Please join us for the Hopkins Award Lecture and Reception honoring 2015 awardee Larry Dalton.

Friday, November 6, 2015
4:00 pm Lecture, BAG 154
5:00 pm Reception, CHB 102

The Science of Organic-Inorganic Hybrid Electro-Optics
Professor Emeritus Larry Dalton
National Science Foundation and Department of Defense studies have recognized chipscale integration of electronics and photonics as crucial to next generation telecommunication, computing, and sensing (including transportation and medical diagnostic) technologies. Appropriately, 2015 has been designated the "Year of Light." Central to chipscale integration of electronics and photonics is electro-optic technology that interconverts information between electronic, photonic, and plasmonic domains. Transduction of signals between various information carriers (electrons, photons, plasmon polaritons) must be accomplished at high speed (GHz or THz bandwidths), energy efficiency (femtojoule/bit for digital signals), and with device footprints (1 micron^2) compatible with high-density integration. Unlike electronic device integration (which is monolithic and focuses on a single fundamental device architecture), photonic and electro-optic integration involves hybrid integration of diverse materials and a variety of complex device (silicon photonic, plasmonic, photonic crystal, and metamaterial) architectures.

In this presentation, we focus on the development of state-of-the-art-defining silicon-organic hybrid (SOH) and plasmonic-organic hybrid (POH) devices. This involves optimizing organic electro-optic materials through development of effective multi-scale theoretical methods coordinated with development of new synthetic, materials processing, and material characterization methodologies. This research spans the disciplines of physical, organic, analytical, and inorganic chemistry. Electrical engineering research has pioneered the emerging field of nanophotonics/sub-wavelength optics. The combination of material and device architectures advances have led to electro-optic device voltage-length performance of 50 V-micron (permitting femtojoule/bit energy efficiency and micron scale device footprints) and bandwidth performance of greater than 100 GHz (or 100 Gbit/s). Record setting telecommunication performance has been demonstrated for all advanced modulation formats. Hybrid organic/inorganic device technology also permits record setting performance in sensing applications such as phased array radar.

A YouTube video of the lecture can be found here: https://youtu.be/bI48NijNCz0

The Paul B. Hopkins Endowed Faculty Award is awarded to a member of the Department of Chemistry faculty to honor outstanding achievement in any area of professional responsibility. The award was established through a gift from Professor Emeritus B. S. Rabinovitch. Unlike awards given by professional societies or within specific fields of chemistry, the Hopkins Award is given by UW Chemistry faculty to their colleagues for outstanding achievement. Previous Hopkins Award recipients have been professors B. S. Rabinovitch, Karen Goldberg, Michael Gelb, Charles T. Campbell, Alvin L. Kwiram, James M. Mayer, and František Tureček.

Larry Dalton joined the faculty of the UW Department of Chemistry in 1998, where he served as the George B. Kauffman Professor and the B. Seymour Rabinovitch Chair until 2011 when he assumed emeritus status. At the UW he served as the founding Director of the National Science Foundation Science & Technology Center on Materials and Devices for Information Technology Research, the DARPA MORPH (Molecular Photonics) program, and the Lumera Sponsored Research Agreement. Larry came to the UW from the University of Southern California where he co-directed the Loker Hydrocarbon Research Institute (with George Olah) and served as the Harold and Lillian Moulton Chair and Professor of Chemistry. He also directed two Department of Defense MURI centers and several additional DARPA, NRO, and SDI programs. Professional recognition includes election to fellowship in the American Chemical Society (inaugural class), the Materials Research Society, the Optical Society of America, the American Association for the Advancement of Science, the SPIE-International Society of Optics and Photonics; election to senior membership in the Institute of Electrical and Electronic Engineers; and election to membership in Washington State Academy of Sciences. Awards include the Helmholtz International Fellow Award for Excellent Researchers and Science Managers from Abroad (2015), the Linus Pauling Award and Medal (2011), the IEEE/LEOS William Streifer Scientific Achievement Award (2006), the QEM (Quality Education for Minorities) Giants in Science Award (2005), the ACS Award in the Chemistry of Materials (2003), the Richard C. Tolman Medal (1996), the University of Southern California Associates Award for Creativity in Research and Scholarship (1990), the Burlington Northern Foundation Faculty Achievement Award (1986), an NIH Research Career Development Award (1976), a Camille and Henry Dreyfus Teacher-Scholar Award (1975), and an Alfred P. Sloan Fellowship (1974). Larry received a B.S. (1965) and M.S. (1966) from the Honors College of Michigan State University and his Ph.D. (1971) from Harvard University working with Professor Alvin L. Kwiram.