Faculty of Science and Engineering

Profile report: Tenure Track Assistant Professor with education profile Analytical Chemistry (Analytische Chemie)

- Discipline: Analytical chemistry, modern analytical methods in chemistry

- Level: Tenure-track assistant professor
- Fte: 0,8-1,0 fte

1. Scientific discipline

Within chemistry, the discipline analytical chemistry has a central place as it studies and uses instruments and methods used to separate, identify, and quantify matter. It is also focused on improvements in experimental design, chemometrics, and the creation of new measurement tools. Analytical chemistry has important applications in all other branches of chemistry.

2. Vacancy

This position is opened by the Board of the Faculty (ref. 21/00265) and will be embedded in the Stratingh Institute for Chemistry, basic unit Systems Chemistry. The criteria and conditions pertaining to the position are described in the document '[Assistant professor with an education profile]'.

3. Selection committee (BAC)

- Prof. A. J. Minnaard (Scientific Director Stratingh Institute for Chemistry)
- Prof. W. R. Browne (Education Director Stratingh Institute for Chemistry)
- Prof. M. Tromp (Zernike Institute for Advanced Materials)
- Prof N. H. Katsonis (Stratingh Institute for Chemistry)
- Prof. E. Pidko (TU Delft)
- Prof. S. Otto (Stratingh Institute for Chemistry)
- Student member

4. Area of expertise

Modern analytical techniques and methods are an important element in the chemistry curriculum. Especially, there is a need in chemistry-based laboratory courses and in education in modern techniques to handle chemical data. Analytical techniques and methods are also a key component of many on-going research projects within, especially molecular, chemistry. We therefore want to strengthen our institute with a position in this area.

The candidate is expected to play a leading role in our education in the area of analytical chemistry and to carry out research that is aligned with the teaching activities. The candidate should have the capacity to apply modern techniques to chemical analysis, with a high scientific level in order to contribute actively to research within chemistry and build bridges with research in principle outside of chemistry, where chemical analysis is a supporting component (e.g., pharmacy,

chemical engineering). Specifically, the assistant professor will develop and teach primarily in the Bachelor program chemistry and chemical engineering to train students in modern approaches to data handling and analysis in the context of molecular chemistry. Further, the candidate will develop aspects of analytical chemistry and spectroscopy in the laboratory-based program as well as in the learning line for programming (primarily Python) in courses such as Principles of Chemistry and Chemical Engineering, Physical Chemistry 1, Spectroscopy and Physical Chemistry 2 in the bachelor cycle and topics in chemistry with Python in the Masters cycle. Finally, there will be a connection with the applicable post-Master specialization training programs.

5. Embedding: Stratingh Institute for Chemistry (unit Systems Chemistry)

The candidate will be embedded in the Stratingh Institute for Chemistry, which focuses on research in molecular and supramolecular chemistry, with overarching impact on biology, chemical engineering, and physics based on fundamental organic and inorganic chemistry. The Stratingh Institute has an (inter-)national excellent position in synthetic chemistry and catalysis in the Dutch chemical landscape, and is recognised as a stronghold for synthesis. The candidate will be positioned in the unit Systems Chemistry, a research unit that relies heavily on advanced analytical methods and is facing complex analytical problems on a daily basis. This embedding will allow the candidate to be involved as a collaborator in multiple research projects, also independently with other research teams, and maximise the use of their knowledge and skills throughout the research process, as well engage in their own research line.

The Stratingh Institute for Chemistry's strong tradition of sharing facilities with open access (also to external researchers) ensures that the candidate can build a sustainable independent research line in chemical analysis and stimulate developments in research infrastructure of mutual benefit.

6. Local and (inter)national position

The Stratingh Institute for Chemistry has an established history of collaboration with the research Institutes ZIAM, GBB, GRIP and groups at the UMCG in all aspects of molecular chemistry applied to materials, life sciences as well as industrial cooperation (ARC-CBBC) with the international chemical industry. In the field of systems chemistry the Center for Systems Chemistry (a consortium of several research units) is a partner in the national Gravitation program Functional Molecular Systems in which its strengths in molecular organic and inorganic chemistry, systems chemistry and functional molecular based materials are well represented. The new position will strengthen the research unit and institute in the use of advanced methods and data handling necessary to deal with the increased complexity of the molecular and supramolecular systems being developed. It will facilitate interaction within the Faculty of Science and Engineering, especially chemical analysis efforts in other institutes (e.g., pharmaceutical analysis) and provide support for complex collaborative projects in which data handling skills are essential.

7. Expected contributions to teaching

The candidate is expected to bring innovative ideas and methods in the current teaching environment. In practice, they will be responsible for:

- Strengthening education in analytical chemistry both in itself and as a component in related courses, with an emphasis on modern technologies and recent developments in the field. This will increase the attractiveness of our students for industrial jobs, and is in line with the goal of the UG to provide workers for the northern part of the country as a 'Universiteit van het Noorden'
- Working alongside university teaching staff to develop learning materials and resources for practical and computer-based learning in the chemistry courses they provide
- Complementing the strengths of the program content of the chemistry practical courses with modern analytical techniques or approaches
- Bringing innovative teaching in some of the following areas (with a link to analytical chemistry): data handling and reporting (e.g., R analysis), error analysis, development of mathematical skills applied to analytical chemistry, programming (e.g., Python) for analytical chemistry, spectroscopy, and advanced data analysis in chemistry.
- Course and curriculum development working with the practical education team as well as staff to increase the quality of 'hands on' and skills training broadly in both bachelor and masters programs.

We intend to complement the array of subjects currently taught to our students by hiring an expert in modern analytical chemistry/methods. The focus on analytical skills and the handling of chemical data with modern methods that this position will allow us to reinforce our efforts in training students in the chemical sciences by strengthening the analytical component related to it, and to expand our teaching capacity on the often-overlooked analysis side of chemistry. We foresee that this position will positively benefit the following programs:

- Chemistry
- Chemical Engineering
- Life Science and Technology
- Pharmacy

8. Expected contributions to research

The research profile of the new TT assistant professor should complement the foci of education which fall in the area of chemical analysis. Focus should be on applying modern techniques and handling data at an international scientific level. Research may support current research lines in the area of physical organic chemistry and specifically systems chemistry within the Stratingh Institute for Chemistry or lead to an independent research line. Although we are primarily looking for candidates with an excellent teaching profile, high potential for successful analytical research is required. Research could include, for instance, chemical systems modeling

approaches, chemometric analysis of complex data sets generated in catalysis research etc.

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.