



Research at the University of Antwerp

*Centers of Research
Excellence*

Core Facilities

*IOF Technology
Platforms*

The University of Antwerp – An Introduction

The University of Antwerp (UA) is characterised by its high standards in education, internationally competitive research and entrepreneurial approach. It was founded in 2003 after the merger of three university institutions previously known as RUCA, UFSIA and UIA. Their roots go back to 1852.

The University of Antwerp has about 13.000 students, which makes it the third largest university in Flanders. Over 1.200 international students (exchange students not included) are registered at the UA. The University of Antwerp forms the backbone of the Antwerp University Association (AUHA) a strategic collaboration with four university colleges in the city of Antwerp.

The University of Antwerp has 7 faculties:

- APPLIED ECONOMICS
- ARTS AND PHILOSOPHY
- LAW
- MEDICINE
- PHARMACEUTICAL, BIOMEDICAL AND VETERINARY SCIENCES
- POLITICAL AND SOCIAL SCIENCES
- SCIENCES

Alongside the faculties, the Institute of Development Policy and Management (IOB), the University of Antwerp Management School (UAMS) and the Institute of Transport and Maritime Management Antwerp (ITMMA) have an autonomous, faculty-like status. Doctoral programmes are available in most faculties.

The University has 4 campuses situated in the historic city centre and in the green belt to the south of the city.

In research the University of Antwerp ranks among Europe's leading universities in terms of relative scientific impact scores in the natural and biomedical sciences (EU Science and Technology Indicators for 2003). Research at UA has thus proven to meet the highest standards of quality. Many UA researchers belong to authoritative international research teams and have achieved excellent results in strict competitive inter-university selections.

The university boasts internationally renowned research units in various fields of expertise. Academic and research staff from UA are involved in intensive collaboration with other scientific institutes in Belgium and abroad, leading to numerous forms of exchange within the framework of scientific as well as educational cooperation programmes.

External funding of scientific research at the university amounts to over 40% of the total research income. Along with the 675 academic staff, over 1000 researchers (working on externally funded research projects) carry out exclusive research assignments on campus. Annually, over 4,000 original scientific works are published and around 130 postgraduate students out of a constant pool of about 800 obtain a doctorate (PhD).

The University of Antwerp – Frontline Research Domains

In a recent exercise the University of Antwerp has identified and formulated a number of cross-faculty, multidisciplinary frontline research areas where Antwerp has visible excellence, critical mass and access to state-of-the-art infrastructure to compete both nationally and internationally. In these areas the University of Antwerp excels in fundamental and applied research and, where relevant, in creating opportunities for collaboration with businesses. The frontline research domains are:

- MATERIALS CHARACTERISATION
- NEUROSCIENCES
- IMAGING
- ECOLOGY AND SUSTAINABLE DEVELOPMENT
- INFECTIOUS DISEASES
- DRUG DISCOVERY AND DEVELOPMENT
- SOCIAL ECONOMIC POLICY AND ORGANISATION
- URBAN HISTORY AND CONTEMPORARY URBAN POLICY
- HARBOUR, TRANSPORT AND LOGISTICS

Alongside these, the university has chosen three strategic research areas where the university sees important opportunities for future growth through internal and external collaboration. These areas are aligned with future economic and social developments and are carried by an already clustered group of academic research teams. The growth areas are:

- ONCOLOGY
- PROTEOMICS, GENOMICS, AND METABOLOMICS
- GLOBALISATION, MULTI-LEVEL GOVERNANCE AND FEDERALISM

The frontline research domains and growth areas are underpinned by clusters of research teams, each with their own focus. The 5 **CENTRES OF RESEARCH EXCELLENCE** focus on fundamental and basic research, the 7 **CORE FACILITIES** house important research infrastructure in a given domain and the 9 **IOF TECHNOLOGY PLATFORMS** were chosen for their potential for industrial collaboration. Each of these will be introduced in more detail in the following pages.

CENTRES OF RESEARCH EXCELLENCE

Centres of research excellence cluster a number of research groups active in closely related and complementary scientific fields. The centres all have proven excellence in basic research nationally and internationally and bring together a critical mass in researchers, state of the art research infrastructure and ongoing research projects.

VAXINFECTIO - VACCINE & INFECTIOUS DISEASE INSTITUTE

<http://www.ua.ac.be/vaxinfectio>

Main Contact: Herman GOOSSENS (herman.goossens@ua.ac.be)
Pierre VAN DAMME
Zwi BERNEMAN

The Vaccine & Infectious Disease Institute combines the research efforts of three laboratories:

- Laboratory for Medical Microbiology
- Centre for Evaluation of Vaccination
- Laboratory for Experimental Hematology

It provides a translational platform for integrated vaccine and microbiological research, with the possibility to conduct clinical microbiological or vaccine trials (phase I to IV), microbiological diagnostics and basic immunological research.

The Institute stands for integrated vaccine and microbiological research with a focus on improving or increasing the understanding of the immune responses in prophylactic and therapeutic vaccines (including tumour vaccines), and on the containment of antibiotic resistance. These topics are studied in a multi-angle integrated approach at a microbiological, immunological, epidemiological, clinical, socio-economical, bio-mathematical and bio-statistical level.

NEURO - CENTRE FOR MOLECULAR NEUROSCIENCES

<http://www.molgen.ua.ac.be>

Main Contact: Christine VAN BROECKHOVEN (christine.vanbroeckhoven@molgen.vib-ua.be)
Peter P DE DEYN

The centre's research activity focuses on molecular genetic analysis of complex neurological and psychiatric diseases in humans. Research units within the centre are active in the fields of neurogenetics, peripheral neuropathies and psychiatric genetics.

Areas of major research interest include Alzheimer disease, idiopathic epilepsies, Parkinson disease, Creutzfeld-Jacob disease, Charcot Marie-Tooth neuropathy and bipolar disorders.

All these diseases are multi-factorial in nature, i.e. their development involves a complex interplay between genetic predisposition and environmental influences. Research focuses on identifying causative genes and susceptibility genes for the abovementioned diseases using methods based on molecular genetic and genetic epidemiological approaches.

NANO - CENTRE FOR NANOSTRUCTURES

<http://www.nano.ua.ac.be>

Main Contact: Gustaaf (Staf) VAN TENDELOO (staf.vantendeloo@ua.ac.be)

Francois PEETERS

Annemie BOGAERTS

The emergence of new and unexpected properties and processes in nanostructures creates an urgent need for theoretical modelling and large-scale computer simulation in order to understand, control and accelerate scientific developments in this area.

In order to strengthen its position in this competitive research field and to focus its investments, the University of Antwerp has integrated the groups on condensed matter theory, modelling and electron microscopy for materials science into a centre of excellence for nanostructures.

ECO - CENTRE ON ENVIRONMENTAL STUDIES

<http://www.ua.ac.be/eco>

Main Contact: Reinhart CEULEMANS (reinhart.ceulemans@ua.ac.be)

Ronny BLUST

René VAN GRIEKEN

The research activities of the Centre on Environmental Studies pertain to terrestrial ecology as well as marine and fluvial environments with strong focus on animal ecophysiology. A common research theme is the effect of changes in abiotic factors on ecological systems, on health and behaviour, and on cultural heritage.

The centre studies the causative relationship between factors such as environmental change and stress on the one hand and ecophysiological and chemical responses at several organisational levels on the other.

SOCIO - CENTRE FOR SOCIAL POLICY RESEARCH

<http://webhost.ua.ac.be/csb/eng/index.php>

Main Contact: Bea CANTILLON (bea.cantillon@ua.ac.be)

Jef BREDÁ

The centre's research is characterized by an empirical and multidisciplinary approach. Thematically, it focuses on the functioning and the efficiency of social policy in the fields of social security, taxation, education, labour, healthcare, housing and wellbeing, and on how such policy interacts with socioeconomic and demographic changes in society. From a methodological point of view, the research uses national and international data surveys, combined with administrative databases, as sources for subsequent analysis

CORE FACILITIES

Core facilities cluster important research infrastructure and/or vital central supportive activities that are put at the service of the internal research groups as well as external partners and customers. The following core facilities are servicing the AUHA research groups as well as external research partners and companies:

ANTWERP BIOBANK

<http://www.bornbunge.be>

Contact: Peter P DE DEYN (peter.dedeyn@ua.ac.be)

Since 1927 the Antwerp Biobank at the Institute Born Bunge (IBB) has built a large collection of human brain samples associated with neurological disorders. It provides samples to study Alzheimer's disease and related disorders, Parkinson's disease, frontotemporal dementia, Creutzfeldt-Jakob disease, epilepsy, peripheral neuropathies and muscle disorders. The Antwerp Biobank is closely integrated with the Centre for Molecular Neurosciences and is a central service facility that provides correctly collected samples and well documented biological material from clinically well defined patients and controls.

BIOMEDICAL MICROSCOPIC IMAGING

<http://www.microsimaging.comli.com>

Contact: Jean-Pierre TIMMERMANS (jean-pierre.timmermans@ua.ac.be)

Biomedical Microscopic Imaging harbours the latest instrumentation covering all aspects of imaging at cellular and tissue level. It is fully equipped for processing biological specimens towards different types of imaging methods in cell biology, including standard light microscopy, scanning- and transmission electron microscopy, and confocal microscopy.

GENETIC SERVICE FACILITY

<http://www.vibgeneticservicefacility.be>

Contact: Hubert BACKHOVENS (hubert.backhovens@molgen.vib-ua.be)

The Genetic Service Facility is a joint effort of the University of Antwerp and the Flemish interuniversity Institute for Biotechnology (VIB) to provide high throughput sequencing, genotyping and SNP analysis to academia and industry. It provides an integrated state-of-the-art high throughput genetic screening platform. All processes are highly automated by the use of a robotic platform and a laboratory Information Management System (LIMS).

IN VIVO BIO IMAGING LAB

<http://webh01.ua.ac.be/biomag/Core.htm>

Contact: Annemie VAN DER LINDEN (annemie.vanderlinden@ua.ac.be)

The Bio-Imaging Lab combines expertise in non-invasive molecular imaging techniques and neurological research, allowing small animal in vivo imaging. Major instrumentation is composed of two in vivo MRI-MRS spectrometers, a Pharmascan 70/16 and a BioSpec 94/20 USR MRI system from Bruker Biospin.

CENTRE FOR PROTEOME ANALYSIS & MASS SPECTROMETRY (CEPROMA)

<http://www.ceproma.ua.ac.be>

Contact: Frank SOBOTT (frank.sobott@ua.ac.be)

The Centre for Proteomics combines expertise in mass spectrometry, proteome analysis and bioinformatics to integrate data derived from complex protein mixtures into systems biology. It offers access to different electrophoretic systems, analytical HPLC systems and mass spectrometers.

CALCUA

<http://calcua.ua.ac.be>

Contact: Annie CUYT (annie.cuyt@ua.ac.be)

CalcUA is one of the most powerful computer clusters of Belgium. It provides capacity to perform highly demanding calculations in a broad range of research applications (computer science, mathematics, biomedical sciences, physics, chemistry, linguistics, ...), at a speed of 3 billion operations/second. The core facility CalcUA delivers almost 3 teraflop. This computing power is provided by CalcUA, Jaws and Seastar. 10 % of the computing capacity is open to external partners.

STATUA

<http://www.ua.ac.be/statua>

Contact: Peter GOOS (peter.goos@ua.ac.be)

StatUa is the core facility for Statistics which groups all statistical expertise of the University of Antwerp and its associated University Colleges. StatUa acts as a statistical helpdesk for researchers within and outside the University. Our services can include, but are not limited to:

1. Statistical advice for researchers (“statistical help desk”)
2. Partnership in research projects with a statistical component
3. Statistical training, workshops and short courses

StatUa employs two full-time statisticians, supported by an extended network of data analysts with various backgrounds.

IOF-TECHNOLOGY PLATFORMS

Through the Industrial Research Fund (IOF) of the university a total of nine Research and Innovation Managers are appointed to pro-actively support the valorisation of research from selected technology platforms. These platforms bring together research groups with complementary expertise in a technology area with high potential for industrial collaborations. The Research and Innovation Managers act as intermediates between industry and their consortium.

ADDN - ANTWERP DRUG DISCOVERY NETWORK

<http://www.addn.be>

Research and Innovation Managers: Jurgén JOOSSENS (jurgén.joossens@ua.ac.be)

The Antwerp Drug Discovery Network (ADDN) combines the expertise of three research teams at the University of Antwerp in the area of drug discovery. The main objectives of the network are:

- To deliver quality lead compounds
- To search for innovative peptidase inhibitors (infectious disease, diabetes, cancer,...)
- To develop innovative chemical probes for drug discovery

NATuRA - NATURAL PRODUCTS & FOOD RESEARCH AND ANALYSIS

<http://www.ua.ac.be/UCAG2>

Research and Innovation Managers: Mart THEUNIS (mart.theunis@ua.ac.be)

The consortium on Natural Products & Food Research and Analysis has a unique expertise in Flanders in the areas of: (1) analysis and quality control of herbal medicinal products and food supplements, (2) method development and validation, (3) fundamental research on medicinal plants and (4) identification of biologically active compounds in food. It combines the complementary expertise of three research teams at the University of Antwerp:

- Pharmaceutical Analysis (including the University Centre for the Analysis of Pharmaceuticals and Health Products - UCAG2)
- Pharmacognosy
- Nutrition and Functional Food Science

TRANSLATIONAL RESEARCH PLATFORM IN KIDNEY, VESSELS AND BONE

<http://www.pathophysiology.be>

Research and Innovation Managers: Patrick D'HAESE (patrick.dhaese@ua.ac.be)

The laboratory of Pathophysiology is a multidisciplinary team performing basic as well as applied research focusing on mechanisms, treatment, and prevention of disease affecting kidney, vessels and bone.

UNIVERSITY OF ANTWERP IMAGING FACILITIES

<http://www.egami.be>

Research and Innovation Managers: Geoffrey DE VISSCHER (geofrey.devisscher@ua.ac.be)

The University of Antwerp Imaging Facilities comprise 3 major research teams dedicated to different imaging modalities and research topics.

The contributing groups are:

- Biomedical Microscopic Imaging core facility
- BioImaging Lab core facility
- Small animal subdivision of the Molecular Imaging Centre Antwerp

The main objectives of the network are:

- To apply imaging to research in pathology of the brain, lung and gut and in cancer
- To evaluate drugs and other therapies in these pathologies, including transgenic models
- To develop and apply new imaging modalities

VAXINFECTIO - VACCINE AND INFECTIOUS DISEASE INSTITUTE

<http://www.vaxinfectio.be>

Research and Innovation Managers: Vanessa VANKERCKHOVEN (vanessa.vankerckhoven@ua.ac.be)

The VAXINFECTIO Consortium is formally recognized as a Centre of Excellence at the University of Antwerp and aims at integrated vaccine and microbiological research with a focus on increasing the understanding of the immune response in prophylactic and therapeutic vaccines (including tumour vaccines) and on the containment of antibiotic resistance. Vaxinfectio consists of 3 main research groups at the University of Antwerp:

- Centre for Evaluation of Vaccination (CEV) - offering a vaccine clinical trial platform and health economic and epidemiological research
- Laboratory of Medical Microbiology (LMM) - offering microbiological diagnostics and research
- Laboratory of Experimental Hematology (LEH) - offering translational immunological and stem cell research.

For valorisation projects involving medical devices VAXINFECTIO liaises closely with the Product Development research team at Artesis, one of the associated university college partners of the University of Antwerp.

ORGANICA - ORGANIC CHEMISTRY CONSORTIUM

<http://www.ua.ac.be/orgsynth>

Research and Innovation Managers: Sergey SERGEEV (serguei.sergueev@ua.ac.be)

The Organica consortium comprises two major partners from the University of Antwerp. The Organic Synthesis team focuses on the development of new synthetic methodologies and the Cryospectroscopy group studies the development of new and the optimization of existing experimental and theoretical spectroscopic methods. Additionally, in collaboration with Karel de Grote University College, the consortium develops sustainable (bio)chemical technologies for the production of high added value products such as biofuels or lubricants.

EMAT - ELECTRON MICROSCOPY FOR MATERIALS SCIENCE

<http://www.emat.ua.ac.be>

Research and Innovation Managers: Artem ABAKUMOV (artem.abakumov@ua.ac.be)

The EMAT laboratory of the University of Antwerp is one of the most established electron microscopy centres in the field of materials research. Over more than 40 years, EMAT has built up an expertise in the theoretical understanding of transmission electron microscopy (TEM) combined with high-level experimental work covering various types of materials:

- Oxides, semiconductors, metals and alloys, polymers
- Nanoparticles and nanotubes
- Thin films, interfaces and heterostructures
- Soft-hard matter composites
- Biomaterials

VIB8/AMG - VIB DEPT OF MOLECULAR GENETICS/APPLIED MOLECULAR GENOMICS GROUP

<http://www.multiplicon.com>

Research and Innovation Managers: Dirk GOOSSENS (dirk.goossens@ua.ac.be)

The VIB8/AMG consortium uses its genetics/genomics expertise to develop multiplex PCR based assays for Next Generation DNA sequencing, copy number variation detection and genotyping. These activities are the basis of the spin-off company Multiplicon NV.

ENVIROMICS - ENVIRONMENTAL IMPACT ASSESSMENT AND ENGINEERING

Research and Innovation Managers: to be appointed

The ENVIROMICS consortium brings together molecular, biological and engineering expertise to provide innovative solutions to environmental pollution and waste water treatment problems.