**Assistant, associate or full professor in High-Resolution Electron Microscopy**

*Field of research: Structural Biology*

*Level: Tenure-track assistant professor – associate professor – full professor*

*Fte: 1.0*

1. **Field of research**

   The field of research is the structural biology. The candidate is supposed to understand complex proteins and subcellular structures at the molecular level, using high-resolution electron microscopy (single particle analysis, electron tomography).

2. **Vacancy**

   The position is embedded in the Groningen Biomolecular Sciences and Biotechnology Institute (GBB) of the Faculty of Mathematics and Natural Sciences (FMNS), University of Groningen. The institute has 13 research groups, targeting biological questions in the two focal areas “Molecular Mechanisms of Biological Processes” and “Physiology and Systems Biology”. It is foreseen that the candidate for this position will become the head of the group “Electron Microscopy”. The vacancy has been opened by the board of the faculty.

3. **Short description**

   In the field of structural biology cryo-electron microscopy and X-ray crystallography are more and more complementary in the structural analysis of increasingly complex molecular systems. Electron microscopy (EM) is a technique to study macromolecules, and cellular- and subcellular structures. In recent years, EM has developed enormously because of instrumental and computational innovations. The advantage of direct electron detection cameras, together with ultrahigh stability of the microscopes, allows single-particle bio molecular complexes to be resolved at atomic resolution. Furthermore, powerful algorithms to correct for radiation-induced motion of particles and methods for image processing and classification have been developed. Thus, cryo-EM is now competing with X-ray analysis for the structural analysis of large and complex (bio)molecules. The attractiveness of cryo-EM for structure determination is that the formation of crystals, a step in the structure determination of membrane proteins and complex multi-domain proteins, is no longer necessary. It is expected that within the coming years the method of single-particle cryo-EM will become the main tool in the determination of large protein complexes, especially those that are difficult to approach by X-ray protein crystallography.

   **(Inter)national position.** About 15 groups in Europe focus on single-particle EM, with leading groups in the Netherlands (incl. Groningen), Germany, United Kingdom, Spain and Switzerland. Most of these groups also study cellular structures by cryo-EM tomography. High-resolution structural analysis by EM requires expensive hardware. The only place in the Netherlands that currently meets the optimal hardware requirements for extensive and high-quality data acquisition is the Netherlands Centre for Electron Nanoscopy (NeCEN). The University of Groningen (via GBB) is an active partner of NeCEN but access to this facility is limited due to short capacity. Investments are foreseen to install a high-end electron microscope that will allow the new staff member to establish his/her own top-notch research in Groningen.

   **Electron microscopy at RUG.**

   The FMNS, together with the research institutes GBB, Stratingh and Zernike, will establish an Electron Microscopy Centre as part of NanoLabNL (EMCNL) aiming to boost the current electron microscopy infrastructure to the latest state of the art. This infrastructure will guarantee first-rate research on the structural analysis of (bio)molecules and macromolecular complexes and will allow (soft-)materials to be analysed at the highest resolution.

4. **Selection committee**

   - Prof.dr. B. Poolman (Scientific Director GBB), chair
   - Prof.dr. D.J. Slotboom (head research group Membrane Enzymology)
5. Context
The position will be embedded in the research group Electron Microscopy. The chair of this group, Prof.dr. E.J. Boekema, will retire in 2017. Timely recruitment of a successor is needed to support the broad use of EM (collaborative projects with groups of GBB, Stratingh, Zernike, GRIP and UMCG). As of November 2014 the research group comprises two tenured support staff, 1 postdoc, and 3 PhD students. The current focus of the group is on i) single particle analysis of large biomolecular complexes, most notably plant photosystems, and ii) the ultrastructural analysis of soft materials (membrane systems, hybrid materials). In addition, technical support is provided in cryo-EM tomography to analyse (sub)cellular structures.

Future collaborations are foreseen in the following areas:
- structural biology in the GBB groups Molecular Microbiology, Membrane Enzymology, Biotransformation and Biocatalysis, Molecular Cell Biology, and Cell Biochemistry as well as research groups of GRIP
- the analysis of soft-materials by cryo-EM at GBB, Stratingh, Zernike, and GRIP
- structural cell biology at GBB (Cell Biochemistry, Membrane Enzymology and Molecular Cell Biology), research groups of the University Medical Centre Groningen and the European Research Institute for the Biology of Ageing (ERIBA)

6. Expected contribution to teaching
The successful candidate is expected to have excellent teaching skills and a strong commitment to participate in the teaching programmes of the Undergraduate and Graduate Schools of Science. The tasks comprise the development of courses and teaching in structural biology and biophysical chemistry within study programmes affiliated to Life Sciences and Chemistry. Important study programmes are the majors Molecular Life Science and Biomedical Sciences in the BSc programmes Biology, Life Sciences & Technology, and Biology as well as the MSc programmes Molecular Biology and Biotechnology, the top programme Biomolecular Sciences, Biomedical Science, and Chemical Biology. He/she will also supervise (under)graduate students during BSc/MSc research and thesis projects.

7. Expected contribution to research
The candidate should be an excellent scientist, capable of leading a research group and have demonstrated excellence in high-resolution electron microscopy and structural biology of biomolecular systems. He/she should be able to establish his/her own line of research of high quality and to establish acquisition of external funds.
The research activities should further result in the strengthening of the international position of GBB in structural biology and high-resolution electron microscopy of biomolecules. The research programme of the candidate should be focused on the structure-function analysis of challenging proteins, including multidomain protein complexes or/and membrane proteins, or/and subcellular structures. The research should lead to publications in high-impact international journals and contributions to major international scientific conferences in the field. A research line combining both high-resolution EM and X-ray protein crystallography is possible.

8. Expected contribution to the organisation
The candidate is expected to contribute in an active manner to organisational aspects of the research unit, the institute GBB, and overarching activities within the faculty.

9. Career perspective
The position will be offered as tenure track or tenured depending on the qualifications of the candidate and according to the document “Career Paths in Science” ((www.rug.nl/fwn/careerpathsinscience) of the FMNS.)