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

Research Topic: Astrophysics transients

Sky-surveys, which are repeatedly covering large areas of the sky, reveal that there are many new, transient sources of light in the sky, which suddenly appear, and then fade away and disappear on timescales from less than a second to a few years. Among them are Tidal Disruption Events (TDEs), Gamma Ray Bursts (GRBs), and Gravitational Wave Events (GWEs).
The young researcher will be involved in the international collaborations and will conduct research in the rapidly evolving fields of TDEs, GRBs, and GWEs, which have in common that they are transients produced by compact astrophysical objects, i. e. neutron stars and black holes. Training will be embeded in the research program P1-0031 »Multi-messenger Astrophysics« (PI Prof. Dr. Samo Stanič). To large extent it will be done in connection with international collaborators and Rubin LSST project, in which the supervisor, Dr. Andreja Gomboc, is a member. The young researcher will also collaborate with international experts in TDE modelling with whom we already have established collaboration.

2. mentor: prof. dr. Franc Marušič: 1 position

Research Topic: Linguistics

The PhD student will be included in the research project »The behavior of Czech and Slovenian Clitics«, which will start on May 1, 2023. Within the project, the student will participate in the preparation and administration of the experiments that will investigate syntactic, morphological, and phonological properties of Slavic clitics. The core of the project is about the comparison of Czech and Slovenian clitics, but the project also has a natural extension into the study of other

Slavic languages with comparable clitics (e.g. Slovak, Croatian, Serbian, etc.). The project combines theoretical and experimental linguistic research, and is expected to provide robust novel evidence about the nature of clitics from both a general linguistic perspective and the perspective of Slavic linguistics. The main aim of the project is to bring to the clitic debate a strong set of new data, which can be used for a stronger linguistic theory.

3. mentor: prof. dr. Matjaž Valant: 1 position

Research Topic: **Advanced material synthesis**

The topic of the doctoral thesis covers the study of synthesis routes for the synthesis of advanced materials such as nanostructured catalysts and hybrid perovskites. The doctoral thesis will also cover the structural and functional characterization of the synthesized systems. In doing so, the candidate will use modern characterization methods based on X-ray diffraction and various types of spectroscopies, including those using synchrotron light.

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

Research Topic: Laser based methods, material characterization

Determination of thermo-electro-optical parameters of photoactive layers for photonics and non-linear optics

For the design and construction of optoelectronic devices the knowledge of their thermal and optical of photoactive materials is important. It is also necessary to study the correlation/relation between all these properties since it is directly related to new practical applications of such materials.

Among all photoactive materials metalloquinolates with styryl fragment (MeStQ) are of special interest since exhibit the properties of both photochromic and luminophore materials. They are organo-metallic compounds with a quinoline moiety, which can be used as active layers in different optoelectronic devices.
The most important advantage is the huge possibility of modifying their physical properties through the appropriate design of their chemical structure as well as the ease of their integration in photonics and nonlinear optical devices for desired application.
The objective of the proposed research is to perform the study on improving the optical and thermal properties of photoactive materials with a quinoline moiety since it can bring huge benefits to the development in the field of photonics and nonlinear optics. A special effort is made to characterize the mentioned above photactive materials in form of thin films.
In the research, the material characterization is tended to be performed by the use of photothermal techniques such as photothermalbeam deflection spectrometry (BDS), photothermal infrared radiometry (PTR) and frequency-domain thermoreflectance (FD-TR) 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, PTR, FD-TR will not be limited to determination of bulk properties only, but also to studies of subsurface structures and 3D distribution of materials' 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: prof. dr. Irina Elena Cristea: 1 position

Research Topic: Algebra

The candidate will work in the field of hypercompositional algebra in the Centre of Information Tehnologies and Applied Mathematics. The algebraic hypercompositonal 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 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. On the other side, the theoretical results will be motivated by their future applicability in various complex engineering and environmental systems.

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

Research Topic: Synthesis of nanostructures at surfaces

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 this 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 Scanning Electron Microscopy (SEM) equipped for in-situ heating. The approach will be applied to locally drive some technologically relevant phenomena, such as for example the synthesis of graphene at metal or dielectric surfaces, or the synthesis of nano-patterned 2D chalcogenides.

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

Research Topic: Electro-optical properties of 2D heterostructures including organic semiconductors

We are seeking a talented PhD student to join our team and experimentaly investigate the electro-optical properties of 2D heterostructures and organic semiconductors. The ideal candidate will have a strong background in solid state physics and intuition to perform experimental research. The successful candidate will be responsible for developing and implementing advanced techniques for characterizing the properties of these materials, as well as for designing and conducting experiments to gain deeper insights into their behavior. The candidate will learn how to prepare 2D heterostructures including organic semiconductors and study their applicability by preparing novel electronic components, organic thin film transistors, photodetectors, organic solar cells, memory components, energy-harvesting components, and bio-mimetic components e.g. biosensors. The selected candidate will be immediately employed and involved in the experimental research in Laboratory of organic matter physics.

Responsibilities:

- Preparation of 2D heterostructures including organic semiconductors;
- Develop and implement advanced techniques for characterizing the electro-optical properties of 2D heterostructures;

- Design and conduct experiments to investigate the behavior of these materials under different conditions;
- Analyse data and interpret results to gain insights into the fundamental properties of these materials;
- Collaborate with other researchers to advance our understanding of 2D heterostructures and their potential applications;
- Publish research findings in leading scientific journals and present work at national and international conferences.

8. mentor: prof. dr. Katja Mihurko Poniž: 1 position

Research Topic: Literary studies, gender studies, cultural history

The research will focus on representations of masculinity in Slovenian literature in the 20th century.This will be a pioneering work in this field, so the junior researcher will first examine the current state of art in international literary studies on the topic of gender studies, and then, using a selected corpus of literary works, analyse how representations of masculinity are reflected in Slovenian literature and literary studies. Her/his research will also incorporate findings from other disciplines (cultural history of gender, sociology of gender) that will contribute to a better understanding of the broader context of representations of masculinity in the Slovenian space. Emphasis will also be placed on the inclusion of approaches from the field of comparative literature in the research, which will enable reflection on possible specificities of representations of masculinity in Slovenian literature.The candidate will be directly involved in the research work of the Research Centre for the Humanities in the field of cultural history and literary studies, related to digital repositories, gender studies and intercultural contacts.

9. mentor: prof. dr. Artur Stepanov: 1 position

Področje raziskav: Linguistics

The successful candidate will do research on the syntax of Slavic languages with an emphasis on the 'free' word order phenomenon. The candidate's work will be closely related to topics relevant in the context of the research project ‘The limits of freedom: A permutational approach to free word order in South Slavic Languages’, which aims to develop innovative formal and experimental methods of analysis of word order flexibility in South Slavic languages as well as in general. The theoretical part of the research will be complemented by experimental and psycholinguistic investigations into cognitive mechanisms on the basis of which natural language speakers process different variations of word order in real time. The work will be conducted at the Center for Cognitive Science of Language, in a dynamic and interdisciplinary research environment supported by state-of-the-art equipment, and will include direct involvement in the international research arena.

10. mentor: prof. dr. Sandra Gardonio: 1 position

Research Topic: Material sciences

The successful candidate will contribute to research on topological materials at the Materials Research Laboratory.

Topological materials host symmetrically protected, highly mobile, and spin-polarized electronic states. These properties make them attractive for a range of applications such as spintronics, catalysis, etc.

There is a growing interest in exploring the potential use of topological materials for energy efficient applications such as water splitting, thermoelectricity, batteries, etc. However, the interaction between topological properties and reaction processes needs to be better understood. In this context, the candidate will synthesize/characterize high-quality bulk single crystals of selected compounds with well-defined surface terminations, which should exhibit a non-trivial topology of electronic band structure.

11. mentor: prof. dr. Barbara Ressel: 1 position

Research Topic: Physics

"Study of the electronic properies of lead-free organic perovskites"

The stringent need to reduce extensive emission of carbon dioxide to decelerate global warming makes research towards new materials and technologies for the supply of our society with clean energy one of the most important and challenging fields in today's materials science. Solar energy conversion bears a huge potential to be a leading technology in the world's future energy production, as the sun is an unlimited source of energy in a time horizon of millions of years and provides enough energy in one hour to meet the global energy needs for one year.
Perovskite-based materials are the latest development in photovoltaic materials and possess an ABX_3 crystal structure (A: monovalent (in)organic cation, B: divalent metal cation, X: halide anion). They have been shown to provide impressive power conversion efficiencies up to 25.7% and can be prepared solution-based using a very low amount of energy.
We propose a a research project to investigate a novel family of tin halide perovskites (namely $PEA_{0.15}FA_{0.85}SnI_{2.85}Br_{0.15}$) thoroughly studying the electronic structure as well as the electronic dynamics (i.e. site specific recombination pathways) by conventional and time resolved photoemission spectroscopy (TR-PES).

12. mentor: prof. dr. Samo Stanič: 1 position

Research Topic: High energy astrophysics

Cosmic very high-energy (VHE) gamma photons carry unique information about the most energetic phenomena in the Universe. The most sensitive experimental approach in VHE gamma-ray astronomy is based on simultaneous imaging of Cherenkov flashes from air showers induced by VHE photons using multiple telescopes (imaging air Cherenkov telescopes or IACTs), and reconstruction of their properties from those images. The understanding of main atmospheric characteristics, which requires the use of remote-sensing instruments, is of

paramount importance for determining atmospheric transmission and thus reducing IACT systematic uncertainties.
The young researcher will join the international Cherenkov Telescope Array Consortium (CTAC), and will, together with international partners, contribute to the development of a dedicated Raman lidar and its integration into the emerging CTA Observatory (CTAO), as well as to the study of atmosphere-induced systematic uncertainties, which are expected to be particularly important for the all sky surveys. The CTAO construction will start in 2023 in the legal form of a European Research Infrastructure Consortium (CTAO ERIC), where Slovenia is one of the founding members.
The training at UNG will be conducted as a part of the research program P1-0031 "Multi-messenger astrophysics" and supported by the ESFRI CTA project, both led by the adviser.

13. mentor: prof. dr. Gabrijela Zaharijas:1 position

Research Topic: High energy astrophysics

The nature of dark matter is one of the biggest puzzles in modern day astrophysics. Currently a plethora of astrophysical experiments are in progress or will soon come online, that will increase our sensitivity to detection of the most energetic sources in the Universe and could, at the same time, reveal first signatures of dark matter.

Successful candidate will conduct research related to dark matter searches in experimental astrophysical data of the Fermi LAT satellite, Cherenkov Telescope Array and Vera Rubin observatories, together with theoretical studies and data interpretation.

Center for astrophysics and cosmology is active in the research fields of astrophysics and astroparticle physics with focus on dark matter searches, analysis of the ultra high-energy cosmic rays and gamma-ray data, studies of gamma-ray bursts and high-energy transients and actively participates in several large experimental collaborations, as Fermi LAT, CTA, Vera Rubin Observatory and Pierre Auger Observatory. We also benefit from the proximity of several institutions with strong expertise in astroparticle physics such as the Jožef Stefan Institute in Ljubljana and IFPU, SISSA and ICTP in Trieste.

The training at UNG will be conducted as a part of the research program P1-0031 "Multi-messenger astrophysics" and supported by the ESFRI CTA project (PI prof. dr. Samo Stanič).

14. mentor: doc. dr. Kristina Pranjić: 1 position

Research Topic: Literary studies / new media / cultural history

The topic of the doctoral student's research will mainly relate to the study of avant-garde literature and art of the 20th century in the areas of Central and Southeastern Europe. Special emphasis will be placed on the cultural history of the avant-garde, which includes studies of local avant-gardes in a wider international perspective and examines the influence of the avant-garde not only in the field of aesthetics, but also within the wider cultural and political context: their media, spaces, reception and audiences, political and gender perspectives, connections between local and international avant-gardes and the cultural consequences of avant-garde movements.The research may include various avant-garde manifestations: literature, visual arts, magazines, theater and performance, architecture and design, radio and film.
The candidate will be directly involved in the research work of the Research Center for Humanit-

ies in the field of cultural history and literary studies that are connected to digital repositories, gender studies and intercultural contacts.

15. mentor: doc. dr. Matteo de March: 1 position

Research Topic: Comparative Oncology

The overall goal of the project is to demonstrate the feasibility and utility of a humancanine comparative oncology platform to understand the biology and develop effective treatments for rare cancers, starting with MM (Mucosal Melanoma) and MCT (Mast Cell) models. The project has the possibility of utlising a multidisciplinary research structure, the kind of which does not yet exist in Slovenia, in fact there are only a few pioneering examples in this field in Europe, though it has already been successfully established in the USA (https://ccr.cancer.gov/Comparative-Oncology-Program; Burton et al., 2018 Clin Cancer Res 24:5830; LeBlanc, 2019 Vet Pathol 56:642; Canine Comparative Oncology and Genomics Consortium (CCOGC) - www.ccogc.org). To achieve this goal, it is necessary to coordinate the cooperation of groups with complementary expertise. The young researcher at UNG will identify useful biomarkers and develop immunoreagents suitable for high-resolution tumor visualization and targeted drug delivery to human and canine cells. These reagents will be evaluated on an animal model at the Veterinary Faculty of the University of Ljubljana (VFLJ), and on human biological samples at the Oncology Institute (OI).
The specific goals of the project include:
1. the isolation, functional validation, engineering and production of MM- and MCTspecific (Nb) nanobodies. For Nb to be useful for comparative oncology, selection will be performed to obtain binding molecules that will cross-react with human and canine antigens expressed on tumor cells;
2. the identification of new biomarkers for MM and MCT that can be used for imaging diagnostics and therapeutic approaches;
3. an investigation of the applicability of newly identified markers for in situ imaging during resection of canine MM and MCT and for mapping of sentinel lymph nodes
4. an investigation of the utility of newly identified reagents for targeted drug delivery in the treatment of canine MM and MCT;
5. an evaluation of newly identified markers for the diagnosis of biopsy (archival and new) samples of canine MM and MCT and evaluation of the usefulness of their expression as a predictive factor.

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 15 May 2023.

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

If you have any questions relating to the application procedure, please contact:

Tea Stibilj Nemec, tel. +386 5 6205 822, e-mail careers@ung.si or

Nina Cotič, tel. +386 5 6205 817, e-mail careers@ung.si.