



The Graduate School



Molecular Medicine – the challenge of the 21st Century

What is Molecular Medicine?

The discovery of microorganisms as the cause of infectious diseases and penicillin as an effective weapon to combat them revolutionized the field of medicine in the last century. Today, medicine is again going through a phase of radical change. It has become clear that the causes of many human diseases reside in the cells, namely, the genes and the proteins they produce. To broaden this knowledge and use it for the well-being of patients is the aim of the new interdisciplinary scientific subject of *Molecular Medicine*. Scientists working in the field of Molecular Medicine analyze the molecular mechanisms of the origin of diseases with the long-term goal of developing innovative diagnostic and therapeutic concepts and strategies. Their experimental findings are highly relevant for society since cardiovascular diseases, cancer and metabolic disorders, to name but a few, are deemed to be the major causes of death worldwide. Moreover, dementia, such as Alzheimer's Disease and other diseases linked to aging, will increase the costs for our health systems dramatically, especially in view of the dramatic demographic changes in population structure. Because of the significance of Molecular Medicine for modern society, the need to provide highly trained scientists is of immense importance.

PhD training in Molecular Medicine at Ulm University

Modern concepts in Molecular Medicine utilize interdisciplinary approaches that combine methods from the areas of molecular biology and genetics with those from informatics, mathematics, physics and engineering. In the past, PhD studies in Germany lasted many years and were marked by a strong dependency on one scientific supervisor. Today's training concepts are based on a well-structured and defined schedule with a broader approach to supervision. In October 2005, the Medical Faculty of Ulm University launched a three year doctoral training program entitled *International PhD Programme in Molecular Medicine*. The major aims of this program are:

- to improve graduate training by creating an active and motivating research environment
- to encourage graduates to perform independent scientific research by adopting a multilevel supervision and mentoring approach
- to steer graduate education by establishing a definitive program structure
- to advance graduate career opportunities in the academic world and in industry.

Our *International PhD Programme in Molecular Medicine* leads to the international degree of *Doctor of Philosophy* or the German degree of *Doctor rerum naturalium*. Each PhD student is assigned an interdisciplinary Thesis Advisory Committee (TAC) consisting of scientists from Ulm University and abroad to offer scientific advice from a wide range of perspectives. The graduates perform their research in the different institutes of Ulm University, and come together for common training activities and to attend optional courses organized by the Graduate School. During the three year program, the students complete two intermediate examinations before their TAC to ensure appropriate progress in their scientific project.

Training in clinical research

To strengthen the training of medical students in clinical research, the Graduate School also runs the program *Experimental Medicine*. In order to participate in this program, students of human medicine are obliged to interrupt their course of studies for nine months to work full time in a laboratory. During this period students are supported by a fellowship of the Medical Faculty and receive € 500 per month. Besides their lab work, doctoral students must attend seminars, prepare literature reports and give progress reports. It is expected that the quality of medical dissertations will increase significantly by means of this structured program designed for MD thesis work. At the same time, medical students are thus excellently prepared for PhD training.

Proven excellence

In 2006, the *Molecular Medicine* study programs at Ulm University were integrated into the newly founded *International Graduate School in Molecular Medicine Ulm*. One year later, the school's training concept received official recognition of its excellence through funding from the *Excellence Initiative* of the German federal and state governments amounting to € 1 million per annum for a period of five years. This *Excellence Initiative* was initiated in 2005 to grant competitive awards to the best performing German universities and has subsequently proved to be a great success for our Graduate School, the Medical Faculty and Ulm University.

Recently, our Bachelor, Master and PhD programs were accredited by the 'Central Evaluation and Accreditation Agency Hannover' (*ZevA, Zentrale Evaluations- und Akkreditierungsagentur Hannover*). This is yet another endorsement of the high scientific and educational quality of the programs we offer.





Promotion of Young Scientists

The Graduate School is committed to the promotion of young scientists and offers a variety of compatible programs in order to support and actively encourage young scientists.

The International PhD Programme in Molecular Medicine

(Speaker: Prof. Dr. M. Kühl, Institute of Biochemistry and Molecular Biology; www.uni-ulm.de/mm)

In October 2005, the Medical Faculty of Ulm University launched a three year doctoral training program entitled *International PhD Programme in Molecular Medicine*. This postgraduate course offers a structured doctorate in English. The course was accredited in March 2009. During their postgraduate course, doctoral candidates are monitored by a Thesis Advisory Committee (TAC). The TAC consists of scientists from Ulm University and abroad, and offers scientific advice from a wide range of perspectives. The graduates perform their research in the various institutes of Ulm University and come together for common training activities and courses organized by the Graduate School. Each student's coursework is calculated and accredited according to the European Credit Transfer and Accumulation System (ECTS). After having successfully defended their thesis, graduates opt to receive either the international academic title of PhD or the German academic title Dr. rer. nat. The opportunity for graduates to obtain the academic title of Dr. rer. nat. or PhD is a unique feature of the Medical Faculty and the Graduate School at Ulm University. This aspect will continue to make Ulm more attractive in the future and to strengthen its importance on an international level.

GRK 1041 Molecular Diabetology and Endocrinology in Medicine

(Speaker: Prof. Dr. B. O. Böhm, Department of Internal Medicine I; www.uni-ulm.de/grk1041)

The German Research Foundation set up the Research Training Group of Molecular Diabetology and Endocrinology in Medicine at Ulm University in July 2004. GrK1041 is run under the direction of the International Graduate School in Molecular Medicine Ulm. The aim of the multi-faculty research/training program is to convey theoretical and practical knowledge in the field of molecular diabetology and endocrinology for both students of human medicine and qualified natural scientists. This research/training program represents an outstanding platform for further training in clinical/experimental medicine with the main emphasis on endocrinology, diabetology and metabolic diseases, while at the same time conducting an individual research project under the guidance of a qualified person.

The research projects carried out in the research/training group 1041 include epidemiologically important and highly relevant problems in the fields of diabetology and endocrinology:

- Chronic hyperglycemia and its vascular complications
- Diabetes as an autoimmune disease
- Metabolic diseases and advanced aging
- Genetic basis of Type 1 and Type 2 diabetes and rare variants

Study Programme Experimental Medicine

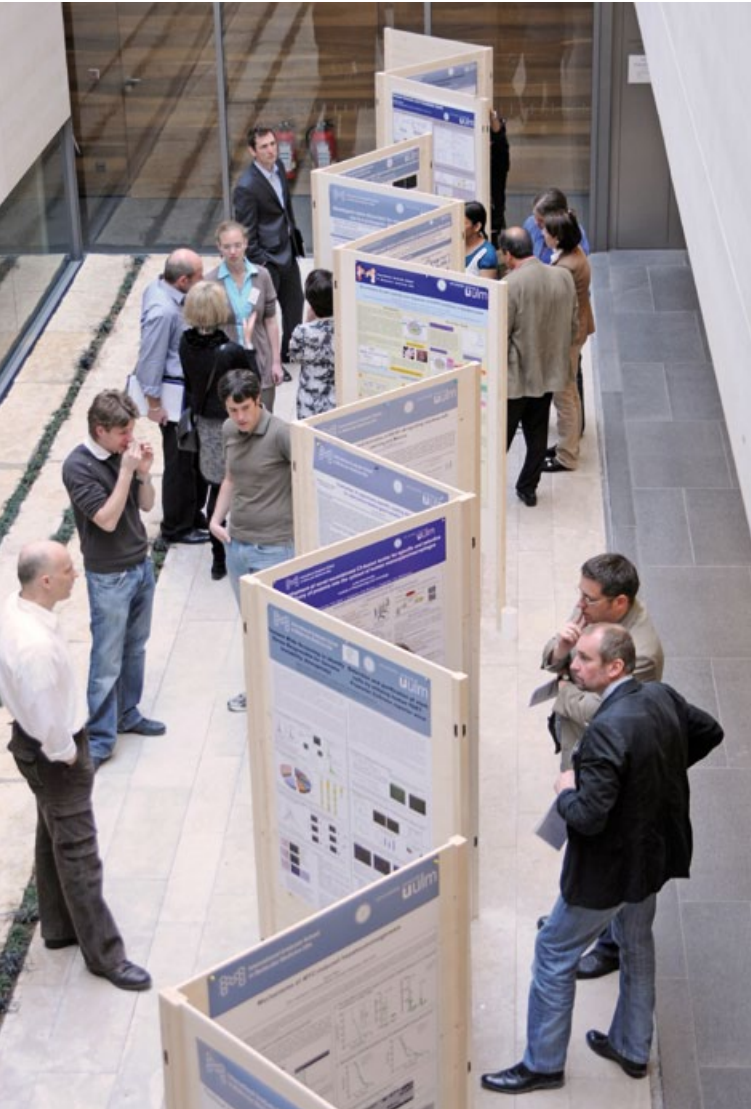
(Speaker: Prof. Dr. Th. Wirth, Institute of Physiological Chemistry;
www.uni-ulm.de/med/med-molmed/promotionsprogramm-experimentelle-medizin.html)

In 2005, in order to combat deficiencies in the supervision and quality of medical theses, the Medical Faculty implemented a structured training program entitled *Study Programme Experimental Medicine*, which was subsequently adopted by the Graduate School in 2009. The requirement for entry is an above-average intermediate examination (part one of the national medical licensing exam). Doctoral candidates must interrupt their studies in medicine for nine months in order to concentrate fully on their experimental work. The Medical Faculty and the Graduate School support this program with approximately 28 stipends yearly (€ 500 per month over 10 months). Doctoral candidates submit reports on their research work in the program's seminars in addition to giving presentations of up-to-date scientific literature in a *Journal Club*. As an option, students may attend part of the training programs offered by the International Graduate School in Molecular Medicine Ulm.



“Medical science is more than just being a “doctor”. Thus, successful therapy strategies have to be based on profound research. The Study Programme Experimental Medicine allowed me to concentrate on my work. Through my experimental thesis I gained a deep insight into physiology as well as into medical research procedures. While I was finishing my thesis, I also passed my last exams. At the moment I’m in my final year of medical school learning practical medical skills. The theoretical, the experimental and the practical parts – all three will be important to fulfill my duties in my upcoming residency.”

Susanne Albrecht studies human medicine at Ulm University and participated in the *Study Programme Experimental Medicine* from December 2007 till August 2008. In 2011 she received a doctoral award from the German Lung Foundation.



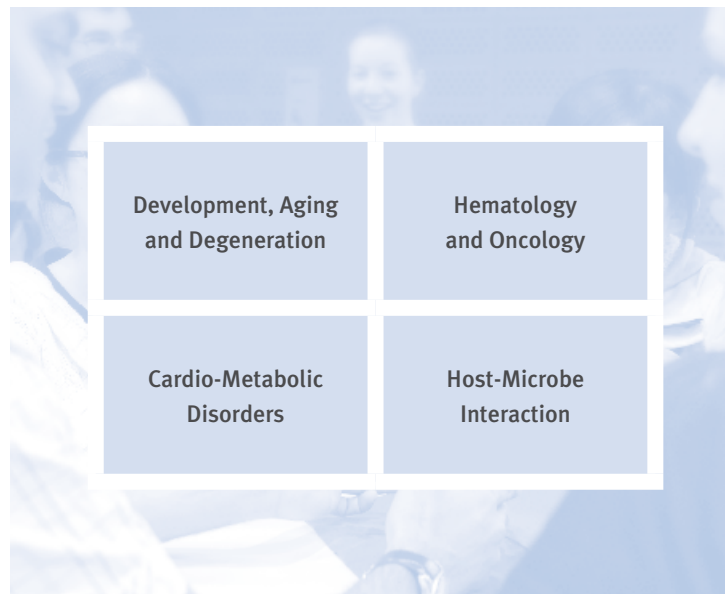
The Graduate School's Research Training Groups

From the beginning of their PhD studies, doctoral students are organized and trained in smaller, thematically focused Research Training Groups in order to concentrate on specific research areas in Molecular Medicine.

These Research Training Groups, based on the scientific topics particular to Ulm University, are defined by the Board of Directors and implemented at the International Graduate School in Molecular Medicine Ulm.

For each of the four Research Training Groups, two persons are responsible for organizing retreats, seminars and activities within their respective Training Group.

The four Research Training Groups are:





Graduates are actively integrated into the international scientific community.

Each year the Graduate School organizes international meetings where students deliver poster presentations and talks while at the same time having the opportunity to seek advice for their work from professional international scientists. We also hold scientific retreats where graduates can exchange ideas among themselves and with senior scientists within a relaxed atmosphere. Furthermore, our PhD students have the chance to attend meetings and conferences abroad with the financial support of travel grants from the Graduate School.

In order to prepare our doctoral candidates for the job market, we offer a variety of key competency seminars in such subjects as project management, bioethics, and patent law. In addition, we regularly organize career workshops and excursions to pharmaceutical companies.



“It was a good opportunity for me to be a part of the Graduate School which had PhD students from diverse fields of biology. The best part that I liked was that it funded me to attend international conferences during which I could present my work and discuss my project with experts in the field. I enjoyed working at Ulm University and now I am a postdoc at the prestigious Stanford University, working on protein trafficking. I will do my best to contribute a significant piece of work to this field and I plan to take up a post in academics in the near future.”

Ganesh Varma Pusapati is currently working as a postdoctoral research fellow at the Department of Biochemistry at Stanford University. He graduated in summer 2010.



Alumni

The Graduate School's alumni reflect the excellence and caliber of its students. Our alumni are part of a broad and diverse network that includes students from all disciplines and from all over the world.

Our alumni are invited to attend science meetings and seminars organized by the Graduate School. It has always been our aim to bring together former and current students in order to promote an enthusiastic doctoral culture at the Graduate School.



Careers

Our Alumni work in a variety of sectors. Below is a sample list of places where our former students are currently working:

- Cleveland Clinic, Department of Pathobiology, Cleveland, Ohio, USA
- Harvard Medical School, Immune Disease Institute and Children's Hospital Boston, Boston, USA
- Harvard Medical School, Regenerative Medicine Section of Harvard Stem Cell Institute, Boston, USA
- McGill University, Department of Biochemistry, Montreal, Quebec, Canada
- Stanford University School of Medicine, Psychiatry and Behavioral Science, Stanford, USA
- Stanford University School of Medicine, Department of Biochemistry, Stanford, USA
- University of Liège, Coma Science Group, Cyclotron Research Centre, Liège, Belgium
- University of Lund, Lund Center for Stem Cell Biology and Cell Therapy, Lund, Sweden
- German Cancer Research Center (DKFZ), Heidelberg, Germany
- ETH Zurich, Institute of Pharmaceutical Sciences, Zurich, Switzerland
- Baltech AG, Hallbergmoos/Munich
- Boehringer Ingelheim Pharma GmbH & Co. KG, Ingelheim, Germany
- Roche Deutschland Holding GmbH, Penzberg, Germany
- HiPP GmbH & Co. Vertrieb KG, Pfaffenhofen (Ilm)

Our free services include:

- Invitation to events at the Graduate School and Ulm University
- Use of the Career Service of Ulm University – free of charge for graduates up to two years after the completion of their studies
- Alumni email address for life



“Looking back at my time at Ulm, I realize that both the excellent graduate training there and the diligent supervision, without taking away the freedom to develop projects in my own ways and along with the opportunity to travel to international conferences, were key to my future career. I hope that one day my work will contribute to the development of research strategies to normalize function in individuals with synaptopathies.”

Andreas Grabrucker is currently working as a postdoctoral research fellow at the Department of Psychiatry and Behavioral Sciences at Stanford University. He graduated in fall 2009 with summa cum laude.



The Graduate School's Gender Equality Programs

At present, 67% of our doctoral candidates are female. To maintain this standard, special initiatives have been adopted for the benefit of female doctoral students, single parent doctoral students, doctoral students with children, and doctoral students during pregnancy.

Childcare Programs

In order to enable PhD students with children to pursue their work, the Graduate School provides financial support for childcare during meetings and conferences, stays abroad and for childcare services outside the regular business hours of daycare centers. We can also offer practical help in finding the right daycare center.

Technical Assistance

The Graduate School finances the employment of technical assistants to conduct experiments for students during pregnancy and maternity leave as regulated by law. This enables female students to continue their PhD work during and after pregnancy without the loss of precious time. This financing of technical assistants by the Graduate School is possible for a maximum period of one year.

Female Mentoring

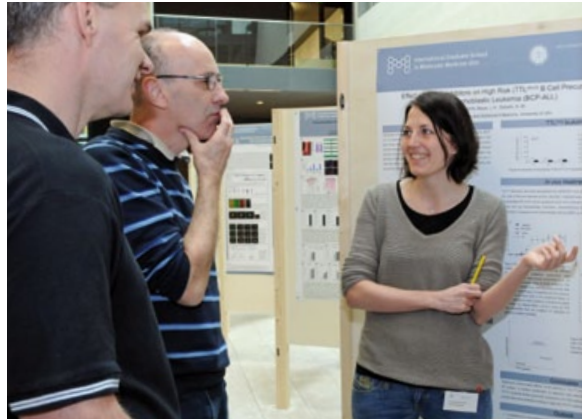
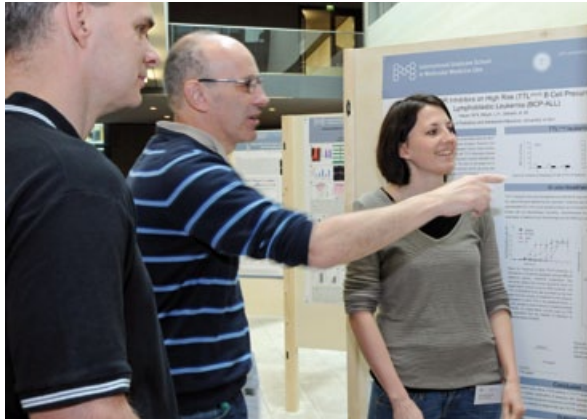
A Mentoring and Training program (*MuT*) enables our highly qualified female scientists to become acquainted with the ways and means of successfully tapping their career potential and exploring the opportunities available to them. It is there to support their personal development and assist in planning their careers.

Scholarships

Many institutions offer a variety of scholarships for female students and those with children. The Graduate School provides information regarding the possibilities of financial support and assists students in receiving these scholarships in order to alleviate the conflicting demands of studying and family life.

These numerous female scholarships have helped to increase the rate of future female professors. To contribute to this development, the Graduate School provides re-entry fellowships for doctoral students who may have had to interrupt their work due to maternity leave.





The Graduate School's Mentoring Programs

Scientific Mentoring

The training of outstanding researchers is the key task of the International Graduate School in Molecular Medicine Ulm. As mentioned before, our major aims in this respect are:

- Cutting-edge research training of young scientists
- Scientific independence and the self-responsibility of PhD students
- Improvement of employability through training in key competencies

Each doctoral student is supervised by a Thesis Advisory Committee (TAC), which is involved in ensuring interdisciplinary training and mentoring in research. Each TAC consists of three members:

- The group leader of the laboratory where the thesis work is performed
- A scientist from another institute of Ulm University
- An external reviewer, either from industry or from a research institute

Furthermore, a member of the School's Junior Faculty can be integrated into the TAC as an additional member.

The TAC supervises PhD students in their daily laboratory work to help them with formal or technical problems, and to evaluate oral examinations and their written dissertation. This multiple supervision approach supports the independence of our PhD students as young researchers.

Social Mentoring

Apart from their scientific training, our doctoral students are offered mentoring on different levels to facilitate their stay in Ulm and to help them concentrate fully on their academic performance in their chosen field of scientific research.

Our Coordination Office assists graduates with the organization of their studies within the *International PhD Programme in Molecular Medicine*, and of their study life in general.

This office is the first point of contact and assists applicants even before their first acceptance into the program, as well as throughout the period of their PhD studies up to their final graduation. It also advises on issues concerning visas, contracts, work permits, accommodation, and health insurance etc.

Each year the graduates elect two students to represent their interests on the various boards and committees of the Graduate School, and to act as their official contact concerning student issues.

M₄M – Mentorship for Molecular Medicine – is a social mentoring program that brings together doctoral students and seniors living in Ulm for mutual exchange and support. The idea behind the program is to give our international students a positive impression of everyday German culture through a variety of social activities, such as excursions, intercultural workshops and themed evenings. This personal contact and individual support gives students the opportunity to participate more easily in German society. Senior consultants support doctoral students even before their arrival in Ulm and help them to find their way during their first days and weeks in a new country. Regular meetings and personal contacts between PhD students and senior consultants help to develop an atmosphere of confidence and familiarity.

Female Mentoring

The Graduate School supports the participation in the *MuT*-Program, (Mentoring and Training Program) for junior female academics. *MuT* enables highly qualified female scientists to become acquainted with the ways and means of successfully tapping their career potential and of exploring the opportunities available to them. It supports their personal development and assists in planning their careers.





Additional Benefits for Students

Our program offers additional benefits for students. The most frequently requested programs include:

Mobility Program

In order to enhance the integration of our students into the international scientific community, the Graduate School offers a mobility program awarding financial support to students wishing to participate in meetings and engage in practical training. Students can obtain funding for short visits to national and international conferences and for long-term stays at laboratories lasting up to several months.



Doctoral Student Award

To motivate doctoral students and to honor extraordinary achievements, the Doctoral Student Award is presented once a year by the Graduate School.

Awards are conferred for exceptional research, as documented in publications or as talks given at international scientific conferences, and for the development and implementation of innovative novel methods. Interdisciplinary projects are given preferential consideration. Students are free to use this award for any purpose that helps to promote their career in the field of science.

Postdoc Fellowships and Programs

The Graduate School provides postdoctoral fellowships for a period of 3-6 months for outstanding doctoral students planning to apply for a postdoctoral academic position abroad. This is an important benefit since applications for postdoctoral fellowships are normally evaluated over a period of up to six months. Key competency courses also offer assistance in writing grant applications and have proved useful for those beginning a new postdoctoral career.

Social Activities

The Graduate School organizes regular social activities, e.g. summer and Christmas parties or sport activities (basketball, soccer and table tennis games etc.) to create a friendly atmosphere and foster a team spirit between doctoral students and supervisors.



“The interdisciplinary background of the program brought important new insights to my work and led to a collaboration with others that is still ongoing today, as well as opening doors to create various scientific networks. In addition, the training courses offered by the program equipped me well to further my scientific career. I think joining the International Graduate School in Molecular Medicine is a great opportunity for anyone aiming for a PhD and wishing to look beyond the end of their own nose!”
Meike Chevillotte has a postdoctoral position at the Rockefeller University in New York. She was Student Speaker of the *International PhD Programme in Molecular Medicine* Ulm and graduated in spring 2010 with *summa cum laude*. In 2009 she received the Doctoral Student Award of the Graduate School.



The Graduate School's International Networking

Scientific excellence not only depends on the outstanding performance of talented young researchers but also on the close cooperation with a worldwide network of renowned partner institutions. Consequently, the Graduate School is continually developing and maintaining scientific and research relations between Ulm and other higher educational and research institutes worldwide. Currently, the Graduate School closely cooperates with several international institutions, such as: the Tongji Medical School in Wuhan, China; the University of North Carolina at Chapel Hill, USA; the University of Padua in Italy; the Universities of Oxford, Cambridge, London and MRC Harwell; BioCenter Oulu, Finland; Bart's and Queen Mary's College in London; the Campus Bio-Medico University, Rome and the Universitat Autònoma de Barcelona.

Central elements of our internationalization strategy are the annual spring and fall meetings attended by speakers whose reputation is recognized internationally. A second important aspect is the promotion of international cooperation through various exchange programs and double degree agreements. In 2011, a new collaboration was initiated between the Graduate School and the OXION Ion Channels and Disease Initiative at the Universities of Oxford, Cambridge, London and MRC Harwell, with the aim of promoting joint training activities for PhD students. In 2010, the Graduate School was able to award Professor Hiromitsu Nakauchi, an internationally-renowned scientist in the field of stem cell research from the University of Tokyo, Japan, a visiting professorship. Furthermore, a joint PhD program with the University of Padua in Italy was also established.

Since its foundation in 2006, the Graduate School has worked in close cooperation with the following partner institutions:

Padua, Italy

In 2010, a joint PhD program with the University of Padua in Italy was set up. Doctoral students taking part in this joint program are supervised by Thesis Advisory Committees consisting of scientists from Ulm and Padua. The students spend a part of their studies in both Germany and Italy to achieve a double diploma that is recognized by both universities.

Oulu, Finland

The Biocenter Oulu in Finland represents our most longstanding international relationship and regularly invites students from the Graduate School to summer schools in Finland. Likewise, the Graduate School

shares the insights of its research in Germany to graduates in Finland by inviting them to attend meetings and visit our laboratories. Students in Germany and Finland also have the possibility of participating in practical training courses at either institution. Just recently, a range of joint PhD projects was agreed upon.

Wuhan, China

Each year the Graduate School organizes summer schools abroad with the ultimate goal of presenting Ulm-based research in order to increase the international visibility of the school and to recruit highly qualified PhD candidates. The first Summer School to be held at Houazhong University of Science and Technology/Tongji Medical College in Wuhan, China, took place in August 2007. The chosen topic of the fifth Summer School in Wuhan in 2011 was Cancer: From Molecules to Disease.

Chapel Hill, USA

The Graduate School has a partnership with the University of North Carolina at Chapel Hill, USA. PhD students from Ulm undertake joint scientific projects between Ulm and Chapel Hill, and complete a part of their studies at Chapel Hill.

Universities of Oxford, Cambridge, London and MRC Harwell, GB

Collaboration involving joint training activities for PhD students between the Graduate School and the OXION Ion Channels and Disease Initiative at the Universities of Oxford, Cambridge, London and MRC Harwell, began in 2011. Activities include joint lab courses and lab visits to learn novel techniques and to foster joint projects, as well as to allow students from both sides to participate in retreats and meetings.

A tri-national PhD program in Endocrinology has been established in collaboration with Bart's and Queen Mary's College (London), the Università Campus Bio-Medico di Roma (Rome), and the Universitat Autònoma de Barcelona (Barcelona).



