A Combinatorial Computational Approach to Optimizing Drug Delivery from Passive Hydrogels SÉBASTIEN CASAULT, GARY W. SLATER, University of Ottawa — We introduce a new computational approach to design passive drug delivery systems based on porous materials such as hydrogels. The approach uses four tools: a method to establish the exact release pattern from all possible loading sites inside a given hydrogel; a method to generate a large number of hydrogel structures to be tested numerically; a method to compute the loading pattern that would provide the best release curves for a given hydrogel structure; and an optimization method that leads to the selection and design of optimal hydrogel structures. Using this novel approach, we show that non-trivial release curves can be obtained by generating a multitude of random structures. Strategies to generalize this approach to other systems will be discussed.

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