Alexander Laskin

Professor Alexander Laskin is a Professor in the Department of Chemistry with a courtesy appointment in the Department of Earth Atmospheric and Planetary Sciences at Purdue University in West Lafayette, Indiana. He received his M.Sc. in Mechanical Engineering from St. Petersburg Polytechnical Institute, Russia, and his Ph.D. in Physical Chemistry from The Hebrew University of Jerusalem, Israel. Dr. Laskin's group advances aerosol and multiphase environmental chemistry with discoveries that reframe sources, composition, and climate/health impacts.

He is actively involved in the scientific community, serving as a Co-editor of the Atmospheric Chemistry and Physics journal since 2013, and as a member of the Editorial Board for Aerosol Science and Technology and Scientific Reports. His honors include the NASA Honor Award (FIREX-AQ Group Achievement) in 2019 and being named a W.R. Willey Research Fellow of the Environmental Molecular Sciences Laboratory at PNNL in 2018.

Questions and comments about the Dawson Lecture can be directed to *chemistry@uky.edu*

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Department of Chemistry

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28th Annual Lyle Ramsay Dawson Lecture

Molecular Insights into Atmospheric Organic Aerosol: Optical Properties, Gas-Particle Partitioning, and Viscosity Assessment

Dr. Alexander Laskin

Department of Chemistry
Purdue University

Friday, December 5, 2025 | 4:00 PM
139 Chemistry/Physics Building

College of Arts and Sciences
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Abstract

Molecular characterization of Atmospheric Organic Aerosol (OA) using advanced methods of high-resolution mass spectrometry provides essential insights into the composition, properties, and behavior of chemical constituents, contributing to a more comprehensive understanding of its environmental impacts. These studies have enabled the identification and quantification of specific components of OA, including light-absorbing chromophores, such as phenolic, quinone and nitroaromatic compounds, N-heteroatom compounds, polycyclic aromatic hydrocarbons, etc. Through comprehensive understanding the chemical composition of OA, we can now assess its sources and atmospheric transformations. Recent investigations have also broadened their scope to explore the partitioning of OA species between the particle and gas phases. These measurements yield valuable data on particle-to-gas transition enthalpies and apparent volatilities of individual OA species, crucial for constructing volatility basis sets (VBS). The resulting VBS distributions enable an assessment of equilibrium gas-particle partitioning across various atmospheric conditions of organic mass loadings, temperatures, and pressures relevant to Earth's atmosphere. Furthermore, novel parameterization models leverage chemical characterization and volatility datasets to evaluate the viscoelastic properties of OA. This comprehensive molecular understanding of OA chemistry is essential for predicting their ability to undergo chemical reactions, partition between gas and particle phases, and impact atmospheric environment and related processes, such as radiative forcing of climate and cloud formation. This presentation will provide an overview of recent advancements in this field and outline future directions for continued research.

College of Arts and Sciences
Department of Chemistry

Lyle Ramsay Dawson

Dr. Dawson served in several academic positions in Illinois, Wisconsin, Nebraska and Louisiana and also worked on the Manhattan project as a Research Chemist and Group Leader in the Metallurgical Laboratory at the University of Chicago. In 1946, he was awarded the War Department's Certificate of Merit and a U.S. patent for his efforts on the Manhattan project which led to the discovery of a fundamental process for the extraction and purification of the elements plutonium and neptunium. He was a member of the committee that organized the Oak Ridge Institute of Nuclear Studies and was a council member of the Institute. Professor Dawson came to the University of Kentucky in 1945 as Chair of the Department of Chemistry. He provided key leadership in initiating and building the doctoral program in Chemistry at the University. For example, in his first decade in the department, he individually obtained the major portion of extramural research support. During his twenty five years with the Department, he held contracts for fundamental chemical research with the U.S. Army, the National Science Foundation and Atomic Energy Commission. He directed or co-directed seventeen Ph.D. dissertations and nine M.S. theses.

He was a talented research director and had a special ability to imbue his students with a concise, clear and complete scientific writing style. He published more than fifty research papers dealing with the chemistry of non-aqueous solutions and co-authored a reference book on the subject.

Dr. Dawson was a master teacher both in the classroom and in less formal conferences and discussions. His leadership and mentoring led many graduate teaching assistants and junior faculty members to become more effective teachers. His uncompromising devotion to high achievement standards in course work, research, education and training set the tone for our Department for years to come. Another significant contribution to the Department was Professor Dawson's indefatigable advocacy for a new chemistry building. His leadership in soliciting and designing a replacement for the former Chemistry building, Kastle Hall, culminated in the opening of the current Chemistry-Physics Building in 1963.

He also served the campus community in other ways. Dr. Dawson was elected a Distinguished Professor in the College of Arts and Sciences in 1954-1955, and was appointed to the rank of Distinguished professor in the field of Physical Chemistry by the University of Kentucky Board of Trustees in 1956. He served as Acting Dean of the Graduate School in 1954-1955, 1956 and 1960-1961.

Dr. Dawson's contributions outside the University were well recognized. He was a Fellow of both the American Institute of Chemists and the American Association for the Advancement of Science. He was a member of the American Chemical Society, Electrochemical Society, Sigma, Xi, Omicron Delta Kappa, Alpha Chi Sigma and Kappa Delta Pi, serving leadership roles in each of these organizations. He served several times as a Tour Lecturer and Visiting Scientist under the sponsorship of the American Chemical Society. He was also active in a variety of other non-academic organizations.

Dr. Dawson's twenty-five years in the Department represent a truly outstanding combination and balance of administrative leadership, teaching, research and service. Although Dr. Dawson passed away in 1976, his impact on the Department continues to this day. The endowment of the Lyle Dawson Lecture Series by his beloved daughter, Venita Dawson Curry, permits us to rejoice in this legacy and to continue our traditions of world-class chemical research.