

NANOOM LEE

nanoom.lee@jhu.edu · Google Scholar

EMPLOYMENT

Horizon Postdoctoral Fellow · Johns Hopkins University · Baltimore, MD

Oct 2024 – Present

- Mentor: Prof. Marc Kamionkowski

EDUCATION

Ph.D., Physics · New York University, New York, NY

Sep 2024

Advisors: Profs. Yacine Ali-Haïmoud & Roman Scoccimarro

Thesis: Imprints of Fundamental Physics on the Primordial Cosmic Plasma

M.A., Physics · Stony Brook University, Stony Brook, NY

May 2018

B.S., Physics & Mathematics · Korea University, Seoul, South Korea

Feb 2016

First in class

RESEARCH INTERESTS

Data-driven cosmology, CMB, Cosmological recombination, Boltzmann code development, Extensions to Λ CDM (decaying dark matter), Hubble tension, Large-scale structure, Fisher forecasting, Statistical methods.

HONORS & AWARDS

- Newton International Fellowship — The Royal Society (reserve list) 2024
- Roman Galaxy Redshift Survey Postdoctoral Researcher — Caltech (declined) 2024
- Beus Prize Postdoctoral Fellowship — Arizona State University (finalist, 2nd place) 2024
- James Arthur Graduate Associate Fellowship — NYU 2020 – 2021, 2022 – 2023
- Balzan Cosmological Studies Program Award — Oxford / JHU 2022
- **Outstanding Graduate Student Instructor Award** — NYU 2019 – 2020
- **Korean Government Scholarship for Overseas Study** — Ministry of Education, South Korea 2016 – 2018
- First Rank Graduation Award — Korea University 2016
- Boheon Scholarship (Full tuition) — Korea University 2012 – 2013, 2015
- National Scholarship — Ministry of Education, South Korea 2012

PUBLICATIONS

12 first-authored papers (15 total) · h -index 7 · $\gtrsim$ 250 citations · Google Scholar · InspireHEP

[†] mentored students

First- & second-authored

1. **N. Lee**, A. Bencke[†], M. Kamionkowski “Cosmological evolution with decaying dark matter: an integral-equation approach” arXiv:2607.24910 (under review)
2. A. Bencke[†], **N. Lee**, M. Kamionkowski “Constraints with CMB lensing on dark matter decays to massive decay products” arXiv:2606.14849 (under review)
3. **N. Lee** and T. Zhou[†] “What it takes to solve the Hubble tension through Modifications of Cosmological Recombination II: in light of ACT DR6 and DESI DR2” arXiv:2606.06495 (under review)
4. **N. Lee** “Compressed Gaussian likelihood for the Planck low- ℓ data” arXiv:2606.05166 (under review)
5. **N. Lee**, Y. Ali-Haïmoud, M. Kamionkowski “Efficient analytic approximation for small-scale non-cold relic perturbations” Phys. Rev. D 113, 043525 (2026)
6. **N. Lee**, J. L. Bernal, S. Günther, L. Ji, M. Kamionkowski “Rapid and accurate numerical evolution of linear cosmological perturbations with non-cold relics” Phys. Rev. D 112, 043529 (2025)
7. **N. Lee**, M. Braglia, Y. Ali-Haïmoud “What it takes to solve the Hubble tension through scale-dependent modifications to primordial power spectrum” Phys. Rev. D 112, 083506 (2025)
8. A. Eggemeier, **N. Lee**, R. Scoccimarro, et al. “Boosting galaxy clustering analyses with non-perturbative modelling of redshift-space distortions” Phys. Rev. D 112, 063532 (2025)
9. **N. Lee** and Y. Ali-Haïmoud “Magnetic field from primordial perturbations” Phys. Rev. D 109, 103536 (2024)

10. **N. Lee** and S. C. Hotinli “*Probing light relics through cosmic dawn*” Phys. Rev. D 109, 043502 (2024)
11. **N. Lee**, Y. Ali-Haïmoud, N. Schöneberg, V. Poulin “*What it takes to solve the Hubble tension through modifications of cosmological recombination*” Phys. Rev. Lett. 130, 161003 (2023)
12. **N. Lee**, S. C. Hotinli, M. Kamionkowski “*Probing cosmic birefringence with Polarized Sunyaev Zel'dovich Tomography*” Phys. Rev. D 106, 083518 (2022)
13. **N. Lee** and Y. Ali-Haïmoud “*Probing small-scale baryon and dark matter isocurvature perturbations with cosmic microwave background anisotropies*” Phys. Rev. D 104, 103509 (2021)
14. **N. Lee** and Y. Ali-Haïmoud “*HYREC-2: a highly accurate sub-millisecond recombination code*” Phys. Rev. D 102, 083517 (2020)

Nth-authored

1. A. Pezzotta et al. “*Extending evolution mapping to massive neutrinos with COMET*” Phys. Rev. D 112, 023520 (2025)

PUBLIC CODE

planck-gaussian-lowl	github.com/nanoomlee/planck-gaussian-lowl Compressed Gaussian likelihood for the Planck low- ℓ EE data Piecewise log-normal approximation enabling analytic Fisher matrix computation
CLASSIER	github.com/nanoomlee/CLASSIER CLASS Integral Equation Revision (a modified version of CLASS) Boltzmann hierarchy for non-cold relics replaced with integral-equation approach
HYREC-2	github.com/nanoomlee/HYREC-2 A highly accurate sub-millisecond cosmological recombination code Incorporated into CLASS and CAMB

TALKS & PRESENTATIONS

<i>Oct 2025</i>	CosmoLab, USC
<i>Oct 2025</i>	Cahill Cosmology Journal Club, Caltech (remote)
<i>Oct 2025</i>	COSMO-25, CMU
<i>Jul 2025</i>	Cosmology Summer Fest 2025, JHU, Baltimore
<i>Jun 2025</i>	Cosmology from Home (remote)
<i>Jan 2024</i>	Perimeter Institute, Waterloo (remote)
<i>Apr 2023</i>	PONT conference, Avignon
<i>Apr 2023</i>	LUPM, Montpellier
<i>Jan 2023</i>	AAS 241st Meeting (iPoster), Seattle
<i>Jul 2022</i>	Cosmology from Home (remote)
<i>May 2022</i>	Particle Astro/Cosmo Meeting Around NYC (PACMAN), CCA
<i>Apr 2022</i>	Brown Bag, New York University
<i>May 2021</i>	NYU-CCA × Data Science meeting

TECHNICAL SKILLS

Programming	Python (Pandas, NumPy, SciPy, scikit-learn), C, Mathematica, HPC/parallel computing, git, Linux
Research Tools	CLASS, CAMB, MontePython, MultiNest, emcee

MENTORSHIP

Anna Bencke	Ph.D. student, JHU (1 paper under review, 1 paper in preparation)	2025 –
Tianji (Jimmy) Zhou	Undergraduate, Haverford College → USC Ph.D program (1 paper under review)	2025 –

SERVICE

Referee: Nature Astronomy, Astronomy & Astrophysics, Journal of Cosmology and Astroparticle Physics

TEACHING

General Physics I Lab (undergraduate)
Electricity & Magnetism I (undergraduate)
Mathematical Physics (undergraduate)

Spring 2024
Fall 2019, Fall 2021
Spring 2019, Spring 2020

REFERENCES

Yacine Ali-Haïmoud

Ph.D. advisor

Associate Professor, Department of Physics, New York University

yah2@nyu.edu

Roman Scoccimarro

Ph.D. advisor (secondary)

Professor, Department of Physics, New York University

rs123@nyu.edu

Marc Kamionkowski

Postdoc mentor

William R. Kenan Jr. Professor, Department of Physics & Astronomy, JHU

kamion@jhu.edu