Johannes U. Lange

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RESEARCH INTERESTS

Dark Energy, Gravitational Lensing, Galaxy Formation, Statistical Methods and Machine Learning

EDUCATION

Yale University 08/2014 – 08/2019
M.Sc., M.Phil, Ph.D. in Astronomy

Ruprecht-Karls-Universität Heidelberg 09/2012 – 08/2014
Master of Science in Physics

Freie Universität Berlin 10/2009 – 08/2012
Bachelor of Science in Physics

POSITIONS

American University 08/2024 – present
Assistant Professor

University of Michigan 09/2022 – 07/2024
Leinweber Center for Theoretical Physics Fellow

Stanford University 09/2021 – 08/2022
Stanford–Santa Cruz Cosmology Postdoctoral Fellow

University of California, Santa Cruz 09/2019 – 08/2021
Stanford–Santa Cruz Cosmology Postdoctoral Fellow

TEACHING

Instructor, American University Fall 2024
Course: Modern Physics

Postdoctoral Course on STEM Teaching, University of Michigan Winter 2024
The Postdoctoral Short Course on College Teaching in STEM is a comprehensive 10-week program for postdocs to teach effectively as future faculty members.

Adjunct Lecturer, University of Michigan Fall 2023
Course: Naked-Eye Astronomy

Certificate of College Teaching Preparation, Yale University 2014-2019
The Certificate of College Teaching Preparation (CCTP) is an opportunity for graduate students to engage in a comprehensive training program in effective college teaching.

Teaching Fellow, Yale University Spring 2016, Spring 2018
Course: Astrostatistics and Data Mining

Teaching Fellow, Yale University Fall 2017, Fall 2014
Course: Introduction to Astronomical Observing

Teaching Fellow, Yale University Fall 2015
Course: Introduction to Cosmology

Teaching Fellow, Yale University Spring 2015
Course: Gravity, Astrophysics, and Cosmology

ADVISING

Alexandra Doytcheva (undergraduate) 2023-2024
Topic: Galaxy Clustering and Control Variates

Filomela Gerou (undergraduate) 2022-2024
Topic: Galaxy Clustering and Control Variates

Diana Blanco (graduate, co-adviser) 2021-present
Topic: Photometric Redshift Calibration

Juliana Karp (undergraduate) 2022-2023
Topic: Anisotropic Satellite Galaxy Quenching

Gilad Pifko (undergraduate) 2022-2023
Topic: Relationship between Galaxy and Dark Matter Halo Size

Simon Wu (undergraduate) 2022-2023
Topic: Gravitational Lensing Contribution from Subhalos

Garv Shah (undergraduate) 2022-2023
Topic: Boosting Importance Nested Sampling with Neural Networks

Enia Xhakaj (graduate, co-adviser) 2019-2023
Topic: Gravitational Lensing

LEAD-AUTHOR PUBLICATIONS

[14]   J. U. Lange et al. "Systematic Effects in Galaxy-Galaxy Lensing with DESI". *The Open Journal of Astrophysics* 7, 57 (July 2024).

[13]   J. U. Lange. "NAUTILUS: boosting Bayesian importance nested sampling with deep learning". *MNRAS* 525.2 (Oct. 2023), pp. 3181–3194.

[12]   J. S. M. Karp, J. U. Lange, and R. H. Wechsler. "Anisotropic Satellite Galaxy Quenching: A Unique Signature of Energetic Feedback by Supermassive Black Holes?" *ApJL* 949.1, L13 (May 2023).

[11]   J. U. Lange et al. "Constraints on S_8 from a full-scale and full-shape analysis of redshift-space clustering and galaxy-galaxy lensing in BOSS". *MNRAS* 520.4 (Apr. 2023), pp. 5373–5393.

[10]   J. U. Lange et al. "Five per cent measurements of the growth rate from simulation-based modelling of redshift-space clustering in BOSS LOWZ". *MNRAS* 509.2 (Jan. 2022), pp. 1779–1804.

[9]   J. U. Lange et al. "On the halo-mass and radial scale dependence of the lensing is low effect". *MNRAS* 502.2 (Apr. 2021), pp. 2074–2086.

[8]   J. U. Lange et al. "Cosmological Evidence Modelling: a new simulation-based approach to constrain cosmology on non-linear scales". *MNRAS* 490.2 (Dec. 2019), pp. 1870–1878.

[7]   J. U. Lange et al. "New perspectives on the BOSS small-scale lensing discrepancy for the Planck ΛCDM cosmology". *MNRAS* 488.4 (Oct. 2019), pp. 5771–5787.

[6] J. U. Lange et al. "Updated results on the galaxy-halo connection from satellite kinematics in SDSS". *MNRAS* 487.3 (Aug. 2019), pp. 3112–3129.

[5] J. U. Lange et al. "Maturing satellite kinematics into a competitive probe of the galaxy-halo connection". *MNRAS* 482.4 (Feb. 2019), pp. 4824–4845.

[4] J. U. Lange et al. "Brightest galaxies as halo centre tracers in SDSS DR7". *MNRAS* 473.2 (Jan. 2018), pp. 2830–2851.

[3] J. U. Lange et al. "Evidence for Non-stellar Rest-frame Near-IR Emission Associated with Increased Star Formation in Galaxies at z ~1". *ApJL* 819.1, L4 (Mar. 2016).

[2] J. U. Lange and M. .-. Chu. "Can galactic dark matter substructure contribute to the cosmic gamma-ray anisotropy?" *MNRAS* 447.1 (Feb. 2015), pp. 939–947.

[1] J. Lange and M. Pohl. "The average GeV-band emission from gamma-ray bursts". *A&A* 551, A89 (Mar. 2013).

CO-AUTHOR PUBLICATIONS

[22] DESI Collaboration et al. "The Early Data Release of the Dark Energy Spectroscopic Instrument". *AJ* 168.2, 58 (Aug. 2024).

[21] S. Chen et al. "Not all lensing is low: An analysis of DESI×DES using the Lagrangian Effective Theory of LSS". *arXiv e-prints*, arXiv:2407.04795 (July 2024).

[20] S. Yuan et al. "Redshift evolution and covariances for joint lensing and clustering studies with DESI Y1". *MNRAS* (July 2024).

[19] E. Xhakaj et al. "Cluster cosmology without cluster finding". *MNRAS* 530.4 (June 2024), pp. 4203–4218.

[18] DESI Collaboration et al. "Validation of the Scientific Program for the Dark Energy Spectroscopic Instrument". *AJ* 167.2, 62 (Feb. 2024).

[17] Y. Wang et al. "Measuring the conditional luminosity and stellar mass functions of galaxies by combining the DESI LS DR9, SV3 and Y1 data". *arXiv e-prints*, arXiv:2312.17459 (Dec. 2023).

[16] B. Hadzhiyska et al. "Synthetic light-cone catalogues of modern redshift and weak lensing surveys waith ABACUSSUMMIT". *MNRAS* 525.3 (Nov. 2023), pp. 4367–4387.

[15] R. Ruggeri et al. "A data compression and optimal galaxy weights scheme for Dark Energy Spectroscopic Instrument and weak lensing data sets". *MNRAS* 525.3 (Nov. 2023), pp. 3865–3878.

[14] K. Wang et al. "Evidence of galaxy assembly bias in SDSS DR7 galaxy samples from count statistics". *MNRAS* 516.3 (Nov. 2022), pp. 4003–4024.

[13] DESI Collaboration et al. "Overview of the Instrumentation for the Dark Energy Spectroscopic Instrument". *AJ* 164.5, 207 (Nov. 2022).

[12] S. Huang et al. "The outer stellar mass of massive galaxies: a simple tracer of halo mass with scatter comparable to richness and reduced projection effects". *MNRAS* 515.4 (Oct. 2022), pp. 4722–4752.

[11] E. Xhakaj et al. "Beyond mass: detecting secondary halo properties with galaxy-galaxy lensing". *MNRAS* 514.2 (Aug. 2022), pp. 2876–2890.

[10] K. Dawson et al. "Snowmass2021 Cosmic Frontier White Paper: High Density Galaxy Clustering in the Regime of Cosmic Acceleration". *arXiv e-prints*, arXiv:2203.07291 (Mar. 2022).

[9] A. Leauthaud et al. "Lensing without borders - I. A blind comparison of the amplitude of galaxy-galaxy lensing between independent imaging surveys". *MNRAS* 510.4 (Mar. 2022), pp. 6150–6189.

[8] K. Wang et al. "Concentrations of dark haloes emerge from their merger histories". *MNRAS* 498.3 (Nov. 2020), pp. 4450–4464.

[7] F. C. van den Bosch, J. U. Lange, and A. R. Zentner. "Basilisk: Bayesian hierarchical inference of the galaxy-halo connection using satellite kinematics - I. Method and validation". *MNRAS* 488.4 (Oct. 2019), pp. 4984–5013.

[6] K. Wang et al. "How to optimally constrain galaxy assembly bias: supplement projected correlation functions with count-in-cells statistics". *MNRAS* 488.3 (Sept. 2019), pp. 3541–3567.

[5] A. R. Zentner et al. "Constraints on assembly bias from galaxy clustering". *MNRAS* 485.1 (May 2019), pp. 1196–1209.

[4] D. Campbell et al. "The galaxy clustering crisis in abundance matching". *MNRAS* 477.1 (June 2018), pp. 359–383.

[3] A. S. Villarreal et al. "The immitigable nature of assembly bias: the impact of halo definition on assembly bias". *MNRAS* 472.1 (Nov. 2017), pp. 1088–1105.

[2] E. J. Nelson et al. "Where Stars Form: Inside-out Growth and Coherent Star Formation from HST Hα Maps of 3200 Galaxies across the Main Sequence at $0.7 < z < 1.5$". *ApJ* 828.1, 27 (Sept. 2016).

[1] I. G. Momcheva et al. "The 3D-HST Survey: Hubble Space Telescope WFC3/G141 Grism Spectra, Redshifts, and Emission Line Measurements for ~100,000 Galaxies". *ApJS* 225.2, 27 (Aug. 2016).

INVITED TALKS

Physics Colloquium 04/2024
University of Hawaii

ITP Cosmology Seminar 12/2023
Ruprecht-Karls-Universität Heidelberg

Frontiers of Nested Sampling Workshop 07/2023
42nd International Workshop on Bayesian Inference and Maximum Entropy Methods in Science and Engineering

Webinar Series 06/2023
National Observatory in Rio de Janeiro

Early Career Researcher Cosmology Seminar 11/2022
Korea Astronomy and Space Science Institute

HEAP Seminar 12/2021
University of Utah

Astronomy Colloquium 09/2021
Swinburne University of Technology

Growth of Structure Webinar 07/2021
University of California, Santa Cruz

Growth of Structure Webinar 06/2021
University of California, Santa Cruz

Research Progress Meeting 01/2019
Lawrence Berkeley National Laboratory

CCAPP Seminar 01/2019
Center for Cosmology and AstroParticle Physics

BCCP Seminar 09/2018

University of California, Berkeley

The Galaxy-Halo Connection Across Cosmic Time 07/2017
Kavli Institute for Theoretical Physics

OUTREACH

- Invited KIPAC Public Lecture, Palo Alto, CA, 07/2022
- Class at Stanford Splash, Palo Alto, CA, 11/2021
- Talk at Astronomy on Tap, New Haven, CT, 06/2019
- Talk at Institute for Learning in Retirement, New Haven, CT, 04/2019
- Talks at Leitner Family Observatory, New Haven, CT, 02/2018 and 05/2019
- Talks at Open Labs Science Cafe, Yale University, New Haven, CT, 10/2017 and 04/2019
- Member of Open Labs, Yale University, New Haven, CT, 2016 - 2019
- Tutor at New Haven Reads, New Haven, CT, 2015 - 2018
- Member of UCSB Physics Circus, UC Santa Barbara, Santa Barbara, CA, 2012

HONORS AND AWARDS

- Brouwer Ph.D. Thesis Prize, Yale University
- Cosmology Fellowship, University of California, Santa Cruz and Stanford University
- Graduate Fellowship Program, Kavli Institute for Theoretical Physics
- Henry A. Smith Fellowship, Yale University
- DAAD (German Academic Exchange Service) Scholarship
- Deutschlandstipendium National Scholarship Program
- Ernst Reuter Scholarship, Free University of Berlin
- Dean's List, University of California, Santa Barbara

LEADERSHIP AND SERVICE

- Co-Chair of the Dark Energy Spectroscopic Instrument (DESI) C^3 Working Group, 2022 - present
- Reviewer for Astronomy & Astrophysics, Monthly Notices of the Royal Astronomical Society, and The Astrophysical Journal
- Reviewer for the National Science Foundation, 2022
- Member of the Stanford Physics Equity & Inclusion Committee, 2021 - 2022
- Member of the DESI Early Career Scientists Committee, 2021 - 2022
- Mentor for the DESI Diversity, Equity, and Inclusion Mentorship Program, 2021 - 2023
- Member of the UCSC Astronomy Department Colloquium Committee, 2019 - 2020
- Member of the Yale Graduate Admissions Committee, 2018 - 2019
- SOC Member for KICP Workshop "Lensing at different scales: strong, weak, and synergies between the two", 08/2023
- SOC Member for the Michigan Cosmology Summer School 2023, 06/2023
- SOC Member for the KITP Online Conference "The Galaxy-Halo Connection Across Cosmic Time: Recent Updates", 08/2020
- SOC Member for the KIPAC Online Workshop "Precision Measurements and Modeling of Lensing and Clustering in the DESI Era", 07/2020

REFERENCES

Frank C. van den Bosch
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