

# Curriculum Vitae

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## CURRENT POSITION

2018 - 2023 *Department Chair*, Department of Chemistry, Rice University;  
2014-2018 - *Associate Department Chair*, Department of Chemistry, Rice University.  
July 2011 - *Professor*, Department of Chemistry, Rice University;  
*Professor*, Department of Chemical and Biomolecular Engineering,  
Rice University;  
September 2014 - *Primary Investigator*, Center for Theoretical Biological Physics,  
Rice University.  
May 2019 - *Professor*, Department of Physics and Astronomy, Rice University.

## PERSONAL

Born: September 3, 1967, Vinnitsa, Ukraine, USSR  
US citizen

## EDUCATION

**M.S.** in **Chemistry**, Moscow State University, June 1991, Adviser: Professor L.N. Sidorov.

**M.S.** in **Chemistry**, Cornell University, May 1996.

**Ph.D** in **Chemistry**, Cornell University, January 1998, Adviser: Professor B. Widom.

1980-1984: Moscow State University Correspondence Mathematical High School.

1984-1991: Moscow State University, Department of Chemistry, top place, first class diploma.

1988-1990: Landau Institute for Theoretical Physics, Academy of Sciences of the USSR,  
Moscow: Passed 3 exams of the "Landau Theoretical Minimum":  
Mathematics I, Mathematics II, and Classical Mechanics.

1991-1992: Postgraduate School, Department of Chemistry, Moscow State University.

1993-1994: Graduate School, Department of Chemistry, University of Kentucky.

1994-1998: Graduate School, Department of Chemistry, Cornell University.

## POSITIONS

1988-1992: *Laboratory Technician*, Laboratory of Thermochemistry, Department of  
Chemistry, Moscow State University.

January 1998-June 1998: *Visiting Scientist*, Department of Chemistry, Cornell University.  
June 1998-August 2000: *Postdoctoral Research Associate*, Research group of  
Prof. M.E. Fisher, Institute for Physical Science and Technology, University of  
Maryland.  
2000-2007 - *Assistant Professor*, Department of Chemistry,  
Department of Chemical and Biomolecular Engineering, Rice University.  
2007-2011 - *Associate Professor*, Department of Chemistry,  
Department of Chemical and Biomolecular Engineering, Rice University.  
Fall 2008, Summer 2009, Fall 2018 - *Visiting Professor*, Department of Physics,  
Ludwig-Maximilian University Munich, Germany.  
Summer 2010 - *Visiting Professor*, Laboratory of Physical Chemistry, ESPCI, Paris, France.  
Fall 2011, Spring 2017 - *Visiting Professor*, Fudan University, Shanghai, China.  
Fall 2015 - *Visiting Professor*, Oxford University, Department of Physics, Oxford, UK.  
*Visiting Professor*, Imperial College, Department of Chemistry, London, UK.  
Spring 2019 - *Visiting Professor*, ENS, Department of Physics, Paris, France.  
Fall 2023 - *Rosi and Max Varon Visiting Professor*, Weizmann Institute of Science, Israel.  
Fall 2023 - *Visiting Professor*, Free University Berlin, Germany

## HONORS and AWARDS

- Second Prize Winner in Chemistry of All-Ukrainian Olympiads between high-school students (1982, 1983).
- Moscow State University N.N. Semenov Memorial Fellowship (1989-1991).
- Outstanding First-Year Graduate Student, ACCOUNTS OF CHEMICAL RESEARCH Graduate Student Prize (1993).
- Cornell University Howard Neal Wachter Memorial Prize for outstanding work in Physical Chemistry (1996-97).
- Camille and Henry Dreyfus New Faculty Award (2000).
- NSF CAREER Award (2002).
- Alfred P. Sloan Fellowship (2004).
- Hamill Innovation Award (2006).
- Humboldt Research Fellowship for Experienced Scientists(2008).
- IUPAC Young Observer (2011).
- Fellow of the American Physical Society (2015).
- Rice University Wiess School of Natural Sciences Exemplary Faculty Award (2024).

## SYNERGISTIC ACTIVITIES

- Editorial Board: *Biophysical Journal* (2016-2022).

## TEACHING EXPERIENCE

- Rice University: Lecturer for graduate Classical and Statistical Thermodynamics, Spring 2001, Spring 2002, Spring 2003, Spring 2004, Spring 2015, Spring 2016, Spring 2017, Spring 2018, Spring 2021, Spring 2024.
- Rice University: Lecturer for undergraduate Physical Chemistry (Introduction to Quantum Mechanics), Fall 2001, Fall 2002, Fall 2003, Fall 2006.
- Rice University: Lecturer for undergraduate Physical Chemistry (Classical and

- Statistical Thermodynamics), Spring 2005, Spring 2006, Spring 2007, Spring 2008.
- Rice University: Lecturer for graduate Chemical Kinetics, Fall 2005, Fall 2007, Fall 2016, Fall 2017, Spring 2020.
  - Rice University: Lecturer for graduate Biophysical Chemistry, Fall 2006, Spring 2009, Spring 2011, Spring 2019.
  - Rice University: Lecturer for graduate Quantum Mechanics, Fall 2009, Fall 2010, Fall 2014.
  - Rice University: Lecturer for graduate Physical Organic Chemistry, Spring 2012, Spring 2013, Spring 2014.
  - Rice University: Lecturer for graduate Chemical Physics of Condensed and Biological Matter, Fall 2012.

## **RESEARCH INTERESTS and EXPERIENCE**

**Theoretical and Experimental Physical Chemistry, Condensed Matter Theory, Theoretical Biophysics and Statistical Mechanics.**

### **Specifically:**

- Machine-Learning Methods to Investigate Mechanisms of Biological Processes
- Dynamics of Cancer Initiation and Progression
- Mechanisms of Transcriptional Bursting
- Size Regulation of Biological Cells
- Stochastic Description of Antibiotic Action and Antibiotic Resistance
- Antimicrobial Peptides
- Mechanisms of Kinetic Proofreading in Biological Systems
- Mechanisms of Heterogeneous Catalysis
- Mechanisms of CRISPR and Single-Base Editing
- Transport through Channels
- Dynamics of Protein-DNA interactions
- Dynamics of Singlet Fission Processes
- Photo-induced Redding in Fluorescent Proteins
- Electron Transport in Fluorescent Proteins
- Formation of Morphogen Gradients in Biological Development
- Dynamics of Breaking Chemical and Biological Bonds
- Artificial Molecular Motors, Rotors and Nanocars
- Protein Nucleation, Aggregation and Crystallization.
- Mechanisms and Dynamics of Cytoskeleton Protein Filaments
- Critical Properties of Ionic Systems. Lattice Models of Electrolytes
- Theoretical Foundations of Biological Molecular Motors Functioning
- Dynamics of Polymers in Dense Media
- Asymmetric Simple Exclusion Processes. Driven Lattice Gases
- Foundations of Stochastic and Non-Equilibrium Thermodynamics
- Hydrophobic Interactions

**H-INDEX:** 52 (Google Scholar, May 2024)

**Publications:** 260 papers in peer-reviewed journals, 13 invited review articles, 7 book chapters, 1 book;  
10500+ citations, 230+ invited talks and seminars.

## **PERSONAL REFERENCES**

### **Professor Benjamin Widom**

Cornell University, Baker Laboratory, Department of Chemistry, (607) 255-3363, 255-0576,  
E-mail: bw24@cornell.edu; Ithaca, New York 14853-1301, USA

### **Professor Roger Loring**

Cornell University, Baker Laboratory, Department of Chemistry, (607) 255-4873,  
E-mail: rfl@cornell.edu; Ithaca, New York 14853-1301, USA

### **Professor Dave Thirumalai**

University of Texas, Department of Chemistry, (512) 475-8670,  
E-mail: dave.thirumalai@gmail.com; Austin, Texas 20742, USA

### **Professor Peter Rossky**

Rice University, Department of Chemistry, (713) 348-3350,  
E-mail: peter.rossky@rice.edu; Houston, TX 77005-1892, USA

### **Professor Peter Wolynes**

Rice University, Department of Chemistry, (713) 348-4101,  
E-mail: pwolynes@rice.edu; Houston, TX 77005-1892, USA

### **Professor Jose Onuchic**

Rice University, Department of Physics, (713) 348-4197,  
E-mail: jose.onuchic@rice.edu; Houston, TX 77005-1892, USA

### **Professor Anna Krylov**

University of Southern California, Department of Chemistry, (213) 740-4929,  
E-mail: krylov@usc.edu; Los Angeles CA 90089-0482, USA

### **Professor Eugene Shakhnovich**

Harvard University, Department of Chemistry, (617) 495-4130,  
E-mail: shakhnovich@chemistry.harvard.edu; Cambridge, MA 02138, USA