

Mladen Ivkovic

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Summary

My background is in physics and astrophysics, with heavy emphasis on computational astrophysics and software development for high performance simulations and on-the-fly analysis. I have been developing scientific software intended for use on shared and distributed memory systems and supercomputers since 2015, and so far, my fields of research span halo finding, mergertree building, computational fluid dynamics (using meshless methods, finite volume methods, and smoothed particle hydrodynamics), and radiative transfer in astrophysical codes that make use of MPI, OpenMP, and QuickSched.

Education and Career

- 2012 – 2017 **University of Zurich, BSc** in Physics (major) and Applied Informatics for Scientists (minor)
Thesis title: “[Halo- and Subhalo Finding in Cosmological N-Body Simulations](#)”
- 2016 – 2018 **University of Zurich, MSc** in Theoretical Astrophysics and Cosmology
Thesis title: “[Creating Mock Galaxy Catalogues from Dark Matter Simulations](#)”
- 2018 – today **École Polytechnique Fédérale de Lausanne, PhD Candidate**
Thesis title: “Dwarf Galaxies in the Epoch of Reionization”

Software

Simulations

- Major contributions to [RAMSES](#) and [SWIFT](#) open source astrophysical high performance simulation codes.
- Author of [mesh-hydro](#), a didactical finite volume hydrodynamics solver in C.

Visualisation and Analysis

- Contributed to the [swiftsimio](#) and [pNbody](#) python libraries.
- Author of [astro-meshless-surfaces](#), a python library for the visualisation of “effective surfaces” in mesh-free hydrodynamics methods

Skills

- Programming **Experienced** with Python, C, Fortran, bash, \LaTeX , git, and CLI. Familiar with C++, Java, and Wolfram Mathematica.
- HPC **Experienced** with MPI, OpenMP, QuickSched, and working on supercomputing facilities. Familiar with openACC and CUDA.
- Languages **Native** in German, Swiss German, and Serbian. **Fluent** in English, **intermediate** in French.




Publications

- 1 **Ivkovic, M., & Teyssier, R. (2022).** ACACIA: a new method to produce on-the-fly merger trees in the RAMSES code. *Monthly Notices of the Royal Astronomical Society*, 510(1), 959–979.
[doi:10.1093/mnras/stab3329](https://doi.org/10.1093/mnras/stab3329)



Scientific Talks

- November 2019  SWIFTcon, Durham: "On Meshless Methods in Astrophysics"
December 2019  RASCAS-in-SPHINX workshop, Geneva: "On Meshless Methods in Astrophysics"


Teaching and Training

- 2011 – 2016  **Private tutor** in physics, mathematics, and German at elementary-, middle-, high-school and university level
2014 – 2018  **Teaching Assistant, University of Zurich** for basic physics courses, practical courses in physics, and introduction to programming
2019 – today  **Teaching Assistant, École Polytechnique Fédérale de Lausanne** for MSc level lectures "Stellar and Galactic Dynamics" and "Observational Cosmology"

Public Outreach

- 2015 – 2017  **University of Zurich:** Participated in several university-wide public outreach events as a point of contact for people interested in studying physics on the university campus and in public schools
2018 – today  **École Polytechnique Fédérale de Lausanne:** Participated in university-wide public outreach events as a point of contact for the general public, and as a guide on public and private visitations of the Geneva Observatory

Grants

- 2021  **HPC-Europa3 Transnational Access Programme:** awarded travel grant to Leiden (NL) for 9 weeks and 100'000 CPU hours to enhance the parallelisation of the radiative transfer module in SWIFT