

**Steve Krone** (University of Idaho, USA)

Spatial structure undermines parasite suppression by gene drive cargo

*Abstract:* Gene drives may be used in two ways to curtail vectored diseases. Both involve engineering the drive to spread in the vector population. One approach uses the drive to directly depress vector numbers, possibly to extinction. The other approach leaves intact the vector population but suppresses the disease agent during its interaction with the vector. This second application may use a drive engineered to carry a genetic cargo that blocks the disease agent. An advantage of the second application is that it is far less likely to select vector resistance to block the drive, but the disease agent may instead evolve resistance to the inhibitory cargo. However, some gene drives are expected to spread so fast and attain such high coverage in the vector population that, if the disease agent can evolve resistance only gradually, disease eradication may be feasible. Here we explore several models to show that spatial structure in the vector population can greatly facilitate persistence and evolution of resistance by the disease agent. (This is joint work with Richard Gomulkiewicz, Jim Bull, and Chris Remien.)