

## Jacob Klein

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**Personal:** Primary and secondary Education: Israel (1955-58), England (1958-66). Marital Status: Married + 4 children.

### Academic education and career

1970 – 1973:	B.A. (1st Class Honours), in Physics, at the Cavendish Laboratory, Cambridge University
1974 – 1977:	Ph.D. degree in the Cavendish Laboratory: "Diffusion of Long Molecules Through Bulk Polymers". (Supervisor: David Tabor).
1976 – 1984:	Research Fellow (1976-7) and Fellow in Physics of St.Catharine's College Cambridge.
1977	Awarded M.A., Ph.D degrees by Cambridge University.
1977 – 1980:	Post-doctoral Fellow, Department of Polymer Research, Weizmann Institute of Science, Rehovot, Israel
1980 – 1984:	Assistant Professor, Department of Physics, University of Cambridge
1980 - 1984	Senior Scientist, Weizmann Institute of Science.
1984 - 1987	Associate Professor, Weizmann Institute of Science.
1986 - present	Herman Mark Professor of Soft Matter Physics, Weizmann Institute of Science (Full Professor since 7/1987).
1989 -1991	Head, Polymer Research Department, Weizmann Institute of Science.
1999 – 2000	Chairman of Scientific Council, Weizmann Institute
2000 - 2007	Dr. Lee's Professor of Chemistry, University of Oxford
2000 – 2005	Head of Department, Physical and Theoretical Chemistry Department, University of Oxford

### Visiting Positions

1990	Visiting Professor, University of California at Santa Barbara
1991	Visiting Professor, Princeton University
1994	Royal Society Exchange Professor, Oxford University
1996	Visiting Professor, Ecole Polytechnique Federal – Lausanne
2004	Paris Sciences Professor, Ecole Supérieure de Physique et Chimie Industrielle, Paris
2008	Frank & Robert Laughlin Professor, Cornell University
2010-19	Visiting Professor, Tsinghua University, Beijing
2017-20	Visiting Professor and Chief Scientist, Beihang University, Beijing

### Selected honours and named lectures

1983:	Somach Sachs Prize, Weizmann Institute of Science.
1984:	Charles Vernon Boys Prize, British Institute of Physics,
1987:	Dudley Wright Award in Membrane Research
1994:	International Kao Fellow, Japan
1995:	High Polymer Physics Prize, American Physical Society
1998:	Ford Annual Science Lecture (Ford Motor Company, Michigan)
2000:	Whitby Lectures (Akron Univ., Ohio)
2001:	Fellow, Royal Society of Chemistry
2002:	Inaugural John D. Ferry Lectures (Univ. of Wisconsin)
2003:	Fellow, American Physical Society
2004:	Paris Science Medal, City of Paris
2004:	Annual Award Lecture of the Japanese Chemical Society
2004:	Fellow, Institute of Physics, UK
2004:	Paris Science Lectures, Ecole Supérieure de Physique et Chimie Industrielle, Paris
2007:	Kolthof Prize, Technion Israel Institute of Science
2008:	The Laughlin Lectures, Cornell University
2010:	ERC Advanced Grant Award (2010-2015)
2010:	Israel Chemical Society Prize for Excellence
2011:	Honorary Membership, Israel Polymers & Plastics Society
2011:	Royal Society of Chemistry (UK) Soft Matter and Biophysics Prize and Medal
2012:	Tribology Gold Medal of the International Tribology Trust (top award in field)

2013:	Elected to Academia Europaea
2014:	Molecular Science Frontiers Professorship, Chinese Academy of Science
2015:	David Turnbull Award, Materials Research Society
2016:	Elected to Israel Academy of Sciences and Humanities
2017:	ERC Advanced Grant Award (2017-2023)
2017:	Liquid Matter Prize of the European Physical Society (awarded once every 3 years)
2019:	Gold Medal of the Israel Chemical Society
2020:	The Rothschild Prize
2021:	Irving Langmuir Award in Chemical Physics of the American Physical Society
2021:	Overbeek Gold Medal of the European Colloid and Interface Society
2021:	Wiley Life Achievements Award
2012-2022	6 ERC Proof-of-Concept Awards

Editorial and journal advisory boards (year of appointment)

1988:	Editorial Board, 'Macromolecules';
1992:	Editorial Board, 'Acta Polymerica'
1992:	Editorial Board, 'Journal of Macromolecular Science' – Polymer Reviews.
1995:	Editorial Board, Israel Journal of Chemistry; (Guest editor special issue 'Polymers at surfaces')
1993:	Editorial Board, J. Polymer Science: Physics
2000:	Editorial Board, Macromolecular Chemistry and Physics, and Macromolecular Rapid Communications
2001:	Editorial Board Liquids and Soft Matter Board, J. Physics: Condensed Matter;
2004:	Editorial Board, ChemPhysChem
2013:	Editorial Board, Friction
2022:	Editorial Board, Philosophical Transactions of the Royal Society A

Research: 310+ research papers to date (including ca. 25 in *Science* and *Nature*).

Mentoring: ca. 85 graduate and post-doctoral students to date, of whom 36 currently in tenured (or tenure-track) academic appointments

Invited lectures at international meetings: Over 270 invited keynote/plenary lectures at international meetings since 1993.

Industrial consultancies (past and current): 1985-1995 Exxon Corporate Research; Unilever; Procter & Gamble; Kodak; Johnson & Johnson; W.R. Grace; Strauss Inc. (Israel, current); Liposphere Ltd. (Israel, current).

Selected past and present academic positions of trust:

Dutch Academy of Sciences large grants review panel  
 German Science Foundation review panel for several Schwerpunktprograms  
 Senior Jury of Institut Universitaire Francaise  
 Science Foundation Ireland major grants review panel  
 Max Planck Society (Germany) Advisory Committee on establishing new MPIs.  
 Selection panel for Coulson Chair of Theoretical Chemistry, University of Oxford  
 Chair of Weizmann Institute Central Academic Appointments Committee  
 Member of Weizmann Institute Tenure and Professorial Appointments committee  
 Chairman of Scientific Council, Weizmann Institute  
 Member, Weizmann Institute Presidents Council  
 International Advisory Board, State Key Laboratory of Tribology, Tsinghua University, Beijing

Research interests

Understanding the physical properties of soft matter, including liquids (especially water), polymers, lipids, and colloidal dispersions, and their applications, particularly at interfaces. This has been achieved through direct measurement of forces, molecular motion and interfacial dissipation by such materials at surfaces and under confinement, using self-designed apparatus with unique sensitivity and resolution to the sub-nanometre level; the molecular modeling of these effects, and their implementation in

biomedical applications. The concept of hydration lubrication, discovered and developed in the past 3 decades, has been especially fruitful.

#### Technology transfer

Many of the findings of Klein's lab have been patented. 8 of these patents, related to lipids as lubricating elements based on the hydration lubrication mechanism, were licensed to the company Liposphere Ltd. (<https://www.lipo-sphere.com/>), founded in 2019 by two of Klein's former students (Dr. Ronit Goldberg and Dr. Sabrina Jahn). This company develops (non-drug) lipid-based treatments for biolubrication-related pathologies, including in particular alleviation of osteoarthritis-related pain. Recent first-in-human double-blind placebo-controlled clinical trials have been successfully completed. This hydration-lubrication-based technology, and Liposphere in particular, were highlighted by the International Union of Pure and Applied Chemistry (IUPAC) as one of the top emerging technologies in chemistry for 2024 ('IUPAC's 2024 Top Ten Emerging Technologies in Chemistry', F. Gomollón-Bel, *Chemistry International*, **46**(4), 8-16, (especially pp. 10-11), (2024) <https://doi.org/10.1515/ci-2024-0403>)