Science that matters
Faculty of Science
Radboud University
Research at the Faculty of Science

The Faculty of Science has taken a leading position worldwide.

The faculty profile is characterized by a well-chosen combination of education programmes and closely related science research domains. In research, the faculty has a worldwide leading position in various topics. Due to this profile the faculty has a fruitful combination of research areas at its disposal, which enables us to be a highly adaptive, innovative and responsive player in the highly competitive scientific arena. At the same time, we are able to maintain the connections between education, science and society, which are of crucial importance for meeting the growing need of society to contribute to the solution of major issues, in cooperation with companies, governments and civil society organizations. We create this collaboration by establishing relationships with external partners, and we explore the possibilities of engaging them actively in our research and education agenda.

In the past decade, this strategy has proven fruitful: the faculty has been awarded with 13 ERC Advanced Grants, 6 Spinoza grants as well as 2 NWO Gravity programmes. The numbers of researchers, publications in top periodicals and their impact have been increasing steadily.
Research Institutes

The research areas at Faculty of Science are taken up by seven different research institutes:

Institute of Mathematics, Astrophysics and Particle Physics (IMAPP)

IMAPP carries out fundamental research in mathematics, high-energy physics and astrophysics, with special attention for interdisciplinary topics. The overarching research theme is the origin and evolution of the universe and its underlying mathematical structures. The combination of research topics of IMAPP is remarkable. There are mathematicians working on statistics of diseases, astrophysicists looking at collisions of black holes and physicists trying to complete the standard model of particle physics. IMAPP covers different research fields, but scientists are working closely together on interdisciplinary research topics. Examples of research at IMAPP include the investigation of the Higgs boson particle and gravitational waves.

www.ru.nl/imapp

Institute for Water and Wetland Research (IWWR)

Human impact and climate change have substantially altered wetlands and many other ecosystems. These changes have resulted in stress responses of all living biota and impose major challenges on individuals, populations and the entire ecosystem. The IWWR studies the mechanisms of adaptation to these changes by microorganisms, plants and animals at the level of the molecule, the cell, the organism and the ecosystem. Innovative applications for current environmental problems are developed from new fundamental insights in molecular, physiological and ecological processes. For instance, the groundbreaking research by Prof. dr. Hans de Kroon on the decline of insectivorous birds and a few years later on massive decline of flying insect biomass have got wide interest. Thanks to his research among others, these pesticides have now been banned by the EU.

www.ru.nl/iwwr

Source: Kees van Vliet
Institute for Molecules and Materials (IMM)

IMM is an interdisciplinary research institute in chemistry and physics. Our mission is to perform fundamental research to understand, design and control the functioning of molecules and materials and to train the next generation of leaders in science and entrepreneurship at the highest international standards. The scientists at our institute make use of unique research facilities, including one of the strongest magnets in the world with a coupled laser laboratory. IMM has three Spinoza Prize Winners. Professor in Physical Organic Chemistry Wilhelm Huck studies how networks of chemical reactions create functional systems. Professor in theory of Condensed Matter Mikhail Katsnelson is one of the founding fathers of research into graphene, a single layer of carbon atoms arranged in a honeycomb lattice. Theo Rasing, professor in Experimental Physics, is known for his pioneering research on the manipulation of magnetism by light. With our research, we actively explore the interaction with industry and the application of our fundamental research. Amongst many others, applications lie in the fields of electronics and medicine.

www.ru.nl/imm

Institute for Science in Society (ISiS)

In the 21st century, we, human beings, witness the pervasive and irreversible impact we have on our planet. The ‘Anthropocene’ is an era of mass extinction and the birth of new life forms in vitro at the same time. Humans themselves are continuously affected by technoscience, for instance via smart implants, self-tracking gadgets and gene editing. Technoscience has furthered the quality of life worldwide. At the same time, as a driver and cause of ecological disruption, technoscience raises concerns.

The Institute for Science in Society (ISiS) studies the philosophical questions and socio-ecological transformations that come with new technologies and innovations.

One of our showcases, the European H2020 PRINTEGER project is about ethical awareness and public trust in science. The project provides tools for policy makers, research leaders, and a next generation of scientists.

www.ru.nl/isis
Our mission includes conducting interdisciplinary research of excellence at the unique interface between genetic, molecular and cellular processes at one end and computational, systems-level neuroscience with cognitive and behavioral analysis at the other end. An example of our leading research is that of Prof. John van Opstal, who received a ERC Advanced Grant for his insightful research into eye-head coordination. 

www.ru.nl/donders

Institute for Computing and Information Sciences (ICIS)

ICIS focusses on three fields: Software Science, Digital Security and Data Science. ICIS is leading in the field of Computing Science, especially in terms of Cyber Security. With the advent of quantum computers, classical public-key cryptography may soon be broken. With this in mind, US standardisation department NIST held an open call for post-quantum cryptographic schemes in 2017. Out of the 69 submissions, the Digital Security research group of ICIS is present in 8 (an absolute record) and represents all major kinds of schemes. The overall goal of ICIS is to improve the security and reliability of computer-based systems and algorithms based on mathematically sound theories. Through their cutting-edge research, ICIS is a forerunner in terms of research, and contributes to society. ICIS looks beyond their own field as they integrate their know-how with

Donders Institute for Brain, Cognition and Behaviour

The Donders Institute is a world-class research centre devoted to understanding the mechanistic underpinnings of human cognition and behavior in health and disease. The Institute is home to more than 600 researchers from 43 countries who share the common goal of contributing to the advancement in the brain-, cognitive- and behavioral sciences in this field.

Education

Our Institutes are directly involved in Bachelor’s and Master’s education in our programmes: Biology, Chemistry, Computing Science, Molecular Life Sciences, Mathematics (Dutch only), Physics and Astronomy (Dutch only) and Science (Dutch only). Our students work side by side with many top scientists and make use of our state-of-the-art facilities.
other disciplines such as law, medicine, and neuroscience. Through this approach, ICIS is relevant not only in research, but also tackles the challenges of IT in modern-day society.

www.ru.nl/icis

Radboud Institute of Molecular Life Sciences (RIMLS)
The Radboud Institute for Molecular Life Sciences is a leading interfaculty research institute of the faculty of Science (Radboud University) and of The Faculty of Medical Sciences (Radboudumc). By integration of scientific expertise of both molecular and medical sciences, RIMLS aims to achieve a greater understanding of the molecular mechanisms of disease. Research areas from RIMLS- Faculty of Science include epigenetics, stem cell and developmental biology and bioinformatics. Recent research led to amongst others, a paradigm shift regarding innate immunity in humans; a revised model of the cell cycle in pluripotent cells and its implications on cancer treatment; and new insight into Polycomb-mediated gene regulation, which opens a new angle on cellular reprogramming and cancer biology. This illustrates that basic knowledge generated by molecular medical science can be useful and translated to medical application and thus can have an important impact on healthcare.

www.rimls.nl
Facts & figures

Staff 2017

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Laureates 2007-2017

- **Veni**: 42
- **Vidi**: 21
- **Vici**: 6
- **Spinoza**: 6
- **ERC Starting grants**: 190
- **ERC Advanced grants**: 190

Publications

- **Total Publications**: 16,160

Funding 2013-2017

- **Direct funding**: €307,950 k
- **Other funding**: €195,848 k
- **Total**: €503,798 k

Concerns turnover consisting of the grants from NWO, EU, FOM, STW, the private sector, and others

Reference date January 2018
Science with Impact

Fundamental knowledge is the driving force of innovation. The Faculty of Science works closely together with the private sector and non-profit organisations to accelerate the process of innovation and to maximise our societal impact. Moreover, the faculty encourages entrepreneurship among students and researchers.

Consortium Projects
The research groups of the Faculty of Science take part in a large number of public-private consortium projects. These projects enable us to involve the private sector in our research at an early stage, resulting in a direct pathway from science to end product. The Faculty of Science has worked with many small to medium-sized enterprises (SME) and corporations like Airbus, AkzoNobel, DSM, Heineken, Philips, LG electronics, NXP, Shell, and Unilever.

The Faculty of Science takes part in 30 new consortium projects per year. About five of these are coordinated by the Faculty of Science.

Contract Research
High-quality research requires state-of-the-art research facilities. The Faculty of Science has a broad range of analytical instruments, as well as internationally renowned, large-scale facilities such as the advanced scanning probe microscopes and the High Field Magnet Laboratory. These facilities are provided to SME via Radboud Research Facilities. www.ru.nl/radboudresearchfacilities

Entrepreneurship
The Faculty of Science also focusses on entrepreneurship. Students and researchers with the ambition to set up their own businesses receive support in business development, intellectual property and financing. They can also educate themselves through our faculty-wide entrepreneurship courses. Our campus offers an excellent environment for further development with our pre-incubator Mercator Launch and the start-up centre Mercator Incubator.

There are about two or three spin-offs each year. Additionally, the faculty has an average of four patents per year.

Interested in collaborating with the Faculty of Science?
Please send us an email via radboudinnovation@science.ru.nl
“Cooperation with the private sector not only strengthens the chain of innovation. It also results in new ideas for fundamental research.”

FLORIS RUTJES, PROFESSOR SYNTHETIC ORGANIC CHEMISTRY
Labs and facilities

One of the most remarkable aspects of the Faculty of Science in Nijmegen is the strong focus on the development of research methods and facilities.

The most significant laboratories and research facilities of the faculty:

- **High Field Magnet Laboratory:** A unique, international lab which carries out pioneering research with the help of continuous high magnetic fields. [www.ru.nl/hfml](http://www.ru.nl/hfml)

- **FELIX Laboratory:** A unique, international lab with intense, short-pulsed infrared and terahertz free electron lasers. [www.ru.nl/felix](http://www.ru.nl/felix)

- **HiSPARC (NAHSA):** The Nijmegen division of the High School Project on Astrophysics Research with Cosmic Radiation involving a collection of cosmic radiation detectors. [www.hisparc.nl](http://www.hisparc.nl)

- **Life Science Trace Gas Facility:** Lab with state-of-the-art gas detectors allowing for real time measurements with detection levels at or below parts per billion volume level. [www.ru.nl/tracegasfacility](http://www.ru.nl/tracegasfacility)

- **Experimental Garden and Genebank:** Botanical garden which pays special attention to the Solanaceae family. [www.ru.nl/bgard](http://www.ru.nl/bgard)

- **Radboud Radio Lab:** Advanced lab that develops instruments for astronomical projects. [www.radboudradiolab.nl](http://www.radboudradiolab.nl)

- **Nuclear Magnetic Resonance Labs**
  Large-scale facility housing eight NMR spectrometers. [www.ru.nl/science/solidstatenmr](http://www.ru.nl/science/solidstatenmr)

- **SPiN labs:** A cluster of cutting-edge scanning probe labs, hosting multiple STM and AFM microscopes and the STILL lab facility, which is one of the quietest labs in the Netherlands. [www.ru.nl/spinlabs](http://www.ru.nl/spinlabs)

- **Radboud Data Science Centre:** Brings together researchers across the Radboud campus in a truly interdisciplinary approach to contemporary data-driven research challenges. [www.ru.nl/datasciencecentre](http://www.ru.nl/datasciencecentre)

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