

Biographical Sketch of Bob (more formally Robert S) Eisenberg
Biographical Sketch of Principal Investigator Robert S 'Bob' 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**, Dezsó; **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; **Peysner**, 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; **Vlassiounk**, 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, Yunkyong, 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 100th 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