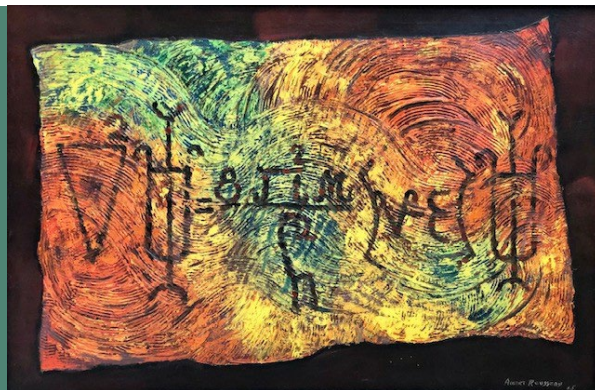


Automne 2022

Conférence

au Département de chimie



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Montréal, Québec, Canada

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Light-Matter Interactions at the Nanoscale

I often thought of the optical properties of nanomaterials as an oil rig in the middle of the ocean: Almost everybody exploits its outcome, while probably not so many could dive to the deep ocean to see where the oil comes from. Similarly, the unique optical properties of nanoparticles have been proven extremely attracting, resulting in the booming of nanotechnology with applications in namely every field of science and engineering. On the other hand, some of the theories explaining light-matter interactions at the nanoscale are sometimes still hard to grasp, controversial, if not a complete mystery.^{1,2} Just like the depth of the ocean, we still face limitations in getting a deeper understanding of how and why nanoparticles differ from their bulk counterparts. In this seminar, I will try to summarize what we already know about optical nanomaterials and, more importantly, how we can get more insights into their mechanisms to improve their applications, such as nanodrugs in radiotherapy or in particle velocimetry.²⁻⁴ These examples will also serve the scope of introducing a novel research field that proposes the use of optical nanomaterials to replicate the functions of a human brain. Just like a neuron, an optical nanomaterial can answer to a certain stimulus (light) with a certain response (light, motion, heat, etc.), which is dependent on the stimulus and the used material. Once more, understanding and exploiting the peculiar optical properties at the nanoscale can help developing new optical nanomaterials, i.e. neuromorphic nanomaterials. I believe that exploring this new field can present remarkable implications for applications in computer science, photonics and even medicine.

References

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Cordiale invitation à toutes et à tous !

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