QGCS 18th Annual Symposium Keynote Lecture
DNA Nanostructures: From Design to Targeted Cancer Therapy

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DNA is universally recognized as the molecule of life, encoding the genetic instructions that define us. But the very attributes that make it such an effective information carrier also make it an exceptional material for constructing nanoscale objects.

In our work, we use DNA to create three-dimensional structures, such as cages, nanotubes, and DNA-polymer nanostructures, that hold great promise for precise drug delivery. These assemblies can be finely tuned in size, shape and molecule presentation. They can encapsulate drug cargo and only release it in response to disease-related biological signals. They resist enzymatic breakdown, block the production of disease-causing proteins, and show favourable biodistribution in vivo, pointing to new opportunities in targeted cancer treatment. We will also describe how small molecules can redirect DNA assembly into completely new structures, extending the possibilities of this biomaterial beyond classical base-pairing.

Hosted by QGCS and C2MCI

Hanadi Sleiman is a Professor of Chemistry and Canada Research Chair in DNA Nanoscience at McGill University. She received her Ph.D. from Stanford University, and was a CNRS postdoctoral fellow in Prof. Jean-Marie Lehn's laboratory at the Université Louis Pasteur. She joined the faculty at McGill University in 1999, where her research group focuses on using the molecule DNA as a template to assemble nanostructured materials.

Sleiman is Fellow of the Royal Society (London) and of the Royal Society of Canada, and was Associate Editor of J. Am. Chem. Soc. (2018-25). Among her research recognitions are the NSERC Polanyi Award (2021), Izatt-Christensen Award in Supramolecular Chemistry (2016), Killam Research Fellowship (2018), and CSC E. W. R. Steacie Award (2024)

Sleiman also received the Society of Chemical Industry Kalev Pugi award (2024), CSC R. U. Lemieux Award in Organic Chemistry (2018), Cottrell STAR Award (2021), Albus Award (Grifols, 2018), Netherlands Scholar Award in Supramolecular Chemistry (2018), CIC E. Gordon Young Award (2011), CSC Strem Award (2009). She received named lectureships including Ayer (U. Alberta), Hirschmann (U. Wisconsin-Madison), BP Sustainability (U. Cambridge), Bristol-Myers-Squibb (Columbia U. and MIT), Swiss Chemical Society (U. Genève, EPFL, U. Neuchâtel, U. Fribourg, U. Basel).

Sleiman is Editorial Advisory Board member of Chem, J. Org. Chem., ChemBioChem, and Trends in Chem. She received the McGill Principal's Prize (2002) and the Leo Yaffe Award (2005) for Excellence in Teaching.