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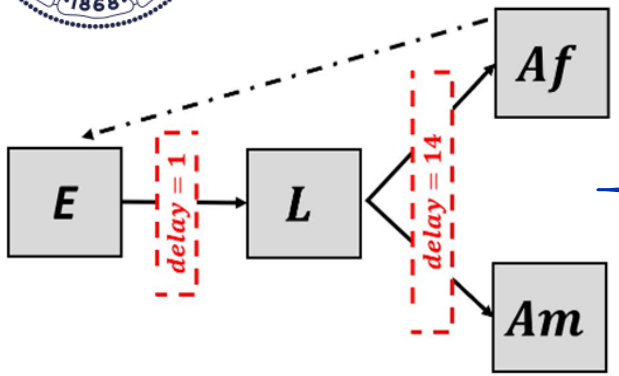


Dynamic population model developed to study the **optimal release strategy** for genetically modified mosquitoes, with applications for eradicating malaria.

Fig. 1. A visual representation of the population dynamics model. The entire system is solved in each timestep.

Model Predictive Control (MPC) is a dynamic programming approach based on an **iterative, deterministic, finite-horizon** optimization.

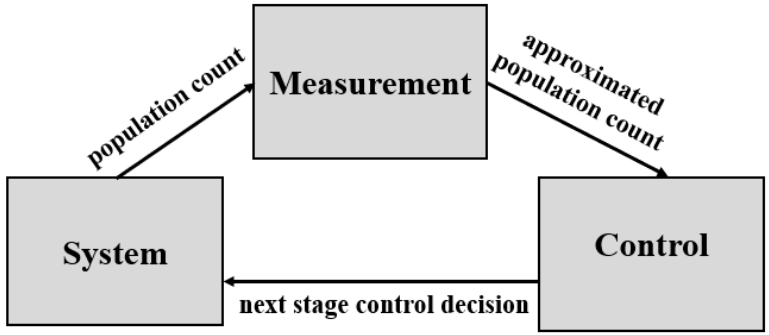
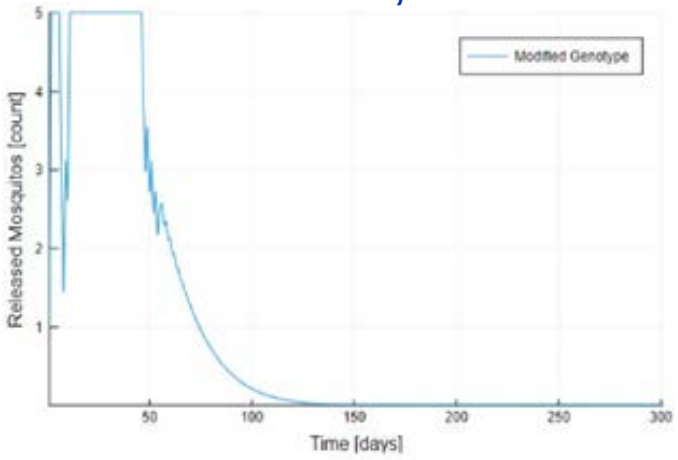


Fig. 2. A conceptual diagram of the MPC process.



The objective function seeks to **reduce the difference** between the wildtype and modified adult male populations as much as possible in each timestep.

Fig. 3. The control trajectory in the 5-step lookahead MPC problem.

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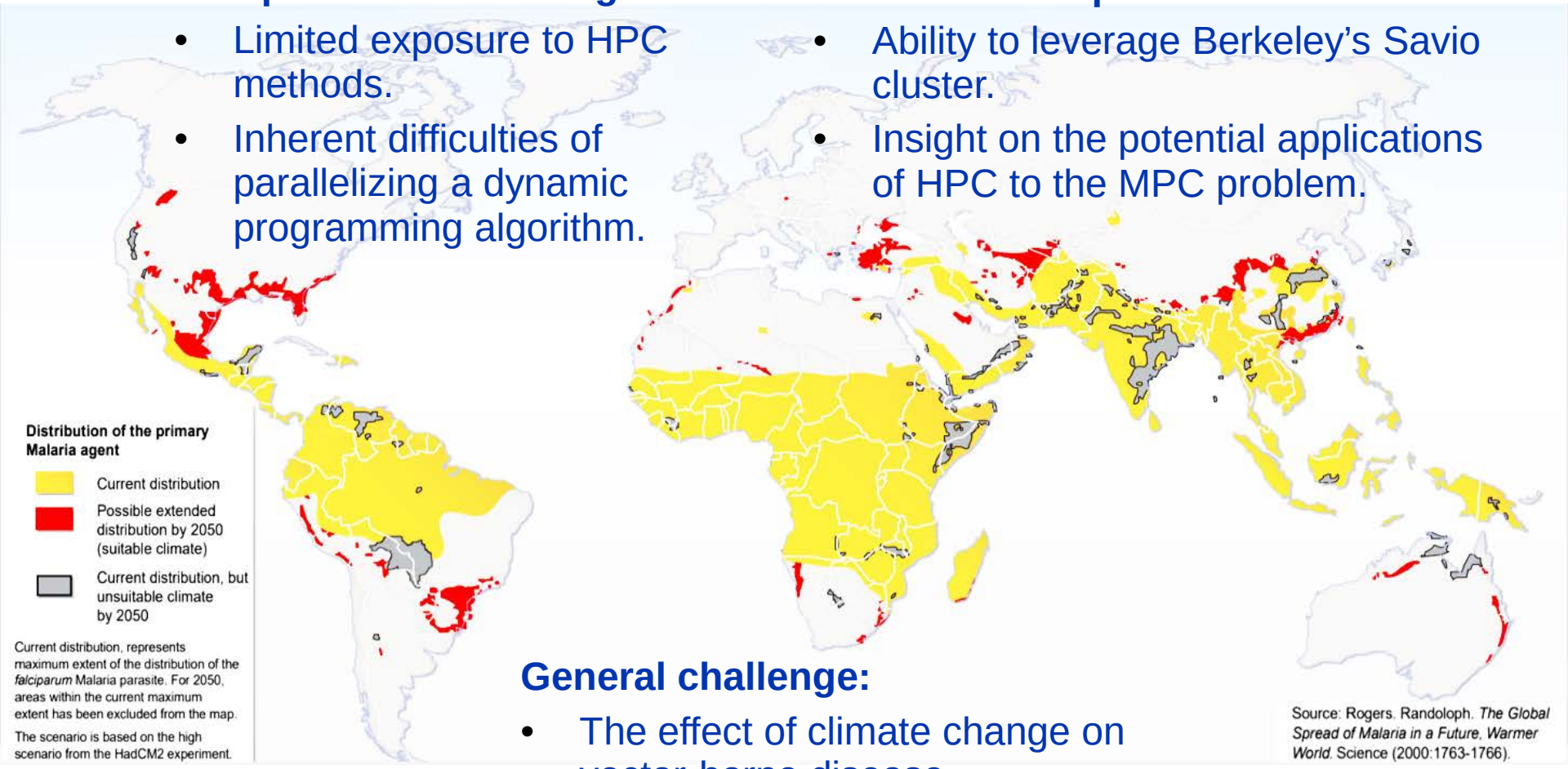
Computational challenges:

- Limited exposure to HPC methods.
- Inherent difficulties of parallelizing a dynamic programming algorithm.

Desired accomplishments:

- Ability to leverage Berkeley's Savio cluster.
- Insight on the potential applications of HPC to the MPC problem.



General challenge:

- The effect of climate change on vector-borne disease.