



Universiteit Utrecht

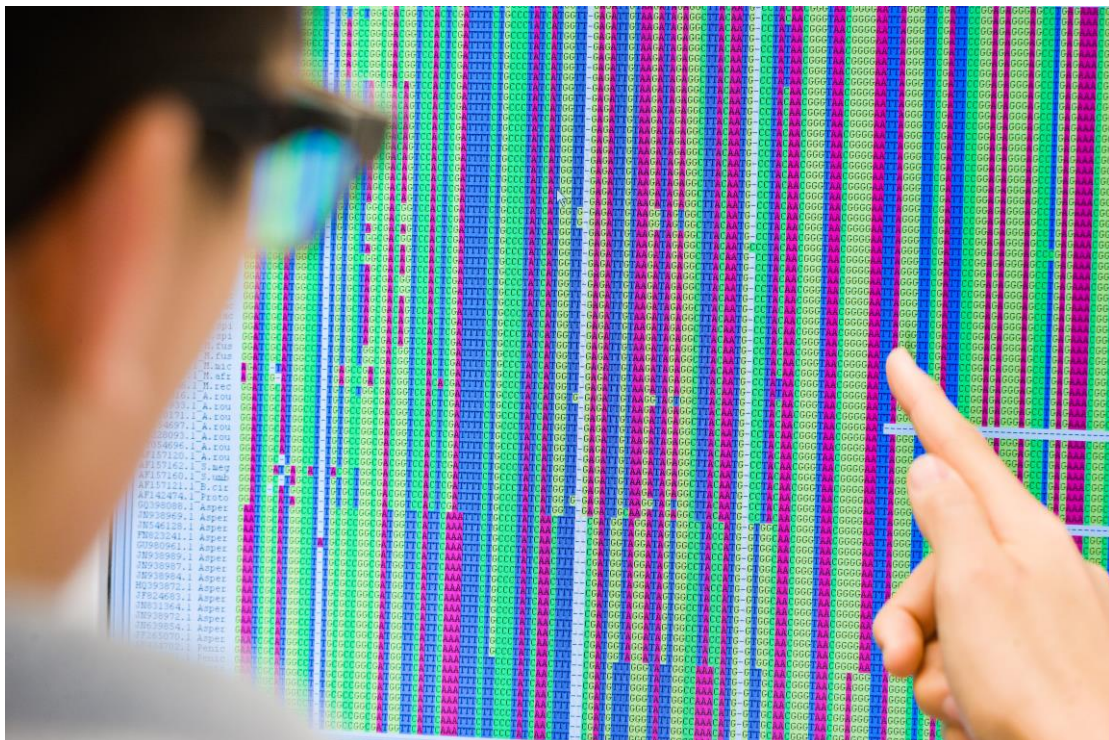


UMC Utrecht

# How to obtain a PhD in Life Sciences in Utrecht, The Netherlands

Information for prospective PhD candidates

Utrecht University  
Graduate School of Life Sciences



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Utrecht University Graduate School of Life Sciences  
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## 1 Preface

Welcome to the Utrecht University Graduate School of Life Sciences and, specifically, to our PhD programmes. The PhD programmes offer breadth and depth of research across all the major Life Sciences disciplines. This provides Master's students and PhD candidates from all over the world with exceptional training. As a PhD candidate at Utrecht University Graduate School of Life Sciences you will be typically employed as a junior research assistant for a period of four years, though there are some exceptions. Notably, for medical specialists in training the track lasts often three years. During that period you will be supervised by a top scientist (full professor) and have full access to state-of the art facilities at Utrecht Science Park. From day 1 you will be working on your own research project, side by side at the bench with Master's students, fellow PhD candidates and postdocs. You will also discuss the results of your research project at local scientific meetings and national and international conferences. At the end of your PhD track, the doctoral thesis will be a compilation of scientific papers you will write during your PhD track.

As a PhD candidate, your department will be your main academic home, but you will also be a member of a PhD programme and the Graduate School of Life Sciences, other intellectual and social communities within this large university. This will give you the chance to engage with academics and fellow PhD candidates across different disciplines, which is a distinctive advantage over universities organised solely on departmental lines.

This document provides an overview of the Life Sciences research in Utrecht, and what it is like to do your PhD here. We hope it will help you make the best choice for your future career and I wish you a lot of success. Please note that this document was designed primarily for online use and will be updated regularly. **The most recent copy can be found at [www.uu.nl/lifesciences](http://www.uu.nl/lifesciences).**

Prof. W.J.A. Dhert, MD PhD  
Dean of the Faculty of Veterinary Medicine  
Chair to the Board of Studies  
Utrecht University Graduate School of Life Sciences

## 2 Introduction

In The Netherlands, scientific research is carried out in research universities, research institutes and companies. Only the fourteen research universities, among which Utrecht University, can award PhD degrees. However, since other research institutes generally work in close collaboration with these universities, they can also provide positions to PhD candidates and a professor of Utrecht University supervises such PhD candidates. Their PhD track is subject to the same regulations imposed by Utrecht University as that of PhD candidates employed at Utrecht University.

## 3 How to apply for a PhD position?

### 3.1 Job opportunities

It is important to note that as a PhD candidate in the Netherlands, you are **not** a student but, in most cases, are employed as a junior research assistant. As such, you will be paid the standard salary for junior research assistants as specified by the Collective Labour Agreement of Utrecht University. Therefore you are called a PhD *candidate* rather than a PhD *student*.

So if you want to become a PhD candidate you cannot just apply for enrolment into a PhD programme, like you would for a Master's programme. Instead, positions for PhD candidates are advertised as job opportunities. So, in order to get a position, you need to apply in response to an advertisement, which can be found here:

[Utrecht University](#)

[University Medical Center Utrecht](#)

[Hubrecht Institute](#)

### 3.2 Grant opportunities

Some PhD candidates are not employed by the institution but finance their PhD research through a fellowship or grant. Often these candidates come from abroad. If you want to use this option there are two things you need to arrange:

1. Find yourself a fellowship or grant. To find available fellowships and grants please visit the [Grantfinder](#) or [Euraxess-The Netherlands](#). Grants may also be obtained in your home country.
2. Find yourself a supervisor at one of our institutes.

## 4 How to qualify for a PhD position?

PhD positions in Utrecht are of high quality; therefore, candidates need to meet high standards. It is important that candidates begin their research with a solid background in the theory and methods of their field. You will need to have a recognised Master's degree. Specific requirements can be found in the job advertisement. Please take note that a good mastering of the English language, both in speaking and writing, is another major requirement. Our doctoral theses are written in English and 20% of our staff and students are international, so English is often the preferred language. These language skills must be demonstrated before you can obtain a position, e.g. by passing language tests such as TOEFL (minimum score: 93) or IELTS (minimum score: 6.5 overall band, at least 6 for writing and speaking). On top of that, most supervisors will like to experience your verbal English skills through an interview, e.g. via Skype, if necessary, as part of the selection procedure.

## 5 Visa

If you need entry visa, you are advised to contact your institution to find out what to do in your particular situation. Practical information about immigration procedures, social security, taxation, healthcare insurance, etc. can be found at:

- [Euraxess](#)
- [Dutch government immigration site](#)

- [Study in Holland](#)
- [Utrecht University](#)
- [International Service Desk](#)
- [International Neighbour Group Utrecht](#)

## 6 Life Sciences research topics in Utrecht

More than 220 full professors and their staff perform research in the realm of Life Sciences in Utrecht, ranging from fundamental and applied research to translational and clinical research. We cover the whole scope of Life Sciences, from molecules and cells, via tissues and organs, to individuals and populations in the following research areas:

- [Biomembranes](#)
- [Cancer, Stem Cells & Developmental Biology](#)
- [Cardiovascular Research](#)
- [Clinical & Experimental Neuroscience](#)
- [Clinical & Translational Oncology](#)
- [Computational Life Sciences](#)
- [Drug Innovation](#)
- [Environmental Biology](#)
- [Epidemiology](#)
- [Infection & Immunity](#)
- [Medical Imaging](#)
- [Molecular Life Sciences](#)
- [Regenerative Medicine](#)
- [Toxicology & Environmental Health](#)

## 7 Working environment

Utrecht University is located at [Utrecht Science Park](#), a 15 min. bike-ride from the city centre. All associated research institutes, including the University Medical Center Utrecht and the Hubrecht Institute are within walking distance from each other, permitting intense interaction and collaboration between scientists. In fact, almost all PhD programmes bring together PhD candidates from different institutes.

As a majority of the research projects involve lab work, many PhD candidates spend time doing experiments in the lab. If your project is more clinically oriented, you can for instance be positioned in one of the clinical departments at the UMC Utrecht or at the faculty of Veterinary Medicine. You will be working side by side with fellow PhD candidates, technicians, postdocs and Master's students, which provides a very stimulating work setting. You will discuss the progress of your work regularly: with your daily supervisor, direct (lab) colleagues, other scientists within your department and PhD programme and at national and international conferences. On top of that, most research departments and PhD programmes organise social activities after working hours at a regular basis, like drinks, movies, karaoke, etc. Since the campus is only 15 min. by bike from the city centre, it is easy finding a good place to spend some time in a relaxed atmosphere.

## 8 Graduate School of Life Sciences

In Utrecht the Graduate Schools are the organising body of training and supervision of PhD candidates (and Master's students). They also monitor the quality of research. For the Life Sciences, this is done by the [Utrecht University Graduate School of Life Sciences](#), which is the research school for the [Faculty of Science](#) (departments of Biology, Chemistry and Pharmacy), [Faculty of Veterinary Medicine](#) and the [University Medical Center Utrecht](#) (faculty of Medicine). The Graduate School of Life Sciences offers 13 research Master's programmes and 15 PhD programmes, with ± 1,000 registered Master's students and ± 1,700 registered PhD candidates.

## 9 The PhD track

The PhD track, typically 4 years, is defined as the combined activities of a PhD candidate in a defined period of time with the aim of writing and defending a doctoral thesis. The PhD track includes activities such as the execution of a research project, reading and absorbing relevant scientific literature, following training to deepen and broaden knowledge and expertise in a particular scientific area and to acquire professional skills necessary to become an independent scientist.

A PhD track involves research activity and little course work. In Utrecht you start doing research from day one. This allows you to develop your own ideas and priorities in your research project while maintaining close contact with your supervisor (who often works in the same department). As a PhD candidate you will be part of the Graduate School of Life Sciences providing you with an inspiring and challenging research and networking environment and tailor-made study programmes, including courses, masterclasses, journal clubs, seminars and conferences.

Upon successful completion of the PhD track, you should demonstrate achievement of the following learning outcomes:

- you have made an original contribution to academic research that can withstand the scrutiny of national and international peer review;
- you are able to independently use scientific methods of inquiry in creating, interpreting and applying new knowledge in one of the areas of the life sciences;
- you are able to develop and implement an extensive knowledge-creation project;
- you have become acquainted and worked with a substantial body of knowledge which at least encompasses the principles and methods of international scientific inquiry as well as the theory development process, methods and studies in the relevant area;
- you are able to adequately communicate the knowledge and methods in the relevant specialisation and/or field;
- you are able to carry the social responsibility for the conduct, application and use of your own research.

## 10 Supervision

At the start of your PhD track a supervisor and daily supervisor are assigned to you. The supervisor ('promotor' in Dutch) is a full professor at Utrecht University. The daily supervisor ('copromotor'), often an associate professor, provides guidance on a day-to-day basis throughout the entire research period, which is typically 3-4 years. Apart from the day-to-day supervision progress will be monitored in a required annual assessment interview, the content of which is based on a progress report written by the PhD candidates. In the first assessment interview, one year after start of the PhD track, continuation of the PhD track is determined by the 'go-no go decision'. (Discontinuation does occur, usually by mutual agreement, but is rare). A Supervisory Committee is also assigned at the start of the research track. Its role is to provide independent advice to you and the (daily) supervisor(s) with respect to the progress (rate, direction) of the PhD track. The Supervisory Committee consists of 1-2 members, each of them being a researcher in a related field, and not involved in your research project. The minimum contribution of the Supervisory Committee is to discuss your annual progress report with you and your supervisors. Especially before the end of the first year of the PhD track, when the go-no go decision is made, the contribution of the Supervisory Committee is very important.

## 11 Training & Supervision Agreement

The Training & Supervision Agreement (TSA) is a standard agreement between you and relevant representatives of the Graduate School of Life Sciences to ensure proper training



and supervision during your PhD track. It contains the name of the PhD programme to which you are registered, the names and signatures of the supervisor(s) and daily supervisor(s), the name(s) of the member(s) of the Supervisory Committee and the intended training programme.

## 12 Training Certificate

When you have met the requirements of the Graduate School of Life Sciences you will qualify for the Training Certificate at the end of the PhD track. These requirements are:

- The training should comprise a minimum of 5 credits\* for each year of research appointment, which will be at least 2 years and no more than 4 years (i.e. 10-20 credits in total).
- A minimum of 40% of the total credits should be spent on thematic courses of the PhD programme to which you have been admitted.
- A maximum of 20% of the total credits may be spent on symposia/conferences.
- A minimum of 20% of the total credits should be spent on general courses.

\* Credits are assigned according to the European Credit Transfer System (ECTS) where 1 credit = 28 hours.

## 13 Doctoral thesis

The doctoral thesis of the Graduate School of Life Sciences must be written in English and consists of scientific papers in peer-reviewed journals, accompanied by an introduction and general discussion. The exact requirements differ per faculty, but, typically, 2-3 papers need to be accepted for publication or already published.

Once the thesis is complete, your supervisor determines if it is ready for submission and defence. A committee of professors is appointed to read and approve the thesis and to examine you during an oral defence. The thesis will be made public (parts of it may have already been published as articles in international journals during the PhD track). Doctoral theses from Dutch universities generally meet the highest academic standards and are therefore held in high regard.

## 14 Summer Schools

If committing yourself for 4 years to the unknown seems too big a leap, you may consider attending one of our 1-2 week Summer Schools first so you can get the flavour of our programmes, university, city and country. Utrecht University organizes the largest [Summer School](#) in Europe. A number of our PhD programmes participate in the Summer School.

## 15 Education and Training

The PhD training programme refers to the collected training activities to which you have access. Thematic training is provided by the different PhD programmes (see below). General training in professional competences and skills is provided by the PhD Course Centre.

### 15.1 PhD Course Centre

Doing a PhD is a wonderful learning opportunity. You will grow to be an independent researcher. However, you can get overwhelmed by the amount of work and developing some specific competencies often has low priority. The key is to plan your personal development, so that you are optimally ready for your next job when you get your PhD. Recently a clear set of competences were assembled that every PhD student should have when they are finished. The [PhD Course Centre](#) provides education and training for PhD candidates of the Utrecht University Graduate School of Life Sciences to develop these competences. The courses are meant to help you in your current research project and in your future career, be it in research or otherwise. Topics covered include general scientific skills, communication, entrepreneurship, personal development and career development.

These courses complement our PhD programmes and PhD events, including the annual PhD Day. Attendance of courses is free of charge for PhD candidates who are registered to the GS-LS and are employed, either on a grant or on a salary, by one of our three Life Sciences faculties (faculty of Veterinary Medicine, faculty of Science and UMC Utrecht).

Together with the other University Medical Centres, organised in the NFU, competence areas were defined in 2016 in which PhD candidates should be able to develop. These are: Scientific Skills & Knowledge, Responsible Conduct of Science, Teaching, Communication, Leadership & Management, Personal Effectiveness and Professional Development. In addition, a self-assessment form was developed aimed to aide PhD candidates in developing these competences in a structured way during their PhD track ([www.phdcompetencemodel.nl](http://www.phdcompetencemodel.nl)).



## 15.2 PhD programmes

Thematic training and education is organised in 15 PhD programmes, which range in size from 25 - 150 PhD candidates. These programmes offer educational activities such as courses, journal clubs, seminars, masterclasses, and PhD retreats. Their work, training programme and associated researchers are summarized below. Only once you have obtained a position as a PhD candidate you will, together with your supervisor, decide to which programme you will register. We cover the whole chain, from molecule and cells, via tissues and organs to individuals and populations in the following PhD programmes:

- [Biomembranes](#)
- [Cancer, Stem Cells & Developmental Biology](#)
- [Cardiovascular Research](#)
- [Clinical & Experimental Neuroscience](#)
- [Clinical & Translational Oncology](#)
- [Computational Life Sciences](#)
- [Drug Innovation](#)
- [Environmental Biology](#)
- [Epidemiology](#)
- [Infection & Immunity](#)
- [Medical Imaging](#)
- [Molecular Life Sciences](#)
- [Regenerative Medicine](#)
- [Toxicology & Environmental Health](#)

The most recent course list of the thematic PhD programmes can be found [here](#).

### **15.2.1 Biomembranes**

Programme director: Prof. Bernd Helms, PhD

Programme coordinator: Nick Olrichs, PhD

Contact: [n.k.olrichs@uu.nl](mailto:n.k.olrichs@uu.nl)

Website: [Biomembranes](#)

#### **Research area**

The Institute of Biomembranes (IB) is a unique multi-disciplinary research-training institute at Utrecht University. Cutting-edge research on biological membranes provides optimal training and infrastructure for the next generation of talented researchers and allows a strong contribution to solving societal problems by knowledge valorisation. The IB has been founded by members of the department of Biology, the department of Chemistry (Faculty of Science), the Faculty of Veterinary Medicine, and the University Medical Center Utrecht. Currently, the IB research focuses on membrane biogenesis, membrane trafficking, and membrane structure & dynamics. During their training, PhD candidates obtain large-scale and in-depth exposure to researchers of the Faculty of Science, University Medical Center and the Faculty of Veterinary Medicine. At these institutes, there is increasing demand of IB PhD candidates in the framework of the much advocated 'One Health concept' that requires integrated knowledge from animal to man at the molecular level. The multi-disciplinary character of the IB is optimally suited for the next generation researchers ranging from molecular life sciences to applied life sciences in human and animal health. Due to the multidisciplinary approach of membranous structures the IB covers a wide range of research areas ranging from Microbiology, Biotechnology, Biochemistry, and Cell Biology to Veterinary medicine.

#### **Associated research groups**

All information regarding our researchers and research groups can be found at our [website](#).

#### **Profile of prospective PhD candidates**

Admission to the IB requires that the candidate has successfully finished Bachelor's and Master's Studies. As IB scientists provide courses within the Molecular & Cellular Life Sciences Master's programme of the Utrecht University Graduate School of Life Sciences, high potential students are often already selected and invited during this Master's programme to apply for a PhD position within the IB. However, to select the best candidates we do not restrict recruitment for the IB PhD positions to our own Master's students, but advertise both nationally and internationally. The strong competition with international candidates for positions will ensure that only the best students will be selected.

IB PhD candidates can also write a PhD project based on their personal interest. A selection committee, including internal scientists representing the different IB faculties, and external experts, including members of the scientific advisory committee of the school, review applications for positions. The selection committee will be instructed to give particular attention to the grades of the PhD candidates for their internships and take into account to what extent this is an original proposal reflecting the ideas of the student. The projects will be selected based on scientific excellence, originality and feasibility of the project idea, and potential to create collaboration between different IB research groups.

#### **Mission of the training programme**

Research in the IB is aimed at increasing insight into the function of biological membranes. This research is focused on three topics: membrane biogenesis, membrane trafficking, and membrane structure & dynamics. The functions of biomembranes are studied using a multidisciplinary approach using different biological model systems, which is reflected in the

composition of associated groups that originate from different departments and faculties of the Utrecht University and UMC Utrecht. With this focus, the IB fits seamlessly in the strategic theme Life Sciences of Utrecht.

### Training programme

Name of the activity	Frequency	Credits	Organizer
IB introduction course	1x/yr	1.5	IB
IB seminars	25x/yr	5.0*	IB
IB PhD Day	1x/yr	1.5*	IB
IB conference on Biomembranes	1x/yr	1.5*	IB
IB PhD Evenings	8x/yr	4.0*	IB PhD Board
IB PhD Retreat	1x/2yr	3.0*	IB PhD Board
Journal clubs	Continuous	0.5/yr	IB

\* when attended over a 4-year period.

### 15.2.2 Cancer, Stem Cells & Developmental Biology

Programme director: Prof. Boudewijn Burgering, PhD

Programme coordinator: Eric Kalkhoven, PhD

Contact: [CSnD-PhD@umcutrecht.nl](mailto:CSnD-PhD@umcutrecht.nl)

Website: [Cancer, Stem Cells & Developmental Biology](http://www.umcutrecht.nl/cancer-stem-cells-development)

### Research area

Fundamental developmental processes are frequently affected in human disease. Many of the important genes and mechanisms controlling development also regulate adult physiology, and deregulation of these processes may result in pathological conditions. Our understanding of the genome (all genes) and the proteome (all proteins) is rapidly increasing, but the regulatory processes that shape our bodies and, when affected, cause diseases such as cancer, are still poorly understood and require fundamental research. Genomic and proteomic technologies have shaped a new area of research enabling us to monitor the expression of some 20,000 genes simultaneously and to monitor the presence and modifications of proteins. Bioinformatics ([Utrecht Bioinformatics Center](http://www.umcutrecht.nl/bioinformatics)) has become a major aspect of modern biomedical research. In addition, microscopic analysis has witnessed a true revolution in the past few years.

The PhD programme Cancer, Stem Cells & Developmental Biology focuses on understanding processes underlying cancer and developmental biology using techniques and applications of post-genomic research, including microarray analysis, next generation sequencing, proteomics, metabolomics and advanced microscopy techniques. PhD candidates in this programme explore research questions concerning embryonic growth, stem cells, signalling pathways, gene regulation, evolution and development in relation to health and disease using various model systems.

### Associated research groups

All information regarding our researchers and research groups can be found at our website ([www.csnd.nl](http://www.csnd.nl)).

### Profile of prospective PhD candidates

Prospective PhD candidates should have a Dutch or equivalent foreign MSc degree in life sciences (medicine, biomedical sciences, biology, chemistry). We expect PhD candidates to be highly motivated, talented and capable of working independently as well as in groups.

### Mission of the training programme

The programme offers training programmes at both the Master's and PhD level, which are frequently combined in joint courses and other activities so as to offer students a truly integrated research and educational programme with a natural progression from the

Master's to the PhD level. The aim of the programme is to offer research, training and education that builds on novel methodology in genomics, proteomics, metabolomics and bioinformatics technology applied to biomedical and developmental systems and processes. PhD candidates participate in the research lines of the participating groups, collaborating with their fellow PhD candidates and postdocs yet at the same time developing their own research project and expertise within the group that should lead to a series of articles and a PhD thesis to be defended in public before an expert committee. PhD candidates are encouraged to seek collaborations outside Utrecht and The Netherlands and to attend international workshops and meetings in addition to the course and seminar programme offered by the CS&D PhD programme.

Master's students seeking a PhD position within CS&D are expected to be highly motivated to perform their thesis research in this field, as the programme aims to attract the most talented and motivated students in the life sciences from the Netherlands and abroad.

### **Training programme**

#### **Seminar series**

Every Thursday at 16.00 pm an invited (international) speaker presents a seminar on a topic relevant to the programme's research programme. PhD candidates are expected to attend the seminars and engage in the discussion sessions. A seminar committee is responsible for the selection of high quality speakers. Both group leaders and PhD candidates are asked to send suggestions for speakers to the committee's chair.

#### **Introductory course**

All first-year PhD candidates participate in a one-day course aimed at introducing them to each other and the school's research programme and organisation. The course consists of a theoretical part and visits at the organizing departments as an introduction to the practical aspects of the research performed by the affiliated research groups.

#### **Specialized courses**

Several specialized 1-5 day courses are organized every year or biannually on topics related to cancer, stem cells and developmental biology, but also on bioinformatics and various technologies.

#### **Master class**

Every December, a 2-day Master class is organized for all PhD candidates at a conference centre away from the lab. International leaders in the field of cancer, stem cells and developmental biology are invited to present their latest research and actively participate in workshops with the PhD students. The PhD award for the best publication of the year is announced during this Master class.

#### **PhD candidate retreat**

This 3-day meeting in June is organized entirely by and for the PhD candidates. The programme's PhD committee composes a programme consisting of seminars by the senior PhD candidates and poster presentations by the junior PhD candidates that are discussed between themselves without any interference from supervisors.

### **Training programme**

<b>Name of the activity</b>	<b>Frequency</b>	<b>Credits</b>	<b>Organizer</b>
Introductory course	2x/yr	0.3	CS&D
Seminars	40x/yr	2.0	CS&D
(International) specialised courses	1x/yr	2.0	CS&D
Master class	1x/yr	1.0	CS&D
PhD retreat	1x/yr	1.0	CS&D

Journal clubs    Continuous                          0.5/yr                          CS&D

### 15.2.3 Cardiovascular Research

Programme director:                          Prof. G. Pasterkamp, MD, PhD  
Programme coordinators:                          M.L. Zonderland, PhD  
   M.F.A. Bierhuizen, PhD  
Contact:    [m.l.zonderland@umcutrecht.nl](mailto:m.l.zonderland@umcutrecht.nl)  
   [m.f.a.bierhuizen@umcutrecht.nl](mailto:m.f.a.bierhuizen@umcutrecht.nl)  
Website:    [Cardiovascular Research](#)

#### Research area

In the western world, cardiovascular diseases still are one of the most prevalent causes for morbidity and overall mortality. Our research programme aims to enhance our knowledge concerning atherothrombosis and heart failure in order to improve therapeutic options for these disorders. The two lines of research include the whole spectrum from basic to clinical activities. The research is done at various levels of complexity ranging from health care in general, to population and prevention, patient care, experimental work on animals, cell biology and using molecular techniques as proteomics and genomics. Within the theme *Atherothrombosis*, research is aimed to enhance knowledge concerning vascular remodelling, plaque vulnerability, relevance of toll-like receptors, coagulation, arteriogenesis, thrombogenicity of platelets and protein misfolding. The theme *Heart Failure* focuses on understanding the pathophysiology of and signals responsible for cardiac adaptation processes leading to ventricular hypertrophy, heart failure, arrhythmias and sudden cardiac death. Complementary integrative research is conducted on inherited and acquired diseases related to heart and kidney with an emphasis on the consequences of aging for the progression of the disease.

Within the UMC Utrecht the Cardiovascular Research (CVR) programme comprises the research activities of eight divisions (Heart and Lungs; Internal Medicine and Dermatology; Laboratory and Pharmacy; Surgical Specialties; Radiation, Radiology and Nuclear Medicine including Imaging; Julius Center; Neuroscience, Paediatrics); within Utrecht University extensive collaborations exist with the Faculty of Veterinary Medicine (Prof. Alain de Bruin, PhD, Pathology), the departments of Pharmacy (Prof. A. de Boer, PhD, Pharmacoeconomics and Pharmacotherapy), and Biology (Jan Andries Post, PhD, Cell Biology) and the Proteomics Centre (Prof. Albert Heck, PhD) of the Faculty of Science.

#### Associated research groups

All information regarding our researchers and research groups can be found at the [programme's website](#).

#### Profile of prospective PhD candidates

Prospective candidates have to be highly motivated and capable of doing research independently but also working in a team. The interest in cardiovascular disease should be apparent from the pre-education, e.g. through knowledge of (patho)physiology and pathology of heart and vessels obtained during Bachelor's and Master's studies in Life Sciences.

#### Mission of the training programme

The programme aims to challenge PhD candidates to gain more in-depth knowledge of cardiovascular research. In a multidisciplinary setting PhD candidates participate in research, meetings, symposia and courses, a.o. on the (patho) physiology of heart and vessels. Subjects include thrombotic aspects, methodology including animal models, valorisation and regenerative medicine. Via this, the PhD candidates are offered the opportunity to explore the area from the level of molecular biology to patient care. Besides theoretical education

the programme aims to train academic researchers who are familiar with exceeding the limits of their own project.

After completion of the programme, the PhD candidate:

- Has profound knowledge of cardiac and vascular diseases and disease mechanisms;
- Is able to communicate and collaborate with peers and other scientists in the Netherlands and abroad;
- Can operate independently;
- Can formulate new research questions and write grant proposals;
- Is able to communicate with the broad scientific community on an academic level, and with the general public;
- Will have insight into the various possibilities to develop his/her career according to personal interests.

### Training programme

Name of the activity	Frequency	Credits	Organizer
UCARE-seminars	10/yr	1.5 /4yrs	CVR
Regenerative Medicine luncheon meetings	10/yr	1.5 /4 yrs	RM*
Cardiovascular animal models	1x/2yr	3	CVR
Seminar series 'Entrepreneurship and innovation in Life sciences & Health'	10x/yr	3*	CVR
Sophisticated laboratory techniques in cardiovascular research	1x/2yr	3	CVR
Innovations in clinical cardiovascular medicine	1x/2yr	3	CVR
PhD Retreat	1x/yr	0.3	CVR
Courses by the <a href="#">Netherlands Heart Foundation</a>	1x/yr	1.5	NHF

\* Course co-organized by the PhD programme Regenerative Medicine.

To ascertain its high quality and actuality, the admission to and mission of the CVR programme is continuously monitored by the programme committee consisting of:

- Prof. G. Pasterkamp (chair), MD, PhD, Exp. Cardiology, UMC Utrecht
- S.A.J. Chamuleau, MD, PhD, Cardiology, UMC Utrecht
- Prof. M.L. Bots, MD, PhD, Julius Center, UMC Utrecht
- M. Roest, PhD, Clinical Chemistry, UMC Utrecht
- J.A. Post, PhD, Cell Biology, Department Biology, Utrecht University
- M.L. Zonderland, PhD, Medical Physiology, UMC Utrecht
- M.F.A. Bierhuizen, PhD, Medical Physiology, UMC Utrecht
- PhD candidate representative(s)

### 15.2.4 Clinical & Experimental Neuroscience

Programme director: Prof. P. Burbach, PhD

Programme coordinator: Mariken de Krom, PhD

Contact: [m.dekrom-3@umcutrecht.nl](mailto:m.dekrom-3@umcutrecht.nl)

Website: [Clinical & Experimental Neuroscience](#)

### Research area

Central to our research are five disorders:

- Stroke
- Epilepsy
- Neuromuscular disorders
- Psychotic disorders
- Developmental disorders

Research and care go hand in hand. In most cases, the UMC Utrecht serves as a national referral centre. Large patient cohorts have been established in each of the disease areas. All

acquired information is used as input for in-depth investigations into the mechanisms underlying disease processes. In turn, the outcome of our research helps to improve early diagnosis and provides patients with the latest innovations in care.

The five disorders share common research angles:

- Genetic risk factors play an important role in the aetiology of the selected diseases.
- Environmental risk factors, in interaction with the genetic background, further contribute to disease vulnerability.
- These risk factors impact on the structure and connections of the brain and spinal cord.
- Translational approaches, making use of the latest technological possibilities in model systems, allow follow-up experiments to unravel underlying disease mechanisms.
- Implementing research findings in the daily practice of patient care is a common interest of all disease areas.

### Associated research groups

All information regarding our researchers and research groups can be found at the [programme's website](#). In principle all our researchers work in one of the five disease areas and/or with one or more of the research approaches as mentioned under research area (point 2).

### Profile of prospective PhD candidates

We are looking for PhD candidates with a broad interest in clinical and experimental neuroscience and who are open to research on the interface of the clinic and the lab. Background can be diverse; from medical\* (is possible in combination with clinical training), biomedical, psychology up to engineering or computer science. Experience with either: imaging techniques, genetic studies and/or translational research (i.e. animal studies, electrophysiology, cell and molecular biology).

\*If you want to work in a clinical setting it is advisable that you do speak Dutch (considering patient contact).

### Mission of the training programme

The mission of the training programme is to get PhD candidates broadly informed in the large field of clinical and experimental neuroscience; to train and prepare PhD candidates as good as possible for the next step in their (scientific) careers.

### Training programme

Name of the activity	Frequency	Credits	Organizer
Introduction course	2x/yr	0.5	C&EN
Current issues in clinical neuroscience	1x/yr	1.5	C&EN
Developmental neurobiology	1x/2 yr	2.0	C&EN
Neuropsychopharmacology	1x/2 yr	1.7	C&EN + ONWAR*
Summerschool (theoretical part)	1x/yr	0.5	C&EN
C&EN symposium	1x/yr	0.5	C&EN
ONWAR retreat	1x/yr	1.0	ONWAR
General skills workshops	1-2x/yr	0.5	C&EN
Several in-depth disciplinary courses	1x/2yr	1-2	ONWAR

\* ONWAR is the Neuroscience Research School Amsterdam Rotterdam. All our PhD candidates have free access to these courses.

### 15.2.5 Clinical & Translational Oncology

Programme director: Prof. Susanne Lens, PhD

Programme coordinator: Prof. Onno Kranenburg, PhD

Contact: [o.kranenburg@umcutrecht.nl](mailto:o.kranenburg@umcutrecht.nl)

Website: [Clinical & Translational Oncology](#)



### **Research area**

Cancer is the major cause of disease-related mortality and cancer incidence rates continue to increase. Based on demographic data it is expected that they will continue to do so until 2040, in parallel with ageing of the population. However, more effective treatment regimens have gradually lowered the chance of dying from cancer by ~10% over the past decade. To further improve cancer survival rates research on the causes of cancer, its prevention, and on new and better forms of treatment are essential.

The goal of Translational Cancer Research is to apply the knowledge obtained with basic research to the design of novel treatment modalities and novel tools for diagnosis. *Vice versa*, it is equally important to use clinical data to formulate scientific research questions.

Novel tumor culture protocols and sophisticated mouse models have greatly improved the quality of translational research. The clinical impact of studies using these platforms will, in all likelihood, be considerably higher than those based on traditional cell culture models. The novel model systems are also increasingly being used for studying basic aspects of tumor biology, metastasis, tumor recurrence following therapy, and therapy resistance. In addition, the rapid development of 'omics' technologies that document changes in tumor DNA, RNA, proteins and metabolites allow for an in-depth analysis of the tumors and the genetic background of individual patients. The large datasets that are generated with these techniques requires implementation of Bioinformatics in the research structure. Ultimately these developments should lead to true personalized cancer therapy.

Translational Research can only be successfully done in situations where clinicians and biomedical researchers collaborate closely. The PhD programme Clinical and Translational Oncology strives to optimize such collaboration and most PhD students in the program will work in such an environment. The programme aims to maximize the clinical impact of basic research findings and to identify the conditions for successful therapy by using the above mentioned state-of-the art technologies.

### **Associated research groups**

All information regarding our researchers and research groups can be found at our [website](#).

### **Profile of prospective PhD candidates**

Applicants should have completed a Master of Science or a Bachelor of Science from an accredited school (HBO) having followed a minimum of 168 weeks of education. PhD fellows that have completed a Biomedical or Medical Master's will be best suitable candidates for the program. PhD fellows have to participate in (clinical) cancer-research projects carried out in, or associated with one of the departments of the UMC Utrecht, Biology (Utrecht University), Veterinary Medicine (Utrecht University) or Hubrecht Institute.

### **Mission of the training programme**

The mission of the PhD programme Clinical & Translational Oncology is to promote and facilitate excellent oncology research and education for all PhD candidates but with emphasis on the clinically-oriented PhD candidates that perform research projects involving the causes and behaviour of cancer in both animal models and humans as well as projects that aim to improve cancer prevention, diagnosis and treatment. The field of cancer research is rapidly moving forward and the translation of novel preclinical findings into the clinic is the challenge ahead. Because research that involves patients or patient materials requires a different set of skills we have developed the Clinical & Translational Oncology PhD programme. The objective of the programme is to provide PhD candidates the knowledge and skills to become independent, highly qualified (bio)-medical scientists capable of crossing the bridge between bench and bedside.

## Training programme

Name of the activity	Frequency	Credits	Organizer
Introduction course	1x/2 yr	1.0	CTO
Clinical Trial Development	1x/2 yr	1.5	CTO
Modern Cancer Pathology	1x/ 2 yr	1.5	CTO
PhD retreat	1x/yr	0.3/yr	CTO
Development and Treatment of Breast and Colorectal Cancer	1x/yr	1.5	CTO
Courses organized by OOA, MGC	2x/yr	variable	CTO, OOA, MGC
Oncology seminars	Continuous	1.0/30	CTO
Journal clubs	Continuous	1.0/30	CTO

### 15.2.6 Computational Life Sciences

Programme director: Prof. Rob de Boer, PhD

Programme coordinator: Bram van Dijk, MSc

Contact: [r.j.deboer@uu.nl](mailto:r.j.deboer@uu.nl)

Website: [Computational Life Sciences](#)

#### Research area

Biological research in the life sciences is changing rapidly now that biologists are generating vast amounts of data on very complex regulatory systems. In modern biology bioinformatics plays an essential role in analysing data and modelling is required to help us understand these intricate biological systems.

Thus, a major challenge in the next decades is to extract useful information from vast amounts of biological data and to develop computational models to investigate the complex dynamics of living organisms. Accomplishing these goals will depend on collaborations between experimentalists and computational biologists, which is nowadays known as BioComplexity, Systems Biology and/or Quantitative Biology. Our mission with this PhD programme is to train students to become computational biologists with a strong expertise in modelling and/or bioinformatics, and a strong footing in the life sciences.

During this programme you will learn to use and develop computational approaches for bioinformatics data analysis and/or for mathematical and computational modelling. Current expertise in the Computational Life Sciences PhD programme involves a variety of biological disciplines and computational approaches. Some of the biological areas that we cover are genome evolution, metagenomics, eco-evolutionary dynamics, gene regulatory networks, bacterial evolution, immunology, cell motility, development, and spatial pattern formation. PhD candidates can therefore be trained a variety of biological areas. Computationally the programme covers scripting (in Python or Perl), programming (in R, C or C++), mathematical modelling (ODEs), and computer simulation (varying from numeric integration, to agent based models and the cellular Potts model).

#### Associated research groups

All information regarding our researchers and research groups can be found at our [website](#).

#### Profile of prospective PhD candidates

PhD candidates in Computational Life Sciences should be highly motivated and ideally have a strong background in the life sciences as well as in computational modelling. Because of the interdisciplinary nature of our PhD programme the criteria for admission are flexible and depend on the background of the PhD candidate and the requirements of the PhD project. An optimal preparation for a PhD candidate in Computational Life Sciences is the track Computational Biology in the Master's programme Molecular & Cellular Life Sciences of the

Graduate School of Life Sciences. An excellent add-on is the '[QBio honours programme](#)' of the Institute for Biodynamics and Biocomplexity. Students with a Master's education in mathematics or physics may also be admitted provided that they have successfully completed courses in the biological, modelling and/or bioinformatics areas relevant to the PhD project. Similarly, students with a Master's degree in the life sciences, that have not yet developed sufficient modelling or bioinformatics skills, should repair their computational skills to be admitted to the school. An excellent preparatory course for any future candidate is the MSc course Computational Biology (B-MCOBI).

#### **Mission of the training programme**

- The main *objective* of the Computational Life Sciences PhD programme is to train PhD candidates to become excellent and independent computational biologists, with solid expertise in modelling and/or bioinformatics, combined with a good interdisciplinary knowledge in the life sciences.
- Computational Life Sciences PhDs learn to communicate with members of interdisciplinary research teams (PhD candidates with a theoretical background have to understand the underlying biology, and biologists should master the innovations in computational biology),
- Computational Life Sciences PhDs learn to become 'computational biologists' capable of high-level research on BioComplexity, Systems Biology, Quantitative Biology, and/or Bioinformatics.

#### **Training programme**

PhD candidates in our group attend the advanced courses that are given [locally](#) and various other national and international courses. Examples of schools and courses attended by our PhD candidates:

- Q-Bio Summer Schools (organized by the UU and by the Center for Non Linear Studies at Los Alamos National Laboratory),
- Complexity Summer School (organized by the UU and by the Santa Fe Institute),
- Computational Biology schools and conferences,
- Complex Systems Summer School of the Santa Fe Institute
- Advanced in bioinformatics,
- Advanced Immunology Courses (e.g. in the Infection & Immunity programme),
- Statistical and programming courses in R,
- General courses writing papers and giving presentations.

#### **15.2.7 Drug Innovation**

Programme director: Prof. Albert Heck, PhD  
Programme coordinator: Paul Henricks, PhD  
Contact: [Science.UIPS@uu.nl](mailto:Science.UIPS@uu.nl)  
Website: [www.uu.nl/science/UIPS](http://www.uu.nl/science/UIPS)

#### **Research area**

The research area of Drug Innovation is best described by the multidisciplinary collaboration of chemists, biologists, pharmacists, biomedical and clinical scientists, in order to translate scientific hypotheses to products for care, cure and prevention of diseases. We aim to perform ground breaking, exploratory research in areas, which are the supports of drug innovation: disease targets, bio-active molecules, drug targeting and action and evaluation. This will ultimately lead to the molecules, methods, concepts and approaches, which are so indispensable for the successful outcome of drug development in the pharmaceutical industry and medicines used in society.

The focus is shifting to the high hanging fruit of peptides, proteins, nucleotides and even more advanced medical products like (stem) cells. These **Future Medicines** offer major

scientific challenges for translation. For example, the key success factor for gene therapy and exon skipping is successful delivery to cells.

### Associated research groups

Almost all PhD candidates are working in one of the research groups of the [Utrecht Institute for Pharmaceutical Sciences \(UIPS\)](#). The research of *UIPS* is ideally positioned in the Faculty of Science to work on basic scientific problems and to translate new findings into potential solutions to urgent societal medical needs, which are addressed in the Faculties of Medicine and Veterinary Medicine. This field is growing rapidly due to developments in Technology.

The five research groups of *UIPS* (see figure) have their different specialties. The Chemical Biology and Drug Discovery group makes mimics of proteins, carbohydrates and peptides. The Pharmaceutics group targets proteins and genes to cells and innovates the regulation of biotech products. The Biomolecular Mass Spectrometry and Proteomics group excels in proteomics of stem cells, biomarkers and glycoprotein analysis. The Pharmacology group focuses on immune and microbiome modulation by medical nutrition, but also on regenerative medicine and organ-on-a-chip technology. The Pharmacoepidemiology and Clinical Pharmacology group was involved with regulation of the first approved gene therapy in the world and is responsible for clinical use of advanced medical therapies. All groups offer courses in the training programme.

### Profile of prospective PhD candidates

The PhD programme is open to candidates having a Dutch or equivalent international MSc in Life Sciences (e.g. Pharmaceutical, Chemical or Biomedical Sciences). Depending on the research project the PhD student is entering, he/she should have the required theoretical and lab-skill background. PhD candidates should be team-players with good communication skills, should have a high degree of achievement drive and initiative and should have a good knowledge of English (both writing and speaking). Candidates either have their own funding/scholarship or they apply to a job opening on the UU website.

### Mission of the training programme

The research projects of the PhD students are focused on interdisciplinary research in the field of innovation and usage of drugs, biologicals and diagnostics. The underlying philosophy is a cyclic approach of starting with the disease; applying top chemistry to bring active molecules into a sequence of molecular and cellular characterization; developing delivery options; administering the drug within a clinical setting and to the population; and finally looping back real life experiences with medicines again into the discovery and development process. The focus of our programme is **Future Drugs: advanced and affordable biomolecular and cellular therapies**. We can think of therapies based on proteins, nucleic acids, carbohydrates, fatty acids, synthetic vaccines, immune cells, stem cells and bacteria. Translational research is, in this context, of vital importance to bring concepts from a molecular level to human use.

### Training programme

Name of the activity	Frequency	Credits	Organizing entity
DI Introduction course	1x/yr	1.0	DI
Drug Delivery and Drug Targeting DI/GUIDE*/LACDR**	1x/yr	2.0	
Biomolecular Mass Spectrometry	1x/yr	3.0	DI
Future Medicines	regularly	3.0	DI
GLP/GCP	1x/2yr	3.0	GUIDE
GMP	1x/2yr	1.0	GUIDE
Pharmaco-epidemiology & Drug Safety	1x/yr	1.5	DI

Pharmaceutical Policy Analysis	1x/yr	1.5	DI
Pharmaco-economics	1x/yr	1.5	DI
Advanced Pharmacology	1x/yr	7.5	DI
Advanced Organic Synthesis	1x/yr	7.5	DI/Debye
PhD retreat	1x/yr	0.3	DI
Masterclasses/Symposia/PhD meetings	regularly		DI

*\*GUIDE: Groningen University Institute for Drug Exploration*

*\*\*LACDR: Leiden Academic Centre for Drug Research*

### 15.2.8 Environmental Biology

Programme director: Saskia C.M. Van Wees, PhD

Programme coordinator: Roeland L. Berendsen, PhD

Contact: [r.l.berendsen@uu.nl](mailto:r.l.berendsen@uu.nl)

Website: [www.uu.nl/science/IEB](http://www.uu.nl/science/IEB)

#### Research area

Within the PhD programme Environmental Biology fundamental life processes of plants and microbes are studied at different organizational levels, from molecules and cells to entire plants and ecosystems. The UN predict that the world population will increase to 9.6 billion people in 2050 and that feeding these people would require an increase in global food production of 70%. As the global acreage available for agriculture is limited and expansion of agricultural land will often go at the expense of natural habitat and biodiversity, an increase in food production efficiency is required. Meanwhile our climate is changing and the consequences for ecosystems are unclear. Plants and microbes are essential components of our natural and agricultural environment and their interactions play a key role in the sustainability of life on Earth. The PhD programme Environmental Biology promotes understanding of functioning of ecosystems and of the individual organisms that build the ecosystems. Our interdisciplinary research program is focused on the biological mechanisms that determine how plants and microbes adapt to their changing environment and how they interact with each other and with animals.

Research within this PhD programme often has a spin-off in applied sciences such as in plant breeding, biotechnology, or management of natural resources. The PhD programme Environmental Biology participates in the Utrecht strategic themes Sustainability and Life Sciences and the focus area Future Food Utrecht.

#### Associated research groups

Information regarding our research groups and researchers is available on the websites of the groups:

- [Ecology & Biodiversity](#) (Prof. George Kowalchuk, PhD)
- [Molecular Plant Physiology](#) (Prof. Sjef Smeekens, PhD)
- [Plant Ecophysiology](#) (Prof. Rens Voesenek, PhD)
- [Plant-Microbe Interactions](#) (Prof. Corné Pieterse, PhD)

#### Profile of prospective PhD candidates

Prospective PhD candidates have a MSc in the area of plant biology, ecology, molecular biology or microbiology and are highly motivated to perform ground-breaking research at the international forefront of one of the above-mentioned research areas.

#### Mission of the training programme

The mission of the PhD programme is to organize and facilitate research and education for PhD candidates in the area of microbiology and plant and environmental biology. The aim of the programme is to train PhD candidates in a multidisciplinary environment to become highly qualified, independent researchers. Central issues in the training programme are 1) the understanding of biological mechanisms that play a role in plant and microbial growth,

development and adaptation to biotic and abiotic stress conditions and their role in survival; and 2) the understanding of ecological processes in plant and microbial ecosystem functioning and the effects of environmental change on this.

Major objectives of the PhD programme are:

- to facilitate plant/ecological/microbial biological research of high international standard on all levels of integration (from molecules to cells; from cells to whole plants; from individual plants to ecosystems), resulting in a high-quality dissertation.
- to organize and facilitate high-quality training and education for PhD candidates in the research area of plant and environmental biology and microbiology, bringing together different expertise areas and monitoring the progress of the PhD candidates.

### **Training programme**

The Environmental Biology research groups not only participate in the Graduate School of Life Sciences of the UU, but also in the Dutch national graduate schools Experimental Plant Sciences (EPS) and Production Ecology & Resource Conservation (PE&RC). Researchers from the Utrecht Environmental Biology groups are actively involved in the organization of specific PhD courses that are organized by these graduate schools. All PhD courses that are organized by the abovementioned national graduate schools are eligible for the PhD programme Environmental Biology. The national graduate schools offer an extensive range of research courses like the Summerschool Environmental signaling in plants, The power of RNA-Seq, Transcriptional regulation, Ecological modeling in R, Generalized linear models, Root ecology, Increasing photosynthesis in plants, and Workshop Metabolomics. For up-to-date lists of specialized courses please visit the schools' respective websites.

### **15.2.9 Epidemiology**

Programme director: Prof. Diederick Grobbee, PhD

Programme coordinator: Maud Verhoef-Jurgens, PhD

Contact: [msc-epidemiology@umcutrecht.nl](mailto:msc-epidemiology@umcutrecht.nl)

Website: [www.phd-epidemiology.nl](http://www.phd-epidemiology.nl)

### **Research area**

Epidemiology is the scientific discipline that studies patterns in space and time in the aetiology, diagnosis, prognosis, treatment, and prevention of diseases in populations, and identifies factors that contribute to or influence these phenomena. The word 'population' is key to this. In populations one can find descriptive or causal relations between factors on the one hand and disease occurrence and dynamics on the other. These patterns are essential for understanding, preventing and controlling diseases. The research is approached from a nationally and internationally unique multidisciplinary perspective, combining clinical, veterinary, pharmacological/pharmaceutical, environmental, occupational, and theoretical epidemiology, and medical statistics, in close interaction with medical, veterinary and pharmaceutical specialists. Based on real and clinically relevant problems, we contribute through research, knowledge dissemination and education to an improved understanding of the aetiology, diagnosis, prognosis, treatment and prevention of disease. These diseases notably include cardiovascular diseases, cancer and infectious diseases, occurring both in humans and animals.

The PhD programme is organised by UMC Utrecht, Julius Centre for Health Sciences and Primary Care; Faculty of Veterinary Medicine: Department of Farm Animal Health and Institute for Risk Assessment Sciences (IRAS); Faculty of Science: Utrecht Institute for Pharmaceutical Sciences, Pharmacoepidemiology and Pharmacotherapy. Research fields covered are therefore clinical epidemiology, epidemiology of infectious diseases, medical statistics, veterinary epidemiology, occupational and environmental epidemiology, and pharmacoepidemiology.

### **Associated research groups**

All information regarding our researchers and research groups can be found at the websites of the following institutes:

- [UMC Utrecht, Julius Center for Health Sciences and Primary Care](#)
- [Veterinary Medicine, Department of Farm Animal Health](#)
- [Institute for Risk Assessment Sciences](#)
- [Utrecht Institute for Pharmaceutical Sciences, Pharmacoepidemiology and Pharmacotherapy](#)

### **Profile of prospective PhD candidates**

The PhD programme Epidemiology is accredited by the Dutch Epidemiology association as leading to a registration as Epidemiologist B. In order to qualify, the research must be epidemiological, and PhD candidates must either be theoretically trained as epidemiologist, or undergo this training during the PhD trajectory by following the Utrecht University MSc Epidemiology Postgraduate. The MSc Epidemiology Postgraduate is also offered online (through [Elevate Health](#)). Previous education must be in (veterinary) medicine, biomedical sciences or a degree from a university in or outside the Netherlands comparable to the previous named Dutch degrees. For questions about admission, you can contact the programme coordinator.

### **Mission of the training programme**

The PhD programme Epidemiology is aimed at optimal preparation of PhD fellows to become independent researchers, research consultants, or continue their career at an academic level in (non)governmental institutions or the pharmaceutical industry. The core of the educational programme consists of formal epidemiological training, with research methodology as its core knowledge area, offered by the participating research groups by within Utrecht University. Collaborative educational activities are primarily aimed at providing PhD fellows with the required knowledge base and skills to conduct their current research and design future research. Simultaneously these interfaculty educational activities aid in the development of a shared view on concepts and terminology, and stimulate research collaboration.

### **Training programme**

Name of the activity: MSc Epidemiology Postgraduate (also offered online)  
Frequency: start yearly in September (MSc online starts in September and January)  
Credits: 90 EC  
Organizing entity: all epidemiological research groups within Utrecht University

Name of the activity: PhD Seminar Epidemiology  
Frequency: yearly in February  
Credits: 1.0 EC  
Organizing entity: all epidemiological research groups within Utrecht University

### **15.2.10 Infection & Immunity**

Programme director: prof. J.A.G. Strijp, PhD  
Programme coordinator: E.J.G. van Wilsem, PhD  
Contact: [j.vanderhoorn@umcutrecht.nl](mailto:j.vanderhoorn@umcutrecht.nl)  
Website: [Infection & Immunity](#)

### **Research area**

The research programme Infection and Immunity has proven itself over the last decades. It connects immunologists, infectious disease physicians, paediatricians, bacteriologists, virologists, chemists and cell biologist to study and fight elements in infectious diseases and

immunological disorders. It aims to develop novel treatments and fight resistance against existing drugs. Since Infection and Immunity are intertwined, it is our choice to integrate these two areas of research within a single research school. PhD candidates are trained in both areas of research in order to fully understand and appreciate this fundamental entanglement.

Therefore we have assembled groups that do outstanding research. Not only in basic microbiology and immunology, but also in the field where the two research areas meet. The latter is illustrated by research on immune evasion, vaccination and the balance between inflammation and infection. In order to study the molecular mechanism of this interplay one needs expertise and insight from both the infection perspective and the immunity standpoint.

#### University Medical Center Utrecht, [Research programme 'Infection and Immunity'](#)

The programme focuses on the following themes: 1. Antimicrobial resistance 2. Infection prevention 3. Immune deficiencies 4. Acute & chronic inflammation.

Head: Prof. Eric Hack, PhD; Management Team: Prof. Marc Bonten, MD, PhD, Prof. Lieke Sanders, MD, PhD, Prof. Jos van Strijp.

#### Faculty of Veterinary Sciences, Utrecht University, [Strategic Infection Biology \(SIB\)](#)

The programme is designed to discover principles of infection and associated pathobiology at the cellular, organ, host, and population level with the goal to develop novel infection intervention and prevention strategies. The focus is on principles of infection and intervention and prevention are investigated using infectious agents that have zoonotic potential and/or are of major (future) veterinary, public health or economic relevance. The research programme is divided into three coherent research lines that each target key steps in the infection process: 1. Cellular Infection 2. Host Defence 3. Infection Dynamics. Prof J. van Putten, PhD is programme coordinator.

New initiatives on campus will strengthen the I&I programme in the near future. Networking alliances, such as [Immunovalley](#) and Utrecht Life Sciences, focus strongly on Infection and Immunity. Future investments like a zoonosis institute, a wild life institute and the move of Danone and the National Institutes of Public Health and the Environment (RIVM) to the Utrecht Science Park in the (near) future, will help to create an environment in which Infection and Immunity can flourish.

#### **Associated research groups**

All information regarding our researchers and research groups can be found at our [website](#).

#### **Profile of prospective PhD candidates**

Prospective PhD candidates have a MSc in Biology, Biomedical Sciences, or a related field of study. They have a basic knowledge of infectious diseases and the immune system and are highly motivated to perform ground-breaking research at the international forefront of one of the above-mentioned research areas.

#### **Mission of the training programme**

The multi-disciplinary programme 'Infection & Immunity' aims to improve knowledge on inflammatory disease resulting from failing immunity and/or infection. The programme aims to host the full range of academic research needed to (1) understand the (molecular) epidemiology of infections and antimicrobial resistance, (2) understand the pathophysiology of infections and of failing or overreacting host responses, (3) develop highly innovative strategies to diagnose, treat and prevent infections, immune deficiency and inflammatory



diseases, (4) improve health-care through applying (and evaluating) these ‘research products’ in patients and healthy subjects.

### Training programme

Name of the activity	Frequency	Credits	Organizer
Advanced course Immunology	1 x/yr	1.5	I&I
Advanced course Infection biology	1 x/yr	1.5	I&I
Spring Meeting	1 x/yr	0.15	I&I
PhD Retreat	1 x/yr	0.3	I&I
van Kinsbergen course	1 x/2yr	1.5	I&I
Infection meets Immunity Summer School	1x/yr	3.0	I&I
Seminars	40x/yr	2.0	I&I
Journal club	Continuous	0.5	I&I

### 15.2.11 Medical Imaging

Programme director: Prof. Max A. Viergever, PhD

Programme coordinator: Renee Allebrandi, MA

Contact: [imago@isi.uu.nl](mailto:imago@isi.uu.nl)

Website: [Medical Imaging](#)

### Research area

The PhD programme Medical Imaging is hosted by the Image Sciences Institute, which is part of the Imaging Division of the UMC Utrecht. With over 200 researchers, the Imaging Division is one of the largest concentrations of academic medical imaging research worldwide. The division comprises the Departments of Radiology (including Nuclear Medicine), Radiotherapy, and Medical Imaging (better known as the Image Sciences Institute). The division is internationally renowned for its research on MR image acquisition, image analysis (registration, quantification, computer-aided diagnosis), diagnostic imaging of brain disorders, cardiovascular diseases and oncology, and image-guided oncological interventions. There is a longstanding close collaboration with industry, which has facilitated rapid translation of research concepts to image technology enabled healthcare solutions, for patient-tailored diagnosis, prognosis, and treatment. Medical Imaging combines expertise from different disciplines so as to offer a balanced educational programme and to perform high-level fundamental and applied research in the area of medical imaging. Both natural and clinical sciences are represented.

### Associated research groups

All information regarding our researchers and research groups can be found at the [website of the Image Sciences Institute](#).

### Profile of prospective PhD candidates

Prospective PhD candidates should have a Dutch or equivalent foreign MSc degree in exact sciences (physics, mathematics, computer science, biomedical or electrical engineering) or life sciences (medicine, biomedical sciences).

We expect PhD candidates to be highly motivated, talented and capable of working independently as well as in groups.

### Mission of the graduate programme

The main objectives of the programme are:

- To establish and execute a coherent and internationally recognized research programme in medical imaging;
- To offer an advanced and balanced educational programme of lectures, courses, seminars and workshops to PhD candidates in this area;

- To train and supervise PhD candidates to attain the level of qualified and independent researchers by the highest international standards;

### Training programme

Name of the activity	Frequency	Credits	Organizer
ImagO introduction (mandatory)	4 x/yr	1.0	MI
Introduction Clinical & Translational Oncology	1 x/yr	1.0	MI*
Image Processing	1 x/yr	7.5	MI
Medical Image Formation	1 x/yr	4.0	MI
Medische Beeldvormende Technieken	1 x/yr	4.5	MI
MRI in Radiotherapy	1 x/yr	2.5	MI
Advanced in vivo NMR	1 x/yr	3.0	MI**
Radiotherapy Physics, including Advanced Radiotherapy Physics	1 x/yr	7.5	MI
Advanced Radiotherapy Physics	1 x/yr	2.5	MI
Advanced MR Physics	1 x/yr	7.5	MI
Knowledge Driven Image Segmentation	1 x/2 yr	1.5	ASCI
Evidence-Based evaluation of new imaging Techniques	1 x/yr	1.5	MI
Advanced Pattern Recognition	1 x/2 yr	1.5	ASCI

\* In collaboration with the PhD programme Clinical & Translational Oncology

\*\* In collaboration with universities of Wageningen, Nijmegen, and Eindhoven.

PhD candidates can also attend courses from other PhD programmes of the Graduate School of Life Sciences, the Graduate School of Natural Sciences as well as courses from Graduate Schools from other universities, e.g. [ASCI](#) or [NIHES](#).

### 15.2.12 Molecular Life Sciences

Programme director: Prof. Marc Baldus, PhD  
 Programme coordinator: Reinout Raijmakers, PhD  
 Contact: [Science.Bijvoet@uu.nl](mailto:Science.Bijvoet@uu.nl)  
 Website: [Molecular Life Sciences](#)

### Research area

The Molecular Life Sciences programme, organised by the [Bijvoet Centre for Biomolecular Research](#), aims to provide PhD candidates with a solid and broad knowledge of structural biochemistry. The programme provides research and training opportunities for PhD candidates interested in many areas of structural biology X-ray diffraction, mass spectrometry, proteomics, electron microscopy, solid-state and liquid-state NMR, protein folding and biomembranes. The programme is coordinated by the Bijvoet Centre for Biomolecular Research, which aims to gain insight into the relation, at the molecular level, between the structure and the function and activity of biomolecules that are involved in recognition, interaction, and regulatory processes.

### Associated research

The Molecular Life Science PhD programme is organized by the Bijvoet Center for Biomolecular Research, which consists of the following groups at the Department of Chemistry of the Faculty of Science of Utrecht University:

- [Biomolecular Mass Spectrometry & Proteomics \(BMS\)](#)
- [Cellular Protein Chemistry \(CPC\)](#)
- [Membrane Biochemistry and Biophysics \(MBB\)](#)
- [Crystal and Structural Chemistry \(CSC\)](#)
- [Medicinal Chemistry & Chemical Biology \(MC\)](#)
- [NMR spectroscopy \(NMR\)](#)

- [Cryo-Electron Microscopy \(Cryo-EM\)](#)

In addition, the following groups are also (associate) members of the Bijvoet Center:

- [Molecular Cancer Research, UMCU](#)
- [Cell Biology, UMCU](#)
- [Cell Biology, Department of Biology, Faculty of Science](#)
- [Utrecht Bioinformatics Center](#)

### **Discovering the Molecular Basis of Life**

The general theme of the research in the Bijvoet Center is discovering how biomolecules function in the human body and in life in general and how the processes and interactions between biomolecules in living cells are affected in patients. This includes, for example, research to understand the cause and potential therapeutic approaches for a disease like cystic fibrosis, which is caused by misfolding of the protein CFTR when it is mutated due to a genetic defect, but the center puts effort in a large diversity of human diseases, both within in the center and together with local, national and international collaborators. The center has expertise that allows for the development of novel technology to study biomolecules, like the analysis of proteins inside cells using NMR spectroscopy, new methods to analyze the dynamics in protein crystals using X-ray diffraction, novel methods for the high-throughput, proteomics based analysis of protein phosphorylation, the development of novel antibiotics, and the development of a new mass spectrometer that allows the analysis of intact protein complexes, including therapeutic antibodies.

### **Profile of prospective PhD candidates**

PhD candidates are expected to be highly motivated, talented, capable of working independently and are generally expected to have an educational background with an emphasis on exact sciences (chemistry, physics, biology) and related fields (e.g. biomedical sciences).

### **Mission of the training programme**

We aim to provide high-quality research training programs for young scientists with an interest in the relationship, at the molecular level, between structure and function/activity of biomolecules that are involved in recognition, interaction, and regulatory processes.

### **Training programme**

<b>Name of the activity</b>	<b>Frequency</b>	<b>Credits</b>	<b>Organizer</b>
Biomolecular Mass Spectrometry course	1x/yr	3.0	MLS
Advanced NMR spectroscopy course	1x/yr	3.0	MLS
Advanced Protein Crystallography course	1x/yr	3.0	MLS
Bijvoet Symposium	1x/yr	2.0	MLS
Seminars	8/yr	2.0	MLS

### **15.2.13 Regenerative Medicine**

Programme director: Prof. Paul Coffey & Dr. Louis Penning

Programme coordinator: Dr. Koen Braat

Contact: [RM-PhD@umcutrecht.nl](mailto:RM-PhD@umcutrecht.nl)

Website: [Regenerative Medicine](#)

### **Research area**

The PhD Programme in Regenerative Medicine (RMUtrecht) is interdisciplinary and cross-faculty. It is organized by Utrecht University, together with the University Medical Center Utrecht and Hubrecht Institute.

Regenerative Medicine is a dynamic field that brings together fundamental and clinical scientists from many disciplines with the aim of developing novel therapeutic strategies for a wide variety of diseases. The multidisciplinary nature of this field accounts for the involvement of several institutes, and covers a variety of enabling technologies and clinical application areas, such as stem cell-based treatment and regeneration of tissue types and organs. Growth and differentiation of stem and progenitor cells is critical for understanding both normal development and disease progression, with an ultimate aim to use these cells for the transplantation and development of novel approaches for the treatment of disease. There is much progress in the clinical aspect of regenerative medicine: new insights from fundamental work on the degeneration and injury of bones and joints are already being applied to the treatment of spine and knee lesions; new stem cell-based treatments for inherited diseases are being developed; and stem cell-based treatments for cardiovascular and renal disease are investigated in the lab and patients.

In this truly multidisciplinary field, stem cell characterization, intracellular signalling, the formation of new blood vessels, the use of biomaterials as scaffold or controlled release systems, and tissue homeostasis are central elements, providing connections to other research programs. The ultimate aim of regenerative medicine is to mobilise the body to heal itself.

RMUtrecht is directly linked with the Regenerative Medicine & Stem Cells strategic research programme of the UMC Utrecht. By definition, this places RMUtrecht in all of the six strategic research programs at the UMC Utrecht; the five others are:

- Brain
- Child Health
- Circulatory Health
- Infection and Immunity
- Personalized Cancer Care

In addition, RMUtrecht has research and education connections with other faculties and departments at Utrecht University, including:

- Faculty of Veterinary Medicine;
- Biomedical Sciences programmes (Bachelor's and Master's);
- Medical sciences;
- Faculty of Sciences (in particular, with Pharmacy).

It also has close ties with the Hubrecht Institute; Technical University Eindhoven (joint RM & Technology Master's program); Erasmus Medical Center; and Delft University of Technology.

### **Associated research groups**

All information regarding our researchers and research groups can be found at our [website](#).

### **Profile of prospective PhD candidates**

Prospective PhD candidates should have a Dutch or equivalent foreign Bachelor's and/or Master's degree in the life sciences, medicine, veterinary medicine or technical areas (such as engineering or computational sciences). We expect PhD candidates to be highly motivated, talented and capable of working independently as well as in groups. As this is a broad diverse field, we also expect PhD candidates to be open to interacting and learning about areas of regenerative medicine that may be outside of their specific research topic.

The topic of a PhD candidate's research must lie within the field of regenerative medicine; the RM Executive Programme Committee relies on the judgment of the (daily) supervisor. In cases of doubt, the decision of the Executive Committee will be final. Students from other universities are also able to follow courses within in the PhD program, based upon

availability, and provided that they have adequate background as mentioned above. Again, in case of doubt, the decision of the executive programme committee will be final.

The PhD candidate must be able to communicate in English; all courses are given in English.

### **Mission of the training programme**

A unique hallmark of RMUtrecht is the integrated approach in which basic scientists and clinicians from both human and veterinary medicine work side-by-side. The main objectives of the RM PhD Programme are:

- To provide an inspiring and high level multidisciplinary and translational education programme in RM;
- To continuously develop a coherent and internationally recognized training and education programme in RM;
- To facilitate a stimulating high-quality scientific climate for PhD candidates to “mature” in the world of Regenerative Medicine whilst developing state-of-the-art practical and theoretical skills;
- To effectively train PhD candidates in the field of Regenerative Medicine over the broad range, from fundamental research to translational application, *i.e.* from bench to bedside;
- To teach and facilitate communication and interaction with colleagues and peers within this highly multidisciplinary field such that PhD candidates become acquainted with the international perspective of the RM field;
- To strengthen the national and international position of the research by cooperation with related academic and industrial institutes;
- To share and transfer knowledge, methodology, software and technology.

### **Training programme**

<b>Name of the activity</b>	<b>Frequency</b>	<b>Credits</b>	<b>Organizer</b>
Introduction to RM (mandatory)	1x/yr	1.0	RMUtrecht
Introduction to Stem Cells	1x/yr	1.0	RMUtrecht
Perspectives in RM (mandatory)	1x/yr	1.0	RMUtrecht
Bench to Bedside	1x/3yr	2.0	RMUtrecht*
Cardiovascular RM	1x/2yr	1.2	RMUtrecht
Enabling Technologies	1x/2yr	1.5	RMUtrecht
Theme Day: Musculoskeletal	1x/2yr	0.3	RMUtrecht
Theme Day: Cardiovascular	1x/2yr	0.3	RMUtrecht
Theme Day: Stem Cell-based Therapies	1x/2yr	0.3	RMUtrecht
RM Lunch Seminar Series	10x/yr	0.6/yr	RMUtrecht
PhD retreat	1x/yr	0.5	RMUtrecht

\* In collaboration with the Dutch National RM PhD Programme.

### **15.2.14 Toxicology & Environmental Health**

Programme director: Prof. Bert Brunekreef, PhD

Programme coordinator: Mieke Lumens, PhD

Contact: [education.iras@uu.nl](mailto:education.iras@uu.nl)

Website: [Toxicology & Environmental Health](#)

### **Research area**

Risk is an integral part of life. We take, perceive, ignore and experience risks every day. The research area studied in this programme investigates risks related to chemical, biological and physical agents in the environment, the work place and the food chain from a multidisciplinary perspective. The focus of the PhD programme is on the three main approaches used in environmental risk assessment: exposure assessment, toxicology and environmental epidemiology.

In order to facilitate and support risk assessment knowledge is needed on the bioavailability and hazards associated with toxic substances. Within risk assessment epidemiological research aims at establishing relationships between environmental and occupational exposures to chemical, biological and physical factors and health. To reliably and quantitatively measure exposure of human beings to all sorts of agents is a complex endeavour, which requires rigorous methods and method development and validation. Combining the information gathered by the three approaches mentioned above will contribute to an improved understanding of environmental risks and more thorough environmental (health) risk assessments.

### **Associated research groups**

All information regarding our researchers and research groups can be found at our [website](#).

### **Profile of prospective PhD candidates**

In the past we have attracted PhD candidates from all over the world and with various scientific backgrounds, such as toxicology, environmental and occupational epidemiology and hygiene, and exposure assessment.

The basic requirement for admission is a relevant and sufficient scientific background in Life Sciences (e.g. Biological, Biomedical, Environmental, Chemical Sciences), and financial support to pay for the PhD position. Because of the interdisciplinary nature of our PhD programme the admission criteria will have to be flexible and individualized. Students that have completed the Master's programme Toxicology and Environmental Health will be well suited as candidates for the PhD programme. The PhD programme committee will decide about admission of PhD candidates proposed by the supervising professors of the research groups involved. Depending on the research project the PhD candidate is entering, he/she should have the required theoretical and lab-skill background. When necessary, PhD candidates should remedy any education deficiencies on the advice of his/her supervisor.

### **Mission of the training programme**

The programme educates PhD candidates to become independent researchers in the area of environmental risk assessment. In a multidisciplinary setting the PhD candidates participate in research and in meetings, symposia and courses, covering different areas of toxicology, environmental and occupational epidemiology, exposure assessment and (veterinary) public health.

### **Objectives**

After completion of the programme, the PhD candidate:

- has profound knowledge of toxicology and environmental health and their application in risk assessment
- is able to communicate and to collaborate with peers and other scientists in the Netherlands and abroad;
- can perform scientific research independently;
- can formulate new research questions and write grant proposals
- is able to communicate with stakeholders in the society, and with the general public about his or her area of research;
- has insight into the various possibilities to develop his/her career according to personal interests.

### **Training programme**

<b>Name of the activity</b>	<b>Frequency</b>	<b>Credits</b>	<b>Organizer</b>
Exposure assessment in epidemiology	1x/yr	3.0	IRAS
Exposure assessment in toxicology	1x/yr	3.0	IRAS
Effects assessment in toxicology and			

environmental epidemiology	1x/yr	6.0	IRAS
Risk assessment and risk management	1x/yr	3.0	IRAS
Environmental and occupational epidemiology	1x/yr	3.0	IRAS
Advanced exposure assessment	1x/yr	1.5	IRAS
Exposure measurements	1x/2yr	1.5	IRAS
Molecular Epidemiology of Chronic Disease and the Exposome	1x/yr	1.5	IRAS
Journal club on environmental and occupational epidemiology	Continuous	0.5/yr	IRAS
Specialization courses in toxicology <a href="http://www.toxcourses.nl">www.toxcourses.nl</a>	1x/1-2yr	1.5-3.0	PET courses

## 16 Student representation

### 16.1 PhD Council

The PhD Council GS-LS consists of 14 PhD candidates who each represent one of the 14 PhD programmes. The PhD Council represents all GS-LS PhD candidates and aims to improve the quality of the education of the PhD candidates and the regulations related to their graduation. The PhD council meets once a month.

The GS-LS PhD council organizes an annual PhD day and bimonthly PhD events. They evaluate the quality of education, supervision and regulations once a year through a questionnaire that is sent out to all PhD candidates registered to the GS-LS. The results are subsequently presented to the Board of Studies. Three PhD events were organized in 2016, with topics ranging from 21<sup>st</sup> Century information management skills to The National Science Agenda. Though attendance varied, people generally rated the sessions as very useful.

### 16.2 Prout

[Prout](#) is the PhD Network of Utrecht University, run by a group of enthusiastic voluntary PhD representatives from all graduate schools of the university. Prout is an official organization whose main aim is to represent the interests of PhD candidates to the university, and to influence decision-making concerning PhDs. We keep PhD candidates informed about their position as a University employee, career development opportunities, and all other practical matters.

### 16.3 China UU Scholar Association (CUSA)

[CUSA](#) is an association founded by CSC PhD candidates in Utrecht. The Utrecht University has already hosted over more than 100 Chinese PhDs/researches, which is a non-negligible large community working and living in Utrecht. CUSA is the acronym of China-UU Scholar Association founded in 2014 April by several Chinese PhD candidates sponsored by CSC-UU scholarship. CSC-UU is a bilateral cooperative mechanism for the Chinese Scholarship Council and Utrecht University, aimed at improving the cooperative scientific research between China and the Netherlands.

### 16.4 The PhD candidates Network of the Netherlands (PNN)

[The PhD candidates Network of the Netherlands \(PNN\)](#) is the national organization that represents the interests of PhD candidates who work at one of the 14 Dutch universities, at one of the 8 University Medical Centers, or at one of the 5 research centers. The PNN has the following goals:

- to represent the interests of PhD candidates and comparable individuals on a national level;
- to coordinate and support the activities of the member organizations;
- to supply information to PhD candidates;
- to improve the quality of PhD research.

## 17 Facts & Figures

### 17.1 Utrecht University

- Founded in 1636
- 7 Faculties:
  - Geosciences
  - Humanities
  - Law, Economics and Governance
  - Medicine
  - Science
  - Social and Behavioural Sciences
  - Veterinary Medicine
- 6 Graduate Schools
- 4 Campuses
- Total number of staff members 6,300 (excluding Faculty of Medicine)
- Member of the [League of European Research Universities](#) (LERU), a partnership of Europe's top research universities including, inter alia, the universities of Oxford, Cambridge, Imperial College London, Heidelberg and Sorbonne-Paris

### 17.2 Education

- 30,000 students
- 2,500 international students
- 130 nationalities
- 2,000 PhD candidates
- Over 200 English taught courses
- The widest range of English-taught graduate programmes in the Netherlands
- Europe's largest academic summer school

### 17.3 Research in Life Sciences

- > 220 full professors
- 14 thematic PhD programmes
- 130 nationalities
- ± 1,700 PhD candidates, of which 20% international

### 17.4 International rankings

According to 2013 Academic Ranking of World Universities (Shanghai Jiao Tong):

- 52nd in the world
- 13th in Europe
- 1st in the Netherlands

## 18 Living in Utrecht and The Netherlands

### 18.1 Utrecht University

Information about Utrecht University can be found at its official [website](#). The [International Neighbour Group](#) organizes social activities for international staff at Utrecht University and is also a good source for information about living in the Netherlands.

### 18.2 Utrecht

Information about the City of Utrecht can be found at the official websites of the [City of Utrecht](#) or [The Netherlands](#).

### 18.3 The Netherlands

The names *The Netherlands* and *Holland* are synonymous. Information about the characteristics of the country can be found at the official website of [Holland](#). For Chinese students the website of [gogodutch](#) (in Chinese) has all the information you need.



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