89L
12. *Star Formation Efficiency and Dispersal of Giant Molecular Clouds with UV Radiation Feedback: Dependence on Gravitational Boundedness and Magnetic Fields*  
**Kim, J.-G.**, Ostriker, E. C., & Filippova, N. 2021, ApJ, 911, 128K
11. *The environmental dependence of the  $X_{\text{CO}}$  conversion factor*  
Gong, M., Ostriker, E. C., Kim, C.-G., & **Kim, J.-G.** 2020, ApJ, 903, 142
10. *Factories of CO-dark gas: molecular clouds with limited star formation efficiencies by far-ultraviolet feedback*  
Inoguchi, M., Hosokawa, T., Mineshige, S., & **Kim, J.-G.** 2020, MNRAS, 497, 5061I
9. *# Diffuse Ionized Gas in Simulations of Multiphase, Star-forming Galactic Disks*  
Kado-Fong, E., **Kim, J.-G.**, Ostriker, E. C., & Kim, C.-G. 2020, ApJ, 897, 143
8. *Modeling UV Radiative Feedback from Massive Stars: III. Escape of Radiation from Star-Forming Giant Molecular Clouds*  
**Kim, J.-G.**, Kim, W.-T., & Ostriker, E. C. 2019, ApJ, 883, 102
7. *Modeling UV Radiative Feedback from Massive Stars: II. Dispersal of Star-Forming Giant Molecular Clouds by Photoionization and Radiation Pressure*  
**Kim, J.-G.**, Kim, W.-T., & Ostriker, E. C. 2018, ApJ, 859, 68
6. *Modeling UV Radiative Feedback from Massive Stars: I. Implementation of Adaptive Ray Tracing Method and Tests*  
**Kim, J.-G.**, Kim, W.-T., Ostriker, E. C., & Skinner A. M. 2017, ApJ, 851, 93
5. *Disruption of Molecular Clouds by Expansion of Dusty H II Regions*  
**Kim, J.-G.**, Kim, W.-T., & Ostriker, E. C. 2016, ApJ, 819, 137
4. *Instability of Magnetized Ionization Fronts Surrounding H II regions*  
**Kim, J.-G.**, Kim, W.-T. 2014, ApJ, 797, 135
3. *Nature of Wiggle Instability of Galactic Spiral Shocks*  
Kim, W.-T., Kim, Y., & **Kim, J.-G.** 2014, ApJ, 789, 68
2. *Instability of Evaporation Fronts in the Interstellar Medium*  
**Kim, J.-G.**, Kim, W.-T. 2013, ApJ, 779, 48
1. *Gravitational Instability of Rotating, Pressure-Confined, Polytropic Gas Disks with Vertical Stratification*  
**Kim, J.-G.**, Kim, W.-T., Seo Y. M., & Hong, S. S. 2012, ApJ, 761, 131

## Papers in Preparation.....

*What Regulates Galactic Star Formation Rates? A View from New TIGRESS Simulations*  
Kim, C.-G., **Kim, J.-G.**, Gong, M., Ostriker, E. C. 2022, to be submitted

*Destruction of Giant Molecular Clouds by Stellar Feedback: I. Relative Importance of Radiation, Winds, and Supernovae*  
**Kim, J.-G.**, Lancaster, L., Kim, C.-G., & Ostriker, E. C. 2022, in prep.

*The Lyman Continuum and Far-UV Interstellar Radiation Field in Simulations of Multiphase, Star-forming Galactic Disks*

Linzer, N., **Kim, J.-G.**, Ostriker, E. C., Kim, C.-G. 2022, *in prep.*

*Bubble Expansion Driven by Stellar Winds and Radiation in Turbulent, Magnetized Clouds*

Lancaster, L., Ostriker, E. C., **Kim, J.-G.**, Kim, C.-G. 2022, *in prep.*

*Modeling Polarized Thermal Emission from Dust Grains in Low-Mass Protostellar Cores with POLARIS*

Giang, N. C., Hoang, T., & **Kim, J.-G.** 2022, *in prep.*

## **Selected Conferences and Talks (2016-present)**

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- **Invited Colloquium**, Yonsei Univ. (online), Seoul, Korea, Apr 29, 2022
- **Invited Colloquium**, Chungnam Nat'l Univ., Daejeon, Korea, Apr 21, 2022
- **Contributed Talk**, KAS Spring Meeting, Busan, Korea, Apr 14, 2022
- **Invited Talk**, Breakthroughs in Galaxy Formation, Ringberg Castle, Germany, Apr 6, 2022
- **Seminar Talk**, Theoretical Astrophysics Group Seminar, KASI, Daejeon, Korea, Mar 24, 2022
- **Contributed Talk**, The 1st VARNET Workshop on Star Formation and Stellar Feedback (online), Dec 9, 2021
- **Invited Colloquium**, KASI, Daejeon, Korea, Nov 24, 2021
- **Invited Seminar**, CCAPP Seminar (online), Ohio State University, OH, USA, Nov 24, 2020
- **Invited Seminar**, Thunch Seminar (online), Princeton University, NJ, USA, Nov 12, 2020
- **Invited Seminar**, Astronomy Seminar (zoom), University of Kentucky, KY, USA, Oct 29, 2020
- **Invited Review**, WIM in Galaxies Workshop, Green Bank Observatory, WV, USA, Oct 8, 2019
- **Contributed Talk**, The Self-organized Star Formation Process, Institut Pascal, Orsay, France, Sep 30, 2019
- **Special Seminar**, KASI, Daejeon, Korea, Aug 29, 2019
- **Special Colloquium**, Max Planck Institute for Radio Astronomy, Bonn, Germany, Jul 3, 2019
- **Contributed Talk**, European Week of Astronomy & Space Science 2019, Lyon, France, Jun 27, 2019
- **Contributed Talk**, Zooming in on Star Formation, Nafplio, Greece, Jun 13, 2019
- **Invited Talk**, Athena++ Workshop 2019, Las Vegas, USA, Mar 18–22, 2019
- **Poster**, van de Hulst Centennial Symposium Leiden, the Netherlands, Nov 5–9, 2018
- **Poster**, 15th Potsdam Thinkshop Potsdam, Germany, Sep 3–7, 2018
- **Poster**, 231st AAS Meeting, Washington D.C., USA, Jan 11, 2018
- **Invited Colloquium**, Osaka University, Japan, Dec 21, 2017
- **Contributed Talk**, Star Formation in Different Environments, Quy Nhon, Vietnam, Aug 7, 2017

- **Seminar Talk**, Star Formation/ISM Rendezvous, Princeton University, USA, Nov 28, 2016
- **Poster**, Star Formation 2016, Exeter, UK, Aug 22–26, 2016
- **Contributed Talk**, ASTRONUM 2016 11th Annual International Conference on Numerical Modeling of Space Plasma Flows, Monterey, USA, Jun 8, 2016

## Teaching Experience

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- *Man and the Universe* (non-major course), Teaching Assistant for Prof. Jonghak Woo, Fall 2012
- *Observational Astronomy*, Teaching Assistant for Prof. Jonghak Woo, Spring 2012
- Part-time lecturer for An Introduction to IDL Programming for Undergraduates, Feb 2014

## Competitively-Obtained Computing Time

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Co-I (Science PI), 1.6 M CPU-hrs on KISTI Tachyon2,  
*“Galactic Star Formation and Outflows Regulated by UV Radiation and Supernova Feedback”*, 2017

Co-I (Science PI), 1.2 M CPU-hrs on KISTI Tachyon2,  
*“Expansion of Dusty H II Regions and Its Dynamical Impact on the Interstellar Medium”*, 2016

## Computer Skills

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**Programming Language:** C/C++, MPI, Python, IDL

**Visualization/Software:** DDT, GDB, Git, yt, VisIt, ParaView

**Simulation Code:** *Athena/Athena++*

## Other Experience

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**K-GMT Time Allocation Committee:** 2021-present

**Journal referee (ApJ and MNRAS):** 2020-present

**Military Service:** Weather observer in the Republic of Korea Air Force, 2005-2007

**Departmental Service:**

- KASI TAG Seminar Organizer, 2022–present
- SNU Astronomy Journal Club Coordinator, 2011–2013
- Lead editor of *A quick guide to SNU astro graduate students.*, 2014
- Volunteered multiple times for SNU Astronomy Open House, 2010–2014

## Academic References

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◦ **Prof. Eve C. Ostriker**  
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 Princeton University  
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◦ **Prof. Woong-Tae Kim**  
[wkim@astro.snu.ac.kr](mailto:wkim@astro.snu.ac.kr)  
 Department of Physics and Astronomy  
 Seoul National University  
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◦ **Prof. Neal J. Evans II**

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◦ **Prof. Thiem Hoang**

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◦ **Prof. Takashi Hosokawa**

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