

## **Biographical Sketch of Bob (more formally Robert S) Eisenberg**

**Education**      **Harvard**                              **Biochemical Sciences**                      **AB 1962** (*summa cum Laude*)  
                                 **University of London**              **Biophysics**                                      **Ph.D. 1965**

**Graduate Advisors:** Paul Fatt, Alan Hodgkin    **Post-doctoral scholar sponsor:** Paul Horowicz

**Collaborators:** **Abaid**, Nicole; **Aboud**, Shela; **Aguilella-Arzo**, Marcel; **Aguilella**, Vicente; **Astumian**, R. Dean; **Bardhan**, Jay; **Baslé**, A.; Berti, Claudio; **Boda**, Dezső; **Burger**, Martin; **Busath**, David; Carloni, Paolo; **Constantin**, Dragos; **Engl**, Heinz; **Fiegna**, Claudio; **Fonseca**, Jim; **Frank**, Martin; **Gardner**, Carl; **Gillespie**, Dirk; **Gilson**, Michael; **Giri**, Janhavi; **Goodnick**, Steve; **Goryll**, Michael; **He**, Yan; **Hektor**, Hans; **Henderson**, Douglas; **Holcman**, David; **Hollerbach**, Uwe; **Hyon**, Yunkyong; **Jimenez-Morales**, David; **Ivan**, Sudre; **Kalman**, Eric; **Kathawala**, G.; **Kaufman**, Igor; **Krauss**, Dan; **Laws**, G.; **Liang**, Jie; **Liu**, Chun; **Liu**, Weishi; **Luchinsky**, D. G., , **Marreiro**, David; **Martens**, Craig; **McClintock**, P.V.E.; **Meijberg**, Wim; **Meter-Arkema**, Anita; **Miedema**, Henk; **Mori**, Yoichiro; **Nadler**, Boaz; **Nonner**, Wolfgang; **Norbury**, John; **Peneff**, Caroline; **Petrossian**, Leo; **Peyser**, Alexander; **Powell**, Matthew; **Raugei**, Simone; **Ravaioli**, Umberto; **Roth**, Roland; **Ryham**, Rolf; **Saraniti**, Marco; **Schirmer**, Tilman; **Schuss**, Zeev; **Singer**, Amit; **Siwy**, Zuzanna; **Stevens**, Chuck; **Sudre**, Olivier; **Sullivan**, Michael; **Tang**, John; **Thornton**, Trevor; **Tindjong**, R.; **Trellakis**, A., **Valisko**, Monika; **van der Straaten**, Trudy; **Varga**, Tibor; **Vlassiouk**, Ivan; **Vrouenraets**, M; **Wierenga**, J; **Wilk**, S.; **Wirth**, C; **Zhang**, Cha.

### **Positions**

- 1976 – now** first Chairman Dept of Molecular Biophysics and Physiology, Rush Medical College. One of the longest serving Chairmen in the USA.
- 2007 – now** Adjunct Professor, Dept of Bioengineering, University of Illinois Chicago;
- 2011 – now** Visiting Scholar, Department of Mathematics, Pennsylvania State University
- 2005 – 2011** Senior Scientist, Argonne National Laboratory, Mathematics and Computer Science
- 2000 – 2003** Visiting Scientist, Computational Electronics, University of Illinois, Urbana Champaign.
- 1991 – 1995** Visiting Scientist Department of Physics, Brookhaven National Laboratory.
- 1968 – 1976** Assistant Professor to Professor of Biomathematics and Physiology, UCLA;
- 1965 – 1968** Post-doctoral fellow of P. Horowicz, with Dept of Physiology, Duke University.

### **Honors**

- Miller Institute Professor, Univ of California Berkeley, Chemistry School 2012-2013**
- Senior and Life Member** of the IEEE 2007
- Director’s Award** and Colloquium, Argonne National Laboratory 2005
- Fellow**, American Physical Society (Division of Biological Physics) 2004
- Plenary Lecture**, European Mathematics Society/AMAM 2003
- Schlumberger Medal** Physical Chemistry, **Visiting Fellow** Corpus Christi, Cambridge UK 2002
- Editorial Boards**, J General Physiology, 1970-1991; J. Computational Electronics, 2001-2012
- Endowed Chair** “The Francis and Catherine Bard Professor” Rush University Medical Center 1976

### **Selected Papers and Contributions.**

- Senior designer Axopatch** Amplifier for patch clamp recording, sold by *Axon Instruments*, then *Molecular Devices*, and now *MDS: Analytical Technologies*.
- Senior designer Perfusing Pipettes**, a hardware kit for perfusing patch pipettes, *ALA Instruments*
- Co-author PNP-Online** Interactive software for running Poisson Nernst Planck theory.
- Patent Application**, co-inventor Heinz Engl, Design of Ion Channel Selectivity

### **Five Most Relevant Papers**

- Ryham, Rolf, Cohen, Frederic S. and Robert Eisenberg. (2012) a Dynamic Model of Open Vesicles in Fluids. *Communications in Mathematical Sciences*. 10: No. 4, pp. 1273–1285.
- Eisenberg, Bob, Hyon, Yunkyoung, and Chun Liu. (2010) Energy Variational Analysis EnVarA of Ions: Field Theory Primitive Models of Complex Ionic Fluids. *J Chemical Physics*. 133, 104104 (23p)
- Eisenberg, B., Multiple Scales in the Simulation of Ion Channels and Proteins. (2010) *The Journal of Physical Chemistry C*, 2010. 114 (48): p. 20719-20733

- Boda, Dezsó, Nonner, Wolfgang, Henderson, Douglas, Eisenberg, Bob, and Dirk Gillespie. (2008) Volume exclusion in calcium selective channels. *Biophys. J.*, 94: 3486–3496
- Boda, D, Valisko, M, Henderson, D, Eisenberg, B, Gillespie, D & W Nonner. (2009) Ionic selectivity in L-type calcium channels by electrostatics and hard-core repulsion. *J Gen Physiol* 133 497-509.

#### **Five Related Papers**

- Jimenez-Morales, David, Liang, Jie and Bob Eisenberg. (2012) Ionizable Side Chains at Catalytic Active Sites of Enzymes *European Biophysics Journal* 41 (5):449-460.
- Eisenberg, Bob (2012) Ions in Fluctuating Channels: Transistors Alive. *Fluctuations and Noise Letters* Fluctuation and Noise Letters. 11, No. 2 00076 (20 pages)
- Mori, Yoichiro, Liu, Chun, and RS Eisenberg. (2011) A model of electrodiffusion and osmotic water flow and its energetic structure. *Physica D: Nonlinear Phenomena* 240(22): 1835-1852
- Burger, Martin, Eisenberg, Robert S. and Heinz Engl (2007) Inverse Problems Related to Ion Channel Selectivity. *SIAM J Applied Math* Vol. 67, No. 4, pp. 960–989
- Saraniti, M, Aboud, S, and R Eisenberg (2006). Simulation of Ionic Charge Transport in Biological Ion Channels: an Introduction to Numerical Methods. *Rev in Computational Chemistry* 22, pp 229-294

#### **Synergistic Activities**. Bob Eisenberg served on and as

- Chairman of the Physiology Study Section of the NIH,**  
**Biophysical Society** Council Member 1983-86; Executive Board 1983-86; Program Committee 1984  
 Chairman Nominating Committee 1985, Public Policy Committee 1985-7.  
**American Physical Society**, Councilor (DBP: two terms), and member of the Executive Board.  
**President of the Chicago Chapter of the Society for Neuroscience**, and  
**Chair of Research Committee & Research Council American Heart Association**, Chicago.  
 He has been **Councilor of the Society of General Physiology,**  
**Chairman of External Advisory Board of Pennsylvania Muscle Institute.**

#### **Meetings organized** since he started working on ion channels ~1985

- Chairman of Symposium. **Nerve Impulse: From Conduction to Channels by way of Conductance** at 100<sup>th</sup> Anniversary Meeting, American Physiological Society, 1987.
- Chairman of Two Minisymposia. **Moving through (Biological) Channels and Ionic Movement through Biological** Channels Society of Industrial and Applied Mathematics 1990.
- Organizer of Workshop **From Structure to Permeation in Open Ionic Channels** Biophys Soc 1993
- Chairman of Symposium: **Ionic Channels Natural Nanotubes** American Physical Society, 2000.
- Chairman and Organizer of Novartis Meeting: **Physical Models of Ion Permeation**, 2000
- Chairman and Organizer of Symposium International Conference Computational Nanoscience: **Nanostructure Simulation from thin oxides to biological ion channels**. 2001
- Co-organizer of **Yangtze Conference on Fluids and Interfaces**. Chairman, **Ion Channels** 2002
- Organizer, Chairman **Nanostructures: biological ion channels to thin oxides**. Nanotech 2003
- Co-organizer, Chair **Physical Models of Ion/Protein Interactions** American Physical Society 2003
- Chairman **Physics of Ion Interactions with Proteins** American Physical Society 2004
- Co-organizer, with Heinz Engl, **RICAM Seminar on Ion Channels**, RICAM, Linz (Austria), 2004.
- Organizer and Chair: **Multiscale Analysis** (two symposia) American Physical Society, March, 2005.
- Co-organizer, with Martin Bazant of Symposium, **Multiscale Modeling of Electrochemical Systems** SIAM (Society of Industrial and Applied Mathematics), 2006.
- Organizer of Symposium **Modeling as a Tool in Biophysics**, Biophysical Society 2007.
- Co-organizer: **Direct and Inverse Problems in Channels and Membranes**, two symposia, ICIAM 6th International Congress Industrial & Applied Mathematics 2007, Organizer Heinz Engl
- Co-organizer with Paolo Carloni and sole Lecturer **Short Course on Channel Biophysics**, 10 hours, ICTP and SISSA 2008. Theoretical Biophysics and Structural Biology, Trieste, Italy.
- Co-organizer: Symposium on **Inhomogeneous Electrolytes** Rocky Mountain Regional Meeting American Chemical Society Co-organizer Douglas Henderson, June 2008.
- Organizer and Speaker: Workshop **“Biophysics of Membrane Bound Channels”** American Physical Society, Division of Biological Physics, March 2009.
- Co-organizer: National Taiwan University “Energetic Variational Approaches to Elastic Complex Fluids and Molecular Biology” January, 2010, Organizer Tai-Chia Lin