

Job advertisement

Vacancy ID: 412/2021

Closing date: 29 November 2021



**FRIEDRICH-SCHILLER-
UNIVERSITÄT
JENA**

Friedrich Schiller University is a traditional university with a strong research profile rooted in the heart of Germany. As a university covering all disciplines, it offers a wide range of subjects. Its research is focused on the areas Light—Life—Liberty. It is closely networked with non-research institutions, research companies and renowned cultural institutions. With around 18,000 students and more than 8,600 employees, the university plays a major role in shaping Jena's character as a cosmopolitan and future-oriented city.

The Cluster of Excellence "*Balance of the Microverse*" at the Friedrich Schiller University Jena, Germany, combines expertise in life, material, optical and computational sciences to elevate microbiome studies from descriptive to hypothesis-driven and functional analyses. Our core mission is to elucidate fundamental principles of the interactions and functions in microbial communities in diverse habitats ranging from oceans and groundwater to plant and human hosts. We aim to identify the shared characteristics of disturbed or polluted ecosystems as well as infectious diseases on the microbiome level, and develop strategies for their remediation by targeted interventions. Our full spectrum of expertise in the physical and life sciences will be leveraged to address these important issues in natural habitats as well as synthetic arenas in a collaborative manner. The affiliated early career program of the *Jena School for Microbial Communication* (JSMC) offers an ambitious, structured and interdisciplinary post-graduate training based on top-level fundamental research.

The research group of Prof. Dr. Jürgen Popp
at the Cluster of Excellence *Balance of the Microverse* invites applications for a

Doctoral Researcher (m/f/d)

to conduct research on the project

“Ultrasensitive Raman-based detection of natural products in microbial communication (RaMiCo)”

commencing on 01.02.2022. A later start may be possible if desired. The position is initially limited to 3 and a half years. We offer a part-time position 65%.

The aim of this project is to characterize and detect the natural products by sophisticated methods combining electrochemistry and surface-enhanced linear/nonlinear Raman spectroscopy to enhance their molecular specific fingerprint information and link it to their electrochemical state. This new method is expected to shed light on the balance of microbial consortia and their communication in their interactive network. For azalomycin F, we demonstrated that this and other marginolactones are they key drivers of interactions between the bacterium *Streptomyces rapamycinicus*/*S. iranensis*, the fungus *Aspergillus nidulans* and the green algae *Chlamydomonas reinhardtii*, including the activation of the silent orsellinic acid gene cluster. This activation leads to the production of downstream natural products, whose ecological functions remain obscure. Azalomycin F is algicidal and triggers the production of novel structures (gloeocapsoids) of *C. reinhardtii* that promote cell survival, whereas in *Aspergillus fumigatus* it leads to the production of fumigermin that inhibits the germination of *S. rapamycinicus*. For all these compounds, the open questions are how they are released, transported through the environment and how they trigger the response in the recipient microorganisms? We will apply Raman-based optical detection to provide molecular fingerprint information using plasmonic active nanoparticles (surface enhanced Raman spectroscopy, SERS) or non-linear process (coherent anti-Stokes Raman spectroscopy, CARS) to overcome the inherently low Raman signal and allowing ultrasensitive detection of target analytes.

Your responsibilities:

- Design and fabrication of nanostructured surfaces to enhance the Raman scattered light (SERS).
- Combination of SERS with CARS microscopy to detect natural products, in collaboration with the group of Prof. Brakhage (Leibniz Institute for Natural Product Research and Infection Biology, Hans Knöll Institute).
- Development of potential dependent SE-CARS experiments.
- Real-time monitoring of microbial communication.
- Contribute to the development of project direction, as the project evolves.
- Produce high-quality written reports and draft papers.
- Present your results at local meetings and national and international conferences.
- Assist with training other researchers, including Masters' and undergraduate project students, where required.
- Assist with the teaching activities of the group where required.
- Contribute to maintaining the friendly, welcoming and collaborative environment within the group.



Your profile

- An MSc (or equivalent) in chemistry, physics or related discipline. Candidates in the final stages of obtaining their degree are also eligible to apply.
- Required methodological skills: excellent knowledge in optical spectroscopy, such as Raman spectroscopy, design and fabrication strategies of nanostructured surfaces
- Desired methodological skills: knowledge in and practical experience with enhancing strategies in Raman spectroscopy (i.e. CARS, SERS)
- Highly motivated individuals with an interest in joining one of the interdisciplinary research areas of the Microverse Cluster
- The ability to work creatively and independently towards developing your own research project
- An integrative and cooperative personality with enthusiasm for actively participating in the dynamic Microverse community
- English communication skills, both written and spoken

We offer:

- A highly communicative atmosphere within an energetic scientific network
- A comprehensive mentoring program and soft skill courses for early career researchers
- *Jena – City of Science*: a young and lively town with a vibrant local cultural agenda
- A family-friendly working environment with a variety of offers for families: University Family Office 'JUniFamilie' and flexible childcare ('JUniKinder');
- University health promotion and a wide range of university sports activities;
- Attractive fringe benefits, e.g. capital formation benefits (VL), Job Ticket (benefits for public transport), and an occupational pension (VBL)

The three and a half year full-time doctoral researcher position (65% TV-L E13) will be funded through the Excellence Strategy of the German federal and state governments or the Carl Zeiss Foundation. The Friedrich Schiller University Jena is an equal opportunity employer and part-time contracts can be discussed.

To promote gender equality in science, applications by woman are especially welcome. Candidates with severe disabilities will be given preference in the case of equal qualifications and suitability.

Applications in English should comprise a cover letter, a detailed curriculum vitae and copies of academic certificates. Please familiarize yourself with the currently available doctoral projects (www.microverse-cluster.de) and the application process as described in the Online Application Portal. Please submit your application via the JSMC Online Application Portal, under the vacancy **ID 412/2021** by 29 November 2021:

<https://apply.jsmc.uni-jena.de/>

Since all application documents will be duly destroyed after the recruitment process, we ask you to submit only copies of your documents.

For further information for applicants, please also refer to www4.uni-jena.de/stellenmarkt_hinweis.html (in German)

Please also note the information on the collection of personal data at www4.uni-jena.de/en/jobs_information_collecting_personal_data.html