

THIBAUT LECHIEN

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INTRO

Curious and enthusiastic computational astrophysics researcher with a demonstrated history of research experience in multiple projects at ESA and NASA, leading to impactful publications in astrophysics and computer science.

RESEARCH EXPERIENCE

NASA Goddard Space Flight Center / SURA

Sep 2023 - Sep 2024

Research Assistant

- Simulating neutron stars, ray-tracing photons and generating synthetic X-ray light curves based on NICER and Fermi datasets, which enables the simultaneous inference of neutron star mass, radius and magnetic field.
- Developing a machine learning framework that has increased the speed of neutron star parameter inference by 2-3 orders of magnitude. Member of the Fermi LAT collaboration.

imec

Oct 2022 - Jun 2023

Research Intern and Master's thesis

- Investigated and implemented unsupervised computer vision methods on electron microscope images for semiconductor defect detection, saving human experts thousands of hours of labeling time.

European Space Agency - ESA

Jul 2022 - Sep 2022

Intern in the Advanced Concepts Team

- Implemented a novel approach to reconstruct Dark Matter distributions from stellar orbits in the Galactic Centre, eliminating the need to make assumptions on the physical composition of the Dark Matter distribution.
- Identified key insights which can shape future observational campaigns, developed an open-source code repository and wrote a first-author paper under review at *Astronomy & Astrophysics*.

KU Leuven

Jun 2021 - Sep 2021

Research Intern

- Constructed a neural network to reconstruct spectral functions of confined particles in High Energy Physics, generalizing upon previous approaches and achieving state of the art performance on genuine lattice data.

KU Leuven

Jun 2020 - Sep 2020

Research Intern

- Combined AI and evolutionary algorithms to study a problem in graph theory, gaining crucial insights into existing solvers and leading to the development of new and improved methods.

EDUCATION

KU Leuven

Sep 2021 - Jun 2023

Master of Science (M. Sc.), Computer Science, Magna Cum Laude

- Major in Artificial Intelligence
- Graduated 5th out of 148 students

KU Leuven

Sep 2018 - Jun 2021

Bachelor of Science (B. Sc.), Computer Science, Cum laude

- Presented thesis on quantitative finance at the DSO@IJCAI 2021 Conference workshop
- Admitted to competitive Honours Programme consisting of two independent research projects
- Minor in Mathematics and Physics

PUBLICATIONS

Thibault Lechien, David Dudal (2022). Neural network approach to reconstructing spectral functions and complex poles of confined particles, SciPost Physics, <https://doi.org/10.21468/SciPostPhys.13.4.097>

Thibault Lechien, Jorik Jooker, Patrick De Causmaecker (2023). Evolving test instances of the Hamiltonian completion problem, Computers & Operations Research, ISSN 0305-0548, <https://doi.org/10.1016/j.cor.2022.106019>

Thibault Lechien, Enrique Dehaerne, Bappaditya Dey, Victor Blanco, Sandip Halder, Stefan De Gendt, Wannes Meert (2023). Automated Semiconductor Defect Inspection in Scanning Electron Microscope Images: a Systematic Review [arXiv:2308.08376]

Thibault Lechien, Gernot Heissel, Jai Grover, Dario Izzo (2024). Dark Matter reconstruction from stellar orbits in the Galactic Centre [arXiv:2308.09170] (under review at Astronomy & Astrophysics).

TALKS

Invited

- Science Coffee @ ESA's Advanced Concepts Team. Neutron star parameter inference.
- ESA's Advanced Concepts Team's 20 Years Anniversary Workshop 2022. The Dark (Matter) Side of Black Holes.

Contributed

- AAS HEAD Meeting 2024. Integrated Modeling of X-ray Light Curves for Self-consistent Inference of Neutron Star Mass, Radius, and Multipolar Fields.
- DSO@IJCAI 2021. A general forecasting-based portfolio optimization model.

OUTREACH

- Helped introduce members of the public of all ages to ESA's missions during Open Days.
- Currently doing the same for NASA's missions on their Interaction Days.
- Staffing the NASA Fermi booth at the 243rd meeting of AAS.

SKILLS

Languages:	English, Dutch, French
Programming:	Python, C++, Fortran 90, Java, MATLAB, R, Haskell
Software & Tools:	PyTorch, Linux for High Performance and Distributed Computing, LaTeX
Extracurricular activities:	University Volleyball Team, Product Innovation Project