Canadian Association of Physicists
Association canadienne des physiciens et physiciennes

Contribution ID: **2460** Type: **Oral Competition (Graduate Student) / Compétition orale (Étudiant(e) du 2e ou 3e cycle)**

Design and synthesis of an artificial molecular motor: The Lawnmower

Wednesday, June 5, 2019 2:00 PM (15 minutes)

Despite the second law of thermodynamics and a harsh thermal environment, molecular motors, among their many talents, are capable of directed motion and long range transport within cells. In this talk I will discuss our approach towards understanding how directed and processive motion is achieved at the molecular scale through the synthesis of an artificial molecular motor comprised of no biological motor components. Our system is designed to achieve directed motion through a burnt-bridges ratchet mechanism whereby it cleaves peptide substrate sites as it moves, thereby inhibiting backwards stepping. The substrate sites are presented to the motor as a 'lawn' through the tips of a dense polymer brush; we therefore call our artificial motor 'the Lawnmower'. I will present our preliminary experimental results of the micron-sized lawnmower on a two-dimensional lawn, as well as present our kinetic Monte Carlo simulations which offer design principles for a nano-scaled version [C.S. Korosec et al., Phys. Rev. E, 98(3), 2018].

Primary author: KOROSEC, Chapin (Simon Fraser Univ)

Co-authors: Dr ZUCKERMANN, Martin J. (Department of Physics and Department of Molecular Biology and Biochemistry, Simon Fraser University, Canada); Mr KIRKNESS, Michael W.H. (Department of Molecular Biology and Biochemistry, Simon Fraser University, Canada.); FORDE, Nancy (Simon Fraser University)

Presenter: KOROSEC, Chapin (Simon Fraser Univ)

Session Classification: W2-3 Molecular Motors (DPMB) | Moteurs moléculaires (DPMB)

Track Classification: Physics in Medicine and Biology / Physique en médecine et en biologie (DPMB-DPMB)