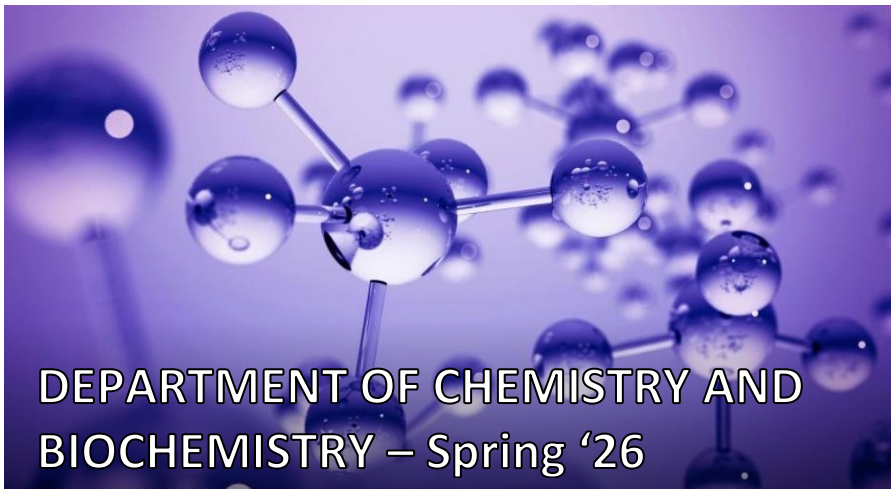

THE SALZBERG CHEMISTRY SEMINAR SERIES

The City College of New York

CREST IDEALS PHASE II

Monday, February 9 2026 @ 12:00 noon – MR1027

Novel electrolytes for batteries operating under extreme conditions

Steven G. Greenbaum
Department of Physics & Astronomy
Hunter College, CUNY

Abstract: Spacecraft for planetary exploration missions are often exposed to harsh environments, including ionizing radiation and extremes in temperature. For example, according to our collaborators at the NASA Jet Propulsion Laboratory (JPL), a future mission concept calls for insertion of a spacecraft into the Venus atmosphere held aloft by a two-stage helium balloon.[1] Thermal models predict that during daytime operation, the battery modules in the spacecraft will approach 100°C, well beyond the range of operation of standard lithium-ion batteries. JPL has developed alternative electrolyte formulations to enable past, present, and future missions,[2] including a recent evaluation of the addition of fluorinated ether co-solvents for high temperature operation.[3] Next, a recent collaboration with the Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA) and the University of Rome - Sapienza is on ionic liquid based electrolytes with and without a polymer matrix designed for elevated temperature operation. In this presentation, we discuss these efforts in detail, with emphasis on the characterization of ion transport by nuclear magnetic resonance (NMR) methods.

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Biography: Dr. Steve Greenbaum is CUNY Distinguished Professor of Physics at Hunter College and the CUNY Graduate Center, and a Fellow of the American Physical Society. He served (2008-14) as Executive Officer of the Ph.D. Program in Physics at the CUNY Graduate Center, and numerous times (total of nine years) as Physics Department chair at Hunter. Dr. Greenbaum earned his Ph.D. in Physics from Brown University. He was an NRC Postdoctoral Fellow in the Semiconductor Branch of the US Naval Research Laboratory in Washington, D.C., a Fulbright Scholar at the Weizmann Institute of Science, and a NASA/NRC Senior Research Fellow at the Jet Propulsion Lab (JPL), where he was a member of the team that designed the lithium-ion batteries for the successful Mars Rover missions. He has held Visiting Professor positions at many universities and was selected as one of eleven Jefferson Science Fellows at the U.S. State Department in 2014-15. Dr. Greenbaum's main research interest is magnetic resonance studies of materials for electrochemical energy storage and conversion. He has co-authored over 350 peer-reviewed publications, and directly supervised 30 Ph.D. students, 23 postdocs, plus numerous undergraduate researchers. His mentoring has received national recognition through the NSF and White House OSTP (PAESMEM Award, 2002), and he received the 2016 SACNAS Distinguished Scientist Award. He currently leads the Hunter College/NASA Center for Energy Storage in Space Applications, a five-year Cooperative Program with JPL, where he is on sabbatical during the 2025-26 academic year.

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