The Vienna International School of Earth and Space Sciences (VISESS) is soliciting applications for a PhD position within the Faculty of Earth Sciences, Geography and Astronomy at the University of Vienna. As humanity is facing grand challenges such as climate change and resource depletion, this doctoral school at the University of Vienna is addressing these and other challenges through interdisciplinary and transdisciplinary academic research connecting the COSMOS with planet EARTH, it's environment and the ANTHROPOSPHERE. We aim our students to become world-leading experts in either of these three branches while also confidently communicate and contribute across all three branches. We want our school to become a central place in the heart of Europe for training and as a resource of knowledge about our place in space and time.

University Assistant (prae doc):

Interdisciplinary Advances in Extragalactic Archaeology

Supervision: Dr. Prashin Jethwa and Univ.-Prof. Dr. Glenn van de Ven in collaboration with Univ.-Prof. Dr. Otmar Scherzer from the Faculty of Mathematics

Project outline:

This PhD position is part of an interdisciplinary collaboration [1] where mathematicians in the field of *inverse-problems* and scientists in fields from microscopy to astrophysics work together to solve challenging modelling problems. As part of this collaboration, you will develop and apply novel techniques to uncover galaxy formation histories from integral field unit (IFU) observations of nearby galaxies. Interested candidates with a background in astrophysics, applied mathematics or computational sciences are welcome to apply.

We can infer the formation history of a galaxy from present-day observations since certain quantities are approximately conserved during a galaxy's evolution. These quantities include stellar *population* labels such as metallicity as well as *dynamical* properties describing stellar orbits. In this project we will combine these two complementary probes into hybrid *population-dynamical* models to reveal a galaxy's past, including mergers that happened billions of years ago.

The "Dynamics of Stellar Systems" research group [2] in Vienna develops software for orbit-based dynamical modelling [3] which has recently been extended to include stellar population information [4]. You will develop these methods further by including additional population labels, explore uncertainty quantification methods, apply these to state-of-the-art galaxy IFU datasets, and use cosmological zoom-in simulations to verify and interpret your results. This project works towards an ultimate aim of identifying specific events in the formation histories of hundreds of nearby galaxies.

[1] FWF Special Research Programme (SFB) "Tomography Across the Scales"
[2] Research Group "Dynamics of Stellar Systems"
[3] Dynamical modelling code DYNAMITE
[4] Zhu L., van de Ven G., Leaman R., et al., 2020, MNRAS, 496, 1579

Job Description:

The position aims to deepen and extend the professional and scientific education targeting a doctoral degree. Tasks and responsibilities include:

- Independent research and development of an academic profile targeting a doctoral degree.
- Participation in research, teaching and administrative tasks of the research group/department
- Participation in examination activities
- Participation in evaluation activities and in quality assurance
- Supervision of students
- Participation in teaching as defined by the collective agreement

The candidate who is selected for this position joins VISESS as a PhD student member.

Profile:

- Master Degree (or equivalent) in Astrophysics/Astronomy with affinity for Mathematics/Computer Science –or– in Mathematics/Computer Science with an affinity for Astrophysics/Astronomy
- Excellent command of written and spoken English

We offer:

- [Job grading in accordance with collective bargaining agreement](): §48 VwGr. B1 Grundstufe (praedoc) with relevant work experience determining the assignment to a particular salary grade
- An active and inspiring research environment, a vibrant PhD community and many ways to connect with peers from home and abroad on a social and professional level
- A broad range of interdisciplinary training possibilities and school activities, workshops, seminars, mobility and summer schools

Expected starting date: Summer/Autumn 2022

Funding Situation:

☐   fully-funded: university-funded
☒   fully-funded: third-party-funded
☐   currently unfunded (funding potentially via VISESS fellowship)

Duration of employment:

☒   3 years with the possibility of extension(s) up to 4 years
(The employment relationship is initially limited to 1.5 years and automatically extended to a total of 3 years, unless the employer submits a declaration of non-renewal after a maximum of 12 months. There is the possibility of extension(s) up to 4 years).

☐   4 years
(The employment relationship is initially limited to 1.5 years and automatically extended to a total of 4 years, unless the employer submits a declaration of non-renewal after a maximum of 12 months).

☐   3 years
(The employment relationship is initially limited to 1.5 years and is automatically extended to a total of 3 years, unless the employer submits a declaration of non-renewal after a maximum of 12 months).

Extent of employment: 30 hours/week

Application: Interested students can apply until the deadline of 15 March 2022 via:
<https://visess.univie.ac.at/how-to-apply/>.

Further information: For further information, please contact <admin.visess@univie.ac.at>.

The University pursues a non-discriminatory employment policy and values equal opportunities, as well as diversity (http://diversity.univie.ac.at/). The University lays special emphasis on increasing the number of women in senior and in academic positions. Given equal qualifications, preference will be given to female applicants.