USC Viterbi
School of Engineering
Ming Hsieh Department of Electrical and Computer Engineering

Ming Hsieh Institute **Seminar Series**

Photonics

Stretched Times and Divergent Time Scales Near the Glass Transition

Michael Shlesinger
Office of Naval Research

Date: Wednesday, April 19, 2023
Time: 10:00am – 11:00am
In-person: EEB 132

Abstract: Near the glass transition temperature, Tg, many supercooled liquids experience stretched exponential relaxations rather than faster exponential decay. The relaxation has a time scale that diverges at a critical temperature, Tc, which is below Tg. I derive these laws from a model of anomalous defect diffusion and apply the theory to the pressure dependent conductivity of ion doped polymers near Tg. From a thermodynamic viewpoint comparisons are made of isochoric activation energy to isobaric activation enthalpy to determine the relative importance of volume and temperature to electrical conductivity. A key ingredient in the theory is the disappearance of free volume associated with defects when the temperature is lowered. The theory is able to explain the free volume measurements made by positron annihilation experiments.

Biography: Dr. Michael Shlesinger received a B.S. in Math and Physics from SUNY Stony Brook in 1970 and PhD in Physics from the University of Rochester in 1976. He then worked at the La Jolla Institute, Georgia Tech, and the University of Maryland before joining the Office of Naval Research in 1983. He became Head of ONR's Physics Division in 1986 and a member of the Senior Executive Service in 1987. He switched to a Chief Scientist role in 1995 and received the Presidential Rank Award in 2004 and ONR's Outstanding Lifetime Achievement Award in 2006. He has held the Kinnear Chair for Science at the USNA. One of his ONR responsibilities was the Division Director for Marine Corps programs. His ONR programs have focused on fields including Nonlinear Dynamics; Fractals; and Plasmonic Materials. He co-founded the Experimental Chaos Conference and received the APS Outstanding Referee Award. His work on random processes can be found in his 2021 mathematical autobiography "An Unbounded Experience in Random Walks with Applications".

Hosted by: Mercedeh Khajavikhan; Michelle Povinelli, Constantine Sideris; Hossein Hashemi; Wade Hsu; Mengjie Yu; Wei Wu; Tony Levi; Alan E. Willner; Andrea Martin Armani