HARRISON—MACRAE FAMILY LECTURE

The Harrison – MacRae Family Lecture Series was established through the generosity of the estate of the late John H. Harrison (Queen's B. Comm., 1949) and Elizabeth (Betty) Harrison (nee MacRae, Queen's B.A., 1949). For over a century the Harrison - MacRae family has attended Queen's University and has shown a distinct enthusiasm for the arts and sciences. Elizabeth Harrison is the daughter of Queen's graduates Alex E. MacRae (B.Sc. Chem. Eng., 1914) and Irene McAllister (B.Sc. Math & Physics, 1914), and sister to Queen's graduates Jean C. Doherty (B.A. 1939), Donalda I. Beattie (B.A. 1939), Marion E. Bradley (B.A. 1946), and brother Robert A. MacRae (B.Sc. Chem. Eng., 1954). Their son Ian Harrison (Queen's B.Sc. Chem. Phys., 1981) is a Professor of Chemistry at the University of Virginia. Numerous children, grandchildren and great grandchildren have likewise attended Queen's University. In recognition of their long affinity for Queen's, this lecture series will feature seminars by distinguished scientists on topics within the fields of chemical physics or physical chemistry.

PREVIOUS HARRISON-MACRAE LECTURERS

2019 • C. Adachi

2018 • B. Bayram

2018 • V. Batista

2016 • A. Aspuru-Guzik

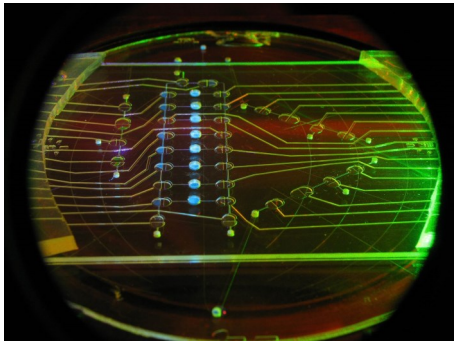
Queen's Chemistry

Department of Chemistry
Queen's University

is honoured to host the 2019 Harrison—MacRae Lecturer:

Dr. Peter A. Willis

NASA Jet Propulsion Laboratory



"The Search for Chemical Signatures of Life Beyond Earth"

Friday, March 15, 2019
11:30 AM
Room 117, Chernoff Hall

DR. PETER A. WILLIS

Peter A. Willis
NASA Jet Propulsion Laboratory
California Institute of Technology
Pasadena, CA

Dr. Peter Willis received his B.Sc. degree (Chemical Physics) from Queen's University in 1994 and his Ph.D. degree (Physical Chemistry) from Cornell University in 1999. As the first graduate student in the laboratory of H. Floyd Davis, he designed, built and validated the first crossed molecular beams machine with a rotating source for the study of neutral transition metal atom reactions. Following his graduate work he moved to the laboratory of Richard E. Smalley at Rice University, where he developed and validated a method and instrument system for the mass-production of single-walled carbon nanotubes. In 2001 he continued his postdoctoral research in nanotechnology at Caltech with collaborator James Heath. While at Caltech he was part of a new research effort to develop nanobiosensors for real-time proteomics. In 2004 he joined the technical staff at the nearby Jet Propulsion Laboratory, operated by Caltech for NASA, in order to advance the development of the Urey Instrument, intended for the European ExoMars rover mission. Since 2009, Dr. Willis has lead his own research group in microfluidic chemical analysis for robotic astrobiology missions to other worlds, and participated in the development of a variety of analytical chemistry instruments in various stages of technology readiness level. He is currently a member of the Science Office for the Mars 2020 Rover Mission, serving as the Investigation Scientist for the SuperCam Instrument suite. Beyond Mars, he also leads JPL's Chemical Analysis and Life Detection Group, as well as the Ocean Worlds Life Surveyor (OWLS) project, which seeks to develop the most capable life detection instrumentation suite available for future missions to ocean worlds. So in addition to developing the first rover-mounted fully autonomous microchip electrophoresis instrument for deployment in the Atacama Desert of Chile in 2017-2019, he is also developing cryogenic vacuum capable systems for use on future missions to the icy worlds of Europa and Enceladus, in the outer solar system.

SELECTED RECENT PUBLICATIONS

- Creamer, J., Mora, M.F., and Willis, P.A. (2018), Stability of Reagents used for chiral amino acid analysis during spaceflight missions in high-radiation environments. Electrophoresis 2018 (22), p. 2864-2871. doi: 10.1002/elps.201800274.
- Mora, M. F., Jones, S. M., Creamer, J. and Willis, P. A. (2017), Extraction of amino acids from aerogel for analysis by capillary electrophoresis. Implications for a mission concept to Enceladus' Plume, Electrophoresis 2017. doi:10.1002/elps.201700323
- Creamer, J. S.; Mora, M. F.; Willis, P. A.*, Enhanced Resolution of Chiral Amino Acids with Capillary Electrophoresis for Biosignature Detection in Extraterrestrial Samples. Analytical Chemistry 2017, 89 (2), 1329-1337.
- Willis, P. A.*; Jiao, H.; Greer, F.; Fisher, A. M.; Mora, M. F.; Stockton, A. M.; Cable, M. L., The Chemical Laptop. CIT-5905-P5 2015.
- Willis, P. A.*; Creamer, J. S.; Mora, M. F., Implementation of microchip electrophoresis instrumentation for future spaceflight missions. Analytical and Bioanalytical Chemistry 2015, 407 (23), 6939-6963.
- Mora, M.; Stockton, A.; Willis, P.*, Analysis of Thiols by Microchip Capillary Electrophoresis for In Situ Planetary Investigations. In Microchip Capillary Electrophoresis Protocols, Van Schepdael, A., Ed. Springer New York: 2015; Vol. 1274, pp 43-52.