

# Dr. Fangzhou JIANG – Troesh Postdoctoral Scholar in Theoretical Astrophysics

## CONTACT INFORMATION

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## EDUCATION AND POSITIONS

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OCT 2022– | Assistant Professor, **Peking University**

JAN 2020–now | Troesh Scholar, **Caltech Institute of Technology, Carnegie Observatories**  
Faculty hosts: Prof. Phillip HOPKINS (Caltech), Dr. Andrew BENSON (Carnegie)

OCT 2016–DEC 2019 | PBC Fellow, **Hebrew University of Jerusalem**  
Faculty host: Prof. Avishai DEKEL

JULY 2016 | Ph.D. in Astronomy, **Yale University**  
Advisor: Prof. Frank VAN DEN BOSCH

JUN 2010 | Bachelor of Science, **Nanjing University**, Kuang Yaming Honors School

## RESEARCH THEME

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TOPICS: galaxy formation, dark-matter halo, galaxy-halo connection, near-field cosmology, feedback  
METHODOLOGY: semi-analytic models, cosmological simulations, Bayesian inference and machine learning

## PAPERS – LIST ON NEXT PAGE [[LINK TO MY ADS LIBRARY](#)]

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**27** published works: **10** as 1st author, **7** as co-author with significant contribution, **> 800** citations  
**2** works in prep: **2** as leading author

## HONORS AND AWARDS

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2020 | [Troesh Postdoctoral Scholar](#) (California Institute of Technology)  
2018 | Rosenblem Prize for good postdoctoral research in astrophysics (Hebrew University)  
2017 | PBC Fellowship (Planning and Budgeting Committee of Israel)  
2018 | [Brouwer Prize for Outstanding PhD thesis](#) (Yale University)  
2015 | Government Award for Outstanding Students Abroad (China Scholarship Council)  
2010 | Pan Xueping Scholarship (top-tier scholarship in Nanjing University)  
2008 | [Goldman Sachs Global Leaders Program Award](#) (IIE and Goldman Sachs Foundation)

## PROFESSIONAL SERVICES

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Referee for HST, Nature Astronomy, MNRAS, ApJ, ApJL, and A&A  
Coordinator of CosmoLunch seminar series in the Hebrew University of Jerusalem (2017-2019)  
Organizer of TAPIR seminar series at Caltech (2021-2022)

## SOFTWARE DEVELOPMENT

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**SatGen** – semi-analytic satellite galaxy generator [[GitHub link](#)]  
**Infer3D** – Bayesian-inference pipeline for 3D galaxy structure (in development)

## MEDIA ATTENTION

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2012 | Astrobites | [A look-alike of  \$z\sim 2\$  galaxies in our backyard](#)  
2017 | Yale News | [Yale-led team puts dark matter on the map](#)

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- [29] *A semi-analytical study of self-interacting dark-matter haloes* **Jiang F.** et al., in prep. [draft available upon request]
- [28] *The relationship between star-formation burstiness and the structure of dwarf galaxies and hosting haloes* **Jiang F.**, Freundlich J., Dekel A., Tacchella S., in prep. [draft available upon request]
- [27] *Orbital Evolution of Satellite Galaxies in Self-Interacting Dark Matter Models* **Jiang F.**, Kaplinghat M., Lisanti M., Slone O., 2021, PRL submitted, arXiv:2108.03243 [Link]
- [26] *SatGen: a semi-analytical satellite galaxy generator – I. The model and its application to Local-Group satellite statistics* **Jiang F.**, Dekel A., Freundlich J., van den Bosch F. C., Green S. B., Hopkins P. F., Benson A., Du X., 2021, MNRAS, 502, 621 [Link]
- [25] *Formation of ultra-diffuse galaxies in the field and in galaxy groups* **Jiang F.**, Dekel A., Freundlich J., Romanowsky A.J., Dutton A., Macciò A., Di Cintio A., 2019, MNRAS, 487, 5272 [Link] 51 citations
- [24] *Is the dark-matter halo spin a predictor of galaxy spin and size?* **Jiang F.**, Dekel A., Kneller O., Lapiner S., Cerverino D., Primack J., Faber S., et al. 2019, MNRAS, 488, 4801 [Link] 53 citations
- [23] *Statistics of Dark Matter Substructure: III. Halo-to-Halo Variance* **Jiang F.** & van den Bosch F.C., 2017, MNRAS, 472, 657 [Link] 41 citations
- [22] *Comprehensive Assessment of the Too-Big-to-Fail Problem* **Jiang F.** & van den Bosch F.C., 2015, MNRAS, 453, 3575 [Link] 40 citations
- [21] *Statistics of Dark Matter Substructure: I. Model and Universal Fitting Functions* **Jiang F.** & van den Bosch F.C., 2016, MNRAS, 458, 2848 [Link] 84 citations
- [20] *Generating merger trees for dark matter halos: a comparison of methods* **Jiang F.** & van den Bosch F.C., 2014, MNRAS, 440, 193 [Link] 82 citations
- [19] *A Nearby Analog of  $z \sim 2$  Compact Quiescent Galaxies with a Rotating Disk* **Jiang F.**, van Dokkum P., Bezanson R., Franx M., 2012, ApJL, 749, L10 [Link]
- [18] *Surface photometry & radial color gradients of nearby luminous early-type galaxies in SDSS Stripe 82* **Jiang F.**, Huang S., Gu Q., 2011, RAA, 11, 309 [Link]

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- [17] *Core Formation in High- $z$  Massive Haloes: Heating by Post Compaction Satellites and Response to AGN Outflows*  
Dekel A., Freundlich J., **Jiang F.**, et al. [[Link](#)]
  - [16] *The tidal evolution of dark matter substructure – II. The impact of artificial disruption on subhalo mass functions and radial profiles*  
Green S. B., van den Bosch F. C., **Jiang F.**, 2021, MNRAS in press (arXiv:2103.01227) [[Link](#)]
  - [15] *The Dekel-Zhao profile: a mass-dependent dark-matter density profile with flexible inner slope and analytic potential, velocity dispersion, and lensing properties*  
Freundlich J., **Jiang F.**, Dekel A., Cornuault N., Ginzburg O., Koskas R., Lapiner S. Dutton A. A., Macciò A. V., 2020, MNRAS, 499, 2912 [[Link](#)]
  - [14] *A Mass Threshold for Galactic Gas Discs by spin flips*  
Dekel A., Ginzburg O., **Jiang F.**, Freundlich J., Lapiner S., Ceverino D., Primack J.R., 2020, MNRAS, 493, 4126 [[Link](#)]
  - [13] *The global star-formation law by supernova feedback*  
Dekel A., Kartick S., **Jiang F.**, Bournaud F., Krumholz M., Ceverino D., Primack J.R., 2019, MNRAS, 488, 4753 [[Link](#)]
  - [12] *A model for core formation in dark matter haloes and ultra-diffuse galaxies by outflow episodes*  
Freundlich J., Dekel A., **Jiang F.** et al. , 2020, MNRAS, 491, 4523 [[Link](#)]
  - [11] *Statistics of Dark Matter Substructure: II. Comparison of Model with Simulation Results*  
van den Bosch F.C. & **Jiang F.**, 2016, MNRAS, 458, 2870 [[Link](#)] **36 citations**
  - [10] *Coming of age in the dark sector: how dark matter halos grow their gravitational potential wells*  
van den Bosch F.C., **Jiang F.**, Hearin A.P., Campbell D., Padmanabhan N., Watson D.F., 2014, MNRAS, 445, 1713 [[Link](#)] **67 citations**

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- [9] *A Search for Wandering Black Holes in the Milky Way with Gaia and DECaLS*  
Green J.E. et al. including **Jiang F.**, 2021, ApJ, 917, 17 [[Link](#)]
  - [8] *Dissipative Dark Matter on FIRE: I. Structural and kinematic properties of dwarf galaxies*  
Shen X., Hopkins P., Necib L., **Jiang F.**, Michael B.-K., Wetzel A., 2021, MNRAS submitted (arXiv:2102.09580) [[Link](#)]
  - [7] *The Star Formation Rate-Radius Connection: Data and Implications for Wind Strength and Halo Concentration*  
Lin L. et al. (including **Jiang F.**), 2020, MNRAS, 899,93 [[Link](#)]
  - [6] *Quenching as a Contest between Galaxy Halos and Their Central Black Holes*  
Chen Z. et al. (including **Jiang F.**), 2020, MNRAS, 897,102 [[Link](#)]
  - [5] *Origin of star-forming rings around massive centres in massive galaxies at  $z < 4$*   
Dekel A., Lapiner S., Ginzburg O., Freundlich J., **Jiang F.**, Finish B., Kretschmer M., Lin D., Ceverino D., Primack J., Giavalisco M., Ji Z., 2020, MNRAS, 496,5372 [[Link](#)]
  - [4] *The galaxy clustering crisis in abundance matching*  
Campbell D., van den Bosch F. C., Padmanabhan N., Mao Y.-Y., Zentner A. R., Lange J. U., **Jiang F.**, Villarreal A., 2018, MNRAS, 477,359 [[Link](#)]
  - [3] *Mapping substructure in the HST Frontier Fields cluster lenses and in cosmological simulations*  
Natarajan P., Chadayammuri U., Jauzac M., Richard J., Kneib J.-P., Ebeling H., **Jiang F.**, van den Bosch F.C., et al., 2017, MNRAS, 468,1962 [[Link](#)] **68 citations**
  - [2] *On the Segregation of Dark Matter Substructure*  
van den Bosch F.C., **Jiang F.**, Campbell D., Behroozi P., 2016, MNRAS, 455, 158 [[Link](#)] **47**
  - [1] *The Photometry of Cataclysmic Variable V1159 Ori and BZ UMa*  
Jiang L., **Jiang F.**, Li Z., Zhao Y., Gu Q., 2010, Acta Astronomica Sinica, 51, 42 [[Link](#)]

## PRESENTATIONS

09/14/2021	Seminar (invited talk)	University of Missouri, Columbia, MO, USA “ <i>Galaxy-Halo Connection &amp; Near-Field Cosmology with Numerical and Semi-Analytical Methods</i> ”
09/17/2020	Seminar	Carnegie Observatories, Pasadena, CA, USA “ <i>Astrophysical implications of self-interacting dark matter</i> ”
07/06/2020	Seminar	Princeton, NJ, USA “ <i>SatGen: a semi-analytic satellite galaxy generator</i> ”
03/10/2020	Seminar	IPMU, Tokyo “ <i>SatGen: a semi-analytic satellite galaxy generator</i> ”
02/20/2020	Seminar	Carnegie Observatories, Pasadena, CA, USA “ <i>Structural diversity of massive dwarf galaxies</i> ”
12/17/2019	Seminar	Hebrew University of Jerusalem, Israel “ <i>SatGen: a semi-analytic satellite galaxy generator</i> ”
10/23/2019	Workshop  (invited talk)	<b>Galaxy Angular Momentum Alignment 2019</b> Tsung-Dao Lee Institute, Shanghai “ <i>A New Galaxy Size Predictor and A Universal Mass Threshold for Galactic Disk Formation</i> ”
08/2019	Workshop (contributed talk)	<b>Santa Cruz Galaxy Workshop</b> “ <i>Infer 3D structure and shape of galaxies from deep 2D imaging</i> ”
06/2019	Workshop (invited talk)	Spetese, Greece “ <i>The global star formation law by supernova feedback</i> ”
11/2018	Workshop	Dali, China “ <i>Is dark-matter halo spin a predictor of galaxy spin and size?</i> ”
06/13/2019	Seminar	Institute de Astrophysique, Paris
05/2019	Colloquium	Tel Aviv University
11/02/2018	Colloquium	KIAA, Peking University
10/12/2018	Seminar	Flatiron Institute, CCA

## PRESENTATIONS (CONTINUED)

10/09/2018	Seminar	Harvard, ITC “Formation of ultra-diffuse galaxies – with a sneak peek of a new semi-analytic model of satellite galaxies”
09/03/2018	Seminar	SHAO, Shanghai “UDG formation & statistics of dark matter substructure”
08/15/2018	Workshop (invited talk)	<b>The Bewildering Nature of Ultra-diffuse Galaxies</b> , Lorentz Center, Leiden “Formation and evolution of ultra-diffuse galaxies in the field and in galaxy groups”
08/06/2018	Workshop (contributed talk)	<b>Santa Cruz Galaxy Workshop</b> “Characterizing simulated ultra-diffuse galaxies in the field and galaxy groups” [ <a href="#">Video</a> ]
01/03/2018	Seminar	Technion, Haifa “Is dark-matter halo spin a predictor of galaxy spin and size?”
05/18/2017	Workshop (contributed talk)	<b>Galaxy-Halo Connection</b> , Santa Barbara “On a weak correlation between the spins of galaxies and their host halos” [ <a href="#">Video</a> ]
08/10/2016	Workshop (contributed talk)	<b>Santa Cruz Galaxy Workshop</b> “Characterizing the substructure of dark-matter halos” [ <a href="#">Video</a> ]
04/05/2016	Workshop (contributed talk)	<b>Dark Matter on the Smallest Scales</b> , Lorentz Center, Leiden “Statistics of dark matter substructure – a comprehensive assessment of the Too Big to Fail Problem”
09/24/2015	Seminar (invited talk)	Brown, Providence “Statistics of Dark Matter Subhalos”
05/15/2015	Workshop (contributed talk)	<b>Advanced Workshop on Cosmological Structures from Reionization to Galaxies</b> , ICTP, Trieste “Comprehensive assessment of the too-big-to-fail problem”
06/01/2014	Seminar	NAOC, Beijing “Semi-analytic Model of dark-matter subhalos”
05/29/2014	Seminar	PMO, Nanjing “Comparison of EPS halo merger trees and statistics of dark-matter subhalos”
05/23/2014	Workshop (contributed talk)	<b>“From Dark Matter to Galaxies” – the 10th Sino-German Workshop on Galaxy Formation and Cosmology</b> , Xi’an “Statistics of dark matter subhalos: model and halo-to-halo Variance”

## TEACHING

2017,19,20 Spring	HUJI	lecturer	Advanced Cosmology (graduate course)
2017,2019 Spring	HUJI	project advisor	Astrophysics Seminar (undergraduate research training course)
2014, Spring	Yale	TA	ASTR 210: Stellar Astrophysics
2012, Fall	Yale	TA	ASTR 110: Planets and Stars
2011, Fall	Yale	TA	ASTR 130: Origins and the Search for Life in the Universe
2011, Spring	Yale	TA	ASTR 120: Galaxies and the Universe
2010, Fall	Yale	TA	ASTR 255/PHYS 295: Research Methods in Astrophysics

## ACADEMIC REFERENCES

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**Prof. Dr. Avishai Dekel**  
(faculty host)

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**Prof. Dr. Andrew Benson**  
(faculty host)

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