

Jeong-Gyu Kim | Curriculum Vitae

Division of Science – 2-21-1, Osawa, Mitaka, Tokyo 181-0015 Japan

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Employment

EACOA Fellow

National Astronomical Observatory of Japan

Mitaka, Tokyo, Japan

10/2022–present

EACOA Fellow

Korea Astronomy and Space Science Institute

Daejeon, Korea

10/2021–09/2022

Lyman Spitzer, Jr. Postdoctoral Fellow

Department of Astrophysical Sciences, Princeton University

Princeton, NJ, USA

09/2018–08/2021

Education and Research Experience

Seoul National University

Ph.D. in Astronomy

Seoul, Korea

08/2018

Advisor: Prof. Woong-Tae Kim

Thesis Title: Dynamical Evolution of Giant Molecular Clouds Driven by

UV Radiation Feedback from Massive Stars

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

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

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

Advising Experience

- **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

Journal Publications – ADS Search.....

Led by a student under direct supervision

18. *Physical Modeling of Dust Polarization from Magnetically Enhanced Radiative Torque (MRAT) Alignment in Protostellar Cores with POLARIS*
Giang, N. C., Hoang, T., **Kim, J.-G.**, & Tram, L. N. 2022, MNRAS submitted
17. *Photochemistry and Heating/Cooling of the Multiphase Interstellar Medium with UV Radiative Transfer in Magnetohydrodynamic Simulations*
Kim, J.-G., Gong, M., Kim, C.-G., & Ostriker, E. C., ApJS 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_{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., Ostriker, E. C., **Kim, J.-G.**, & Kim, C.-G. 2022, *in prep.*

The Effects of Magnetic Fields and H II regions on the Dynamics of Stellar Wind Bubbles

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

Selected Conferences and Talks (2016-present)

- **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

- *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

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

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

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

Simulation Code: *Athena/Athena++*

Other Experience

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

◦ **Prof. Eve C. Ostriker**
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