

Careers in Science Seminar Series
hosted by
West Virginia State University Student Affiliates of the
American Chemical Society

*Utilizing Resting Egg Banks of the Water Flea, *Daphnia pulex*, to Study the
Impacts of Metal Stress on Genome Architecture.*



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Due to the impact of industrial mining operations around the greater Sudbury area, native populations of the water flea *Daphnia pulex* have evolved to thrive in environments historically contaminated with cadmium, as measured by increased fitness. We show that the genetic adaptation of these populations is attributed to increased constitutive transcription of critical metal detoxification genes, most notably Metallothionein 1 (Mt1). Furthermore, significant variations in gene copy number are found within and among natural populations of *Daphnia*. Here we propose that these important structural attributes of the genome are under natural selection, and that to explore this hypothesis, we plan to use the resting egg banks of Kelley, McCharles, MacFarlane, Simon, and Hannah lakes in the Sudbury, Ontario region to determine if the copy number variations observed in existing *Daphnia* populations with regards to cadmium adaptation were present in ancestral populations before the onset of industrialization or if these variations accumulated gradually as environmental conditions worsened. To do so, we will obtain ephippia from dated sediment cores and attempt either hatching experiments to resurrect historical populations from different time periods or obtain genetic material from the egg bank. Comparative studies with extant *Daphnia* populations utilizing genomic methods will then be pursued. *These studies contribute to and benefit from the Daphnia Genomics Consortium.*

Thursday, March 17, 2011
Hamblin Hall Auditorium
12:30 – 1:30