

Faculty of Science and Engineering

Profile report: *Tenure Track Assistant Professor with education profile Sustainable drug development (Duurzame geneesmiddelontwikkeling)*

- Discipline: Pharmacy; Green Chemistry
- Level: Tenure-track assistant professor with education profile
- Fte: 1.0 fte

1. Scientific discipline

Though drugs play an essential role in prevention or treatment of disease, ageing of the population brings about an increased drug use. More drugs stress the ecosystem and may adversely impact our long-term health, e.g. due to reproductive disorders and resistance to antibiotics. The science of *Green Chemistry* or *Sustainable Chemistry* aims to develop drugs in such a way that hazardous substances are reduced. The science encompasses the whole drug life cycle, including its design, production, absorption, distribution, metabolism, and excretion. Here, the focus is on green/sustainable development and/or computational chemistry.

2. Vacancy

This position is opened by the Board of the Faculty (PT/gl/22/00181) and will be embedded in the Groningen Research Institute of Pharmacy (GRIP). Specifically, the position will be embedded in the basic unit Chemical and Pharmaceutical Biology (CPB) as Green Chemistry/Pharmaceutical Biotechnology teaching and research is largely embedded in this basic unit (Prof. W.J. Quax, Prof. G.J. Poelarends, Prof. F.J. Dekker, Dr. K. Haslinger and Dr. S. Schmidt). The criteria and conditions pertaining to the position are described in the document '[Assistant professor with an education profile](#)'.

3. Selection committee (BAC)

- Prof. dr. G.J. Poelarends, Scientific director GRIP, chair
 - Prof. dr. E. Hak, Director Education Cluster Pharmacy
 - Prof. dr. E.M.J. Verpoorte, Professor of Analytical Chemistry and Pharmaceutical Analysis
 - Dr. H.J. Woerdenbag, Programme Director, Pharmacy Bachelor
 - Prof. dr. A. Salvati, Associate Professor Nanomedicine
 - Prof. Bart de Spiegeleer, Professor of Pharmaceutical Sciences, University Ghent
 - Student: TBC
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- Advisors: F.J. Salverda (HR advisor), Dr. R. van Calck (scientific coordinator), Prof. dr. W.J. Quax (Professor of Pharmaceutical Biology)

4. Area of expertise

Staff affiliated with GRIP and the School of Science and Engineering (SSE) have been involved in the education of pharmacy students within the Dutch *2016 Pharmacist Competency Framework & Domain-specific Frame of Reference*. The three universities responsible for the Dutch Pharmacy degree programs (Groningen, Utrecht and Leiden) developed this standard in collaboration with the Royal Dutch Pharmacists Association (KNMP). It incorporates the changing role and position of Dutch pharmacists. Nowadays, pharmacists closely collaborate with general practitioners and are co-responsible for patient treatment (as laid down in the Act of Agreement on Medical Treatment (Wet op de Geneeskundige Behandelingsovereenkomst; WGBO). Over the last few years, the Green Deal developments have forced primary care and the pharmaceutical sciences/pharmacy practice to adopt sustainability aspects into their research and educational program. A graduate from a Dutch university with a bachelor and master Pharmacy not only needs to gain knowledge about conventional chemical reactions, drug design and production, but also on how to modify these to reduce their eco-toxicity.

The assistant professor will redesign and teach Bachelor program elements to train students in sustainable drug development based on Green Chemistry principles [EPA-US, <https://www.epa.gov/greenchemistry/basics-green-chemistry>]. Further, the learning line from bachelor (elementary level) to master (advanced level, Pharmacy & Medical Pharmaceutical Sciences) program will be evaluated and aligned with current Master course elements, in close collaboration with the staff involved in the Master program.

5. Embedding: institute (and base unit)

GRIP is positioned within the Faculty of Science and Engineering (FSE) and physically located within the University Medical Centre Groningen (UMCG) of the Faculty of Medical Sciences (FMS) - hence, in ideal proximity to benefit from collaborations between the two faculties. Together with Medical Sciences, GRIP participates in the joint UMCG-FSE Research Institute GUIDE (Groningen University Institute for Drug Exploration). Pharmaceutical research within GRIP is multidisciplinary. It bridges the clinical and biomedical sciences on the one hand, and chemistry, mathematics (statistics) and physics on the other. The interaction between the pharmaceutical sciences with these fundamental and clinical sciences offers excellent opportunities for cutting-edge research.

With this vacancy, GRIP's ambition is to strengthen its educational program, particularly in the field of sustainable drug development based on Green Chemistry principles. The candidate will be embedded in the GRIP research group Chemical and Pharmaceutical Biology (CPB, current chair Prof. W.J. Quax). Successful research and education in the area of Green Chemistry and Pharmaceutical Biotechnology is currently centralized in this unit, and relevant pharmacy modules are coordinated by members from this unit or in close collaboration with this unit (e.g. Organic and

Biosynthesis (WBFA008-05), Molecules and Reactivity (WBCHE025-05), Organic chemistry practical (WBFA056-05), Applied Biotechnology (WBLT021-05), Pharmaceutical Biotechnology (WMFA043-05), Proteins for Biopharmaceuticals & Drug Discovery (WBFA044-10), and Pharmaceutical Design and Engineering (WMMP008-05). Important interactions with other GRIP research groups are foreseen, especially with the Drug Design group (Profs. Alexander Dömling and Matthew Groves).

6. Local and (inter)national position

The research group CPB within GRIP has an established history of collaborations with (inter)national academic and industrial groups focusing on (biotechnological) processes to make pharmaceutical discovery and synthesis greener and more sustainable. Ongoing EU research programs focus on conversion of CO₂ by smart autotrophic biorefineries for sustainable production of value-added products (i.e. ConCO₂rde) or harness the power of biocatalysts to make organic synthesis greener and more sustainable (i.e. CC-TOP, BiodeCCodiNNG). In collaboration with industrial partners, machine-learning and advanced computational tools for protein engineering are being developed. Spin-off companies (e.g. EV Biotech) provide a successful local example of bringing fundamental knowledge to application. Depending on the research focus, the newly appointed staff member will be able to connect to studies within the FSE in the areas of synthetic biology (Profs. Arnold Driessen, Oscar Kuipers, and Gert Moll), molecular enzymology (Prof. Marco Fraaije, Dr. Max Fürst), and chemical biology (Profs. Adriaan Minnaard and Gerard Roelfes). The envisioned research also contributes to the activities in the FSE theme Molecular Life & Health.

7. Expected contributions to teaching

The staff member will incorporate Green Chemistry elements into relevant BSc courses such as Organic and Biosynthesis, Molecules and Reactivity, Proteins for Biopharmaceuticals & Drug Discovery, as well as master courses such as Pharmaceutical Biotechnology, Applied Biotechnology and Pharmaceutical Design and Engineering. He/she will also coordinate and be actively involved in the development of a new organic/protein chemistry practical and support current teaching staff in aforementioned large BSc courses with up to 200 students. Further, coordination of a future track *Sustainable drug discovery* is foreseen. This track is part of a large ErasmusPlus international master program starting from summer 2022.

The candidate will apply innovative teaching methods including hybrid education (e.g. Massive Open Online Courses [MOOC]), 3D visualization (virtual environment), and/or novel LabBuddy applications. A major opportunity for training settings will be the new Skillslab in the planned Educational Building at the A. Deusinglaan, which will be ready by 2024. In this Skillslab, special rooms are foreseen to incorporate advanced-level innovative teaching including e.g. virtual reality. Depending on the profile of the candidate, the new staff member may play a pivotal

role in setting up elementary training sessions using this Skillslab in the Master phase, such as a virtual organic chemistry practical. The staff member will evaluate the outcome of training sessions and implement improvements across courses. Further, the new staff member will develop best practices, and transfer this knowledge to others (Teach the Teachers). It will be essential for the assistant professor to collaborate with the experienced GRIP staff in the relevant courses. The candidate will further be required to seek funding from relevant teaching scholarship programs (e.g. EIT, ErasmusPlus, local funds).

8. Expected contributions to research

The candidate should have a PhD and a few years of post-academic experience to advance science in a research area relevant to sustainable drug innovation. The research profile of the new TT assistant professor should complement the foci of education, which fall in the area of Sustainable Drug Development and Green Chemistry. Research may support current research lines in the area of Green Chemistry within the research group Chemical and Pharmaceutical Biology (GRIP) and may lead to an independent research line. Although we are primarily looking for candidates with an excellent teaching profile, high potential for successful Green Chemistry research is required. Research could include, for instance, computational chemistry and engineering, artificial intelligence in drug discovery or engineering, or green and sustainable pharmaceutical production.

9. Expected contributions to the organization

The candidate is expected to have an active interest and to provide a positive contribution to the management and organizational tasks of the institute. At the level of FSE, the candidate will contribute to the organization of the faculty, for example by participating in working groups and committees in the area of education. The candidate will participate in relevant national and international organizations.