

Peacock Medal to Dr. Roberta L. Flemming (Western University)

The Peacock Medal is the highest award bestowed by the Mineralogical Association of Canada and recognizes the long-term research efforts and contributions of an individual to the Earth sciences within the Canadian context. This medal is awarded to a scientist who has made outstanding contributions to the mineral sciences in Canada.

This year's awardee is **Dr. Roberta L. Flemming**, a Professor in Earth Sciences and Director of the Powder and Micro-X-ray Diffraction Facility at Western University. She was born and raised in the Niagara Peninsula and graduated from Brock University (1985) with a B.Sc. in Geology and Chemistry. At Brock she discovered her love for Solid State Nuclear Magnetic Resonance spectroscopy (NMR) during her 4th year thesis with Dr. J. Stephen Hartman. She received her M.Sc. (1990) and Ph.D. (1997) in Geological Sciences from Queen's University, studying under Dr. Ron Peterson, where she combined NMR spectroscopy with X-ray crystallography and high-temperature mineral synthesis, studying spinel group minerals. She held a Killam Post-Doctoral Fellowship at University of Alberta (1997-1999) with Dr. Robert Luth where she studied aluminous pyroxenes synthesized from high pressures. She has been at Western University since 2000, where she has enjoyed research and teaching in mineralogy for over 20 years. She was awarded a CFI-funded Micro X-ray Diffractometer in 2002, which performs *in situ* XRD, and she put her first Kimberlite Indicator Minerals (KIMs) (garnets from Dr. Herb Helmsteadt) and her first meteorite (Southampton Pallasite) on the micro-XRD in 2003.

Roberta's research program uses minerals as interpretive and predictive tools to reveal past and present processes on Earth and other planetary bodies including the moon and Mars. Her research program involves innovative applications of *in situ* X-ray diffraction and NMR spectroscopy, and allied methods such as EPMA and XRF, to study Earth and planetary materials to understand solar system evolution. She uses Solid State NMR and XRD to quantify minerals as recorders of temperature in the early solar system and terrestrial mantle rocks, by making systematic observations of mineral composition, crystal structure and cation distribution (order-disorder) for key mineral suites, to derive thermodynamic parameters and equilibration temperatures. She uses *in situ* XRD to correlate crystal structural parameters to chemical composition in minerals, including meteorites to aid classification (e.g. H, L, LL), and KIMs for application to diamond exploration. She is pioneering the development of *in situ* XRD to interpret and quantify minerals as recorders of crystal deformation due to tectonic deformation (strain) and meteorite impact (shock) in Earth and planetary materials. She has recently begun calibrating strain using experimentally shocked rock forming minerals, as well as evaluating strain at a smaller scale, using EBSD. She is also leading a multidisciplinary team of researchers, with funding from the Canadian Space Agency, to develop a "Miniaturized In-situ X-Ray Diffractometer for Mineralogical Characterization of Planetary Surfaces (ISXRD)" with a focus on Mars.

Her research has benefited greatly from working with many excellent collaborators at Western, across Canada, and internationally. She has supervised 37 B.Sc., 20 M.Sc. and 7 Ph.D. thesis students, and published over 70 research papers. She considers it a privilege to have been able to supervise and collaborate with so many outstanding students over the past two decades.

She is an enthusiastic teacher and mentor to students of all ages, and she is committed to public outreach. She was awarded Western's Faculty of Science Outreach Award in 2020. Last year she Co-chaired GAC-MAC 2021, hosted by Western in London, Ontario, and she co-organized the 14th Canadian Powder Diffraction Workshop-Berry School, also at Western.

