



We are looking for a university project assistant:

Researcher – PhD or PostDoc position (m/f/d)
at the intersection of Physics and Computer Science

Institute of Theoretical Physics and Computational Physics, Graz University of Technology
and Graz Center for Machine Learning

Recent advances in Machine Learning have shown considerable impact on technology and society, and show promise also in physics. On the one hand, machine learning is being used to learn surrogate models of computationally heavy simulations in order to employ them for many-query applications such as optimization and uncertainty quantification. On the other hand, physical models have transpired to machine learning for decades. This position is to be involved in a project at the cross-fertilization of machine learning and physics. In particular, a newly discovered connection [1] between differential equations and neural networks opens the path to explore a novel class of physics-based architectures. E.g. a so designed machine could learn solutions to the Schrödinger equation, a central differential equation governing quantum mechanics.

[1] Ranftl, S. "A connection between probability, physics and neural networks". *Proceedings of MaxEnt 2022 Paris. Physical Sciences Forum*. In Press. arXiv: <https://arxiv.org/abs/2209.12737>

Tasks:

- Contribute to an interdisciplinary research project at the intersection of physics and machine learning
- Research, mathematical and numerical computations, programming
- Disseminate results (e.g. contribute to scientific reports, presentation at international conferences etc.)
- Cooperation with both computer scientists and physicists
- NO teaching responsibilities required

Your profile:

- Background: Master in physics, computer science, mathematics, or similar.
- Applicants near graduation will be considered.
- Specific interest in the intersection of machine learning and (theoretical) physics
- Knowledge in one of the following fields and willingness to learn about the remaining topics: Machine learning, probability theory, optimization, differential equations, theoretical physics
- Programming skills: Python or similar preferred, experience with PyTorch, JAX, TF or similar desired
- Fast learner, creative, engaged and scientifically ambitious

What we offer:

- Extensive, cooperative mentoring on an individual basis at eye level
- Collegial working atmosphere, highly international and interdisciplinary scientific environment
- Training in complementary fields (i.e. physics for computer scientists, machine learning for physicists)
- State-of-the-art facilities and science support service units, e.g. high-performance computing clusters
- Possibility of extension to a PhD thesis
- Option for Home Office / Tele-working
- Flexible working hours
- Academic freedom

- The minimum annual gross salary is € 42.820,40 based on a full-time PhD-position. Overpayment is possible depending on qualification and expertise. Post-docs are also welcome to apply (salary & responsibilities will be accommodated accordingly)
- Additional corporate benefits such as university sports program, workplace health management, subsidies for public transport, international and in-house soft skill training opportunities, child-care facilities, and more

Start date and duration: January 2023. This is a temporary position of up to 40h/week for up to 12 months, with a possible extension for another 2-3 years depending on performance.

Graz University of Technology aims to increase the proportion of women and therefore qualified female applicants are explicitly encouraged to apply. Graz University of Technology actively promotes diversity and equal opportunities. People with disabilities and who have the relevant qualifications are expressly invited to apply. Protecting the health of our students and employees is of high importance to our university. For this reason, equally qualified candidates who are fully vaccinated against COVID-19 will be given preference.

To apply, please prepare your CV, motivation letter emphasizing your research experience and research interests, references, further documents. Applications will be considered on a rolling basis until position is filled.

Please send your applications and/or inquiries for further information, using the subject header “[Application UFO 2022 – *Your last name*]”, to ranftl@tugraz.at

Contact

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<https://www.tugraz.at/institute/itpcp/>

Information on the data processing of your application can be found at www.tugraz.at/go/datenschutzinformation-pa.