Jeonghoon Lim

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Employment History

2026-present **Nevada Center for Astrophysics Postdoctoral Fellow**
University of Nevada, Las Vegas, NV

Education

2020-2026 **Iowa State University, Ames, IA**
Ph.D. in astrophysics: *Dust-gas dynamics and planetesimal formation driven by the streaming instability*; Advisor: Prof. Jacob B. Simon

2018-2020 **Chungnam National University, Daejeon, South Korea**
M.S. in astronomy: *Statistics of Turbulence Driven by Solenoidal and Compressive Drivings*; Advisor: Prof. Jungyeon Cho

2012-2018 **Chungnam National University, Daejeon, South Korea**
B.S. in astronomy

Research Interests

- Planet and planetesimal formation, streaming instability, protoplanetary disks, Kuiper belt objects, (magneto)hydrodynamic turbulence, computational astrophysics (GPU computing, adaptive mesh refinement)

Awards and Achievements

2022-2025 Future Investigators in NASA Earth and Space Science and Technology (FINESST)

2022-2023 Preparing Future Faculty Associate: Completed a two-semester professional development program offering advanced training in teaching, mentoring, and leadership to prepare graduate students for faculty careers

2020-2022 The Korean Government Scholarship Program for Study Overseas

2020 Graduate Research Award by Journal of the Korean Astronomical Society

Computational Skills/Experience

- Codes and languages: `AthenaK`, `Athena`, Julia, C(++), Python
- Numerical methods: Godunov schemes, particle-mesh methods, grid-based hydrodynamics
- Early-user access to *Horizon*, TACC's NSF Leadership-Class Computing Facility system (AST25015)
- Large-scale simulations on ACCESS and NASA-HEC supercomputers
- Co-PI on ACCESS allocation AST120062 (2022–2023; 29 million CPU hours; PI: J. Simon), "Numerical Simulations of Planetesimal Formation"

Professional and Committee Services

- 2027 — One of the main organizers, ExSoCal 2027
- 2026 - present — Organizer, weekly meetings of the UNLV Star and Planet Formation Group
- 2025 — External Reviewer for NASA's Solar System Workings Program
- July 2018 — LOC Member, 8th East-Asia School and Workshop on Laboratory Space and Astrophysical Plasmas
- Reviewer for AAS journals; 1 paper in total

Student Mentoring

- 2026 - present — Karol Nowohoński, a master's student at ETH Zurich; self-gravitating dust in disks with magnetorotational instability
- 2026 - present — Aydean Bejtovic, an undergrad at ISU; extending 3D streaming instability simulations to different radial pressure gradients
- Fall 2022 - Spring 2024 — Olivia Brouillette, former undergrad at ISU and now graduate student at New Mexico State University; planetesimal-forming conditions from 3D streaming-instability simulations

Teaching Experience

University of Nevada, Las Vegas, NV

- Fall 2026 — **Guest Lecturer**, AST 713: Astrophysics I (graduate level). Prepared and delivered two 75-minute lectures on exoplanet detection, covering radial velocity, transits, direct imaging, and gravitational microlensing.

Iowa State University, IA

- Spring 2024 — **Graduate Teaching Assistant**, PHYS 132: General Physics II; Astro 150: Stars, Galaxies, and Cosmology
- Fall 2023 — **Graduate Teaching Assistant**, PHYS 115: Physics for the Life Sciences
- Fall 2020 — **Graduate Teaching Assistant**, PHYS 111 Lab: General Physics

Chungnam National University, Daejeon, South Korea

- Spring 2019 — **Graduate Teaching Assistant**, 300-level Galactic Astronomy

References

Prof. Jacob B. Simon
Associate Professor
Iowa State University
jbsimon@iastate.edu

Prof. Zhaohuan Zhu
Professor
University of Nevada, Las Vegas
zhaohuan.zhu@unlv.edu

Prof. Wladimir Lyra
Associate Professor
New Mexico State University
wlyra@nmsu.edu

List of Publications and Products

As of Oct. 2026, **6** first-author articles • **14** total publications • **176** total citations on SciX (**150** from first-author papers) • **h–index: 6**

First-author articles

1. **J. Lim**, J. B. Simon, R. Li, O. Brouillette, D. G. Rea, and W. Lyra, "The Streaming Instability in 3D: Conditions for Strong Clumping," ApJ, vol. 1000, no. 2, p. 156, Apr. 2026, Art. no. 156. DOI: 10.3847/1538-4357/ae47e9

2. **J. Lim**, S. A. Baronett, J. B. Simon, C.-C. Yang, D. Sengupta, O. M. Umurhan, and W. Lyra, "Bridging Unstratified and Stratified Simulations of the Streaming Instability for $\tau_s = 0.1$ Grains," ApJ, vol. 993, no. 1, p. 12, Nov. 2025, Art. no. 12. DOI: 10.3847/1538-4357/ae01a6

3. **J. Lim**, J. B. Simon, R. Li, D. Carrera, S. A. Baronett, A. N. Youdin, W. Lyra, and C.-C. Yang, "Probing Conditions for Strong Clumping by the Streaming Instability: Small Dust Grains and Low Dust-to-gas Density Ratio," ApJ, vol. 981, no. 2, p. 160, Mar. 2025, Art. no. 160. DOI: 10.3847/1538-4357/adb311

4. **J. Lim**, J. B. Simon, R. Li, P. J. Armitage, D. Carrera, W. Lyra, D. G. Rea, C.-C. Yang, and A. N. Youdin, "Streaming Instability and Turbulence: Conditions for Planetesimal Formation," ApJ, vol. 969, no. 2, p. 130, Jul. 2024, Art. no. 130. DOI: 10.3847/1538-4357/ad47a2

5. **J. Lim** and J. Cho, "Decay of Turbulence in Fluids with Polytropic Equations of State," Journal of Korean Astronomical Society, vol. 53, pp. 49–57, Apr. 2020. DOI: 10.5303/JKAS.2020.53.2.49

6. **J. Lim**, J. Cho, and H. Yoon, "Generation of Solenoidal Modes and Magnetic Fields in Turbulence Driven by Compressive Driving," ApJ, vol. 893, no. 1, p. 75, Apr. 2020, Art. no. 75. DOI: 10.3847/1538-4357/ab8066

Second- or third-author articles

1. W. Hall, J. B. Simon, **J. Lim**, D. Carrera, and M. Small, "Closing the Gap: A Test of the Streaming Instability Using Simulations and Observations of the Cold-Classical Kuiper Belt Size Distribution," arXiv e-prints, arXiv:2610.04114, Oct. 2026, Art. no. arXiv:2610.04114, **Contribution:** Participated in scientific discussions. arXiv: 2610.04114 [astro-ph.EP].

2. Z.-Y. D. Lin, **J. Lim**, J. B. Simon, Z.-Y. Li, D. Carrera, M. Fernández-López, R. Harrison, R. Li, L. W. Looney, I. W. Stephens, and H. Yang, "Azimuthal Dust Polarization from Aerodynamically Aligned Grains as Evidence for the Streaming Instability in Protoplanetary Disks," ApJ, vol. 1006, no. 1, p. 95, Jul. 2026, Art. no. 95, **Contribution:** Conducted simulations and analysis. DOI: 10.3847/1538-4357/ae8445

3. D. Carrera, L. E. J. Eriksson, **J. Lim**, W. Lyra, and J. B. Simon, "Positive feedback: II. How dust coagulation inside vortices can form planetesimals at low metallicity," A&A, vol. 701, p. L1, Sep. 2025, Art. no. L1, **Contribution:** Participated in scientific discussions. DOI: 10.1051/0004-6361/202555045

4. D. Carrera, **J. Lim**, L. E. J. Eriksson, W. Lyra, and J. B. Simon, "Positive feedback: How a synergy between the streaming instability and dust coagulation forms planetesimals," A&A, vol. 696, p. L23, Apr. 2025, Art. no. L23, **Contribution:** Analyzed data from my streaming-instability simulations and participated in scientific discussions. DOI: 10.1051/0004-6361/202554100

Other co-authored articles

1. S. A. Baronett, W. Lyra, H. Aly, O. Brouillette, D. Carrera, V. I. De Cun, L. E. J. Eriksson, M. Flock, P. Huang, L. Krapp, G. Lesur, R. Li, S. Li, **J. Lim**, S.-J. Paardekooper, D. G. Rea, D. Sengupta, J. B. Simon, P. Sudarshan, O. M. Umurhan, C.-C. Yang, and A. N. Youdin, "A Comparative Study of the Streaming Instability: Unstratified Models with Marginally Coupled Grains," arXiv e-prints, arXiv:2603.04558, Mar. 2026, Art. no. arXiv:2603.04558, **Contribution:** Performed simulations and participated in scientific discussions. arXiv: 2603.04558 [astro-ph.EP].

2. D. Godines, W. Lyra, L. Ricci, C.-C. Yang, J. B. Simon, **J. Lim**, and D. Carrera, "On the Mass Budget Problem of Protoplanetary Disks: Streaming Instability and Optically Thick Emission," ApJ, vol. 997, no. 2, p. 192, Feb. 2026, Art. no. 192, **Contribution:** Participated in scientific discussions. DOI: 10.3847/1538-4357/ae1f15

3. D. Hetzel Ostertag, M. Flock, P. Rosendahl, A. Mignone, **J. Lim**, and J. B. Simon, "A comparison between particle and fluid approaches for streaming instability in global patch simulations," arXiv e-prints, arXiv:2610.09575, Oct. 2026, Art. no. arXiv:2610.09575, **Contribution:** Participated in scientific discussions. arXiv: 2610.09575 [astro-ph.EP].

4. T. S. Tanvir, J. B. Simon, D. Carrera, and **J. Lim**, "Revisiting planetesimal formation from mm-sized grains in pressure bumps," arXiv e-prints, arXiv:2609.27025, Sep. 2026, Art. no. arXiv:2609.27025, **Contribution:** Participated in scientific discussions. arXiv: 2609.27025 [astro-ph.EP].

Seminar & Conference Presentations

1. **Contributed talk**, 3rd PFITS+ Meeting on Hydrodynamics of Circumstellar Disks and Planet Formation, SETI Institute, CA, Jun. 2026.

2. **Dissertation talk**, The 247th American Astronomical Society Meeting, Phoenix, AZ, Jan. 2026.

3. **Contributed talk**, Star and Planet Formation Group, University of Nevada, Las Vegas, NV, Sep. 2025.

4. **Contributed talk**, TCAN Disk Hydro & Planet Formation, University of Arizona, Tucson, AZ, Nov. 2023.

5. **Contributed talk**, Magnetic Fields in the Universe 7, Quy Nhon, Vietnam, Feb. 2020.

6. **Contributed talk**, Korean Astronomical Society Meeting, Seoul, South Korea, Oct. 2019.