



## Operations Research and Math Seminar

# Southern Ocean Krill, Krill Predators and Krill Fishery Management in a Changing Climate

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**Thursday, August 20, 2009**  
15:00-16:00 in GL-115  
Refreshment 14:45-15:00 in GL-239

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The southern ocean krill *Euphausia superba* is a central to the entire ecosystem: everything in the southern ocean either eats krill directly or something that eats krill. Krill are also remarkably successful with a circumpolar distribution and an enormous biomass. However, climate change in the form of increased UV exposure due to ozone depletion, increased water and air temperatures, and decreases in ice may have profound implications for krill life histories and krill predators. I will explain classical fishery yield models and state dependent life history models, using simple examples to illustrate the concepts. I will show how classical fishery models can be used in novel ways to explore the consequences of warming water and fluctuating sea ice on krill biomass and changing UV on krill survival. I will then show state dependent life history models can be used to explore how variation in krill abundance and spatial patchiness may affect land-based predators (penguins) during the reproductive season. Finally, all of these ideas will tied together in a discussion of the implications for management, especially as movement is made towards small scale management units in the southern ocean.

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Marc Mangel is Distinguished Professor of Mathematical Biology; Fellow, Stevenson College; and Director, Center for Stock Assessment Research.