



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](https://www.univ-nova.si/). 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](https://www.univ-nova.si/en/graduate-school/) of the University of Nova Gorica.

The positions pertain to the following PhD advisers:

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

Research Topic: Algebra

The chosen candidate will be enrolled in the doctoral study programme **Mathematical Sciences at University of Primorska, Koper**, Slovenia and employed as an assistant in the Centre of Information Tehnologies and Applied Mathematics, at the University of Nova Gorica, conducting research on hypercompositional algebra. This new branch of discrete mathematics represents both an independent research line 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 focuss on new combinatorial aspects of hypergroups related with arithmetic functions, graphs, fuzzy sets, aiming also to analyze the similarites and diferences with similar topics in the classical algebra. The theoretical results will be motivated by their future applicability in various complex engineering and environmental systems. The candidate must have a Master's degree in Mathematics or in similar fields, with different exams in Algebra.

2. mentor: doc. dr. Ahmad Hosseini: 1 position

Research Topic: Sustainability

The selected candidate will be enrolled in the doctoral study programme Environmental Sciences at the University of Nova Gorica. He is expected to be employed as an assistant at the Centre for Information Technologies and Applied Mathematics at the University of Nova Gorica. He will investigate the gap between the ecological and carbon footprint of state-of-the-art technologies

for the utilisation of renewable environmental resources. The currently exposed technologies that support the green transition do have a positive effect on reducing greenhouse gas emissions during the phase of use, but at the same time, they mostly have an increased negative impact throughout the entire life cycle on the extraction of (non-renewable, mostly rare) raw material resources and human health - highlights that are just as or even more important than the currently most exposed problem of greenhouse gases. Based on a comparative analysis of the whole life cycle, the candidate will research the optimal design of technologies both from the point of view of resources and benefits with the criterion of minimal increase in entropy during the phase of use and especially at the end of life, when weighing between closing the material loop and energy input is important for the lifelong impact on the environment. The candidate's work will be aimed at the synthesis of a generalized method of assessing the sustainability of a technology, which will be based on all parameters of the ecological footprint, not only on the carbon footprint.

3. mentor: prof. dr. Giovanni De Ninno: 1 position

Research Topic: Ultra-fast characterization of complex materials

Applications are welcomed for PhD position in experimental physics at the Laboratory of Quantum Optics, University of Nova Gorica (Slovenia). The focus of the research project is the investigation of static and dynamic properties of magnetically ordered systems utilizing laser-based magneto-optic effects and/or spectroscopic techniques.

Experimental activities will be conducted using a setup that generates high-order (XUV) harmonics of an infrared high-power laser, yielding short pulses in the tens-of-femtoseconds range. Such radiation can be precisely tuned at the M and N absorption edges of various transition metal and rare-earth compounds, enabling element-sensitive, time-resolved investigations of complex materials, in response to electronic and crystal excitations.

The project entails further development and characterization of the experimental setup, encompassing the generation of ultra-short (few-femtosecond and attosecond) XUV pulses, carrying both spin and orbital angular momenta.

The research work will take advantage of a network of international collaborations, involving, in particular, the teams working with the FERMI free-electron laser at Elettra Sincrotrone Trieste (Italy).

4. mentor: prof. dr. Dorota Korte: 1 position

Research Topic: Laser based methods, material characterization

In the research, the material characterization is tended to be performed by the use of photothermal techniques such as photothermal beam deflection spectrometry (BDS), thermal lens spectrometry (TLS), photothermal infrared radiometry (PTR) and photopyroelectric (PPE) technique. The use of these measuring techniques enables simultaneous determining thermal and optical properties within a single analysis, while performing measurements in a non-destructive way.

Application of BDS, TLS, PTR, PPE will not be limited to determination of bulk properties only, but also to studies of subsurface structures and 3D distribution of nanomaterials' properties (absorption coefficient and refractive index, thermal and electrical properties), which are crucial for material's possible application as well as enables the optimization of their synthesis process regarding the desired properties.

5. mentor: doc. dr. Andraž Mavrič: 1 position

Research Topic: Materials science and technology

Carbon dioxide reduction using supported noble metal nanoparticles based on the intercalation chemistry of layered double hydroxides

The PhD candidate will investigate the potential of noble metal-based CO₂-to-methanol catalysts at low temperatures and mild pressures. These catalysts, consisting of alloys with noble metals such as Pd, Pt, or Au, can achieve higher methanol selectivity at low temperatures and milder pressures, depending on the support types and preparation methods. Despite drawbacks such as low activity, sintering, and high cost, noble metal catalysts offer the possibility of overcoming the CO₂ activation energy barrier at low temperatures and milder pressures than conventional Cu-based catalysts, making them a suitable choice for new CO₂-to-methanol catalyst design. The research aims to improve the dispersion of noble metal on metal oxide matrices, resulting in few nm-sized noble metal particles, thereby increasing the noble metal loading. It aims to improve noble metal-metal support interactions to mitigate time-on-stream deactivation and stabilize reaction intermediates favorable to methanol formation. This will be achieved through an innovative approach that explores the intercalation chemistry of layered double hydroxides. A precursor for catalyst formation will be generated via cation coprecipitation, anion exchange, and thermal treatment, resulting in a mixed metal oxide support with highly dispersed noble metal particles. The candidate will use electron microscopy, X-ray diffraction and thermal analysis to characterize precursors and catalysts. In situ and operando testing using mass spectrometry, IR spectroscopy, UV-Vis spectroscopy and X-ray adsorption spectroscopy will be used to assess the stability of reaction intermediates, elucidate reaction pathways and evaluate the stability of noble metal nanoparticles.

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

Research Topic: Linguistics: Semantics and Pragmatics

The research programme in theoretical and experimental linguistics hosts investigations from all major theoretical fields of linguistics like phonology, syntax, semantics, pragmatics. Programme members are equally engaged in experimental research with a focus mostly on experimental pragmatics and experimental syntax.

The candidate will contribute to the research on natural language semantics and pragmatics. Specifically, the project will focus on cross-linguistic variation at the interface between semantics and pragmatics and their relation to syntax. It will explore phenomena such as:

- Comparison – the relation between comparative and superlative construction; focus and ambiguity in comparison constructions; comparison and polarity licensing; combinatorial properties of phrasal and clausal comparatives; presuppositions in comparison constructions;
- Polarity and its locality constraints – licensing in different embedded contexts; Negative Concord (NC) vs Negative Polarity (NP) in embedded clauses; intervention effects on NPIs and N-words; strict vs non-strict NC; minimizer NP items and presupposition; pragmatic effects of NPIs and N-words in interrogative contexts;

- Presupposition and implicature in the domains of comparison, polarity, questions;
- Focus as related to phenomena within the domain of comparison and polarity.

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.

7. mentor: prof. dr. Saim Emin: 1 position

Research Topic: Synthesis and characterization of functional catalysts

The young scientist will be working in the field of chemistry. The doctoral work will focus on developing functional catalysts for use in electrochemical processes. The study of the catalysts will involve the application of advanced characterization techniques, including scanning electron microscopy, physisorption and chemisorption tests, and other electrochemical approaches. The research is centered toward creating catalysts that can be used to enhance the implementation of sustainable electrochemical processes, namely in the area of CO₂ electroreduction. The research tasks will also encompass the investigation of the products of chemical reactions. The candidate will be employed at the Materials Research Laboratory, which offers a vibrant and interdisciplinary setting facilitated by cutting-edge research equipment.

8. mentor: prof. dr.: Serguei Vorobiov: 1 position

Research Topic: Multi-Messenger Astrophysics

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 km² in Argentinian pampa. From 2024 onwards the Observatory, following the completion of its major AugerPrime upgrade, will provide additional measurements of UHECR-induced extensive air showers that will enable better separation of secondary muons and electromagnetic particles. This will yield new information on the primary mass composition of cosmic rays for each UHECR event separately and further improve the sensitivity of the Pierre Auger Observatory to primary UHE photons and neutrinos.

We expect the candidate to be actively involved in the analysis of the data of the upgraded Pierre Auger Observatory. The training of the doctoral student will take place within the basic research program P1-0031 Multimessenger astrophysics, where UNG is the leading institution. In the case of successful advancement of doctoral study and research, the candidate's participation in related physics research topics of the Cherenkov Telescope Array Observatory will be also possible.

9. mentor: prof. dr.: Rok Žaucer: 1 position

Research Topic: Linguistics – morphosyntax/syntax

The candidate will work as part of a research group at the Center for Cognitive Science of Language which focuses on the syntax and morphosyntax of Slavic languages both within theoretical and experimental linguistics. The dissertation topic will fall in the general scope of the type of morphosyntactic or syntactic topics investigated currently or in the past by the supervisor (e.g., prefixation, argument structure, silent verb constructions, clitics, morphological multifunctionality, negation, noun phrase), with the possibility of including theoretical as well as experimental aspects. As part of their four-year PhD position, the successful candidate will study within the Graduate School's Cognitive Science of Language doctoral program.

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. In the event of absence due to parental care after the completion of the study programme, with which they have enrolled/will enrol in doctoral studies, this period shall be extended for the duration of the justified absence. In the case of justified absence determined in the health insurance regulations, after the completion of the study programme, with which they have enrolled/will enrol in doctoral studies, this period shall be extended only in the case of continuous absence of more than six months (absence of more than six months means at least six months and one day), and only for the duration of the justified absence.

Prior to the beginning of the funding of the training, the young researcher shall obtain the habilitation title assistant. Conditions for obtain the habilitation title assistant are set out in the Article 4 of [Regulations concerning conditions and appointment procedures for research and teaching positions at the University of Nova Gorica](#).

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, the Rules on the Selection and Founding of Young Researchers and Regulations concerning conditions and appointment procedures for research and teaching positions at the University of Nova Gorica 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 careers@ung.si no later than **14 April 2024**.

In the application, it is mandatory to provide the first and last name of the mentor you are applying to.

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 careers@ung.si.