



Vipavska cesta 13, 5000 Nova Gorica

**The University of Nova Gorica is offering positions of
ASSISTANT YOUNG RESEARCHER (m/f)**

We welcome candidates for assistant young researcher (doctoral candidate) positions at the student-friendly and research-oriented [University of Nova Gorica](#). Successful candidates will join research activities in the dynamic research environment supported by state-of-the-art infrastructure through involvement in international research collaborations. Successful candidates will enroll in the appropriate postgraduate study program at the [Graduate school](#) of the University of Nova Gorica.

The positions pertain to the following PhD advisers:

1. mentor: prof. dr. Andreja Gomboc: 1 position

The chosen candidate will work in the [Center for Astrophysics and Cosmology](#) of University of Nova Gorica (UNG), studying the astrophysics transients using the data from the new Vera C. Rubin observatory in Chile. The observatory collaboration, of which the UNG is a member, will collect the largest collection of the sky survey data up to date. It is expected that this data set will offer answers to the questions of the Universe structure and evolution, and astrophysical objects within it. The doctoral research will be performed in the framework of the Research program P1-0031 Multimessenger Astrophysics, for which UNG is the leading institution, and will be supported by the Infrastructure program I0-0033 of UNG.

2. mentor: prof. dr. Sergey Vorobyev: 1 position

The selected candidate will work at the [Center for Astrophysics and Cosmology](#) of the University of Nova Gorica (UNG) in the domain of multi-messenger studies of the origin of ultra-high energy (UHE, $> 1 \text{ EeV} = 10^{18} \text{ eV}$) cosmic rays (CRs) using the upgraded Pierre Auger Observatory. The Pierre Auger Observatory, of which we are members, is the largest UHECR detector in the world, deployed over 3000 km^2 in Argentinian pampa. The training of the doctoral student will take place within the basic research program P1-0031 Multimessenger astrophysics, where UNG is the leading institution, and will be infrastructurally supported by the I0-0033 Infrastructure program of the University of Nova Gorica.

3. mentor: prof. dr. Guillaume Antalick: 1 position

Research Topic : Influence of metal ions on wine aromatic composition from the vineyard to the bottles

Summary: Metal ions are known to catalyze many chemical and biochemical reactions. However, the impact of metal ions on grape and wine chemical composition has been somewhat

overlooked. Preliminary findings from our research group suggest that the presence of iron, copper, and manganese in wine could significantly alter their aromatic signature. These findings open some interesting perspectives regarding the influence of soil mineral composition on grapes and the resulting wine aromatic profile. Therefore the goal of this PhD study will be to characterize the influence of metal ions on wine aromatic composition through the soil, grape, and wine analyses, utilising state-of-the-art analytical methods for chemical characterisation that will enable a comparison of different types of farming: conventional and organic/biodynamic.

4. mentor: prof. dr. Penka Stateva: 1 position

Research Topic: Theoretical and experimental semantics and pragmatics

The successful candidate will contribute to the research on natural language semantics and pragmatics at the [Center for Cognitive Science of Language](#). Specifically, the project will focus on cross-linguistic variation at the interface between semantics and pragmatics and inferences for semantic universals. It will explore phenomena such as comparison, vagueness, numerosity and scalarity. The theoretical part of the research will be complemented by experimental investigations into cognitive mechanisms underlying semantic and pragmatic processing, which may involve behavioral, eye-tracking and/or neurophysiological (event-related brain potentials) experimental paradigms.

5. mentor: prof. dr. Griša Močnik: 1 position

Research Topic: Climate changes

The extent of the effects that light-absorbing aerosols exert on the climate is associated with a large uncertainty, which can be reduced only through measurements. We have conducted 7 global campaigns and are planning additional 3, with measurements of aerosol absorption, and (in some campaigns also) size distribution and scattering. The project will focus on the separation of the contributions to the atmospheric heating rate of different sources in fine and coarse aerosol fractions, and their quantification. Work will include data processing from previous campaigns (two circumnavigations around the global – 2012, 2016; Asia 2018; Cape Verde 2021), modeling, and planning and execution of new laboratory measurements and field campaigns (Himalaya, pole-to-pole flight).

6. mentor: prof. dr. Irina Elena Cristea: 1 position

Research Topic: Algebra

The candidate will work in the field of hypercompositional algebra. This is a relatively new branch of Abstract Algebra which appeared in 1934, that deals with hypercompositional structures, i.e., structures endowed with at least one hyperoperation. A hyperoperation associates to any couple of elements of the support set a subset of elements and not anymore just an element as in classical algebraic structures. The algebraic hypercompositional structures represent both an independent line of research and a tool of investigation in other fields like: Geometry, Graphs and Hypergraphs, Topology, Cryptography, Code Theory, Automata Theory, Probability, Theory of Fuzzy Sets, etc. The candidate will focus on new combinatorial aspects related with arithmetic functions, graphs, fuzzy sets, aiming also to analyze the similarities and differences with similar topics in the classical algebra. On the other side, the theoretical results will be motivated by their future applicability in various complex engineering and environmental systems.

7. mentor: prof. dr. Mattia Fanetti: 1 position

Research Topic: Material sciences

The possibility to modify materials at surfaces along an arbitrary pattern with high resolution is at the base of many nanotechnology approaches, and attractive for a wide range of applications.

At the base of these processes (generally defined as lithography) there is the capability to locally induce a chemical reaction, or a transition, or more in general a modification of the material, with precise control of the position. Thermal activated modifications can be induced by local increase of temperature. The young researcher will explore the possibility to locally induce modifications by means of e-beam local heating, using the e-beam present in a SEM apparatus, possibly with the support of an in-situ heating stage. The approach will be applied to locally drive some technologically relevant phenomena, such as the synthesis of graphene at metal or dielectric surfaces, or the synthesis of nano-patterned 2D chalcogenides.

8. mentor: doc. dr. Blaž Belec: 1 position

Research Topic: Material sciences

The research topic of the doctoral student will be mainly related to the study of the properties of nanoparticles of topological insulators and their combinations with various functional materials such as e.g. adsorbents for various gases, where the photo-thermal effect of topological insulators can be used to release adsorbed gas on demand. Research will include the synthesis of various TI nanoparticles and the synthesis of composite materials and their characterization using various advanced techniques, e.g. electron microscopy, optical measurements, photothermal measurements,

9. mentor: prof. dr. Egon Pavlica: 1 position

Research Topic: Study of Organic Semiconductors

PhD topic is in the field of charge transport in two-dimensional (2D) materials. The selected candidate will be immediately employed and involved in the experimental research in the Laboratory of organic matter physics in the field of 2D materials, their VdW heterostructures and in the field of organic electronics. Research activities are experimental in nature. The main topics are electronic properties of materials that are interesting as novel electronic components, organic thin film transistors, photodetectors, organic solar cells, memory components, energy-harvesting components, and bio-mimetic components e.g. biosensors.

10. mentor: prof. dr. Giovanni De Nino: 1 position

Research Topic: Quantum Optics

Applications are invited for a PhD position in experimental physics within the Laboratory of quantum optics at the University of Nova Gorica (Slovenia). The 4-year research project will focus on the investigation of static and dynamic properties of ferromagnetic samples through magneto-optical Kerr effect (MOKE). Experiments will rely on a setup generating high-order (XUV) harmonics of an ultra-fast infrared laser. The XUV radiation will be tuned at the M absorption edge of various ferromagnetic elements, allowing one to perform element-sensitive, time-resolved, investigations of complex magnetic materials. The candidate will gain experience in advanced material structure-property characterization and nonlinear optics. Topics of focus will be magnetism in hybrid semiconductors, ultra-fast (de)magnetization and temperature-induced phase transitions. The research work will take advantage of a network of international collaborations. Joint experiments are already foreseen with (e.g.) the teams working at the free-electron laser FERMI at Elettra Sincrotrone Trieste (Italy), which co-owns the light source hosting the MOKE beam line at the university of Nova Gorica, at the Institute of NanoSciences of Paris (France) and at the Institute for Nuclear and Radiation Physics at KU Leuven university (Belgium).

Candidates for these positions **are required to** meet the conditions for young researcher as stated in the [Rules on selection and founding of young researchers](#) at University of Nova Gorica.

Conditions for the selection of a young researcher candidate:

- Has not yet completed a doctorate in science or obtained the title of doctor of science;
- Has not yet been employed as a young researcher;
- No more than four years have elapsed since the year of completion of their second cycle programme of study or the programme of study leading to eligibility for admission to the doctoral programme.

Criteria for the evaluation and selection of young researcher candidates:

- Assessment of the interview with the candidate (up to 5 points); Published papers (up to 3 points);
- Participation in research work (up to 3 points);
- Awards or recognitions received (up to 1 point);
- The average grade of the second cycle study programme or the study programme which qualifies the candidate for admission to the doctoral programme (1 point for an average grade between 9 and 10 inclusive and 0.5 point for an average grade between 8 and 8.99 inclusive).

The selected young researchers not having completed their second cycle studies when applying to the tender must complete their studies by 15 September at the latest.

University of Nova Gorica shall conclude employment contracts with the selected young researcher candidates.

Young researchers' training shall be funded until they have obtained a PhD or for a maximum of four years.

The provisions of the Act on Scientific Research and Innovation Activities (UL. RS., 186/2021), the Employment Relations Act ZDR-1 and the Rules on the Selection and Founding of Young Researchers shall be applied in the selection process of young researchers.

The following must be attached to the application:

- a short motivational letter;
- CV;
- a copy of your degree certificate, list of passed exams, grade point average and other relevant documents.

Please send your application, along with the required attachments which evidence the fulfillment of the formal requirements by e-mail to nina.cotic@ung.si no later than 21 August 2022.

The application should be sent as a single PDF e-mail attachment.

If you have any questions relating to the application procedure, please contact: Nina Cotič, tel. +386 5 6205 817, e-mail nina.cotic@ung.si.