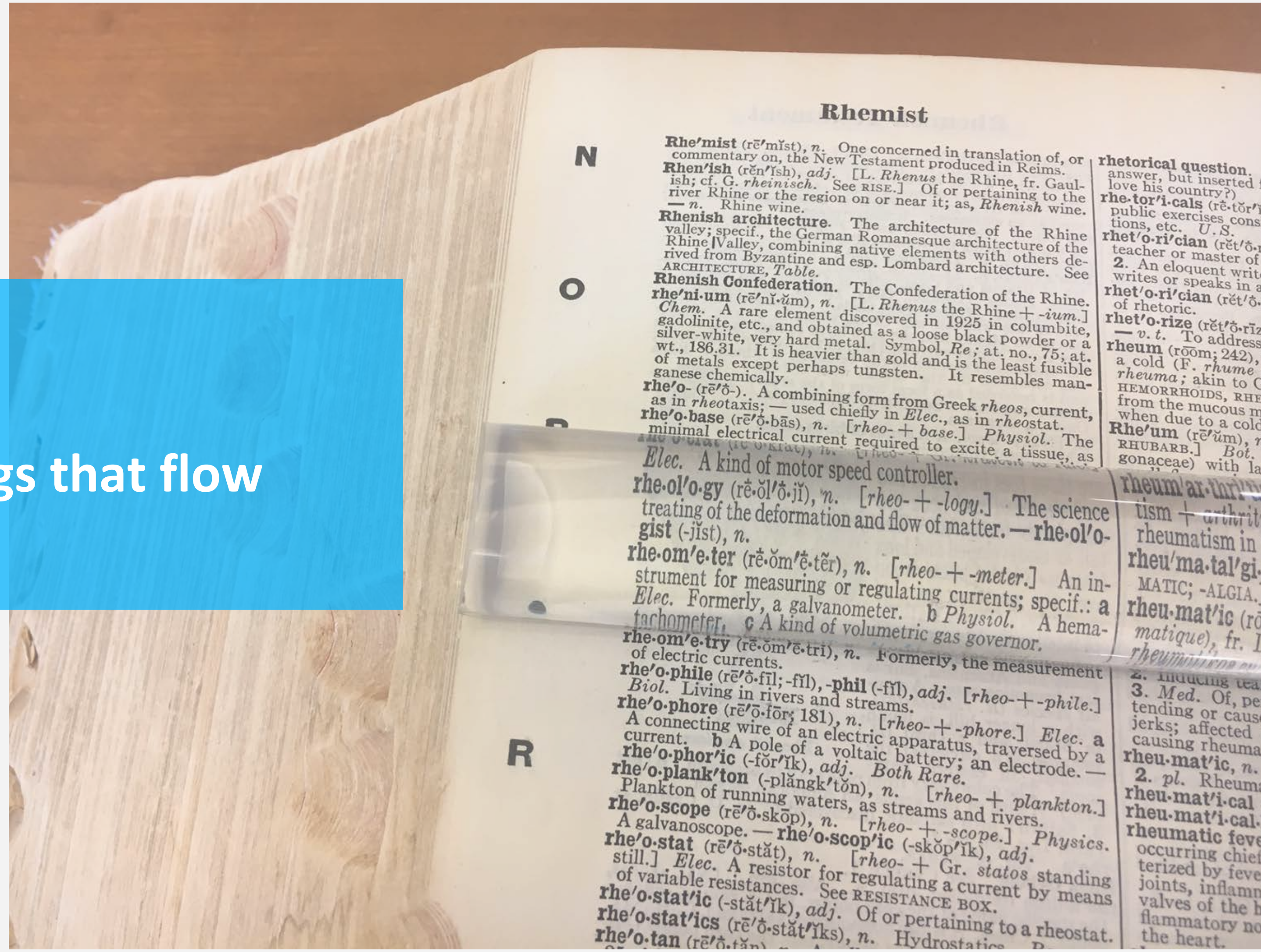
SOCIETY OF PHYSICS STUDENTS
An organization of the American Institute of Physics

Facing the Facts

My summer as the
Society of Rheology
History Intern

Megan Anderson
02 August 2019



What is Rheology?

The study of things that flow

Background

A Hitchhiker's Guide to Complex Fluids

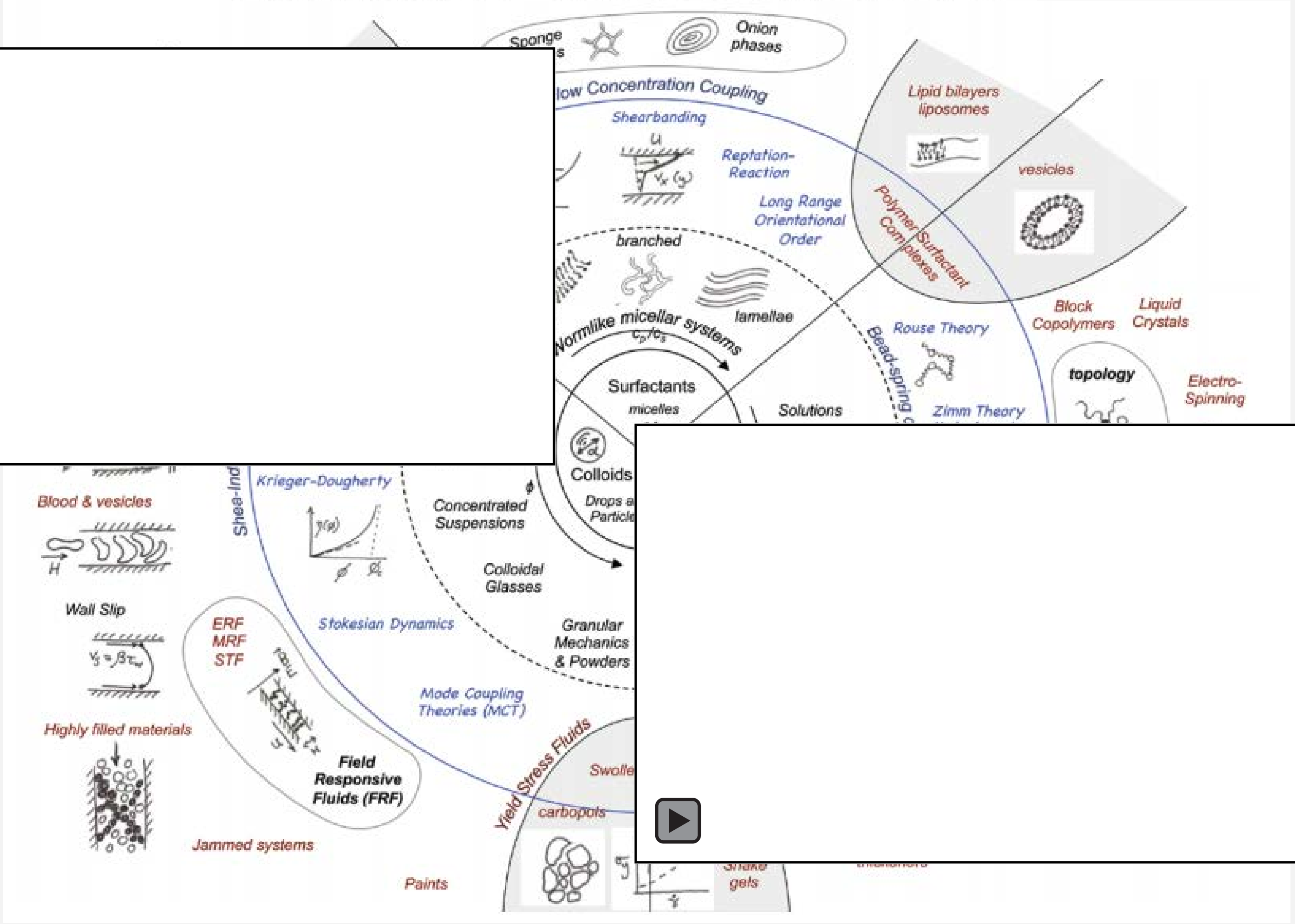


Diagram credit to Dr. Gareth McKinley https://www.rheology.org/sor/Publications/RheoBulletin/RB2015Jan.pdf

The Society of Rheology

AIP Member Societies

Acoustical Society of America

American Association of Physicists in Medicine

American Association of Physics Teachers

American Astronomical Society

American Crystallographic Association

American Meteorological Society

American Physical Society

AVS: Science & Technology of Materials, Interfaces, and Processing

The Optical Society

The Society of Rheology

The Society of Rheology was officially formed on Dec. 9, 1929 and was one of the five founding members of AIP.

The Bingham Medal

Eugene C. Bingham pioneered the field of rheology and is credited with coining its name. This annual award is given in his honor to an individual who has made outstanding contributions to rheology.

What does it look like to preserve the Society of Rheology's history?

- → Preserve **knowledge** along with artifacts
- → Physical and electronic locations
- → Bingham Medalist research

Meet the Rheologists

Julia A. Kornfield 2017 Medalist

Devised a pliable silicone polymer material for eye surgeries

Gregory B. McKenna 2009 Medalist

Member of the AIP Governing Board & Society of Rheology President

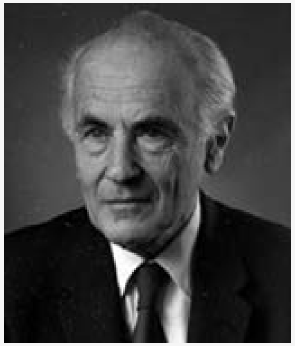
H. Henning Winter 1996 Medalist

Co-wrote the most cited paper in the Journal of Rheology's history

1,561 citations and counting!

Roger S. Porter 1985 Medalist

Developed oriented polymer fiber strands that are ten times stronger than steel yet more flexible



Frederick R. Eirich 1983 Medalist

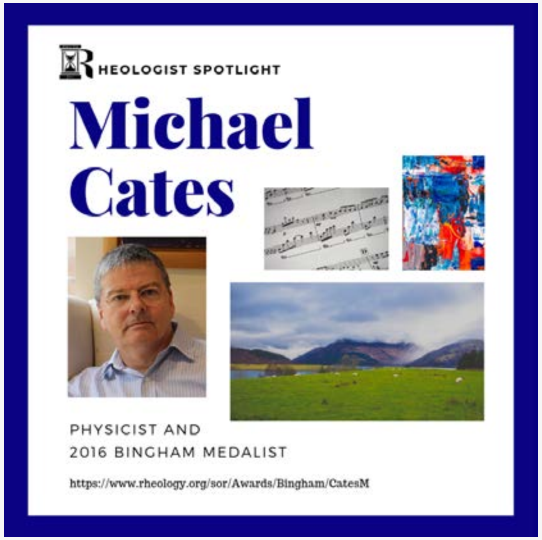
Researched on three different continents

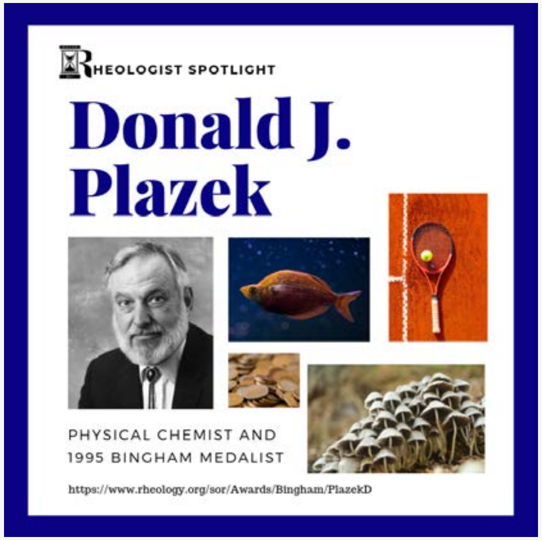
Lawrence E. Nielsen 1976 Medalist

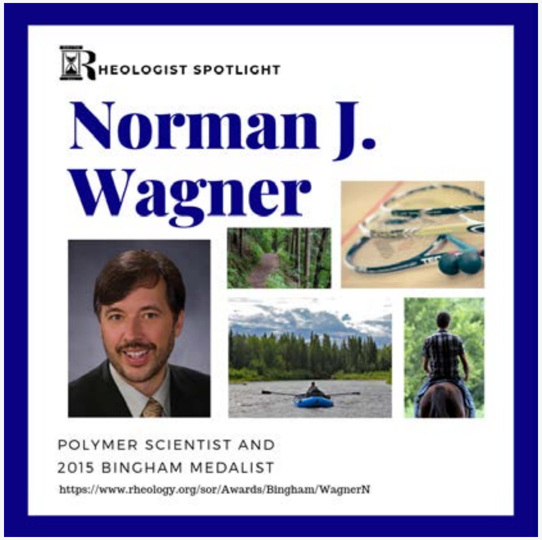
Analyzed the flow properties of glaciers on 19 expeditions!

Winter, H. H.; Chambon, F. Analysis of Linear Viscoelasticity of a Crosslinking Polymer at the Gel Point. Journal of Rheology 1986, 30(2), 367–382

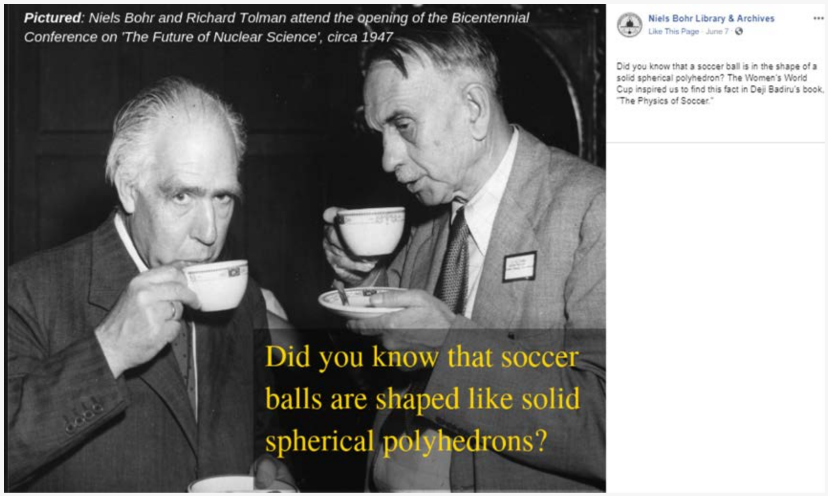
Outreach - Rheology Spotlights

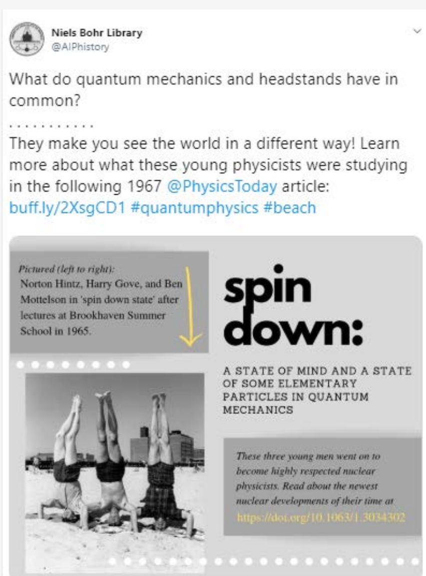






Outreach - Niels Bohr Library & Archives





Outreach - PhysCon Workshops

The Society of Rheology is sponsoring the following sessions at PhysCon. . .

Thermodynamics of Cooking and Our Food System

&

Our Food System Link to Climate Change

Stay tuned!

Source: https://www.youtube.com/watch?v=0fnWf5BvXac; https://www.youtube.com/watch?v=DPZzrlFCD_I&t=614s

Counting on Success

3 Society of Rheology collaborations

15 Social Media features for the Society of Rheology and the Niels Bohr Library & Archives

40 Bingham Medalist Biographies

Thanks!

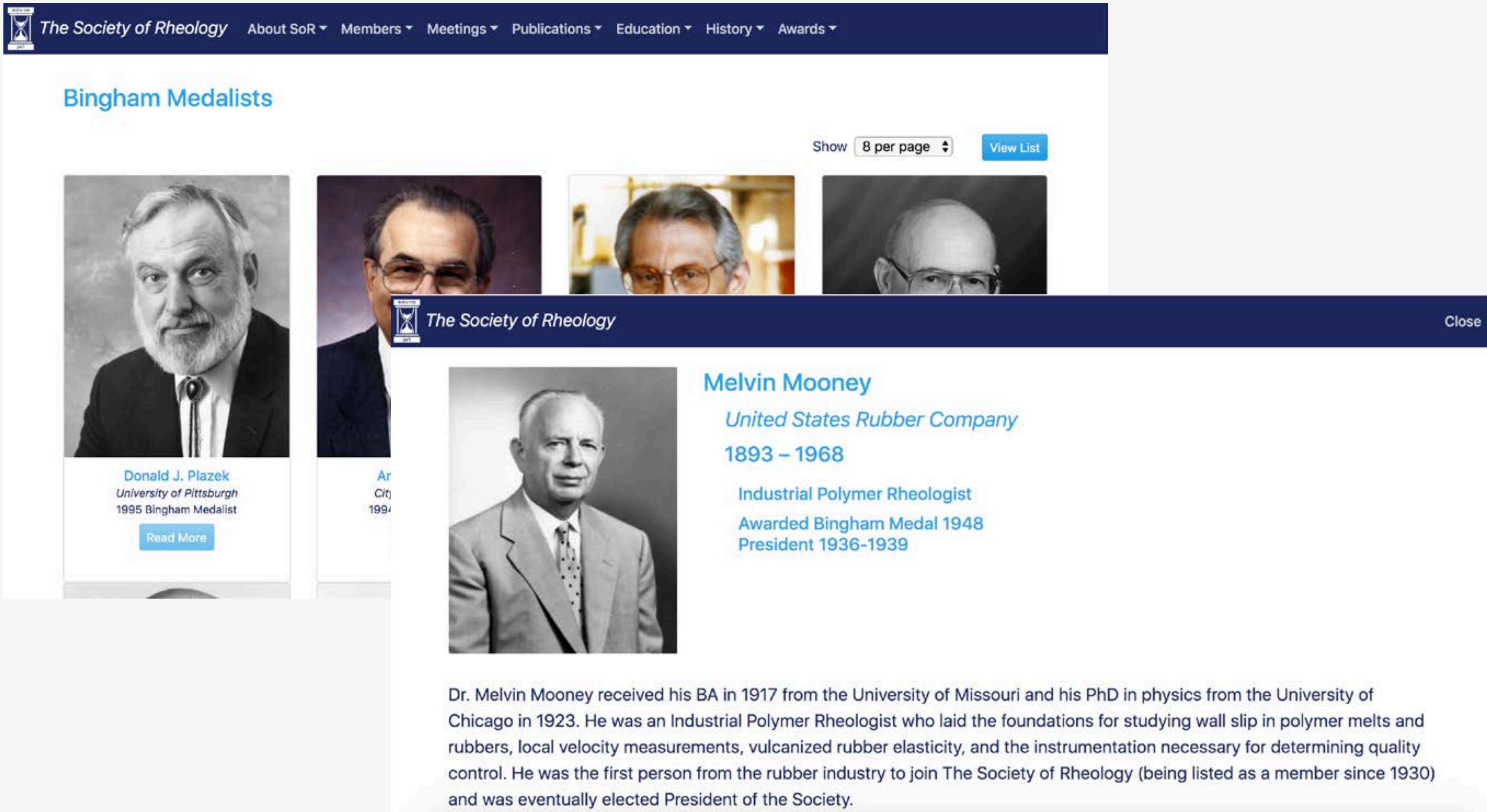
Special thanks to:

- **Gareth McKinley**, my mentor & the Society of Rheology Past President
- The **Niels Bohr Library & Archives** staff—especially Melanie Mueller and Chip Calhoun
- The **American Institute of Physics** and **Society of Rheology**
- My fellow **interns**
- The **Society of Physics Students**—especially Brad and Kayla

Video credit: William Jewell College Fluids Lab; Slide design credit: Slides Carnival

Bonus

rheology.org



Bonus

Biography Examples

Rubinstein is 2018 Bingham Medalist

Ralph Colby

Pennsylvania State University

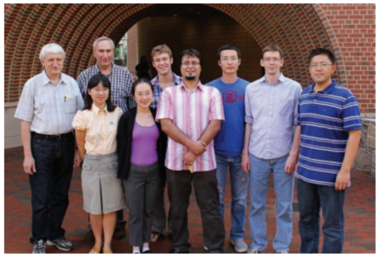
Michael Rubinstein is the recipient of the 2018 Bingham Medal for his seminal contributions to our understanding of polymer dynamics. Michael was trained in Physics (B.S. at CalTech in 1979 and Ph.D. at Harvard in 1983) and worked in industry for 12 years, first at AT&T Bell Laboratories and then at Eastman Kodak, before moving in 1995 to the University of North Carolina, where he stayed for more than 20 years, and then to Duke University in 2018.

Michael has made many contributions to polymer physics with a total of 20,000 citations and an h-index = 68! Forty-eight of his publications have more than 100 citations. His 2005 review article with Andrey Dobrynin on theory of polyelectrolytes in solutions and at surfaces currently has over 1100 citations.

Michael's ideas have had profound impacts on the way rheologists think about their data in the studies of polyampholytes, polyelectrolyte solutions, polyelectrolyte gels, neutral polymer solutions, associating polymers, linear and branched polymer melts, polymer gelation, polymer networks with and without fractal fillers, block copolymers, ring polymers, bottle-brush polymers and polymer nanocomposites.

I met Michael when I started working at Eastman Kodak in July of 1985 (Michael had started working there two weeks earlier). We had offices next door to each other and worked together extensively for our ten years at Kodak. Those were great years, as we always had the time to think until a given problem was solved, without distractions such as proposal writing. We were fortunate to have forward-minded managers that valued research; Jack Chang and John Pochan protected us well from the pressures that many industrial research managers would try to apply. We were in the Polymer Science Lab, a merry band of mostly chemists. Michael was viewed as a messiah, as whatever the problem, Michael could give each person a fresh way to think about the problem they were struggling with. He and I learned a great deal about polymers from this group and owe them a debt of gratitude.

In 1990 Michael and I taught a polymer course in the Physics Department at the



In 2011 Michael Rubinstein's research group included (front row, from left to right): Sergey Panyukov, Yanchun Ling, Yanqian Wang, Ozan S. Sariyer, Evgeny B. Stukalin, Zouwei Wang; Back row: Rubinstein, James Brock, Li-Heng Cai.

Bernard D. Coleman

July 5, 1930-Present

Physical Chemist, Mathematician.

Awarded Bingham Medal 1984.

Bernard David Coleman was born on July 5, 1930 in New York City. Coleman received his B.S. in Chemistry from the University of Indiana in 1951, after which he attended Yale University where he received his M.S. in 1952 and Ph.D. in 1954, both in Physical Chemistry. After graduating with his doctorate, he went to work for the Du Pont Company at the Carothers Research Laboratory conducting basic studies on the tensile strength of fibers. He left the company after three years to take the position of senior fellow at the Mellon Institute, and he remained there from 1957 to 1988. During this time, he was also a professor of mathematics (1967-1988), professor of biology (1974-1988), and professor of chemistry (1984-1988) at Carnegie Mellon University. In 1988 he moved to Rutgers University to become the J. Willard Gibbs Professor of Thermomechanics. He also served as a professor of mathematics and director of the graduate program in mechanics.

The basic and varied contributions to rheology made by Professor Coleman and his collaborators include theoretical studies of viscometric flows of non-Newtonian fluids, linear and nonlinear viscoelasticity, thermodynamics of deforming materials, wave propagation in nonlinear visco-elastic materials, stability of various types of flows and deformations, and the birefringence of flowing and deforming materials. His work is noted for its mathematical rigor, whilst also focusing on key results that can be compared with appropriate experimental data. He coauthored a ground-breaking book *Viscometric Flows on Non-Newtonian Fluids*, written in collaboration with H. Markowitz and W. Noll, that received wide recognition. Besides its noteworthy theoretical content, the book still stands as a landmark reference on viscometry and the measurement of elastic normal-stress differences.

Dr. Coleman has been a visiting professor at numerous universities in this country and abroad. He also served on various university committees and on the editorial board of journals on rational mechanics and mathematical biology. He was a member of the board of directors of the Renaissance and Baroque Society in Pittsburgh from 1974 to 1979, served as the American chairman at the Venice Symposium of the United States-Italy Cooperative Science Program in 1978, and served as the Society for Natural Philosophy Treasurer from 1967 to 1968 then Chairman from 1971 to 1972. It is because of his mathematically-rigorous and experimentally-verifiable research in rheology that Coleman was awarded the Bingham Medal in 1984.

Sources:

"Bernard D. Coleman." Prabook.com. Accessed July 25, 2019.

https://prabook.com/web/bernard_d.coleman/69029.

Coleman, Bernard D. Vita_BDC.