Noam Itzhak Levi

Kibbutz Galuyot 8, Holon 58100, Israel
noam@mail.tau.ac.il
NoamTAU.git • +972 (54) 7909-484
2024-04-16

EDUCATION

Swiss Institute of Technology Lausanne (EPFL), Lausanne, Switzerland

- AI4Science Potdoctoral Fellow — Feb 2024 – Present

Tel Aviv University, Tel Aviv Jaffa, Israel

- Ph.D. in Theoretical Particle Physics — Mar 2018 – Oct 2023
  - Advisor: Prof. Tomer Volansky
  - Focus: New Directions in Particle Physics - From the Early Universe to Artificial Intelligence
  - The research proposal involves research in both early Universe Cosmology and particle physics, as well as studying the fundamentals of Deep Learning (DL) using tools from theoretical physics.

Institute for Advanced Study, Princeton, New Jersey, USA — Sep 2017 – Apr 2019

- Visiting Graduate Student

Tel Aviv University, Tel Aviv Jaffa, Israel

- M.Sc. in Theoretical Particle Physics — Jan 2016 – Jan 2018
  - Magna Cum Laude
  - Advisor: Prof. Tomer Volansky
  - M.Sc. Thesis: “Light Dark Matter from Leptogenesis”
- B.Sc. in Physics — Oct 2011 – Jan 2016
- B.Sc. in Electrical Engineering — Oct 2011 – Jan 2016
  - Advisor: Dr. Yan Benhammou
  - Final Project: “Signal Readout Interface for A Plasma Based Particle Detector”

Stanford University, Online Courses

- Machine Learning — Dec 2017 – Jan 2018
- Convolutional Neural Networks for Visual Recognition

Eylon High School, Holon, Israel

- Gifted Students Program — Oct 1996 – Oct 2006
  - A designated class for gifted children from 3rd grade till high school graduation.

AWARDS & SCHOLARSHIPS

- Inaugural class of recipients of the Milner Foundation scholarship for Ph.D. students, under the “70 for 70 Fellowships” Program, Tel Aviv University — 2019– present
- Ph.D. students scholarship, Tel Aviv University — 2018– present
- Selim and Rachel Benin Scholarship for Excellent Graduate Students — 2017
- Masters students scholarship, Tel Aviv University — 2016– 2018
- Summer research program scholarship, Tel Aviv University — 2015

PUBLICATIONS

SUBMITTED PAPERS

- N. Levi and Y. Oz, “The Universal Statistical Structure and Scaling Laws of Chaos and Turbulence”, Submitted to JSTAT.

PUBLISHED PAPERS

Primary contributions (authors are listed in alphabetical order as per the standard in particle physics):

- Jack Miller, Patrick Gleeson, Charles O’Neill, Thang Bui and N. Levi, “Measuring Sharpness in Grokking”, *Accpeted to ICLR 2024 - Bridging the Gap Between Practice and Theory in Deep Learning (BGPT) Workshop.*
- N. Levi, A. Beck and Y. Bar-Sinai, “Grokking in Linear Estimators – A Solvable Model that Groks without Understanding ” *Accepted to ICLR 2024, arXiv: 2310.16441* .

- N. Levi and Y. Oz, “The Underlying Scaling Laws and Universal Statistical Structure of Complex Datasets ” *arXiv: 2306.14975* .
- T. Jules, G. Brener, T. Kachman, N. Levi and Y. Bar-Sinai, “Charting the Topography of the Neural Network Landscape with Thermal-Like Noise ” *arXiv: 2304.01335* .
- N. Levi, I. Bloch, M. Freytsis, and T. Volansky, “Noise Injection as a Probe of Deep Learning Dynamics” *Accepted to ICLR 2023 - Physics4ML Workshop*, *arXiv: 2210.13599* .
- N. Levi, I. Bloch, M. Freytsis, and T. Volansky, “Noise Node Regularization for Robust Learning” *Accepted to ICLR 2023*, *arXiv: 2210.15764* .
- N. Levi, T. Opferkuch, D. Redigolo, “The Supercooling Window at Weak and Strong Coupling” url: https://doi.org/10.1007/JHEP02(2023)125, *Journal of High Energy Physics* , vol. 2023, no. 2, Feb 2023.
- N. Craig, N. Levi, A. Mariotti, D. Redigolo, “Ripples in spacetime from broken supersymmetry”, url: https://doi.org/10.1007/JHEP02(2021)184, *Journal of High Energy Physics* , vol. 2021, no. 2, Feb 2021.
- E.D. Kramer, E. Kuflik, N. Levi, N.J. Outmezguine and J.T. Ruderman, “Heavy Thermal Dark Matter from a New Collision Mechanism ”, url: https://link.aps.org/doi/10.1103/PhysRevLett.126.081802, *Phys. Rev. Lett.* , vol. 126, iss. 8 no. 1, Feb 2021.
- A. Falkowski, E. Kuflik, N. Levi and T. Volansky, “Light Dark Matter from Leptogenesis”, arXiv: 1712.07652, *Phys. Rev. D*, vol. 99, no. 1, Jan 2019.

Contributions to white papers and as part of larger collaborations:

- R. Caldwell, Y. Cui, H. Guo, N. Levi, V. Mandic, A. Mariotti et al., “Detection of Early-Universe Gravitational Wave Signatures and Fundamental Physics”, arXiv: 2203.07972, Mar 2022.

INVITED TALKS SEMINARS

- Vrije Universiteit Brussel - High Energy Theory Group Seminar: “Charting the Topography of the Neural Network Landscape with Thermal-Like Noise,” Nov 2023.
- CERN CMS ML Innovation Group Seminar: “The Noise Injection Phase Diagram, Deep Learning Dynamics & Implicit Regularization,” Jun 2023.
- Tel Aviv University - Particle Physics Seminar: “Charting the Topography of the Neural Network Landscape with Thermal-Like Noise ,” Mar 2023.
- Lawrence Berkeley National Laboratory - HEP-ML Talk on: “The Noise Injection Phase Diagram, Deep Learning Dynamics & Implicit Regularization,” Mar 2023.
- Berkeley Center for Theoretical Physics - 4D Seminar on: “Cosmological Phase Transitions - From Fundamental Theory to Detectable Signals,” Mar 2023.
- Second EuCAPT Annual Symposium - Lightning Talk on: “The supercooling window at weak and strong coupling,” May 2022.
- LIGO/VIRGO/KAGRA Collaboration - Phase Transitions Group Seminar on: “The supercooling window at weak and strong coupling,” Dec 2021.
- INFN - Sezione di Firenze, Italy - Particle Physics Seminar on: “Exceptionally Heavy Thermal Dark Matter,” Dec 2019.
- Tel Aviv University, Israel - Student Seminar on: “Light Dark Matter from Leptogenesis,” Jun 2017.

TEACHING **Physics TA**, Tel-Aviv University, Oct 2015 – Mar 2020

- Lab Instructor, *”Physics Lab b”*, Prof. Roy Beck, Spring 2020-2022
- Teaching Assistant, *”Numerical Methods for Physicists”*, Prof. Dr. Tomer Volansky, Winter 2019-2023
- Grading Exercises for *”Advanced Electromagnetism”*.
- Grading Exercises for *”Physics II for Chemistry Students”*.
- Grading Exercises for *”Physics II for Engineering Students”*.

MILITARY **IDF Strategic Planning Branch**, Rank - Lieutenant. 2007– 2011

- Strategic planning officer

LANGUAGES

- Hebrew: Native language.

- English: Fluent (speaking, reading, writing).

SKILLS MATLAB, Mathematica, Python, C.

REFERENCES

- **Professor Tomer Volansky**
  Professor of Theoretical Particle Physics
  Tel Aviv University
  Tel-Aviv 69978, Israel
  tomerv@post.tau.ac.il
- **Professor Yaron Oz**
  The Yuval Ne'eman Chair in Physics
  Director, Center for Quantum Science and Technology
  Tel Aviv University
  Tel-Aviv 69978, Israel
  yaronoz@tauex.tau.ac.il
- **Professor Nathaniel Craig**
  Professor of Theoretical Particle Physics
  Department of Physics, University of California
  Santa Barbara, CA 93106, USA
  ncraig@physics.ucsb.edu
- **Associate Professor Eric Kuflik**
  Associate Professor of Theoretical Particle Physics
  Racah Institute of Physics, Hebrew University of Jerusalem
  Jerusalem 91904, Israel
  eric.kuflik@mail.huji.ac.il
- **Senior Lecturer Yohai Bar-Sinai**
  Senior Lecturer in Condensed Matter Physics
  Tel Aviv University
  Tel-Aviv 69978, Israel
  ybarsinai@gmail.com
- **Associate Professor Diego Redigolo**
  Associate Professor of Theoretical Particle Physics
  INFN Sezione di Firenze
  Via G. Sansone 1, I-50019 Sesto Fiorentino, Italy
  diego.redigolo@fi.infn.it
- **Dr Marat Freytsis**
  Postdoctoral Researcher
  NHETC, Department of Physics and Astronomy, Rutgers University
  Piscataway, NJ, USA
  marat.freytsis@gmail.com