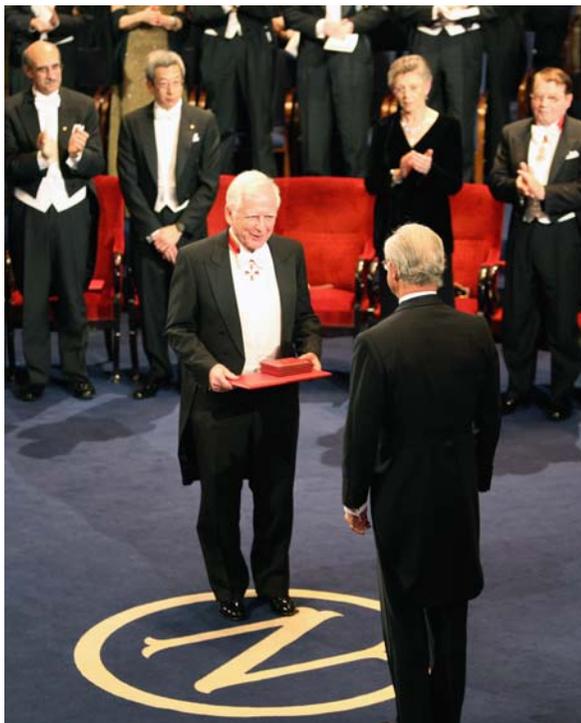


Heidelberg Nobel Prize Winners

Christoph Mager



Harald zur Hausen at the awarding of the Nobel Prize in Medicine 2008

Along with Berlin, Munich and Göttingen, Heidelberg is one of the major places of work for German Nobel Prize winners. Between 1901 and 2009 there were a total of ten Nobel Prize winners working as professors at Heidelberg University. At the time of the award, seven professors were working in Heidelberg; two came to Heidelberg after the award, and one left Heidelberg before receiving the honour. Two further Nobel Prize winners, the industrialists Friedrich Bergius and Carl Bosch, were living in Heidelberg when they were awarded the Nobel Prize in Chemistry in 1931 and were associated with Heidelberg University for many years as honorary doctor and honorary senator ❶. A further 15 Nobel Prize winners were as students or in their early academic careers in Heidelberg ❷.

Heidelberg Nobel Prize winners in Physics

Philipp Lenard (▶▶ [article Meusburger/Probáld](#)), born in Pozsony/Pressburg (at that time Hungary), received the Nobel Prize in 1905 for his work on radiation physics. Lenard's early academic career was marked by frequent moves, determined by academic tutors such as Ro-

bert Bunsen in Heidelberg and Hermann von Helmholtz in Berlin. After spending time in Breslau (Wrocław) and Kiel, he was appointed professor at the Department of Physics and Radiology in Heidelberg, where he remained until his retirement in 1931 ❷. From around 1908, with his "*Deutsche Physik*" he openly opposed modern theoretical work, such as that of Albert Einstein, which he condemned as "Jewish". After World War II, his involvement in National Socialism was not punished on the grounds of his age.

In 1932 the nuclear physicist Walther Bothe succeeded Lenard as director of the Department of Physics in Heidelberg. For political reasons, in 1934 he had to leave the university, and was appointed director of the Kaiser Wilhelm Institute for Medical Research (KWI) in Heidelberg by Max Planck. The latter had been his doctoral advisor in Berlin, was president of the Kaiser Wilhelm Society, and had won the Nobel Prize himself in 1918. In 1946 Bothe was reinstated as a professor at Heidelberg University. In 1954 Bothe shared the Nobel Prize in Physics with Max Born for his work on cosmic radiation and nuclear processes, which during World War II led him to work on the German nuclear research programme.

Hans Jensen studied and did his doctorate and post-doctoral degrees at the university in his home town of Hamburg, before moving to Hanover (Hanover). From 1949 to his retirement in 1969 he was professor of theoretical physics at Heidelberg University. He was awarded the Nobel Prize in Physics in 1963 together with Maria Goeppert-Mayer for the proposal of the nuclear shell model of atoms. In the early 1950s he was visiting professor at various elite universities in the USA known for their large number of Nobel Prize winners and nominees (▶▶ [article Horner](#)).

Heidelberg Nobel Prize winners in Chemistry

Friedrich Bergius and Carl Bosch were jointly awarded the Nobel Prize in Chemistry in 1931 for the development and industrial scale application of high pressure chemistry. Both prize winners were businessmen who, in the light of depleting resources, sought a means of industrially mass producing raw materials. Friedrich Bergius succeeded in syn-

thesising fuel from carbon liquefied at high temperatures and pressures. After studying under the Nobel Prize winners Walter Nernst and Fritz Haber, in the 1920s Bergius set up a carbon chemistry laboratory in the vicinity of BASF in Ludwigshafen. The award winning work of Carl Bosch was the implementation of the high pressure synthesis of ammonia, which is used as the basis of fertiliser and explosives. After his doctorate in 1899 he moved to BASF where he gradually withdrew from active scientific work and instead worked in business and research organisation. In 1919 he became managing director of BASF and in 1937 he succeeded Max Planck as president of the Kaiser Wilhelm Society.

Karl Ziegler also received his Nobel Prize in 1963 for research that could be applied to large scale industry. At the universities in Marburg, Heidelberg (1926-1936) and Halle as well as the KWI for Carbon Research in Mülheim, he discovered various organometallic catalysts that could be used to help control carbon chain reactions. This

❶ The Nobel Prize

The Nobel Prize is the world's most famous and most coveted award. Founded by the Swedish industrialist Alfred Nobel (1833-1895), since 1901 the prizes have been awarded in the five categories chemistry, physiology or medicine, physics, literature, and peace. According to Nobel's testament wishes, the prize is to be awarded annually to the person "who, during the preceding year, shall have conferred the greatest benefit on mankind." In awarding the Nobel Prizes "no consideration whatever shall be given to the nationality of the candidates". In 1968, in memory of Alfred Nobel, the Swedish National Bank founded a further prize in the category economics, which was first awarded in 1969. Up until 2009, a total of 803 individuals and 23 institutions had received Nobel Prizes for outstanding achievements.

discovery opened up new application possibilities for plastics and marked the start of the plastic era.

The Austrian Richard Kuhn did his doctorate under Richard Willstätter (1872-1942), the 1915 Nobel Prize →

❶ Portraits of Heidelberg Nobel Prize winners

Nobel Prize in Physics



Philipp Lenard
(1862-1947)



Walther Bothe
(1891-1957)



Hans Jensen
(1907-1973)

Nobel Prize in Chemistry



Carl Bosch
(1874-1940)



Friedrich Bergius
(1884-1949)



Richard Kuhn
(1900-1967)



Karl Ziegler
(1898-1973)



Georg Wittig
(1897-1987)

Nobel Prize in Physiology or Medicine



Albrecht Kossel
(1853-1927)



Otto Meyerhof
(1884-1951)



Bert Sakmann
(*1942)



Harald zur Hausen
(*1936)

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Curricula vitae of Heidelberg Nobel Laureates in Physics, Chemistry and Medicine

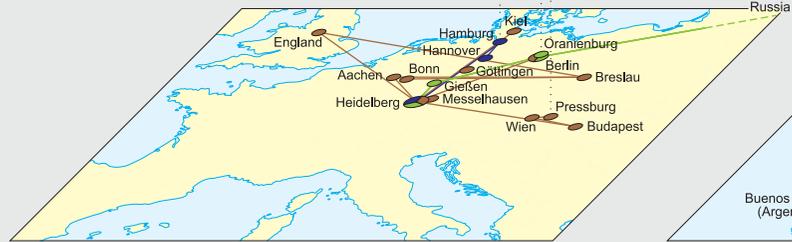
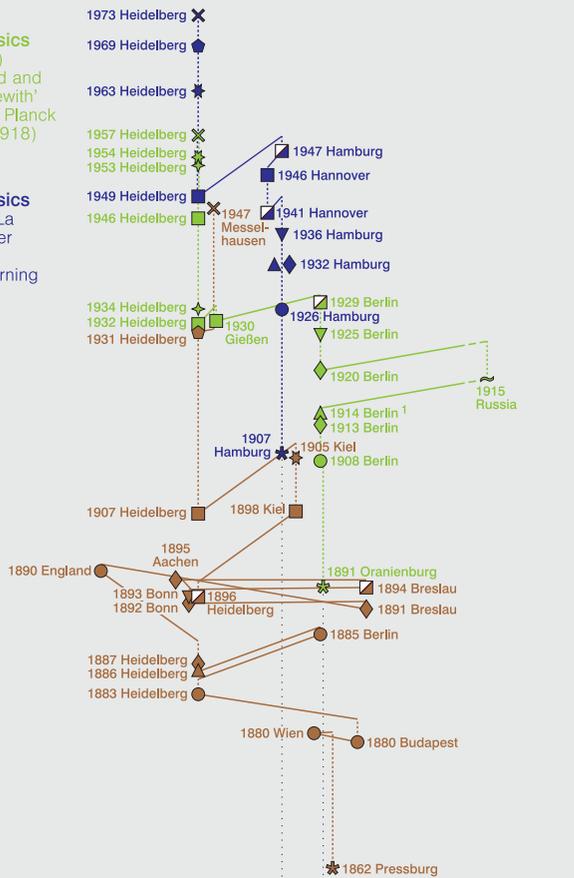
Three-dimensional time geographical representation of the time-space path according to HÄGERSTRAND (1970)

Nobel Laureates in Physics

Philipp Lenard
1905 Nobel Prize in Physics
'for his work on cathode rays'

Walther Bothe
1954 Nobel Prize in Physics
(with M. Bohn (Edinburgh))
'for the coincidence method and his discoveries made therewith'
1 1914 doctorate under M. Planck (Nobel Prize in Physics 1918)

Hans Jensen
1963 Nobel Prize in Physics
(with M. Goeppert-Mayer (La Jolla, USA) and E. P. Wigner (Princeton USA))
'for their discoveries concerning nuclear shell structure'



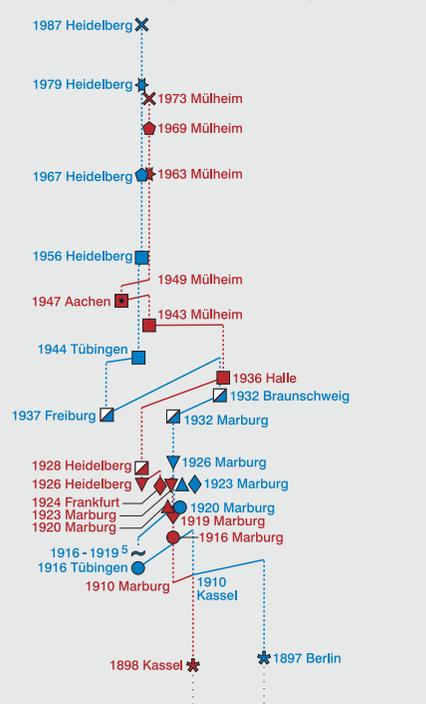
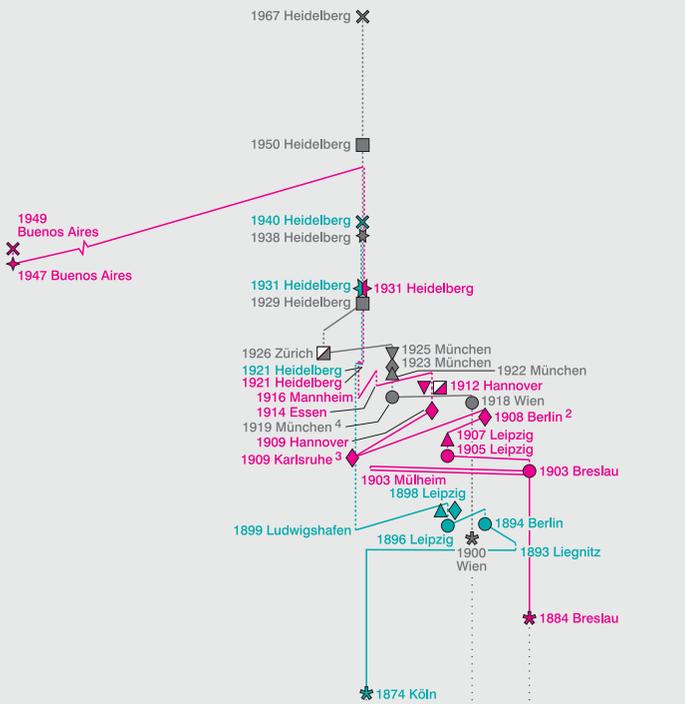
Nobel Laureates in Chemistry

Carl Bosch, Friedrich Bergius
1931 Nobel Prize in Chemistry
'in recognition of their contributions to the invention and development of chemical high pressure methods'
2 1908 research assistant to W. Nernst (Nobel Prize in Chemistry 1920)
3 1909 research assistant to F. Haber (Nobel Prize in Chemistry 1918)

Richard Kuhn
1938 Nobel Prize in Chemistry (presented in 1949)
'for his work on carotinoids und vitamins'
4 1919 studies under R. Willstätter (Nobel Prize in Chemistry 1915)

Karl Ziegler
1963 Nobel Prize in Chemistry
(with G. Natta (Milan))
'for their discoveries in the field of the chemistry and technology of high polymers'

Georg Wittig
1979 Nobel Prize in Chemistry
(with H. C. Brown (West Lafayette, USA))
'for their development of the use of boron- and phosphorus-containing compounds, respectively, into important reagents in organic synthesis'
5 1916-1919 prisoner of war (location unknown)



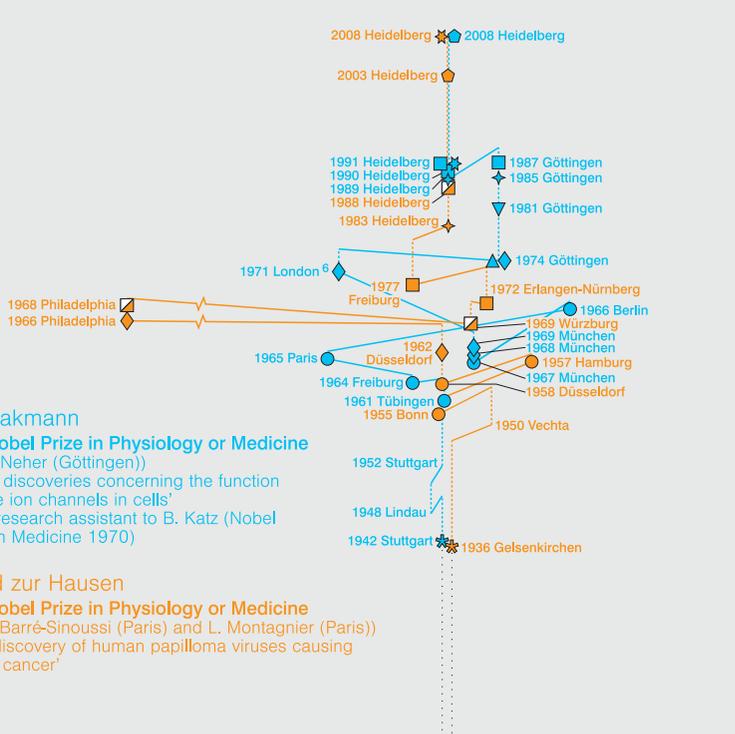
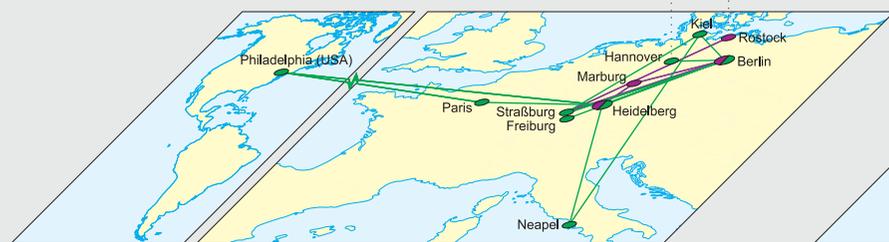
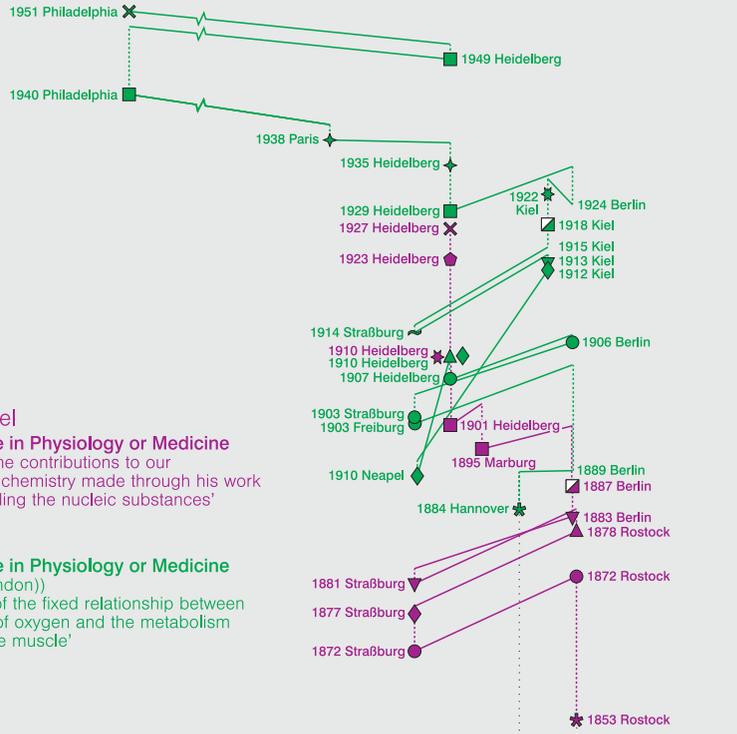
Nobel Laureates in Medicine

Albrecht Kossel
1910 Nobel Prize in Physiology or Medicine
'in recognition of the contributions to our knowledge of cell chemistry made through his work on proteins, including the nucleic substances'

Otto Meyerhof
1922 Nobel Prize in Physiology or Medicine
(with A. V. Hill (London))
'for his discovery of the fixed relationship between the consumption of oxygen and the metabolism of lactic acid in the muscle'

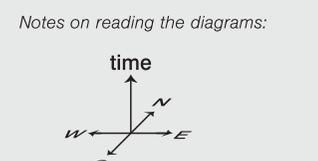
Bert Sakmann
1991 Nobel Prize in Physiology or Medicine
(with E. Neher (Göttingen))
'for their discoveries concerning the function of single ion channels in cells'
6 1971 research assistant to B. Katz (Nobel Prize in Medicine 1970)

Harald zur Hausen
2008 Nobel Prize in Physiology or Medicine
(with F. Barré-Sinoussi (Paris) and L. Montagnier (Paris))
'for his discovery of human papilloma viruses causing cervical cancer'



Time-space path of the Nobel Prize winners
..... length of stay in a location
— change of location

- ✱ birth
- studies
- △ doctorate
- ◇ research assistant
- ▽ post-doctoral degree ('Habilitation')
- ◻ associate professor
- ◻ tenured professor
- ☆ honorary professor
- ★ Nobel Prize
- ◆ head of institute
- retirement
- ≈ war service/imprisonment
- ✕ death



In addition to the two spatial dimensions (in the horizontal plane), a third dimension time is projected (upwards), so that each year with its relevant symbol is shown in its own horizontal plane.

Author: C. Mager

winner in chemistry. After the founding of the KWI for Medical Research in 1930, Kuhn was appointed director of the Chemistry Department of the KWI and named honorary professor of Heidelberg University. Here he carried out fundamental work on the organic chemistry of vitamins and the carotenoid group of natural pigments for which he was awarded the Nobel Prize in 1938. He was not able to receive the

medal and certificate in Stockholm until 1949. After the awarding of the 1935 Nobel Peace Prize to the prominent pacifist Carl von Ossietzky, the National Socialist regime prohibited German academics from accepting Nobel Prizes. As head of a special research section in chemistry and chemical consultant in the Reich Research Council the staunch National Socialist Kuhn knew about fatal human experiments carried

out by the physician Otto Bickenbach (phosgene research, ► [article Eckart "The Medical Faculty Under National Socialism"](#)) in the Natzweiler concentration camp, along with the experiments into nutritional research done on prisoners.

Georg Wittig received the Nobel Prize in 1979 for research that he did as professor at Tübingen University and which he further developed during his time as director of the Chemistry Institute in Heidelberg from 1956. With the help of the Wittig Reaction, named after him, it is possible to carry out targeted changes to organic molecules and so to synthesise delicate natural substances such as vitamin A. The industrial applications of the reaction were developed in close co-operation with BASF with Wittig as advisor.

"Revocation of Doctorates"). Heidelberg University made him honorary full professor in 1949, shortly before his death.

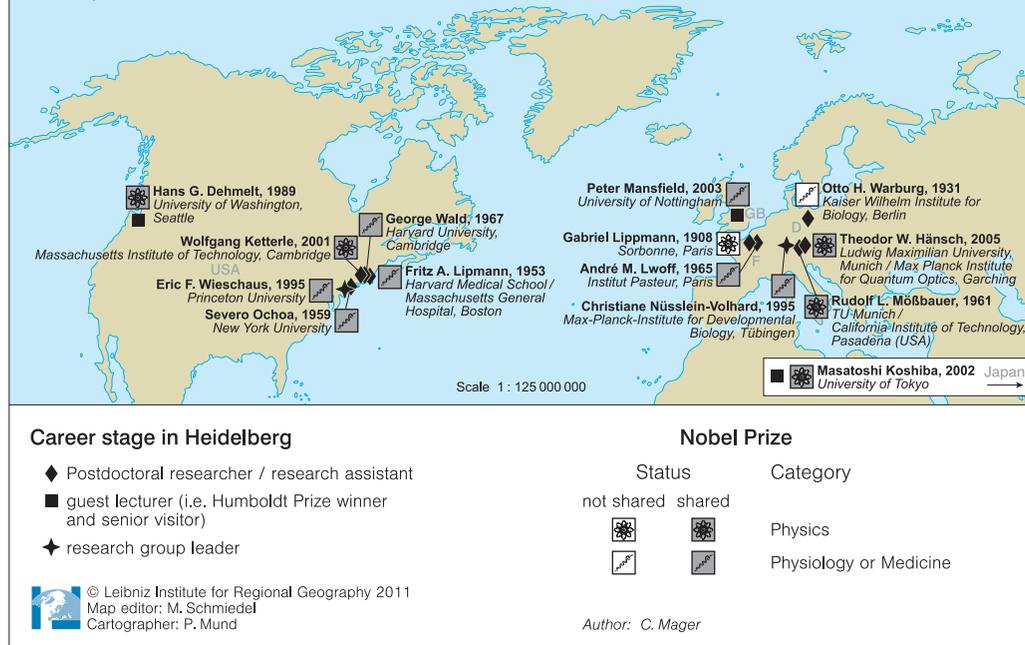
It was not until 1991 that a further Nobel Prize for Medicine came to Heidelberg. Bert Sakmann, director of the Institute for Cell Physiology at the Max Planck Institute (MPI) for Medical Research and professor of medicine and biology at Heidelberg University, along with his colleague Erwin Neher in Göttingen, was honoured for work on signals between cells. These discoveries have important implications for the understanding of disease mechanisms and the development of new drugs. In his autobiography in the 1991 Nobel Prize yearbook, Sakmann emphasised the importance of the Max Planck Society, which provided him with excellent working conditions in its institutes in Munich, Göttingen, and Heidelberg. A post-doctoral stay at University College London from 1970 to 1973 brought Sakmann into contact with biophysicist Sir Bernard Katz, winner of the Nobel Prize in 1970.

Harald zur Hausen won the Nobel Prize in Medicine in 2008 for his discovery of the human papillomaviruses as a cause of cervical cancer. After academic stays in Düsseldorf, Philadelphia, Würzburg, Erlangen, and Freiburg, zur Hausen was chairman and scientific director of the German Cancer Research Center (DKFZ) in Heidelberg from 1983 to 2003. During this time, the institution intensified its contact with Heidelberg University and expanded to become one of the world's leading cancer research institutes. From 1988 zur Hausen was honorary professor at Heidelberg University.

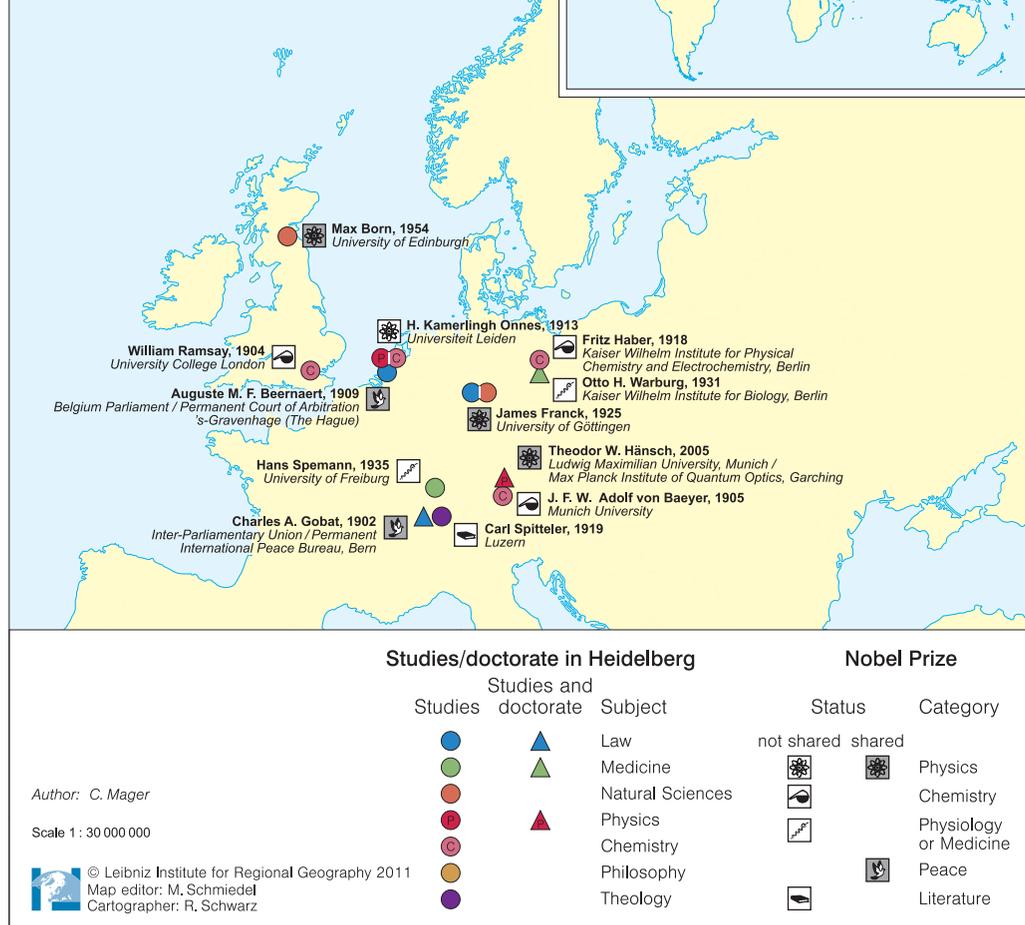
Heidelberg as a step on the way to a Nobel Prize

Social and professional contacts that are made while studying, doing a doctorate, as an assistant or as professor are a decisive factor in scientific discoveries. An inspirational academic environment influences research findings, just as the standard of equipment in a place is a requirement for the performance of certain scientific experiments. Institutional settings and location specific forms of organisation are part of creative environments in which outstanding scientific achievements can be made.

3 Nobel Prize winners who taught or carried out research in Heidelberg by place of work at the time the Nobel Prize was awarded



4 Nobel Prize winners 1902-2005, who studied or did their doctorate in Heidelberg by place of work at the time the prize was awarded

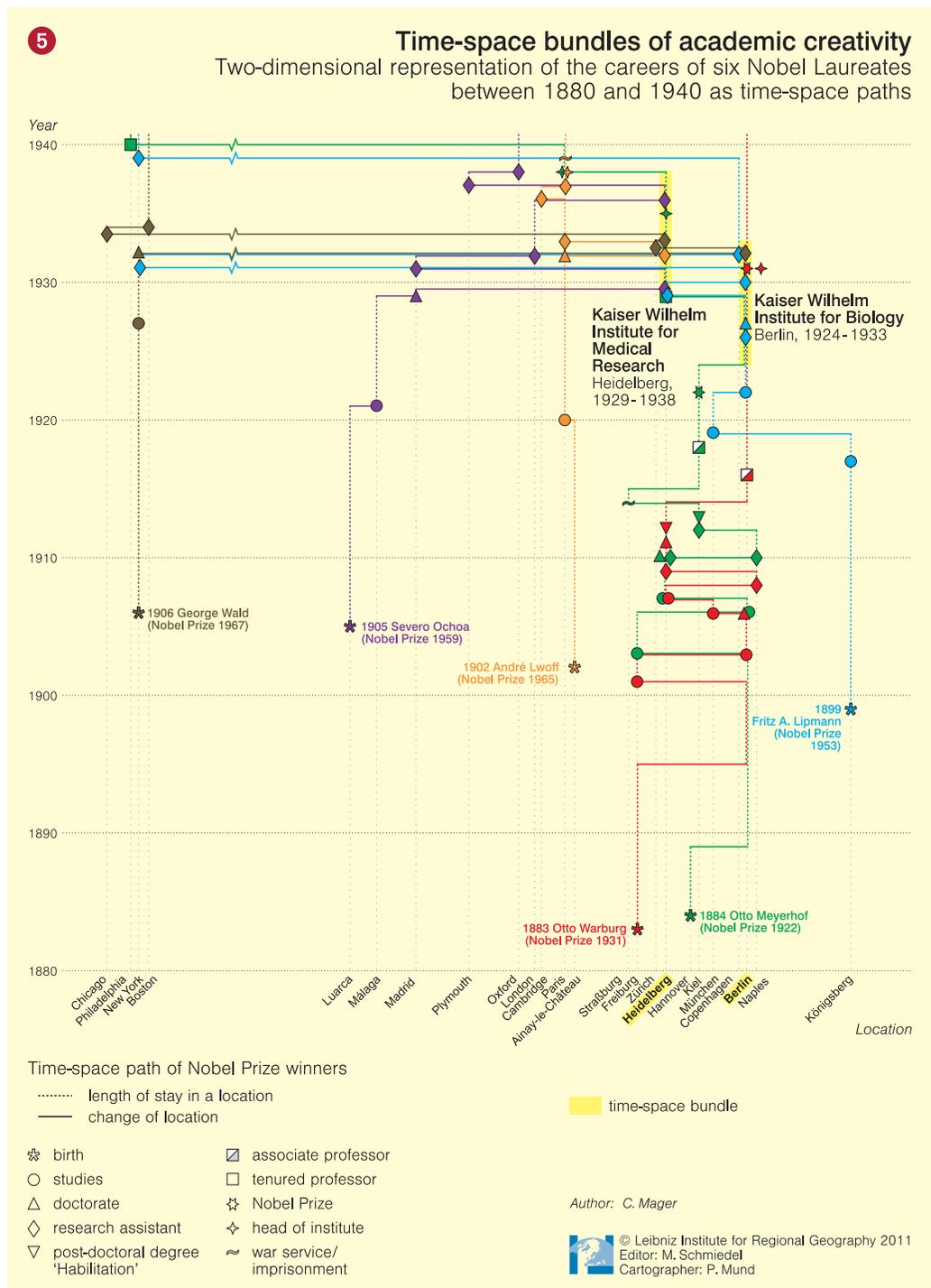


Heidelberg's twelve laureates along with the 14 Nobel Prize winners who have taught and researched there bear witness to the fact that Heidelberg has just such a creative environment, which attracts academics **3**. For example, Rudolf Mößbauer (Nobel Prize 1961) and Wolfgang Ketterle (Nobel Prize 2001), who was born in Heidelberg, were post-doctorates at Heidelberg Institute for Physics where they spent important years of their research careers. Four foreign Nobel Prize winners of the 1950s and 1960s worked at Otto Meyerhof's Heidelberg Institute early during their careers. Meyerhof himself met Otto Warburg (Nobel Prize 1931) in Heidelberg at the start of the 20th century **5**. From 1978 to 1981 Christiane Nüsslein-Volhard and Eric Wieschaus were research group leaders at the European Molecular Biology Laboratory (EMBL) at Boxberg in Heidelberg where they made their fundamental findings on genetic control of early embryonic development, for which they won the Nobel Prize in Medicine in 1995 **3**.

Establishing and maintaining academic contacts in Heidelberg

Map **4** shows the work places of all Nobel Prize winners who did their doctorates in Heidelberg or studied there. These include, in the humanities, Charles Gobat from Switzerland (Nobel Peace Prize 1902) and Carl Spitteler (Nobel Prize in Literature 1919). In the natural sciences, the influence of outstanding, individual scientists such as Robert Bunsen and Gustav Kirchhoff

attracted students and young scientists from all over Europe and the USA. The Nobel Prize winners in Chemistry or Physics from 1904, 1905, 1907, 1913, 1914, 1918, and 1925 had spent time at Heidelberg University. In addition there are further Nobel Prize winners who have other biographical connections with Heidelberg or are connected to the city or university through honours. A total of ten external and three Heidelberg Nobel Prize winners were awarded honorary doctorates from Heidelberg University. Amongst those from outside Heidelberg were the German physician Robert Koch (honorary doctorate 1886), the German chemist Adolf von Baeyer (1886), the Scottish chemist Sir William Ramsay (1903), the Swedish chemist Svante Arrhenius (1903), who was influential on the Nobel committee, the Dutch chemist Jacobus van't Hoff (1908), the Argentinean foreign minister and Nobel Peace Prize winner Carlos Saavedra Lamas (1936), the German-American physicist James Franck (1957), the German chemist Karl Ziegler (1958), and the German-American physicist Hans Dehmelt (1986). Carl Bosch was made honorary senator of the University in 1922.



2 Nobel Prize winners as ambassadors for Heidelberg

The awarding of a Nobel Prize is, for the recipient, associated with worldwide recognition of academic achievement. It ensures lasting public respect from representatives of the discipline, an increased chance to exert academic political influence and prestige. After being awarded a Nobel Prize, the winners are, more than ever, in the public limelight and are confronted with numerous requests for donations, interviews and lectures. The geographical activity pattern of a Nobel Prize winner is presented in **6** using the example of Harald zur Hausen, who after his award used numerous occasions all over the world to promote his specialist field of molecular virology and to represent Heidelberg City and University.

