

Alejandro P. Rooney

Research Geneticist

Postdoctoral, Molecular Evolution, Pennsylvania State University
Ph.D., Genetics, Texas A&M University
B.S., Biology, University of Cincinnati

National Center for Agricultural Utilization Research
United States Department of Agriculture
Peoria, IL 61604-3999

Tel: (309)-681-6395
Fax: (309)-681-6672
E-mail: alejandro.rooney@ars.usda.gov

Research

Understanding how species evolve and diversify is the ultimate extension of understanding how genes and genomes evolve and diversify, as the processes that influence the evolution of the genome are at the core of organismal evolution. While there are always exceptions, many phenotypes are the result of selection that impacts many different genes and gene families that interact to produce the trait of interest. Understanding how this interplay affects genome evolution requires an integrative approach involving theoretical and empirical work in a variety of research areas. This is the approach that my laboratory takes in order to understand the mechanisms and processes of evolution at the molecular level. The two systems that we are primarily interested in are moth sex pheromone biosynthesis and microbial diversification, although we have collaborators working with other organisms and genetic systems as well.

Selected Publications

Xue B., **Rooney A. P.**, Kajikawa M., Okada N., and Roelofs W. L. 2007. Cryptic sex pheromone desaturase genes in the genomes of moths: generation of evolutionary novelty through retroposon fusion. *Proceedings of the National Academy of Sciences USA* 104: 4467-4472.

Rooney A. P., Swezey J. L., Friedman R., Hecht D. W., and Maddox C. W. 2006. Analysis of core housekeeping and virulence genes reveals cryptic lineages of *Clostridium perfringens* that are associated with distinct disease presentations. *Genetics* 172:2081-2092

Rooney A. P. and Ward T. J. 2005. Evolution of a large ribosomal RNA multigene family in filamentous fungi: birth-and-death of a concerted evolution paradigm. *Proceedings of the National Academy of Sciences of the USA* 102: 5084-5089

Rooney A. P., Swezey J. L., Wicklow D. T. and McAtee M. 2005. Bacterial species diversity in cigarettes linked to an investigation of severe pneumonitis in U.S. military personnel deployed in Operation Iraqi Freedom. *Current Microbiology* 51: 46-52.

Nei M. and **Rooney A. P.** 2005. Concerted and birth-and-death evolution of multigene families. *Annual Review of Genetics* 39: 121-152

Rooney A. P. 2004. Mechanisms underlying the evolution and maintenance of functionally heterogeneous 18S rRNA genes in apicomplexans. *Molecular Biology and Evolution* 21: 1704-1711.

Seabury C. M., Honeycutt R. L., **Rooney A. P.**, Halbert N. D. and Derr J. N. 2004. Novel prion protein gene (PRNP) variants and evidence for strong purifying selection in functionally important regions of bovine exon 3. *Proceedings of the National Academy of Sciences of the USA* 101:15142-15147.

Rodríguez S., Liu W., Hao G., Piña B., **Rooney A. P.**, Camps F., Roelofs W. L. and Fabriàs G. 2004. Expression and evolution of delta-9 and delta-11 desaturase genes in the moth *Spodoptera littoralis*. *Insect Biochemistry and Molecular Biology* 334:1315-1328.

Liu, W. **Rooney A. P.**, Xue B. and Roelofs W. L. 2004. Desaturases from the spotted fireworm moth (*Choristoneura parallela*) shed light on the evolutionary origins of novel moth sex pheromone desaturases. *Gene* 342:303-311.

Roelofs W. L. and **Rooney A. P.** 2003. Molecular genetics and evolution of pheromone biosynthesis in Lepidoptera. *Proceedings of the National Academy of Sciences of the USA* 100:9179-9184.

Rooney A. P., Piontkivska H. and Nei M. 2002. Molecular evolution of the nontandemly repeated genes of the histone 3 multigene family. *Molecular Biology and Evolution* 19:68-75.

Piontkivska H., **Rooney A. P.** and Nei M. 2002. Purifying selection and birth-and-death evolution in the Histone 4 gene family. *Molecular Biology and Evolution* 19:689-697.

Roelofs W. L., Liu W., Hao G., Jiao H., **Rooney A. P.** and Linn C. E. Jr. 2002. Evolution of moth sex pheromones via ancestral genes. *Proceedings of the National Academy of Sciences of the USA* 99:13621-13626.

Rooney A. P., Zhang J. and Nei M. 2000. An unusual form of purifying selection in a sperm protein. *Molecular Biology and Evolution* 17:278-283.

Rooney A. P. and Zhang J. 1999. Rapid evolution of a primate sperm protein: relaxation of functional constraint or positive Darwinian selection? *Molecular Biology and Evolution* 16:706-710.

Nikaido M., **Rooney A. P.** and Okada N. 1999. Phylogenetic relationships among cetartiodactyls based on insertions of short and long interspersed elements: Hippopotamuses are the closest extant relatives of whales. *Proceedings of the National Academy of Sciences of the USA*. 96:10261-10266.

Last Revised: April 5, 2007