Hui Li

NASA Hubble Fellowship

Department of Astronomy, Columbia Univeristy

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Education

- **University of Michigan** — **Ann Arbor**
  Ph.D. in Astronomy and Astrophysics, Advisor: Prof. Oleg Y. Gnedin — *2012-2017*
- **University of Michigan** — **Ann Arbor**
  M.A. in Statistics, Mentor: Prof. Ji Zhu — *2013-2016*
- **Nanjing University** — **Nanjing**
  B.S. and M.S. in Astronomy and Astrophysics, Advisor: Prof. Yang Chen — *2005–2012*

Employment

- **Columbia Univeristy** — **New York**
  Hubble Fellow, Host: Prof. Greg Bryan — *Sep. 2020–*
- **MIT MKI** — **Boston**
  Hubble Fellow, Host: Prof. Mark Vogelsberger — *Dec. 2019–Aug. 2020*
- **MIT MKI** — **Boston**
  Postdoctoral Associate, Host: Prof. Mark Vogelsberger — *Oct. 2017–Nov. 2019*

Research Interests

- Star Cluster Formation and Evolution in Cosmological Simulations
- Evolution of Giant Molecular Clouds and Formation of Star Clusters
- Formation and Evolution of Globular Cluster Systems in Different Types Galaxies
- Thermal Conduction and Turbulence in Magnetized IntraCluster Medium
- Cosmic Ray Acceleration and Propagation in the Galaxy
- The Gamma-Ray Emission of Supernova Remnants and Pulsar Wind Nebulae

Publications

12 first/corresponding author (+2 in prep.), 32 in total, >800 citations, *h*-index=14 in ADS database

First/Corresponding Author (Symbol † for students I co-advised)

F14. **Li, Hui**, Vogelsberger, Mark; Marinacci, Federico; Sales, Laura; Torrey, Paul, "Zoom-in to

giant molecular clouds from galactic scales. I. Methods and cloud demographics", to be submitted

F13. **Li, Hui**, Kannan, Rahul; Vogelsberger, Mark, "Disrupting dusty giant molecular clouds by radiative feedback", to be submitted

F12. **Li, Hui**, Vogelsberger, Mark; Marinacci, Federico; Sales, Laura; Torrey, Paul, "Formation and evolution of young massive clusters in galaxy mergers: a SMUGGLE view", MNRAS submitted, arXiv:2109.10356

F11. †Chen, Yingtian; **Li, Hui**; Vogelsberger, Mark, Effects of the initial density profiles on massive star cluster formation in giant molecular clouds, 2021, MNRAS, 502, 6157

F10. **Li, Hui**; Vogelsberger, Mark; Marinacci, Federico; Sales, Laura; Torrey, Paul, "The effects of subgrid models on the properties of giant molecular clouds in galaxy formation simulations", 2020, MNRAS, 499, 5862

F9. **Li, Hui**; Vogelsberger, Mark; Marinacci, Federico; Gnedin, Oleg, "Disruption of giant molecular clouds and formation of bound star clusters under the influence of momentum stellar feedback", 2019, MNRAS, 487, 364

F8. **Li, Hui**; Gnedin, Oleg, "Star Cluster Formation in Cosmological Simulations. III. Dynamical and Chemical Evolution", 2019, MNRAS, 486, 4030

F7. **Li, Hui**; Gnedin, Oleg; Gnedin, Nickolay, "Star Cluster Formation in Cosmological Simulations. II. Effects of Star Formation Efficiency and Stellar Feedback", 2018, ApJ, 861, 107

F6. **Li, Hui**; Gnedin, Oleg; Gnedin, Nickolay; Meng, Xi; Semenov, Vadim; Kravtsov, Andrey, "Star cluster formation in cosmological simulations. I. Properties of young clusters", 2017, ApJ, 834, 69

F5. **Li, Hui**; Gnedin, Oleg, "Modeling The Formation of Globular Cluster Systems in The Virgo Cluster", 2014, ApJ, 796, 10

F4. **Li, Hui**; Chen, Yang, "γ-rays from Molecular Clouds Illuminated by Accumulated Diffusive Protons. II: Interacting Supernova Remnants", 2012, MNRAS, 421, 935

F3. **Li, Hui**; Liu, Siming; Chen, Yang, "Derivation of the Electron Distribution in SNR RX J1713.7-3946 via a Spectral Inversion Method", 2011, ApJ Letters, 742, 10

F2. **Li, Hui**; Chen, Yang, "γ-rays from Molecular Clouds Illuminated by Accumulated Diffusive Protons from Supernova Remnant W28", 2010, MNRAS Letters, 409, 1, 35

F1. **Li, Hui**; Chen, Yang; Zhang, Li, "Lepto-Hadronic Origin of γ-rays from the G54.1+0.3 Pulsar Wind Nebula", 2010, MNRAS Letters, 408, 1, 80

Co-Author (Symbol † for students I co-advised)

C20. Tacchella et al. Hα emission in local galaxies: star formation, time variability and the diffuse ionized gas, MNRAS submitted

C19. Smith et al. The physics of Lyman-α escape from disk-like galaxies, MNRAS submitted

C18. Jahn et al. Real and fake cores: how feedback expands halos and disrupts tracers of inner gravitational potential in dwarf galaxies, MNRAS submitted

C17. Martinez-Medina, Luis et al. On the response of a star cluster to a tidal perturbation, MNRAS submitted

C16. †Ha, Trung et al. Measuring turbulence with young stars in the Orion complex, 2021, ApJ Letter, 907, 40
C15. †Zhang, Yi; Liu, Ruo-Yu; **Li, Hui**, et al. Measuring the mass of missing baryons in the halo of Andromeda galaxy with gamma-ray observation, ApJ accepted
C14. Zhang, Shuo; Zhu, Zhenlin; **Li, Hui**, et al., NuSTAR and Chandra observation of the Galactic center X-ray filament G0.13-0.11: A pulsar wind nebula driven magnetic filament, 2020, ApJ, 893, 3
C13. McKinnon, Ryan; ..., **Li, Hui**, et al., Simulating dust grain-radiation coupling on a moving mesh, MNRAS in press
C12. †Wang, Yunchong; ..., **Li, Hui**, et al., Early-Type Galaxy Density Profiles from IllustrisTNG: II. Evolutionary trend of the total density profile, 2019, MNRAS, 490, 5722
C11. †Wang, Yunchong; ...; **Li, Hui**, et al. "Early-type galaxy density profiles from IllustrisTNG: I. Correlations with galaxy parameters", 2020, MNRAS, 491, 5188
C10. †Meng, Xi; Gnedin, Oleg; **Li, Hui**, "Structure of high-redshift galaxies in cosmological simulations", 2019, MNRAS, 486, 1574
C9. †Choksi, Nick; Marta Volonteri; Monica Colpi; Gnedin, Oleg; **Li, Hui**, "The star clusters that make black hole binaries across cosmic time", 2019, ApJ, 873, 100
C8. Liu, Ruoyu; et al., "Gamma-Ray Production in the Extended Halo of the Galaxy and Possible Implications for the Origin of Galactic Cosmic Ray", 2019, ApJ, 871, 40
C7. †Brown, Gillen; Gnedin, Oleg; **Li, Hui**, "Nuclear Star Clusters in Cosmological Simulations", 2018, ApJ, 864, 94
C6. †Choksi, Nick; Gnedin, Oleg; **Li, Hui**, "Formation of Globular Cluster Systems: From Dwarf Galaxies to Giants", 2018, MNRAS, 480, 2343
C5. Zhang, Shuo; et al., "NuSTAR Detection of a Hard X-ray Source in the Supernova Remnant-Molecular Cloud Interaction Site of IC 443", 2018, ApJ, 859, 141
C4. Kim, Ji-hoon; et al.,"The AGORA High-Resolution Galaxy Simulations Comparison Project. II: Isolated Disk Test", 2016, ApJ, 833, 202
C3. †Zhang, Xiao; **Li, Hui**; Chen, Yang, "The γ-ray emission produced by protons that escape from supernova remnant G349.7+0.2", 2016, RAA, 16, 10
C2. †Zhang, Xiao; Chen, Yang; **Li, Hui**; Zhou, Xin, "On the hadronic γ-ray emission from Tycho's supernova remnant", 2013, MNRAS, 429, 25
C1. Torres, Diego F.; **Li, Hui**; Chen, Yang; Cillis, Analia; Caliandro, Andrea G.; Rodriguez-Marrero, Ana Y., "Cosmic Rays in the Surroundings of SNR G35.6-0.4", 2011, MNRAS, 417, 3072

Proposals of Space Missions and HPC resource

- "Simulating Giant Molecular Clouds From Realistic Galactic Environments-Ext.01", 2022, PI, **NASA Pleiades**, $125,000$ SBU, equivalent to $\sim \$55,000$.
- "A Systematic Study of Star Cluster Formation in Giant Molecular Clouds", 2022, PI, **ACCESS Anvil**, PHY220084, ~ 10M CPU hr, equivalent to $\sim \$41,018$.
- "Modeling the formation and evolution of star clusters in realistic galactic environments",

2020, PI, **NASA Pleiades**, 321,696 SBUs ~ 9M CPU hr, equivalent to $\sim \$151,200$.
- "Disruption of giant molecular clouds via ionizing stellar feedback", 2018, PI, **NASA Pleiades** HEC-SMD-18-2050, $186,258$ SBUs ~ 1.6M CPU hr, equivalent to $\sim \$44,700$.
- "Exploration of directly coupled radiative quasar feedback", 2018, Co-PI, **XSEDE comet** TG-AST180025, 2M CPU hr, equivalent to $\sim \$70,000$.

Technical Skills

- C, C++, Fortran, Python, IDL
- ART, GADGET, AREPO, ENZO, yt
- MPI, OpenMP, Hadoop, SQL
- R, SAS, Mathematica, LaTeX

Professional Services

Referee of ApJ, ApJL, MNRAS, Research in Astronomy and Astrophysics, New Astronomy
Reviewer of NASA Postdoctoral Program 2021
Reviewer of Future Investigators in NASA Earth and Space Science and Technology (FINESST) fellowship 2020, 2021
Member of The Extreme Science and Engineering Discovery Environment (XSEDE) Resource Allocation Committee

Conferences & Seminars

- **Invited Review Talk** at the four-week MIAPP workshop "Connections Between Local and High-redshift Dense Star-Forming Environments", Munich, Germany, Oct. 2022
- **Invited Talk** at NASA Hubble Fellowship Program Symposium, Baltimore, USA, Sep. 2022
- **Invited Talk** at Clusters at McMaster Workshop, Hamilton, Canada, Aug. 2022
- **Invited Talk** at Ringberg Workshop on Computational Galaxy Formation, Germany, Apr. 2022
- **Invited Talk** at the 2nd HUBS workshop, Mar. 2022
- **Invited Seminar** at the University of Bologna, Italy, Mar 2022
- **Invited Seminar** at Canadian Institute for Theoretical Astrophysics (CITA), Feb. 2022
- **Invited Seminar** at the University of Exeter, Feb. 2022
- **Invited Lecturer** in the Advanced School on Star Formation at IAA-CSIC, Spain, Nov. 2021 (unable to attend due to travel ban)
- IAU Symposium 362: "Predictive Power of Computational Astrophysics as a Discovery Tool", Nov. 2021
- **Invited Talk** at conference "A Holistic View of Stellar Feedback and Galaxy Evolution", Ascona, Switzerland, Jul. 2021

- **Invited Review Talk** at EAS 2021 SS33 "Star Clusters to the Next Scale: Reading the Local and High-z Universe with New Giant Eyes", virtual, Jun. 2021
- **Invited Lunch Talk** at IPMU, Apr. 2021
- **Invited Colloquium** at the University of Florida, Mar. 2021
- "Clash of the Titans: the Enigmatic Role of Mergers in Galaxy Evolution", Lorentz center workshop, Leiden, Mar. 2021
- **Invited Colloquium** at Tsinghua University, Beijing, China, Jan. 2021
- **Invited Colloquium** at KIAA, Beijing, China, Jan. 2021
- **Invited Colloquium** at TD Lee Institute, Shanghai, China, Dec. 2020
- **Invited** seminar at UC Santa Barbara, CA, Dec. 2020
- **Invited** astro-coffee at IAS, Dec. 2020
- **Invited Colloquium** at the University of Kentucky, Sep. 2020
- **Invited Talk** on the stellar halo group meeting at the University of Michigan, Jul. 2020
- **Invited Lecturer** at the Cosmological Summer School 2020 (3 lectures+1 hands-on session), Jun. 2020
- **Invited Opening Keynote** at the KITP workshop "Globular Clusters at the Nexus of Star and Galaxy Formation", KITP, CA, May 2020
- **Invited** Astro Lunch at UC Santa Barbara, CA, May 2020 (cancelled due to coronavirus)
- **Invited Talk** at Computational Galaxy Formation 2020 at Ringberg Castle, Germany, Apr. 2020 (cancelled due to coronavirus)
- Computational astrophysics group seminar at Caltech, Mar. 2020 (cancelled due to coronavirus)
- Astronomy seminar at the UC riverside, Mar. 2020
- Galaxy group seminar at Center for Computational Astrophysics (CCA), NYC, Oct. 2019
- **Invited Seminar** in SFIR at Princeton University, Oct. 2019
- **Invited Seminar** at the University of Chicago, Sep. 2019
- Feedback and its Role in Galaxy Formation, Spetses, Greece, Jun. 2019
- **Invited Seminar** at Lund University, Sweden, Jun. 2019
- Four-week workshop "Zoom-in and Out: From the Interstellar Medium to the Large Scale Structure of the Universe" at NORDITA, Stockholm, Sweden, Jun. 2019
- **Invited Colloquium** at the University of Bologna, Italy, Jun. 2019
- **Invited Talk** at the IAU Symposium 351 "Star clusters: from the Milky Way to the early Universe", Bologna, Italy, May, 2019
- Galaxy group seminar at Center for Computational Astrophysics (CCA), NYC, Feb. 2019
- **Invited Talk** at the Lorentz Center Workshop "Formation of Stars and Massive clusters in Dwarf Galaxies over Cosmic Time", Leiden, Netherlands, Feb. 2019
- **Invited Talk** at the Kavli Institute for Astronomy and Astrophysics, Beijing, China, Dec. 2018
- **Invited Colloquium** at the Tsinghua University, Beijing, China, Dec. 2018
- **Invited Colloquium** at the Nanjing University, Nanjing, China, Dec. 2018
- **Invited talk** at the Mini-Workshop in Astrophysics, T.D. Lee Institute, Shanghai, China, Dec.

2018
- Santa Cruz Galaxy Workshop, CA, Aug. 2018
- The formation of globular clusters at high and low redshift, Sexten, Italy, Jul. 2018
- **Invited Colloquium** at the University of Massachusetts, Amherst, Mar. 2018
- "Harvard-Heidelberg Star Formation 2017", Cambridge, MA, Nov. 2017
- **Invited Talk** at the Galaxy Seminar at the Center for Computational Astrophysics (CCA), New York, Sep. 2017
- "Forging connection: From Nuclei to the Cosmic Web", Lansing, Michigan State University, June 2017
- "Star Cluster Formation: Mapping the First Few Myr's", Madrid, Spain, June 2017
- **Invited Talk** at Sexten Workshop "Globular Cluster Systems and their host Galaxies", Sexten, Italy, June 2017
- 5^{th} AGORA workshop, Santa Cruz, Aug. 2016
- Great Lake Cosmology Workshop, Hamilton, Canada, Jun. 2016
- Dynamics Group Meeting, University of Toronto, Jun. 2016
- **Invited Talk** at Cluster Group Meeting, University of Chicago, May 2016
- GMT Community Science Meeting, Pacific Grove, Oct. 2015
- Santa Cruz Galaxy Workshop, CA, Aug. 2015
- **Invited Colloquium** at Nanjing University, China, Oct. 2014
- KICP Computational Cosmology Workshop, Chicago, Aug. 2013
- **Invited Talk** at 7^{th} joint meeting of Chinese physicists worldwide (OCPA7), Kaohsiung, Taiwan, Aug. 2011
- Multi-Messenger Astronomy of Cosmic Rays, KIAA-PKU, Beijing, China, Apr. 2011
- Annual Conference of Chinese Astronomical Society, Nanning, China, Nov. 2010

Honors & Awards

IOP Outstanding Reviewer Awards 2019
NASA Hubble Fellowship, 2019-2022
T.D. Lee Visiting Fellow in Astrophysics, Tsung-Dao Lee Institute, 2018
Rackham One Term Dissertation Fellowship 2016
Rackham Conference Travel Grants, 2015, 2016, 2017
John G. Kirk Fellowship, 2014
Ralph P. Baldwin Fellowship in Astronomy, 2012
Excellent Master Thesis in Jiangsu Province, 2012
The First Award of Guanghua Scholarship in Nanjing University, 2010-2011
Excellent Graduate Student of Nanjing University, 2009-2010

Teaching, Outreach, & Student Supervision

Teaching Assistant, ASTRO 102, "Stars, Galaxies, and the Universe" Winter 2013

Teaching Assistant, ASTRO 104 & 106, "Alien Skies"	Fall 2013
Graduate Employees' Organization (GEO) Representative	2012-2013
Guest lecturer for class 8.942, "Cosmology"	Fall 2018
Xiao Zhang, Nanjing University, now research scientist at NJU	2011-2013
Gillen Brown, graduate student at UMich	2015-
Xi Meng, graduate student at UMich	2016-2018
Nick Choksi, undergrad at UMich, now graduate student at Berkeley	2016-2018
Yunchong Wang, undergrad at MIT/Tsinghua, now graduate student at Stanford	2018-2019
Yuan Gao, graduate student at HKU	2018-
Stephanie O'Neil, graduate student at MIT	2019-
Yingtian Chen, undergrad at MIT/PKU, now graduate student at UMich	2019-
Yuan Wang, undergrad at MIT/NKU	2019-
Chang Cai, undergrad at MIT/NJU	2020-
Ruizheng Jiang, undergrad at MIT/NJU	2020-

David Fang & Hillary Andales, Undergraduate Research Opportunity Program (UROP) at MIT 2020-

References

- **Dr. Greg Bryan**
  Professor
  Columbia University
  gbryan@astro.columbia.edu
- **Dr. Mark Vogelsberger**
  Associate Professor
  Massachusetts Institute of Technology
  mvogelsb@mit.edu
- **Dr. Oleg Y. Gnedin**
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  University of Michigan
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- **Dr. Nickolay Y. Gnedin**
  Professor/Senior Scientist
  University of Chicago/Fermilab
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