Jeong-Gyu Kim | Curriculum Vitae

Quantum Universe Center
85 Hoegi-ro, Dongdaemun-gu, Seoul 02455 Republic of Korea
✉ jeonggyu.astro@gmail.com • jeonggyukim.github.io

Employment

QUC Fellow — **Seoul, Korea**
Korea Institute for Advanced Study — *07/2024–*

EACOA Fellow — **Mitaka, Japan**
National Astronomical Observatory of Japan — *10/2022–2024/06*

EACOA Fellow — **Daejeon, Korea**
Korea Astronomy and Space Science Institute — *10/2021–09/2022*

Lyman Spitzer, Jr. Postdoctoral Fellow — **Princeton, NJ, USA**
Department of Astrophysical Sciences, Princeton University — *09/2018–08/2021*

Education and Research Experience

Seoul National University — **Seoul, Korea**
Ph.D. in Astronomy (Advisor: Prof. Woong-Tae Kim) — *08/2018*
M.S. in Astronomy — *02/2012*
B.S. in Astronomy — *02/2010*

Princeton University — **Princeton, NJ, USA**
Visiting Student Research Collaborator (*Mentor: Prof. Eve Ostriker*) — *2014–2016* (*2mo/yr*)

Honors and Fellowships

EACOA Fellowship, East Asian Core Observatory Association — 2021–2024
Lyman Spitzer, Jr. Fellowship, Princeton University — 2018–2021
Outstanding Thesis Award, Seoul National University — 2018
National Junior Research Fellowship, NRF — 2014–2018
Fellowship for the Next Generation of Basic Research, SNU — 2013
Scholarship for Superior Academic Performance, Brain Korea 21 — 2012
Lotte Scholarship, Lotte Foundation — 2010–2011
National Scholarship For Science and Engineering, NRF — 2003–2004, 2009–2010

Research Interests

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

Advising Experience

- **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–
- **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, 2021–2022
- **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, 2019–2022
- **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

22. *Metallicity Dependence of Pressure-Regulated Feedback-Modulated Star Formation in the TIGRESS-NCR Simulation Suite*
Kim, C.-G., Ostriker, E. C., **Kim, J.-G.**, Gong, M., & LtU collaboration *2024, ApJ accepted*
21. *Geometry, Dissipation, Cooling, and the Dynamical Evolution of Wind-Blown Bubbles*
Lancaster, L., Ostriker, E. C., Kim, C.-G., **Kim, J.-G.**, & Bryan, G. *2024, ApJ, 970, 18*
20. *Implementation of Chemistry in the Athena++ Code*
Gong, M. et al. (incl. **JGK**), 2023, ApJS, 268, 42
19. *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. 2023, MNRAS, 520, 3788
18. *Introducing TIGRESS-NCR: I. Co-regulation of Multiphase ISM and Star Formation Rates*
Kim, C.-G., **Kim, J.-G.**, Gong, M., & Ostriker, E. C. 2023, ApJ, 946, 3
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. 2023, ApJS, 264, 10
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

Structure and Dynamics of Density-Bounded H II Regions with Photoevaporative Outflows
Kim, J.-G., Ostriker, E. C., Lancaster, L., & Kim, C.-G. *2024, in preparation*

Ultraviolet Radiation Fields in Star-Forming Disk Galaxies: Numerical Simulations with TIGRESS-NCR
Linzer, N., **Kim, J.-G.**, Kim, C.-G., & Ostriker, E. C. *2024, ApJ submitted*

Conferences and Talks (2019-)

- **Invited Review**, The Feedback-Driven Matter Cycle in Galaxies: New perspectives from JWST, Heidelberg, Germany, June, 2024
- **Colloquium**, Tohoku Univ., Sendai, Japan, May, 2024
- **Seminar**, KDESci Seminar, KIAS, Seoul, Korea, May, 2024
- **Seminar**, Kyoto Univ., Kyoto, Japan, April, 2024
- **Contributed Talk**, NAOJ DoS+CfCA Workshop, Chiba, Japan, March, 2024
- **Invited Review**, EAYAM2024, Chiang Mai, Thailand, Feb, 2024
- **Contributed Talk**, SAGI workshop, Quy Nhon, Vietnam, Nov, 2023
- **Invited Talk**, Star and Planet Formation Seminar, NAOJ (online), Mitaka, Japan, Oct, 2023
- **Seminar**, ALMA-DS Seminar, NAOJ, Mitaka, Japan, Sep, 2023
- **Invited Seminar**, Nagoya Univ., Nagoya, Japan, Jul, 2023
- **Contributed Talk**, Interstellar Institute 6, Institut Pascal, Orsay, France, Jul, 2023
- **Contributed Talk**, Lyon, France, Jun, 2023
- **Colloquium**, Osaka Univ., Osaka, Japan, May, 2023
- **Contributed Talk**, Athena++ Workshop 2023, Center for Computational Astrophysics, New York, USA, May, 2023
- **Contributed Talk**, Workshop on Star Formation: From Clouds to Cores, NAOJ, Mitaka, Japan, Apr, 2023
- **Poster**, Protostars and Planets VII, Kyoto, Japan, Apr, 2023
- **Colloquium**, Kyungpook Nat'l Univ., Daegu, Korea, Apr, 2023
- **Contributed Talk**, DARWIN+Numerical Galaxy Formation Joint Workshop, Konjiam, Korea, Jan, 2023
- **Contributed Talk**, Recent Advances in Galaxy Formation and Reionization 2022, Yonsei Univ., Seoul, Korea, Nov, 2022
- **Colloquim**, NAOJ, Mitaka, Japan, Oct, 2022
- **Colloquim**, Seoul Nat'l Univ., Seoul, Korea, Sep, 2022
- **Contributed Talk**, IAU Symposium 373: Resolving the Rise and Fall of Star Formation in Galaxies, Busan, Korea, Aug, 2022

- **Colloquim**, Yonsei Univ. (online), Seoul, Korea, Apr, 2022
- **Colloquim**, Chungnam Nat'l Univ., Daejeon, Korea, Apr, 2022
- **Contributed Talk**, KAS Spring Meeting, Busan, Korea, Apr, 2022
- **Invited Talk**, Breakthroughs in Galaxy Formation, Ringberg Castle, Germany, Apr, 2022
- **Seminar**, Theoretical Astrophysics Group Seminar, KASI, Daejeon, Korea, Mar, 2022
- **Contributed Talk**, The 1st VARNET Workshop on Star Formation and Stellar Feedback (online), Dec, 2021
- **Colloquium**, KASI, Daejeon, Korea, Nov, 2021
- **Invited Seminar**, CCAPP Seminar (online), Ohio State University, OH, USA, Nov, 2020
- **Invited Seminar**, Thunch Seminar (online), Princeton University, NJ, USA, Nov, 2020
- **Invited Seminar**, Astronomy Seminar (zoom), University of Kentucky, KY, USA, Oct, 2020
- **Invited Review**, WIM in Galaxies Workshop, Green Bank Observatory, WV, USA, Oct, 2019
- **Contributed Talk**, The Self-organized Star Formation Process, Institut Pascal, Orsay, France, Sep, 2019
- **Seminar**, KASI, Daejeon, Korea, Aug, 2019
- **Colloquium**, Max Planck Institute for Radio Astronomy, Bonn, Germany, Jul, 2019
- **Contributed Talk**, European Week of Astronomy & Space Science 2019, Lyon, France, Jun, 2019
- **Contributed Talk**, Zooming in on Star Formation, Nafplio, Greece, Jun, 2019
- **Contributed Talk**, Athena++ Workshop 2019, Las Vegas, USA, Mar, 2019

Teaching Experience

- **Teaching Assistant**: *Man and the Universe* (non-major course), Fall 2012
- **Teaching Assistant**: *Observational Astronomy*, Spring 2012
- **Bootcamp Lecturer**: *An Introduction to IDL Programming for Undergraduates*, 2014

Professional Service

- **Journal referee**: ApJ, MNRAS, A&A, PASJ, 2020–
- **Member**: K-GMT Time Allocation Committee, 2021–
- **LOC**: Bfields2024 – Magnetic Fields from Clouds to Stars, 2024
- **Organizer**: NAOJ DoS-CfCA workshop, 2024
- **Organizer**: KASI TAG Seminar, 2022–2023
- **Organizer**: SNU Extragalactic Astronomy Journal Club, 2011–2013
- **Lead editor**: *A quick guide to SNU astro graduate students.*, 2014
- **Lecturer/Volunteer**: SNU Astronomy Open House, 2010–2014

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

Academic References

- **Prof. Eve C. Ostriker**
  eco@astro.princeton.edu
  Department of Astrophysical Sciences
  Princeton University
  +1-609-258-7240

- **Prof. Woong-Tae Kim**
  wkim@astro.snu.ac.kr
  Department of Physics and Astronomy
  Seoul National University
  +82-2-880-6769

- **Prof. Thiem Hoang**
  thiemhoang@kasi.re.kr
  Theoretical Astrophysics Group
  Korea Astronomy and Space Science Institute
  +82-42-865-3343

- **Prof. Neal J. Evans II**
  nje@astro.as.utexas.edu
  Department of Astronomy
  The University of Texas at Austin
  +1-512-471-4396

- **Prof. Takashi Hosokawa**
  hosokawa@tap.scphys.kyoto-u.ac.jp
  Department of Physics
  Kyoto University
  +81-75-753-3840