



# Hamilton Institute

## An Equivalence Principle for the Incorporation of Favorable Mutations in Asexual Populations

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### ***Abstract:***

Rapid evolution of asexual populations, such as that of cancer cells or of microorganisms developing drug resistance, can include the simultaneous spread of distinct beneficial mutations. We demonstrate that evolution in such cases is driven by the fitness effects and appearance times of only a small minority of favorable mutations. The complexity of the mutation-selection process is thereby greatly reduced, and much of the evolutionary dynamics can be encapsulated in two parameters—an effective selection coefficient and an effective rate of beneficial mutations.

We confirm this theoretical finding and estimate the effective parameters for evolving populations of fluorescently labeled *Escherichia coli*. The effective parameters constitute a simple description and provide a natural standard for comparing adaptation between species and across environments.

**Venue:** Seminar Room, Hamilton Institute, Rye Hall, NUI Maynooth

**Time:** 10.00 - 11.00am (followed by tea/coffee)

Travel directions are available at [www.hamilton.ie](http://www.hamilton.ie)