



Canadian Association
of Physicists

Association canadienne
des physiciens et physiciennes

Contribution ID: 4475 Type: **Oral not-in-competition (Undergraduate Student) / Orale non-compétitive (Étudiant(e) du 1er cycle)**

(UG) Putting Matter where it Matters: High-Performance, Physics-Based Approaches to Problems in Additive Manufacturing

Tuesday 28 May 2024 11:15 (15 minutes)

The advent of additive manufacturing techniques offers the ability and potential to (literally) reshape our manufactured- and built environment. However, key issues, including questions about robustness, impede the use of additive manufacturing at scale. In this talk, we present a high-performance code that extends topology optimization, the leading paradigm for additive manufacturing design, via a novel Pareto-Laplace filter. This filter has the key property that it couples the physical behaviour of actual, physical products to analogues of physical processes that occur in the space of possible design solutions. We show that the solution space “physics” gives insight into key questions about robust design.

Keyword-1

Additive manufacturing

Keyword-2

Computational physics

Keyword-3

Molecular dynamics

Authors: SHEEDY, Aidan (Queen's University); ALIAHMADI, Hazhir (Queen's University); VAN ANDERS, Greg

Presenter: SHEEDY, Aidan (Queen's University)

Session Classification: (DAPI) T1-10 Applied Physics II | Physique appliquée II (DPAI)

Track Classification: Technical Sessions / Sessions techniques: Applied Physics and Instrumentation / Physique appliquée et de l'instrumentation (DAPI / DPAI)