Toka Alokda, M.Sc.
IMPRS A&A Ph.D. researcher
Argelander-Institut für Astronomie, University of Bonn

Contacts & Links

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Education

University of Bonn (Rheinische Friedrich-Wilhelms-Universität Bonn) - Bonn, DE.
International Max Planck Research School for Astronomy and Astrophysics (IMPRS A&A)
Ph.D. - Astrophysics.
Topic: Exploring Primordial Non-Gaussianity through the Large Scale Structure with Machine Learning.
Supervisor: Cristiano Porciani (porcaini@astro.uni-bonn.de).

June '24 - Present

University of Bonn (Rheinische Friedrich-Wilhelms-Universität Bonn) - Bonn, DE.
Bonn-Cologne Graduate School for Physics and Astronomy.
M.Sc. - Astrophysics.
Thesis: "Identification of Protohalos with Deep Learning" (Grade: 1.0[1])
Grade: 1.6 (ranking: 3rd).

Oct. '21 - Dec. '23

University of Science and Technology at Zewail City - Giza, EG.
B.Sc. - Physics of Earth and Universe; Astrophysics concentration.
GPA: 3.63 [2] (Cum Laude).

Sep. '17 – Jul. '21

Publications

Alokda, T. & Porciani, C. (2025). *Segmenting proto-halos with deep learning.* JCAP 11 (2025) 083. arXiv: 2508.00049

Awards & Honors

Bonn-Cologne Graduate School of Physics and Astronomy (BCGS) Scholarship

Oct. '21 - Sep. '23

Zewail City UST Scholarship

Sep. '17 - Jul. '21

B.Sc. Honors

- **Cum Laude** - Awarded for being among the top students in the graduating class of 2021.
- **Provost's Honors Roll** - Awarded on a semesterly basis for being among the top students. **Jul. '21**

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[1] Indicated in the German system; whereas 1.0 is the highest grade and 5.0 is the lowest.
[2] Indicated in the American system; whereas 4.0 is the highest grade and 0.0 is the lowest.

Scientific Presentations

"Identification of Protohalos with Deep Learning" - Les Houches, FR (Talk)
Presented in the Les Houches - Dark Universe summer school. **Jun. '25**

"Identification of Protohalos with Deep Learning" - Cambridge, MA (Poster)
Presented online in the first AstroAI workshop. **Jun. '24**

"Identification of Protohalos with Deep Learning" - Bonn, DE (Poster)
Presented in the annual BCGS poster session. **Apr. '24**

"CNNs and ViTs for Cosmological Structure Formation" - Bonn, DE (Talk)
Invited speaker in the "Machine Learning Seminar" At AIfA, Bonn. **Dec. '23**

"Identification of Protohalos with Deep Learning" - Bonn, DE (Talk)
Master's Colloquium at AIfA, Bonn. **Nov. '23**

Technical skills

- **Programming & Scientific Computing:**
  Python (advanced), C++ (advanced), Julia (intermediate), MATLAB (intermediate), Wolfram Mathematica (intermediate), Fortran (basic).
- **Machine Learning & Differentiable Programming:**
  PyTorch, TensorFlow, JAX, Keras, Optuna, Kymatio, SciPy.
- **Astrophysics & Cosmology Tools:**
  GADGET-4, L-Galaxies, AHF, CLASS, PINOCCHIO, Python libraries for cosmological analysis: e.g. Pylians, PySpectrum, Nbodykit.
- **High-Performance Computing & OS:** Linux, Bash/UNIX shell, Slurm
- **Documentation & Reporting:** LaTeX, MS Office

Teaching Experience

University of Bonn **Oct. '22 - Present**
Graduate Teaching Assistant
Winter Semester 22/23, 23/24, 24/25, and 25/26
Maths for Theoretical Astrophysics and Cosmology (M.Sc. of Astrophysics).
Summer Semester 24 and 25
Advanced Topics in Cosmology (M.Sc. of Astrophysics).
Summer Semester 23
Astrophysics of Galaxies (M.Sc. of Astrophysics).

University of Science and Technology at Zewail City **Sep. '20 - Jan. '21**
Undergraduate Teaching Assistant
Fall 2021: Quantum Mechanics I (B.Sc. of Physics).

Public Outreach

"Tangled in the Web: The rise of AI in Astronomy" - Astronomy on Tap - Bonn, DE
Oct. '24