Faculty of Science and Engineering

Profile report: Information Assurance and Security (Informatiebetrouwbaarheid en -beveiliging)

- Discipline: Computer Science
- Level: Tenure-track assistant professor (UD)
- Fte: Full time (1.0)

1. Scientific discipline

The domain of information assurance and security concerns the set of processes, strategies and mechanisms to ensure the security properties of data and information like availability, integrity, authenticity, validity, and confidentiality, and thus protect information systems and keep them available and operational. The field is of increasing importance in view of the world's reliance on information technology.

2. Vacancy

This position is opened by the Board of the Faculty (ref: JPT/dja/18/00039) and will be embedded in the Johann Bernoulli institute, basic unit Information Systems. 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 (BAC)

Prof.dr. J.B.T.M. Roerdink	Scientific director Johann Bernoulli Institute for Mathematics and Computer Science (Chair) and professor Scientific Visualization and Computer Graphics
Prof.dr. N. Petkov	Program director master Computing Science and professor Intelligent Systems
Prof.dr. P. Avgeriou	Professor of Software Engineering
Prof.dr. D. Karastoyanova	Professor of Information Systems
Prof.dr. A. Lazovik	Professor of Web Computing
F. Westerman	Student member
Prof.dr. L. Batina	Associate professor of Digital Security, Radboud University

HR advisor:
L.A. Boomsma

4. Research area

Information assurance and security are concerned with ensuring, protecting and defending the security properties of data and information, namely availability, integrity, authenticity/trust, validity, and confidentiality. Furthermore, the field is focusing on designing information systems such that these properties are

guaranteed. Important subfields are cryptography, formal methods and theory of security, security services, hardware security, systems security, network and Internet security, database and storage security, software and application security, and human and societal aspects of security and privacy. The field is of increasing importance in view of the world's reliance on information technology, the growing complexity if information/software systems and amounts of available data. The field of information assurance and security is currently underrepresented at JBI, therefore the institute needs to strengthen its portfolio in this area.

Topics of particular interest are: Blockchain family of algorithms and approaches, and related access control mechanisms; Approaches for secure data provisioning across all components of an IT system and beyond, and security-by-design; Secure enterprise systems and architectures, and open systems for authentication and authorization; Innovative security patterns; Novel biometrics techniques; Information assurance and security in IoT, SOA, Cloud Computing, Big Data and Business Process Management; Information assurance and security aspects in the domains of Smart cities, Smart factories, Smart energy, Healthcare, Supply Chain Management, Data Science.

5. Embedding: institute (and base unit)

The Johann Bernoulli Institute for Mathematics and Computer Science (JBI) is part of the Faculty of Science and Engineering (FSE). The profile of the institute centers around modeling 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 six computer science programmes. The new position on information assurance and security will be embedded in the recently created research group on Information Systems. 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. The JBI aims to strengthen the current research portfolio in Mathematics and Computer Science, by expanding both in fundamental areas that have a prominent role in education as well as in directions that are essential for new technological and societal developments.

6. Local and (inter)national position

Nationally, most universities have strong research efforts in security. In particular, there are strong groups at the Radboud University, VU University, TU Delft, TU Eindhoven, and University of Twente. At the national level the JBI participates in the Dutch computer science research schools Advanced School for Computing and

Imaging (ASCI), Dutch Research School in Logic (OZSL), the Dutch Research School in Programming and Algorithmics (IPA), and the School for Information and Knowledge Systems (SIKS), the latter being the most relevant for the position. At the international level the JBI is involved in several EU research projects (e.g., Human Brain Project, Smart Homes, Visual Analytics), has established collaborations with major companies (Philips Research, IBM) and technological institutes (Astron, TNO, NLR, ECN), and has cooperation and exchange programmes with many universities (e.g., Rome, Leipzig, Birmingham, Barcelona, Ghent, ESIEE-Paris, Tampere). In Computer Science, the JBI has a strong position (as evidenced by participation in NWO and EU projects, publications in renowned journals and conferences, memberships of editorial boards and program committees, conference chairing, etc.) in intelligent systems (biologically inspired computational modelling, machine learning, morphological image processing); pervasive middleware and energy distribution infrastructures; architecting of software-intensive systems and object-oriented software design; information systems; data and information visualization, and visual analytics. The distribution of research effort over these areas is about equal.

7. Expected contributions to research

The assistant professor is expected to develop an internationally leading research track record in Information assurance and security, leading to an autonomous research programme within the JBI. The research should lead to publications in high impact scientific journals and to contributions to major conferences in the field of expertise. Supervision of PhD students and postdocs is an important part of the research activities. Obtaining substantial external funding for PhD and postdoc projects is crucial. A strong involvement in the research theme Data Science and Systems Complexity is expected. Interaction with other domains that require support from information systems (e.g., astronomy, biology, medicine, data analytics companies, big data, smart energy systems), or provide relevant complementary expertise (mathematics, artificial intelligence) is very important.

8. Expected contributions to teaching

The successful candidate is expected to contribute to the teaching programmes of the bachelor and master programmes of Computer Science in the Undergraduate and Graduate Schools of Science of the FSE. He/she will contribute both to teaching existing courses, and to the development of new courses in information assurance and security. This includes the supervision of bachelor and master theses. During the first 5 years of the appointment the tenure-track assistant professor will devote at most 30% of the total time to educational tasks. Once tenure has been obtained, these tasks amount to 40%.

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 the FSE, the candidate will contribute to the organization of the faculty, for

example by participating in working groups and committees, in the fields of teaching, research and management. The candidate will participate in relevant national and international organizations.