

Ústav fyzikální chemie J. Heyrovského, v.v.i.  
Akademie věd České republiky

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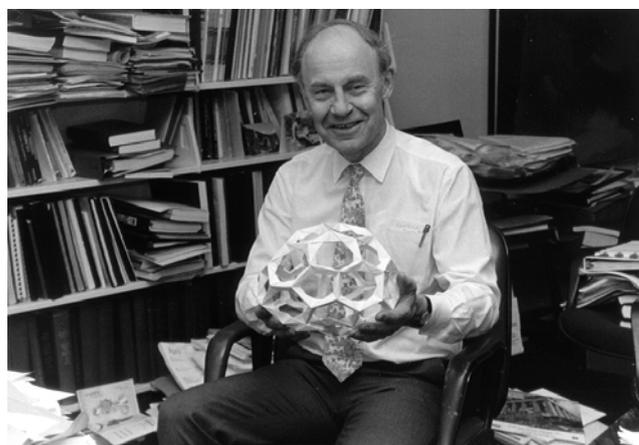
zve všechny zájemce na ústavní seminář,  
na kterém promluví

**profesor Dudley R. Herschbach**  
(Nobelova cena za chemii 1986)

*Department of Chemistry and Chemical Biology  
Harvard University  
Cambridge, MA, U.S.A.*

na téma

## GLIMPSES OF CHEMICAL WIZARDRY



Seminář se koná v pátek 29.června 2012 od 10:30 hodin  
v Brdičkově posluchárně ústavu  
v Praze 8, Dolejškova 3.

*Těšíme se na Vaši účast. Hosté jsou vítáni.*



# Glimpses of Chemical Wizardry

**Dudley R. Herschbach**

*Department of Chemistry & Chemical Biology, Harvard*

In an evangelical spirit, three vignettes will be presented that have the character of molecular parables: stories with lessons that transcend the specific details. (1) How knowledge of the orientation of a methyl group with respect to a neighboring double bond, obtained from thermodynamics and spectroscopy, enabled chemists to synthesize the single biologically active form of a molecule that has  $5 \times 10^{21}$  different structural isomers. (2) The lack of a single methyl group on a particular amino acid among billions in each DNA molecule on the Y chromosome is found to result in an infertile female rather than a male. This mutation is rare, of frequency  $\sim 10^{-5}$ . Consider how different human society would be if it were to become dominant! (3) Remarkable feats, such as synthesis of Indigo, a highly prized dye for many centuries, were achieved in the 19<sup>th</sup> century. Nothing was yet known about atomic structure and experimental tools were very modest; substances could be characterized just by measuring weights, melting and boiling temperatures, observing colors, odors, and tastes. The key guiding concept, which proved amazingly powerful, was simply that all substances are composed of definite proportions of various chemical elements.



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*Dudley Herschbach* was born in San Jose, California (1932) and received his B.S. degree in Mathematics (1954) and M.S. in Chemistry (1955) at Stanford University, followed by an A.M. degree in Physics (1956) and Ph.D. in Chemical Physics (1958) at Harvard. After a term as Junior Fellow in the Society of Fellows at Harvard (1957-1959), he was a member of the Chemical Faculty at the University of California, Berkeley (1959-1963), before returning to Harvard as Professor of Chemistry (1963), where he is now Baird Professor of Science (since 1976). He has served as Chairman of the Chemical Physics program (1964-1977) and the Chemistry Department (1977-1980), and Co-Master with his wife Georgene of Currier House (1981-1986). His teaching includes graduate courses in quantum mechanics, chemical kinetics, molecular spectroscopy, and collision theory, as well as undergraduate courses in physical chemistry and general chemistry for freshmen, his most challenging assignment. He is engaged in several efforts to improve K-12 science education and public understanding of science. He serves as Chair of the Board of Trustees of Science Service, which publishes *Science News* and conducts the Intel Science Talent Search and the Intel International Science and Engineering Fair.

He is a Fellow of the American Academy of Arts and Sciences, the National Academy of Sciences, the American Philosophical Society, and the Royal Chemical Society of Great Britain. His awards include the Pure Chemistry Prize of the American Chemical Society (1965), the Linus Pauling Medal (1978), the Michael Polanyi Medal (1981), the Irving Langmuir Prize of the American Physical Society (1983), the Nobel Prize in Chemistry (1986), jointly with Yuan T. Lee and John C. Polanyi, the National Medal of Science (1991), the Jaroslav Heyrovsky Medal (1992), the Sierra Nevada Distinguished Chemist Award (1993), the Kosolapoff Award of the ACS (1994), the William Walker Prize (1994); and named by *Chemical Engineering News* among 75 leading contributors to the chemical enterprise in the past 75 years (1998), and the Council of Scientific Society President's Award for Support of Science (1999).

Professor Herschbach has published over 400 papers. His current research is devoted to methods of orienting molecules for studies of collision stereodynamics, means of slowing and trapping molecules in order to examine chemistry at long deBroglie wavelengths, reactions in catalytic supersonic expansions, and a dimensional scaling approach to strongly correlated many-particle interactions, in electronic structure and Bose-Einstein condensates.

