

# Bretislav Friedrich: Curriculum Vitae

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## **Education and degrees:**

- (a) J. Neruda Gymnasium, Prague, 1968-71;
- (b) Charles University, Prague, 1971-76 (RNDr in Chemistry);
- (c) J. Heyrovsky Institute, Czech Academy of Sciences, Prague, 1977-81 (PhD in Chemical Physics, with V. Cermak and Z. Herman);
- (d) Charles University, Prague, 1996 (Habilitation).

## **Previous positions:**

Junior and Senior Research Scientist, Heyrovsky Institute of the Czech Academy of Sciences, Prague (1983-87);  
Research Associate, Department of Chemistry and Chemical Biology (1987-1996), and Department of Physics (1994-1996), Harvard University;  
Senior Research Fellow, Harvard University (1996-2003);  
Lecturer on Chemistry, Harvard University (1997-2003);  
Representative of the Scientists (Vertreter der wissenschaftlichen Mitarbeiter) at the Fritz Haber Institute (2014-2017);  
Ombudsman at the Fritz Haber Institute (2014-2017);  
Chief Editor of *Frontiers in Physical Chemistry and Chemical Physics* (2013-2020).

## **Present position:**

Research Group Leader, Fritz Haber Institute of the Max Planck Society (since 2003);  
Research Scholar, Department of Physics, Harvard University (since 2003);  
Honorarprofessor, Technische Universität Berlin (since 2006);  
Member of Springer Editorial Board (since 2008);  
Series Editor of *SpringerBriefs in the History of Science and Technology* (since 2015);  
Executive Editor, *Natural Sciences* (since 2020)  
Founding Co-Editor of the Springer book series "History Physics" (since 2020)

## **Awards and Honors:**

- (a) Alexander von Humboldt Fellow, Max-Planck-Institut für Strömungsforschung, Göttingen (1986-87, 1992);
- (b) Iberdrola Visiting Professor, High Council for Scientific Research, Madrid (1997);
- (c) Karel Preis Prize, Czech Republic (2007);
- (d) Outstanding Referee Award, American Physical Society (2009); similar from the American Chemical Society (2011);

(e) Foreign Member of the Learned Society of the Czech Republic, *Societas Scientiarum Bohemica* (elected in 2011);  
(f) *Manipulating molecules via EM fields: a Festschrift for Bretislav Friedrich*, *Molecular Physics* 111, 1631-1938 (2013).

(g) Symposium for Bretislav Friedrich, held in Harnak-Haus on 12 April 2019  
<https://indico.fhi-berlin.mpg.de/event/36/overview>

### **Research interests:**

As a Diploma (and post-Diploma) student at *Charles University* (1975-76), I was involved in research on the thermodynamics of macromolecular solutions. As a graduate student at the *Czech Academy of Sciences* (1977-81) and later as a post-doc at the *Max-Planck-Institut für Strömungsforschung* (1986-87), I worked chiefly in the area of elementary gas-phase collisions of ions with neutrals. My main focus then were electronically nonadiabatic collisions (reactive scattering and charge transfer) and energy transfer and dissociation processes.

At *Harvard University* (1987-2003), I became interested in the study of polarization of molecules, manipulation of molecular rotation and translation by electric, magnetic fields, and optical fields and in translationally cold molecules.

My work at the *Fritz Haber Institute* (since 2003) entails the development of techniques to cool, slow, and trap molecules, the spectroscopy of cold (and trapped) molecular ensembles, as well as molecular collisions in external fields. The general theme that permeates the work of my Research Group is interactions of molecules with electric, magnetic, and optical fields and with their combinations. The following specific research topics are currently being pursued: (1) manipulation of molecules by means of external fields, (2) molecular collisions in fields, (3) spectroscopy and imaging of molecules in fields, (4) cold/slow molecules, (5) quantum computing with molecules, and (6) supersymmetry and topology of molecules in combined electric, magnetic, and optical fields.

### **Teaching:**

At Harvard, I taught Chemistry 165, an intermediate-level course in *Experimental Physical Chemistry*. The course aimed to provide an introduction to the methods and techniques used in current physical chemistry research laboratories and was recommended as an efficient preparation for research in experimental physical chemistry/chemical physics and related sciences. Also, I taught a Freshman Seminar entitled *The unfolding story of light*. In the spirit of Goethe's maxim that 'A history of a science is that science itself,' the seminar aimed both to provide an understanding of light and to illuminate the historical context that made this understanding possible. At the Technische Universität

Berlin, I teach a course entitled *From the new world of cold molecules* on current cold-molecule research. The course emphasizes good qualitative understanding of the principles involved in manipulating molecules, and provides a broader context for the cold-molecule research within physics at large.