1128-92-266 **Brandon McNellis***, brandon.mcnellis@gmail.com, and **Tara Hudiburg**. *Predicting forest mortality and landscape change under novel climates using an analytical approach to drought response physiology and probabilistic scaling.* Preliminary report.

Climate forecasts for the next century predict substantial shifts in drought severity and intensity across the Western U.S., and tree water stress physiology has attracted significant attention due to rapid and recent observed mortality. Models can attempt to predict which forests are most at risk from drought, but novel environments may preclude analysis that relies on past observations. Mechanistic models may reduce uncertainty in predictions but currently suffer from issues of mechanism identification. Furthermore, scaling mortality from the individual tree to model landscapes introduces stochastic elements that are difficult to assess with process-based models. To improve model performance, we integrate current theory on within-tree carbon dynamics and drought stress physiology with hydraulic models using an explicit analytical approach. Plant performance at the scale of individual trees is used to probabilistically assess the impact of drought on landscape-level gas fluxes and biomass using CLM 5.0. An on-going field experiment in managed stands of Pinus ponderosa and mixed conifers is assessed for model parameterization and performance across PNW forests, with important implications for future forest management strategy. (Received February 28, 2017)