Faculty of Mathematics and Natural Sciences (FMNS)

Johann Bernoulli Institute for Mathematics and Computer Science (JBI)

Profile Report

Discipline: Mathematics (Wiskunde)
Level: Full / Associate Professor
Fte: full time (1.0 fte)

1 Introduction
This profile report concerns a full professorship in Mathematics, within the general scope of the subdisciplines Algebra, Analysis, Geometry and Stochastics.

2. Vacancy
This position is opened by the Board of the Faculty (EMK/gl/16/00319) and will be embedded in the Johann Bernoulli Institute for Mathematics and Computer Science. The research group (basic unit) will be chosen with respect to the expertise of the candidate. The position falls within the framework of 'Career Paths in Science 3' ('Bèta's in Banen 3'). Please see link for criteria and conditions.

3. Selection Committee
Prof.dr. J.B.T.M. Roerdink	(scientific director of JBI, Chair)
Prof.dr. H.L. Trentelman	(deputy director Undergraduate School FMNS)
Prof.dr. A. van der Schaft	(group leader of Systems, Control and Applied Analysis)
Prof.dr. J. Top	(group leader of Algebra)
Prof.dr. G. Vegter	(group leader Dynamical Systems, Geometry & Mathematical Physics)
I. Chiscop	(student member)
Prof. dr. V. Rottschäfer	(external member, professor of Analysis and Dynamical Systems, University of Leiden)

HR advisor:
L.A. Boomsma, Human Resources Department

4. Research area
There is flexibility with respect to the specific research area in mathematics of the candidate within the core sub disciplines of Algebra, Analysis, Geometry and Stochastics. We are looking for a leader in her or his research field. Candidates with a research profile associated to the Data Science and Systems Complexity theme of the Johann Bernoulli Institute are especially encouraged to apply. Since mathematics has a high degree of national organization, the candidate is expected to become active in national boards, committees and in specific mathematics research clusters.

An overarching theme for the department is the analysis, control and inference of dynamical systems. The systems can be autonomous, or open to interaction with other systems. The subject involves a variety of mathematical theories ranging from analysis and algebra to geometry. Statistical, stochastic, and algebraic aspects of network dynamics can also play an important role

herein. Dynamical Systems theory and Systems & Control theory is used throughout the natural and engineering sciences, from mathematical physics to the earth and life sciences, and from fluid dynamics to power networks. The research is expected to benefit from close collaborations with several institutes inside and outside our university.

5. Embedding: Institute and Basic Unit
The Johann Bernoulli Institute for Mathematics and Computer Science (JBI) is part of the Faculty of Mathematics and Natural Sciences (FMNS). The profile of the institute centres around modelling and computation with a focus on science and technology, keeping a balanced mix of fundamental and applied aspects. The JBI comprises five mathematics programmes and five computer science programmes.

The mathematics programmes are: "Algebra", "Dynamical Systems, Geometry & Mathematical Physics", "Statistics & Probability", "Systems, Control & Applied Analysis", and "Computational Mechanics & Numerical Mathematics". The candidate will be embedded in the appropriate basic unit. The constituting programmes participate in seven national research schools and most of the PhD students are enrolled in an educational programme and take part in other activities offered by these schools.

The JBI has a leading role in the recently established cross-disciplinary research theme on Data Science and Systems Complexity (DSSC) within the Faculty of Mathematics and Natural Sciences. This concerns a research cluster of 60+ researchers in a number of basic disciplines (mathematics, computer science, artificial intelligence, systems & control, engineering, astronomy) and various scientific application domains. The ambition is to understand and solve big data problems by exploiting the joint perspectives from both data science and complexity science.

6. Local and (inter)national position
The JBI has a strong position in national and international mathematics, as evidenced by participation in NWO and EU projects (e.g. HYCON2, Cosmic Web, CA15109), publications in renowned journals and conferences, memberships of editorial boards (e.g. *EJC, Indagationes Mathematicae, J Stat Phys)*, boards of mathematical societies (e.g. IBS, Bernoulli) and program committees, conference chairing (e.g. MTNS 2014, IWSM 2017), etc. Mathematics research in Groningen is strongly represented in Nonlinear Dynamical Systems, in Mathematical Physics, and in Systems & Control. At the national level the fundamental mathematical fields participate in the research clusters "Discrete, Interactive and Algorithmic Mathematics, Algebra and Number Theory" (DIAMANT), "Geometry and Quantum Theory" (GQT), "Nonlinear Dynamics of Natural Systems" (NDNS+), "Stochastics – Theoretical and Applied Research" (STAR), and in the national research school WONDER.

7. Expected contribution to research
The candidate is expected to carry out an internationally leading research programme in his/her field of expertise. He/she is a strong scientist in his/her own field, as well as open to collaborations with other scientific areas. The research should have visibility on the worldwide level and lead to publications in top journals. The research is expected to strengthen the existing efforts within JBI. A strong involvement in the research theme Data Science and Systems Complexity is expected. Supervision of PhD students and postdocs and obtaining substantial external funding is an important part of the research activities.

8. Expected contribution to teaching

The candidate is expected to contribute to the teaching programmes of the bachelor and master programmes of Mathematics and Applied Mathematics in the Undergraduate and Graduate Schools of Science of the FMNS. He/she will contribute both to teaching existing courses, and to the development of new courses in his/her own subdiscipline of Mathematics. This includes the supervision of bachelor and master theses. The candidate will also contribute to other relevant programmes of the Faculty. Teaching and supervision tasks amount to 40% of the appointment.

9. Expected contribution to the organization
The associate/full professor is expected to substantially contribute to the organizational tasks of the research institute JBI, the (under)graduate school, and the Faculty.