



dkfz.

GERMAN  
CANCER RESEARCH CENTER  
IN THE HELMHOLTZ ASSOCIATION

# HELMHOLTZ INTERNATIONAL GRADUATE SCHOOL FOR CANCER RESEARCH

 HELMHOLTZ  
| ASSOCIATION



# CONTENT

WELCOME.....	1
WINNING THE NOBEL PRIZE FOR CANCER RESEARCH .....	2
HELMHOLTZ ASSOCIATION.....	4
INTERNATIONAL COLLABORATIONS .....	5
CANCER RESEARCH AT THE DKFZ .....	6
CELL BIOLOGY AND TUMOR BIOLOGY .....	7
STRUCTURAL AND FUNCTIONAL GENOMICS .....	8
CANCER RISK FACTORS AND PREVENTION .....	9
TUMOR IMMUNOLOGY.....	10
IMAGING AND RADIOONCOLOGY .....	11
INFECTION AND CANCER .....	12
TRANSLATIONAL CANCER RESEARCH .....	13
HEIDELBERG – BRIGHT LIGHTS IN AN OLD CITY .....	14
JOINING GERMANY’S BEST UNIVERSITY .....	15
GRADUATE PROGRAM OUTLINE .....	16
SUPPORTING STUDENTS .....	18
THE PHD STUDENT COUNCIL .....	19
APPLICATION AND ADMISSION REQUIREMENTS .....	20





# WELCOME

Welcome to the Helmholtz International Graduate School for Cancer Research at the German Cancer Research Center (Deutsches Krebsforschungszentrum, DKFZ). Our international PhD program warmly invites you to consider applying to join its many distinguished scientists in cancer research.

The DKFZ is Germany's largest biomedical research institute and is a member of the Helmholtz Association of National Research Centers. More than 2,000 staff members, including 850 scientists, are engaged in researching the mechanisms of cancer and are working to identify risk factors. Their valuable work is the cornerstone for developing novel approaches in the prevention, diagnosis, and treatment of cancer. The German Federal Ministry of Education and Research provides 90 percent of the Center's basic funding; the remaining 10 per-

cent comes from the German state of Baden-Württemberg.

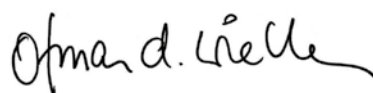
In Germany alone, cancer is the second most frequent cause of death. Each year, over 450,000 new cases are diagnosed and 270,000 deaths occur at the hands of this dreaded disease. Cancer constitutes a particularly challenging task for both research and clinical practice. It affects practically each and every organ in the human body. Each type of cancer has its own *modus operandi* and rules. The resultant changes in affected cells are highly complex.

In recent years, researchers at the DKFZ have been responsible for major advances both in basic research and in the development of novel methods for clinical application. These achievements received momentous recognition in 2008, when the Center's Professor Harald zur Hausen was award-

ed the Nobel Prize for Medicine or Physiology for his outstanding scientific contribution to the study of human papilloma viruses.

Perhaps you too would like to be part of this renowned organization, which is at the cutting edge of cancer research worldwide, and to work amongst leading scientists from the field. This brochure hopes to give you a taste of what life is like in our international PhD program. If you would like to join our scientific community after reading this brochure, we are looking forward to receiving your application.

Best wishes,



*Prof. Otmar D. Wiestler  
Scientific Director and Chairman  
of the DKFZ Management Board*





## WINNING THE NOBEL PRIZE FOR CANCER RESEARCH

In 2008, Professor Harald zur Hausen won the Nobel Prize for Medicine or Physiology for his groundbreaking work in establishing that viral infections can cause cervical cancer.

The story, however, began in the early 1970s, while zur Hausen was working at the University of Erlangen-Nuremberg, Germany, as chair of Clinical Virology. It was here that he isolated the papilloma virus genome from cervical cancer tissue samples. This led to his hypothesis that warts of the genital tract can be harmful and cause cervical cancer in some cases.

In 1977, zur Hausen took up the chair of Virology and Hygiene

at the University of Freiburg, Germany. Here, he continued his research on papilloma viruses with the help of his PhD students, Lutz Gissmann, Michael Boshart, Matthias Dürst and Hans Ikenberg. The aim was to identify the papilloma virus type responsible for cervical cancer. From 1982 to 1984, they succeeded in isolating two human papilloma virus (HPV) genomes from cervical cancer specimens: HPV16 and HPV18. Significantly, they also discovered that HPV18 was present in HeLa cells, the famous cervical tumor cell line used in research around the world since 1949.

In 1983, zur Hausen moved again, this time to the German Cancer Research Center as Scientific Director and Chairman of the Management Board until 2003. Despite the time-consuming task of directing the Center, his research on papilloma viruses continued. Elisabeth Schwarz joined his group and succeeded in identifying residues of the dangerous E6

and E7 virus genes in human cells. She found that the viruses were able to invade healthy human cells and cause them to proliferate uncontrollably, i. e. become cancerous. This important discovery led to the idea that it may be possible to use this infective property of the viruses to create a vaccine protecting against HPV16/18 in cervical cells.

In a related development at the beginning of the 1990s, zur Hausen's former students, Gissmann and Dürst, made waves in the United States. Together with other scientists from the American National Institutes of Health, they succeeded in developing a method to produce a non-infectious protein component of the HPV16 virus capsule in large quantities. These particles formed the basis of the subsequent vaccine – available since 2006 – which has been proven to prevent infection from HPV16 and HPV18 and therefore protect against cervical cancer.



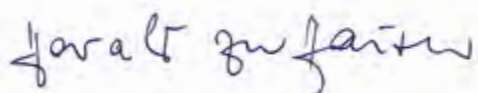
## GREETING

During more than two decades at the German Cancer Research Center, I have seen the institute improve in terms of quality of research, infrastructure and caliber of scientific staff. I am convinced that the research carried out here by some of the world's best scientists has made the Center deserve its place at the very forefront of cancer research worldwide.

At the Center's core are its young scientists. Its new international PhD program recognizes that doctoral students make an important contribution to the Center's achievements and encourages you to apply to join their ranks. If successful, you will take up a place in a community where cross-

disciplinary research is the order of the day, where like (and very able) minds engage in cutting-edge work to discover the many facets and nuances of a disease that has been in existence since the evolution of man.

As to the important role students play in the Center's work, I can vouch for this from personal experience. During my own research into infectious agents, which led to the discovery of cancer-causing human papilloma viruses, three of my students at the time, Lutz Gissmann, Matthias Dürst and Michael Boshart, made significant contributions.



*Professor Harald zur Hausen  
2008 Nobel Prize Laureate for Medicine or Physiology  
Former Scientific Director and Chairman of the Management  
Board of the Deutsches Krebsforschungszentrum (German Cancer  
Research Center), 1983-2003*





The DKFZ is a proud member of the Helmholtz Association of German Research Centers. This association is Germany's largest scientific organization and has an annual budget of approximately 2.4 billion euros. The German federal and state authorities provide about 70 percent of its total budget. The 15 research centers belonging under the Association's umbrella employ 28,000 people, including over 4,000 graduate

students, and are legally independent bodies. These centers are equipped with state-of-the-art equipment, including large-scale scientific facilities and instruments that are only to be found on their sites.

The Helmholtz Association stands for cutting-edge research, the goal of which is to contribute significantly to solving the greatest challenges facing science, society and industry. Its research focuses on six fields: energy; earth and environment; health; key technologies; structure of matter; aeronautics, space and transport. Networks play a key role and Helmholtz scientists work with each other and external partners across disciplines, organizations and Germany's borders.

## Outstanding scientist

The Association is named after Hermann von Helmholtz, a distinguished natural scientist of the 19<sup>th</sup> century. Von Helmholtz was one of the last truly universal scholars, specializing in a natural science that bridged the fields of medicine, physics and chemistry. His groundbreaking work brought together theory, experimental and practical applications. He was the founder and first president of the Physikalisch-Technische Reichsanstalt (PTR), considered to be the world's first scientific research institution outside the university sector.

## Beginnings...

The Helmholtz Association was formed in 1958 as a working committee for administrative and operational affairs in German reactor control stations. Initially, the goal was to exchange experiences relevant to operational and safety issues. During the next 40 years, this loose community of research centers expanded to discuss other issues such as

Energy



Structure of Matter



Key Technologies



Health



Earth and Environment



Aeronautics, Space and Transport



patent management, strategy and other areas of research. In 2007, the Association's scientific research resulted in 12,617 scientific publications. During the same year, more than 4,000 foreign scientists came to its centers to do research. Transferring scientific knowledge into innovation and then to the market is something that the Association excels at. Some 400 new patents are registered every year and there are currently more than 2,500 joint projects with industry.



## INTERNATIONAL COLLABORATIONS

In addition to working with other research centers of the Helmholtz Association, the German Cancer Research Center has collaborations with numerous international institutions and organizations across the world. These ties stretch across Europe, Asia and America, bringing cancer specialists together regardless of their geographic location.

One of the oldest of these partnerships is with the Israeli Ministry of Science, Culture and Sport. This recently celebrated its 30<sup>th</sup> anniversary after commencing in 1976 with three projects. It enables laboratory collaborations in both Germany and Israel, as well as the exchange of know-how

and expertise. More than 1,000 papers emanating from nearly 140 joint projects have been published throughout the alliance's existence and joint research schools for PhD students take place annually.

Other long standing international collaboration partners include the MD Anderson Cancer Center in Houston, USA, the National University of Singapore and the Weizmann Institute of Science in Rehovot, Israel. These partners add to local collaborators, such as the European Molecular Biology Laboratory (EMBL) and the Max-Planck Institute for Medical Research.

Students are encouraged to participate in collaborations

with other universities and research institutes, through, for example, short-term research exchanges, workshops and summer/winter schools.



# CANCER RESEARCH AT THE DKFZ

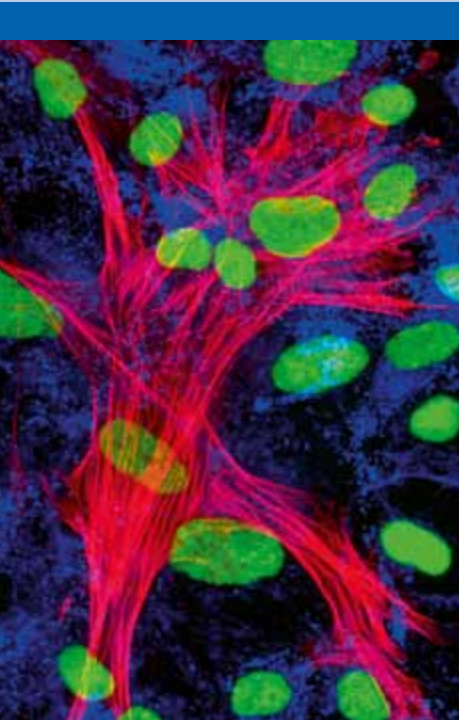
The long-term goal of the German Cancer Research Center is to unravel the causes and mechanisms of cancer development and, based on new insights, to develop novel tools for diagnosis, early detection, treatment and prevention. We build on outstanding basic biomedical research, an evaluation of complex systems (systems biology), as well as efficient platforms for the translation of new findings from “bench to bedside”.

Based on these three key competences the research divisions and groups of the German Cancer Research Center are organized into seven Research Programs:

- A. Cell Biology and Tumor Biology
- B. Structural and Functional Genomics
- C. Cancer Risk Factors and Prevention
- D. Tumor Immunology
- E. Imaging and Radiooncology
- F. Infection and Cancer
- G. Translational Cancer Research

Contributions from many disciplines, an excellent research infrastructure and systematic interactions among the research groups of the Center provide a strong framework for our projects.

The following pages give a brief overview of the research carried out in each of the Research Programs. For more information about the research interests of the divisions and groups within each program, please check our website: [www.dkfz.de/research](http://www.dkfz.de/research)

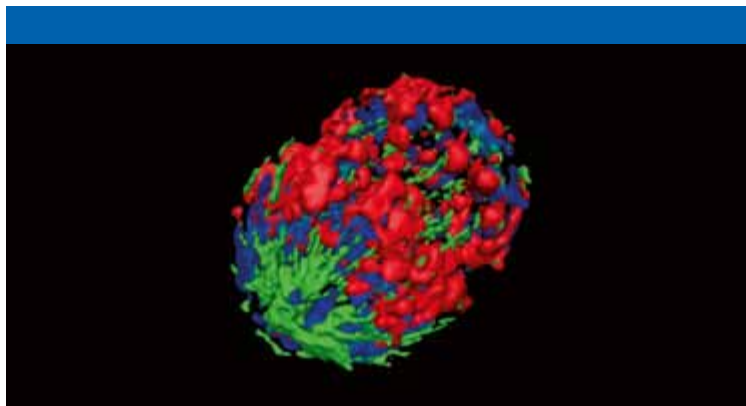




## CELL BIOLOGY AND TUMOR BIOLOGY

Every cancer originates from an individual cell. If its genetic material has undergone a number of changes that can no longer be corrected, then the cell breaks out of the sophisticated balance of growth and renewal and starts to proliferate uncontrollably. Thus, to develop new approaches in cancer treatment, we need to understand the complex processes occurring within cells and their interactions with neighboring cells and their environment.

The research divisions and groups involved in this Research Program study the mechanisms of cell differentiation, i. e. how cells specialize into the various types of differentiated cells and tissues



with their specific tasks. To do so, researchers primarily use methods of cell and molecular biology and genetically modified animal models. A focus of their research is the regulation of cell-type specific proteins and their functions. In addition, researchers are investigating changes in the genetic material that cause or promote tumor development.

### Selected Publications

IFN alpha activates dormant haematopoietic stem cells in vivo. Essers, MAG et al., *Nature* 458 (7240) 904-908 (2009).

Wnt induces LRP6 signalosomes and promotes dishevelled-dependent LRP6 phosphorylation. Bilic, J et al., *Science* 316 (5831) 1619-1622 (2007).

Angiopoietin-2 sensitizes endothelial cells to TNF-alpha and has a crucial role in the induction of inflammation. Fiedler, U et al., *Nature Medicine* 12 (2) 235-239 (2006).

**Anna Postepska,  
Poland**

*„The style of work at the DKFZ is very exciting because the labs are very well equipped and the only factors that limit you are time and your own ideas. The day is only 24 hours long and sometimes I wish it was at least twice as long.“*

*I am lucky to work with a supervisor who is really open to my ideas, even though I am a PhD student. This is very exciting as whatever idea I come up with, no matter how expensive it is, if it is reasonable, my supervisor will find a way to realize it.*

*Once, for my project, it was necessary to conduct genome-wide sequencing, which is quite expensive. We had never used this approach before, so I was the first person to prepare material for this sequencing.*

*This is really great and is something that I would never have been able to achieve doing a PhD elsewhere.“*



# FUNCTIONAL AND STRUCTURAL GENOMICS

**Valentina Kovaleva,  
Russia**

*„It was not a difficult decision to come here. I was interested in the reasons why people got cancer, as I had relatives, who suffered from breast and stomach cancer. Therefore, I would like to find out how likely it is that I or my children will get cancer.*



*I always wanted to work in cancer research with patient materials and to do applied research, which could be used in hospitals. I want to be able to see my results helping patients in three to five years.*

*During my PhD I have also been a member of the five-strong PhD student council, which is elected for a period of one year. Overall, my experience as a foreign student has been very positive, especially as there are a lot of other students from abroad working here.“*

Cancer occurs when genes in a cell are changed in such a way that they cause the cell to divide uncontrollably. For this to happen, however, a multitude of specific changes have to coincide. It is the task of this Research Program to analyze the genome – the complete set of genes – to lay the foundation for developing new diagnostic and treatment methods. This involves mapping the genome, localizing genes within the genetic material and investigating the functions of cancer-relevant genomic areas.

The vast amounts of data accumulated in the process are captured and evaluated using bioinformatic methods. By combining approaches from mathematics, statistics, physics, and computer sciences with computer-assisted simulation techniques, the theoretical groups of this Program are bridging the gap to experimental research. The methods developed within the Program are being used directly in many areas within collaborations with numerous divisions and research groups of the Center. Some examples are molecular and genomic investigations of the structure of genetic material, cancer documentation, medical imaging, and biostatistical evaluations of experimental and clinical data.



### Selected Publications

Experimental evidence for the influence of molecular crowding on nuclear architecture. Richter, K et al., *Journal of Cell Science* 120 (9) 1673-1680 (2007).

Combinatorial synthesis of peptide arrays onto a microchip. Beyer, M et al., *Science* 318 (5858) 1888 (2007).

Secretion of Wnt Ligands requires Evi, a conserved transmembrane protein. Bartscherer, K et al., *Cell* 125 (3) 523-533 (2006).

# CANCER RISK FACTORS AND PREVENTION

**Jittiporn  
Chaisaingmongkol,  
Thailand**

This Program is concerned with identifying risk factors (primary prevention), early detection (screening), and approaches to prevent disease progression (chemoprevention). The German Cancer Research Center occupies a leading position in the area of epidemiological studies as well as in nutrition sciences, biostatistics, and the application of biomarkers, characteristic biological features that are key to the diagnosis or prognosis of cancer. It may be possible to prevent up to 30 percent of new cancer cases within the next 20 to 30 years. To reach this goal, the main activities of this program are focused on:

- integrating laboratory research, epidemiology, and clinical studies
- compiling and extending collections of biological samples and databases
- integrating genome, proteome, and biomarker research into epidemiological and clinical studies on the causes and prevention of cancer
- studies to identify causal connections such as between diet and cancer
- educational measures
- research and quality control related to tests and early detection programs
- characterizing new drugs for cancer prevention
- research in the fields of biostatistics and methodological counseling.

## Selected Publications

Downregulation of death-associated protein kinase 1 (DAPK1) in chronic lymphocytic leukemia. Raval, A et al., *Cell* 129 (5) 879-890 (2007).

Genome-wide association scan identifies a colorectal cancer susceptibility locus on 11q23 and replicates risk loci at 8q24 and 18q21. Tenesa, A et al., *Nature Genetics* 40 (5) 631-637 (2008).

P53 gain-of-function cancer mutants induce genetic instability by inactivating ATM. Song, H et al., *Nature Cell Biology* 9 (5) 573-580 (2007).



*„I have been in Germany for ten years now, two years of which at the DKFZ. I am working on how DNA repair is regulated by epigenetics in tumors.*

*What I really like about the research here are the good facilities. You have great, state-of-the-art equipment to do your work and the cooperation between groups at the DKFZ is marvelous.*

*When I talk to friends at universities, they complain about in-house politics, whereas people here are more open-minded. I made the choice to come to the DKFZ and it's great.*

*I do not feel like a foreign student, although I was born in Thailand. I speak German fluently and consider myself a German with an Asian appearance. I have even taken on many German characteristics and people sometimes forget that I did not grow up in Germany.“*



**Markus Brechmann,  
Germany**

*„Scientifically speaking, I was interested in molecular signaling in immunology and wanted to combine my interest in basic signaling mechanisms with cancer research, hence translational immunology. This meant that the international PhD program at the DKFZ was a perfect match for me.*

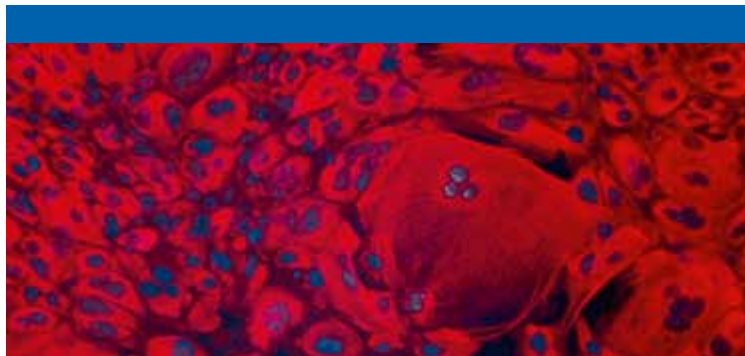


*The Division of Immunogenetics, where I work, has a flat hierarchy. There are a lot of people, with whom you can talk about any problem you might have. We have very close mentoring and great supervision. The supervision is not formal and quite personal. It is just fun being in the lab. I would say we have an outstanding working atmosphere and I really like it at the DKFZ.*

*There are a lot of social activities around and connected to the lab. We don't just meet at work but also at weekends for a beer or to go to the cinema or a party. I feel very settled in Heidelberg.”*

## TUMOR IMMUNOLOGY

The immune system is our body's most powerful weapon to combat pathogens and cancer cells. However, tumor cells have a repertoire of tricks to evade the immune response. The divisions and research groups of this Program investigate the mechanisms regulating the behavior of immune cells. Research focuses on cell proliferation and programmed cell death (apoptosis), as well as on the activation and regulation of immune cells. Also under investigation are cancers affecting the immune system itself. The aim is to better understand the role of the immune system in cancer, AIDS, and autoimmune diseases.



Other working areas include investigating the connections between natural (innate) and adaptive (acquired) immunity and the resistance of tumors to treatment. The findings will be translated into new approaches for clinical application to utilize the potential of the immune system for fighting cancer.

### Selected Publications

An efficient and versatile system for acute and chronic modulation of renal tubular function in transgenic mice. Traykova-Brauch, M et al., *Nature Medicine* 14 (9) 979-984 (2008).

CD24 affects CXCR4 function in pre-B lymphocytes and breast carcinoma cells. Schabath, H et al., *Journal of Cell Science* 119 (2) 314-325 (2006).

# IMAGING AND RADIOONCOLOGY

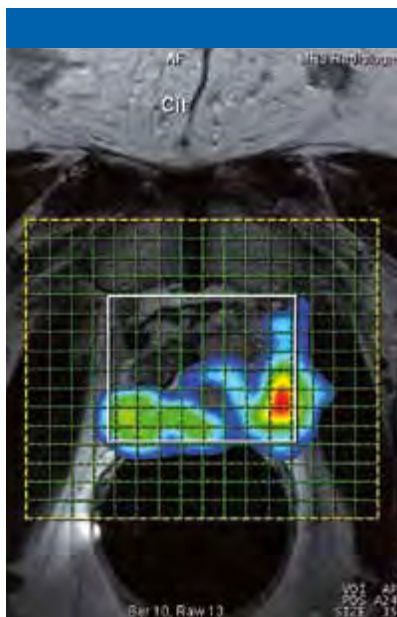
It is the task of this Program to introduce new findings, methods, and technologies to the diagnosis and treatment of cancer. The goal is to tailor tumor treatment to the individual patient and to improve possibilities for local and systemic tumor control. This multidisciplinary Program is divided into two research areas: radiological oncology and medical oncology.

## Radiological Oncology

Work is centered on the development of novel approaches in diagnostics and therapy, based on physical methods. The main research areas are technologies within the fields of imaging and radiation therapy. The subject's complexity requires collaboration among scientists from various disciplines: physicists, mathematicians, computer scientists, engineers, chemists, and biologists.

## Medical Oncology

This area is concerned primarily with questions of toxicology, pathology, and chemotherapy, as well as approaches in gene therapy. The aim is to develop novel systemic diagnostic and therapeutic methods and to immediately transfer these into a clinical setting. This is achieved through intensive collaboration between the fundamental research divisions and groups of this Program and the Clinical Cooperation Units of the German Cancer Research Center.



## Selected Publications

Vascular normalization in Rgs5-deficient tumours promotes immune destruction. Hamzah, J et al., *Nature* 453 (7193) 410-414 (2008).

STED microscopy reveals that synaptotagmin remains clustered after synaptic vesicle exocytosis. Willig, KI et al., *Nature* 440 (7086) 935-939 (2006).

Molecular ultrasound imaging of early vascular response in prostate tumors irradiated with carbon ions. Palmowski, M et al., *Neoplasia* 11 (9), 856-863, (2009).

**Matthias Reuss,  
Germany**

*„The aim of my thesis is to combine the advantages of light microscopy, primarily in live cell imaging, with the high resolution that electron microscopy offers. What is exciting about this area is that it is really cutting edge, and so at the forefront of what is happening in science and light microscopy.“*



*As for the multi-disciplinary approach at the DKFZ, this can really help. For example, we do light microscopy but we are physicists, so we don't always know about how we can best apply it. That's why we collaborate with cell biologists who explain problems, to which we can find answers together.*

*The DKFZ cares about getting the very best students. This provides an environment where you can flourish as you are among very good scientists.“*

## INFECTION AND CANCER

**Rodrigo Mora,  
Costa Rica**

*„When I was in school, some people around me died from cancer; a close family lost the father and a daughter within a year, and I lost a good friend.*

*In my country, I found medicine limiting as you only apply the research of others. I wanted to do something else to make*



*things better for cancer sufferers. That is exactly why I am here. It's idealistic but I am still sticking to this original plan!*

*I always prefer to work efficiently. This means that when you have some results, you stop and consider what you have, taking your time to do so and not allowing anything to detract from your motivation.*

*The Division of Tumor Virology was where I could combine what I had learnt in clinical microbiology with cancer research. The DKFZ has a nice working atmosphere and it's easy to make lots of friends. As a member of the PhD student party team I help organize the parties where I get to know a lot of the other graduate students."*

Viruses play a crucial role in a number of cancers. This Program investigates the mechanisms through which viruses cause cancer and the ways in which the body defends itself against viruses. In addition, researchers are isolating and characterizing unknown viruses from tumor material. Special attention is placed on the diagnosis, prevention, and treatment of such viral infections. Scientists are also working on methods that use viruses to selectively kill cancer cells or as vehicles for introducing therapeutic agents into cells.

The current focuses of tumor-virological research include:

- Papilloma viruses and their role in cancers of the genital organs, the mouth and throat, and the skin
- Parvo viruses as direct inhibitors of tumor growth and as gene vectors for cancer treatment
- Retroviruses (HIV, spuma viruses) for developing specific therapies
- Anello viruses (TT viruses) and their effect on the host cell genome
- Herpes viruses (Epstein-Barr virus) in the development of malignant tumors and as gene vectors for cancer therapy.

### Selected Publications

A specific signature of Merkel cell polyomavirus persistence in human cancer cells. Hausen, HZ, *PNAS* 105 (42) 16063-16064 (2008).

Intranucleolar sites of ribosome biogenesis defined by the localization of early binding ribosomal proteins. Krueger, T et al., *Journal of Cell Biology* 177 (4) 573-578 (2007).

The von Hippel-Lindau tumor suppressor protein controls ciliogenesis by orienting microtubule growth. Schermer, B et al., *Journal of Cell Biology* 175 (4) 547-554 (2006).



## TRANSLATIONAL CANCER RESEARCH

This Program is composed of two divisions, Translational Oncology and Preventive Oncology, both of which are located at the National Center for Tumor Diseases (NCT) Heidelberg and equipped by the German Cancer Research Center. Under its umbrella are the Clinical Cooperation Units, which are operated jointly with the University Medical Schools of Heidelberg and Mannheim. The Program also includes a number of other divisions and research groups of the Center that are engaged in translational research.

The program has three main objectives:

- Supporting the preclinical research of the Center's translational research portfolio
- Offering centralized services for the effective preparation and realization of investigator-initiated trials and basic research projects with patient material
- Facilitating patient access for systematic clinical implementation of phase I to IV trials, in collaboration with the University of Heidelberg.

Great importance is attached to creating a solid infrastructure, such as obtaining patient material through systematic tumor and serum banking (biobanking), developing regulatory clinical protocols by trial physicians and validated laboratory investigations accompanying trials, as well as biostatistical support and evaluation. The goal is also to speed up implementation in clinical research by overcoming the greatest obstacles that arise between the laboratory workbench and the hospital bed.



### Selected Publications

Yes and P13K bind CD95 to signal invasion of glioblastoma. Kleber, S et al., *Cancer Cell* 13 (3) 235-248 (2008).

Genomic instability and myelodysplasia with monosomy 7 consequent to EVI1 activation after gene therapy for chronic granulomatous disease. Stein, S et al., *Nature Medicine* 16 (2) 198-204.

Effective gene therapy with nonintegrating lentiviral vectors. Yanez-Munoz, RJ et al., *Nature Medicine* 12 (3) 348-353 (2006).

### William Aaron Grandy, Canada

*I am studying the development of the kidney and how carcinomas develop in this organ. I work with three different institutes in the immediate area around Heidelberg, which is really rewarding. I have three supervisors; my main supervisor is at the DKFZ. One is from EMBL, and the other is at a clinic in*



*Mannheim, who is my kidney and statistics expert. This means having not just one view of your topic but three.*

*You meet a wide variety of people, from maybe 30 or 40 different nationalities, at the DKFZ student parties. This is really great. I come from a place in Canada that is not so mixed, an island on the eastern coast called Newfoundland. When I came here, it was a nice change. I never knew people from Russia or South Africa before but now I have friends from there and all over the world."*

# HEIDELBERG – BRIGHT LIGHTS IN AN OLD CITY

Heidelberg combines the best of many worlds. Its historic old town transports visitors immediately back into the Middle Ages with its narrow lanes and ancient buildings. Flanked by hills and lush forests, there is plenty to tempt nature-lovers. The gateway to Heidelberg's medieval core is the unmistakable Old Bridge, with its two towers, also known by its official name, the Karl Theodor Bridge. This landmark's nine sandstone arches straddle the Neckar River, whose banks or Neckarwiese attract both locals and tourists alike to while away time.

## Landmark castle

Overlooking the Neckar and forested hills are the majestic ruins of the Heidelberg Castle. It is thought that the oldest part of this edifice was built in 1400 when what was originally a fort was extended to build a castle. Over the next two centuries, the castle underwent further expansion in

both medieval and renaissance styles, until it was sacked and destroyed by the French at the end of the seventeenth century. Karl Theodor, the Prince Elector, rebuilt the palace at the end of the eighteenth century but shortly afterwards lightning destroyed the buildings. The ruins have since inspired many a poem and song and were especially popular with the German Romantic literary movement of the nineteenth century.

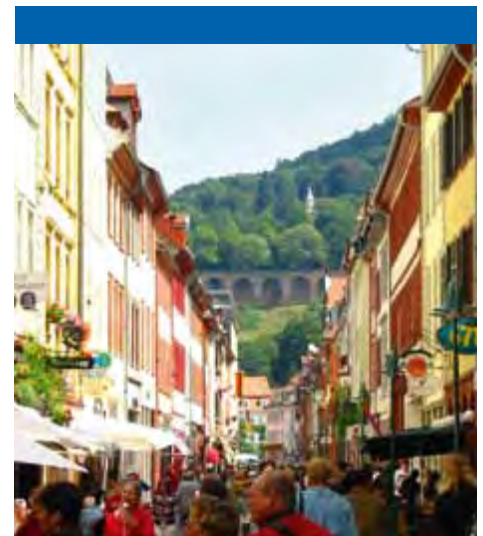
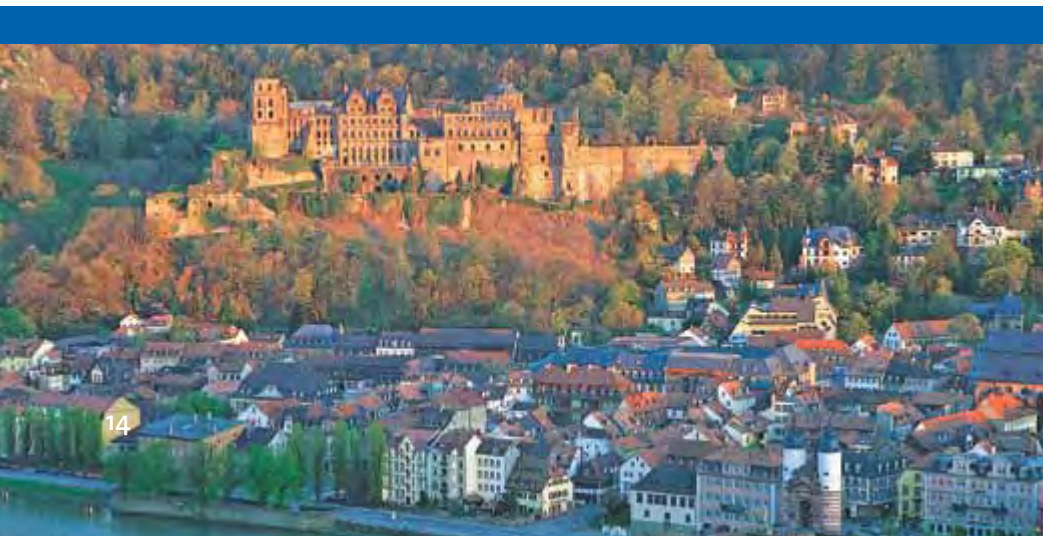
## Contemporary highlights

Heidelberg has much to offer the modern-day visitor, including an enviable cultural palette, ranging from theater and music to film festivals, and even its own beers. Thanks to the presence of many international companies in the region and quality research faculties belonging to the University of Heidelberg, the city is a magnet for cosmopolitan individuals from multicultural backgrounds.

## Scientific hub of excellence

Last but not least, Heidelberg is very much a modern city, which prides itself on being at the cutting edge of scientific research. The DKFZ is located in the Neuenheimer Feld, one of the largest biomedical campuses in Germany. This site also hosts the science faculties of Heidelberg University, as well as the University hospital and other research departments. Some of the DKFZ buildings are located in a thriving biotechnology hub, known as the Technology Park. Also close by are other DKFZ collaborators, the European Molecular Biology Laboratory (EMBL) and the Max-Planck Institute for Medical Research.

And all this in a town with a population of nearly 140,000, more than 20 per cent of whom are students. You do the math and don't just take it from us – come and see for yourself.







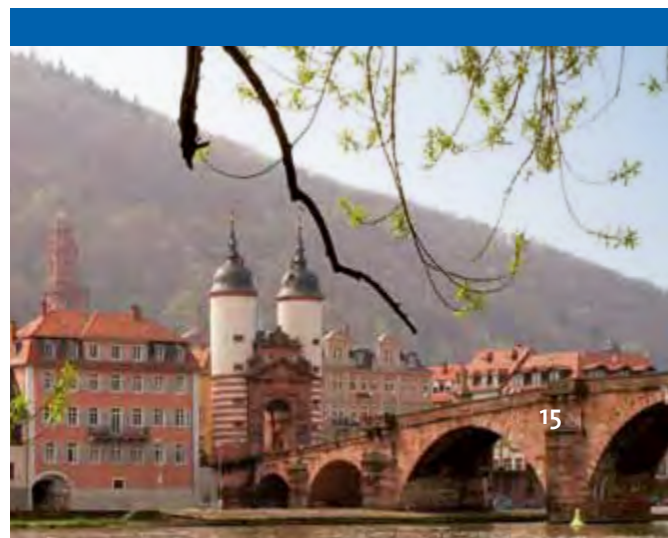
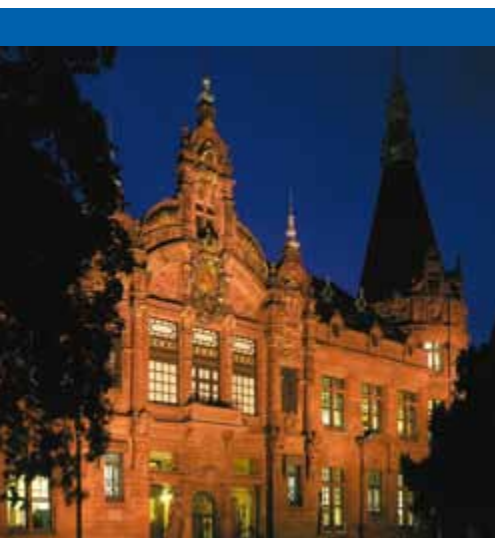
## JOINING GERMANY'S BEST UNIVERSITY

As participants of the international PhD program, you join a thriving community of postgraduate students on the DKFZ site. You will also have formal and informal access to the wider student community in Heidelberg. All entrants to the Helmholtz International Graduate School for Cancer Research must register with a university. Most DKFZ graduate students opt for the University of Heidelberg, one of Germany's oldest and most distinguished universities. This provides a gateway to a world of extra benefits, including access to lectures arranged by the University departments as

well as nation and worldwide student discounts and the right to use university sport facilities at a greatly reduced price.

As one of Germany's oldest universities, Heidelberg has an unparalleled reputation when it comes to excelling at academics. In 2008, it was named the top university in Germany by the Times Higher Education-Quacquarelli Symonds (THE-QS) World University Rankings. With its 625<sup>th</sup> birthday in 2011, the establishment has more than 400 professors, some 3,500 non-professorial staff and over 25,000 students. Its

medical and science faculties are the DKFZ's neighbors in the heart of the Neuenheimer Feld. The University is also part of the CellNetworks national cluster of excellence of which the DKFZ is also an active member. For more information about this seat of learning, take a look at its web site at: [www.uni-heidelberg.de](http://www.uni-heidelberg.de).







## GRADUATE PROGRAM OUTLINE

### Funding

The typical duration of the PhD program is three years. During this time, students are funded by DKFZ stipends or third-party fellowships. These salaries are competitive by national and international standards. All graduate students at the DKFZ are enrolled at the Helmholtz International Graduate School for Cancer Research, regardless of how they are funded.

### Supervision

Group leaders and division heads supervise students. A Thesis Advisory Committee (TAC) – personal to each student – provides further support. This TAC consists of their supervisor and at least two other senior scientists, one of

whom is external to the DKFZ. TAC meetings take place once a year, where the students are expected to prepare short written reports and give presentations of their work. The purpose of the TAC meetings is to monitor the student's progress, offer feedback on research already conducted and discuss future plans and any other issues, which might be relevant to the student's work.

### Degree

Once you have finished your PhD you are granted your degree by the university with which you initially registered. The degree you are awarded depends on your area of research and your university faculty. This is, of course, dependent on having attended the

necessary courses and having completed and defended your thesis successfully.

### Course Program

An important feature of the Graduate School is the course program. Students attend scientific and non-scientific courses and lectures and participate in additional activities. This encourages students to broaden their horizons, while learning valuable skills for their future career.

Participation in the following activities is required, however there remains a lot of flexibility to allow students to tailor their education to meet their own needs and interests.



### *PhD Initial Course*

All new PhD students are invited to join the one-week PhD Initial Course, where they attend seminars giving an overview of the DKFZ, visit the core facilities and take part in a team-building event. This is a great chance not only to get to know the DKFZ but also to meet other new PhD students.

### *Progress in Cancer Research Lecture Series*

Often it's easy to get so involved in your own research project that you lose sight of the big picture. This lecture series, which takes place once a week during semester time, is designed to give every student an overview of the current state of cancer research.

### *Active Participation in Seminar Series*

An important part of PhD training is learning to explain your research to other scientists. Therefore, students are required to present their work regularly in larger division seminars.

### *PhD Retreat*

Organized for PhD students by PhD students, this is a great chance to take a step back from the lab bench and find out what your colleagues are working on. For more information, see page 19.

### *International Conference*

Every student must also participate (with either a poster or talk) in an international conference. Students often have the opportunity to travel to conferences abroad, but with so many scientific institutes in and around Heidelberg, you'll also find excellent international conferences taking place locally.

### *Scientific and Soft-Skills Courses*

While working at the bench will form the main part of your PhD, it is important that you gain the additional skills required to complete your PhD. Students therefore collect credit points by attending scientific and soft-skills courses, such as "Confocal microscopy", "Scientific writing" or "How to present in English". Many such courses are organized by the DKFZ, but students are also encouraged to attend externally-organized courses.

### *DKFZ PhD Poster Session*

Every year there is a large PhD poster presentation, organized in the same style as those at scientific conferences, where students have the chance to present their work and get feedback from other students and scientists, in addition to finding out what other students at the DKFZ are working on.



### *Additional Activities*

There are many other activities supported by the Graduate School, for example participation in summer schools, student-led activities, English or German language classes, teaching responsibilities... the list goes on...



# SUPPORTING STUDENTS

## Graduate Program Office

Student welfare at the DKFZ has top priority. There is a dedicated Graduate Program Office to help you deal with the minutiae of being at the DKFZ and much more. This office manages the entire PhD program – including the bi-annual candidate selections – and takes care of participants' concerns.

## Career Advisor

Of course, completing your PhD is just the first step. That's

why the Graduate Program also has a dedicated Career Advisor on hand to provide you with information about future careers and give you access to the resources you require for planning the next stage in your career.

## Ombudsperson

For help in the rare instances when things go wrong, the Graduate Program also has an ombudsperson to offer assistance. As a DKFZ principal investigator, they can provide

confidential advice and help to solve the issue at hand.

## PhD Student Council

But that's not all: to ease your transition into life in Heidelberg, there are PhD Student Teams, led by the PhD Student Council, to provide support and to answer any questions you might have.



# THE PHD STUDENT TEAMS



Elected by students from among the postgraduate community, the five-strong PhD-Student Council is in office for a year. It is the official liaison between the PhD students and administrative and scientific executive boards.

Each council member is responsible for a PhD student team. These teams organize a number of events that allow

students to get to know each other and broaden their horizons. The teams are:

## Welcome team

This team provides new students with a warm welcome and friendly advice, easing their transition into their new community. They produce a Newcomers' Guide filled with chapters of practical infor-







mation about working at the DKFZ and living in Heidelberg.

#### **Retreat team**

This group organizes the annual PhD student retreat, which all students attend at some point during their PhD. The format of the retreat is similar to a conference, where PhD projects are presented either as posters or as short lectures. Social and cultural events are also an integral part of the retreat.

#### **Pizza&Talk team**

The Pizza&Talk seminar is an informal forum where PhD students regularly meet, presenting their latest results or even research problems concerning their thesis. Each Pizza&Talk seminar consists of two short talks (around 15-20 minutes each). After the scientific presentations, there is always extended pizza time to exchange ideas and socialize.

#### **Party team**

To make sure that it's not all just work, parties are regularly organized for all students at the DKFZ. These offer a chance to meet people from other research groups at the DKFZ in a relaxed atmosphere, where non-scientific discussions are strongly encouraged!

#### **Homepage team**

This team looks after the Student Council's web pages, known as the Student Forum. For more information, check out [www.dkfz.de/studentforum](http://www.dkfz.de/studentforum).

The PhD Student Teams are always looking for volunteers. There are plenty of opportunities to get involved.



# APPLICATION AND ADMISSION REQUIREMENTS

By the time you have reached this page, you might be thinking that the DKFZ is the right place for you to do your PhD. If so, then why not send in your application?

First of all, there are a number of criteria that candidates have to fulfill. The most important ones are:

## *University degree*

Applicants should, or expect to complete within 6 months of the application deadline, a masters degree or equivalent. You will find further information about the university degrees accepted by the DKFZ at [www.dkfz.de/phd](http://www.dkfz.de/phd).

## *English proficiency*

If you are not from Germany or a native English speaker, you will need to provide proof of your proficiency in English. Accepted qualifications are a minimum TOEFL test score of 240 (computer-based) or 600 (written), an IELTS score of band 6.5+ or the Cambridge Certificate in Advanced English (CAE).

## *Graduate Record Examinations (GRE) preferred*

The Selection Committee encourages students to take a GRE.

## **Online application**

The first stage of the application process takes place online. There are two application

rounds each year in summer and winter. To find out the exact deadlines for this year and to apply online, please check the website: [www.dkfz.de/phd](http://www.dkfz.de/phd). The application form asks for information about your background, including your educational qualifications, honors, skills and interests. A statement of motivation is also required. When filling in the online form, remember to have electronic copies of your academic certificates and evidence of other honors and skills to upload with your application. You are also asked to provide the names and contact details of two referees.

## **What makes a successful application?**

The Selection Committee will evaluate whether you are a good match for the Graduate School. Here is a non-exhaustive list, outlining some of the characteristics, which the Committee will look for: evidence of intellectual brightness, creativity, aptitude, perseverance, independence and the ability to work in a team.

## **Interviews**

Within six weeks after the deadline, the DKFZ will inform you of the outcome of your application. If you are through to







the next selection round, you will be invited to Heidelberg for an interview. In preparation for the interviews, you will be provided with a list of PhD projects and asked to choose several labs in which you would be interested in working. The final evaluation lasts several days and takes place approximately eight weeks after the application deadline. This visit will give you the chance to meet potential supervisors and colleagues and to get to know the DKFZ. As part of the final evaluation, you will be expected to

give a short oral presentation of a recent research project.

### Success?

You can expect to hear from the DKFZ within days of the final evaluation as to whether you are offered a place in the Helmholtz International Graduate School for Cancer Research at the DKFZ.

If you have any questions about applying, please do not hesitate to contact the Graduate Program Office (email: [higs@dkfz.de](mailto:higs@dkfz.de)).

**We are looking forward to receiving your application!**



## IMPRINT

### Published by:

German Cancer Research Center in the Helmholtz Association

### Editor:

Dr. Lindsay Murrells  
Graduate Program Office (Mo70)  
German Cancer Research Center  
Im Neuenheimer Feld 280  
D-69120 Heidelberg, Germany  
Phone: +49 6221 42-2141  
E-mail: [higs@dkfz.de](mailto:higs@dkfz.de)

### Authors:

Faryal Mirza  
Dr. Lindsay Murrells

**Design:** Dagmar Anders,  
[www.different-arts.de](http://www.different-arts.de)

### Printed by:

CITY-DRUCK HEIDELBERG

## IMAGE CREDITS

Front: DKFZ, K. Böhnke; U2 (top): DKFZ, N. Schuster; U2 (bottom), p. 7 (bottom), p. 8 (left), p. 9, p. 10 (left), p. 11 (top), p. 12, p. 13 (top), p. 16, p. 17, p. 18 (top), p. 19, back: DKFZ/Y. de Andres; p. 1 (top): DKFZ, p. 1 (bottom): DKFZ, S. Kallakuri; p. 2 (top): DKFZ, N. Flerlage, p. 2 (bottom): private; p. 3, p. 4, left row (bottom), p. 13 (bottom): DKFZ/T. Schwerdt; p. 4, left row (top): IPP, p. 4, left row (middle): A. Zschau, GSI Helmholtzzentrum für Schwerionenforschung, middle row (top): Karlsruhe Institute of Technology, S. Herrmann, p. 4, middle row (bottom): photo: S. Hermann, copyright: Alfred-Wegener-Institut für Polar- und Meeresforschung, right row: ESA/NASA; p. 5: DKFZ, L. Murrells; p. 6: DKFZ, M. Nici; p. 7 (top): DKFZ, C. Leufke, p. 7 (right): DKFZ, S. Pinto; p. 11 (bottom): DKFZ, C. Zechmann; p. 14 (left): Heideberg Marketing GmbH, p. 14 (right): Wikimedia commons; p. 15: University Hospital Heidelberg, Medienzentrum; p. 17: DKFZ, C. Schlude; p. 20: University Hospital Heidelberg, Medienzentrum; p. 21 (top): University of Heidelberg, p. 21 (bottom): DKFZ, A. Shukla.

© German Cancer Research Center

All rights reserved



A blue-tinted microscopic image of tissue, showing cellular structures and a large, irregular mass, likely a tumor, on the right side of the frame.

**dkfz.**

German Cancer Research Center  
in the Helmholtz Association  
Im Neuenheimer Feld 280  
D-69120 Heidelberg  
Germany