Neish Young Investigator Awardee

Daniel K. Owens earned a BSc degree with a concentration in biochemistry from East Tennessee State University where he first began research into natural products and flavonoid metabolism by developing a novel assay system for flavanone-3-hydroxylase. He continued working with flavonoids in the lab of Brenda Winkel at Virginia Tech and was awarded his PhD for examining the labile dioxygenase enzymes involved in flavonol biosynthesis in *Arabidopsis thaliana* with a particular focus on the flavonol synthase isozyme family. He then began a postdoctoral position in the lab of Cecilia McIntosh where glucosyltransferase enzymes with the potential to influence flavor chemistry and other aspects of metabolism in Citrus species were identified and thoroughly characterized. Subsequently, he moved to a plant physiologist postdoctoral position with the USDA-ARS Natural Product Utilization Research Unit in Oxford, MS where natural products were investigated as herbicide leads and herbicide resistant crop plants were characterized in the labs of Franck Dayan and Stephen Duke. Daniel is currently an assistant professor in Molecular Biosciences and Bioengineering at the University of Hawaii - Manoa in Honolulu, HI where his lab is investigating the herbicidal potential of natural products from allelopathic tropical and subtropical plants as well as beginning to study the potential of glucosyltransferase enzymes to interact within the flavonoid metabolon.

Award Presentation Title: Identification and Mode of Action of Herbicidal Natural Products

Joey Ooka and Daniel K. Owens

University of Hawaii at Manoa, Department of Molecular Biosciences and Bioengineering, 1955 East West Rd., Agricultural Sciences 218, Honolulu ,HI 96822, USA

Among agronomic pests worldwide, weeds are considered to be of the greatest concern to farmers. Weeds are conservatively estimated to cause greater than $40 billion in annual agricultural losses. This is particularly problematic issue in the Hawaiian islands where no winter kill offs and a temperate climate allow for essentially year round growth of pest and invasive species. Developing herbicidal products with novel modes of action as part of an overall integrated pest management strategy to combat weed and invasive plant infestations as well as continued problems with evolving herbicide resistance is a critical challenge. There is also a need for cheaper, environmentally safe, organically-approved herbicides to aid producers in meeting the increasing demand for organically grown products. Plant natural products are a valuable source for the discovery of new herbicidal compounds. Having naturally evolved herbicidal activity instead of being designed against a previously identified molecular target site, as with the majority of synthetic compounds, improves the likelihood of identifying natural compounds with novel target sites and modes of action. We propose to characterize herbicidal compounds from allelopathic plants, such as the Hawaiian invasive species strawberry guava (*Psidium cattleianum*), for activity against broadleaf and grassy weeds. Identified herbicidal compounds are to be tested for their specific molecular target sites of action and further developed for usage as novel modes of action are discovered.