

## ANTONIS ROKAS, PH.D.

Department of Biological Sciences  
Vanderbilt University  
VU Station B 351634  
Nashville, TN 37235, U.S.A.

antonis.rokas@vanderbilt.edu  
office: (615) 936 3892  
lab: (615) 936 3893  
fax: (615) 343 6707

### CURRENT POSITION

**2007 – present** Assistant Professor, Vanderbilt University

### EDUCATION

**2001 Ph.D. in Evolutionary Biology** University of Edinburgh, United Kingdom

**1998 B.Sc. in Biology** University of Crete, Greece

### PREVIOUS ACADEMIC POSITIONS

**2005– 2007** Research Scientist, The Broad Institute of MIT & Harvard

**2002–2005** Post-doctoral Fellow, University of Wisconsin-Madison, Advisor: S. B. Carroll

**1998–2001** Doctoral Student, University of Edinburgh, Advisor: G. N. Stone

**1997–1998** Undergraduate Exchange Student, Reading University, Advisor: P. W. H. Holland

**1996–1997** Undergraduate Thesis Student, University of Crete, Advisor: E. Zouros

### AWARDS AND FELLOWSHIPS

**Faculty** 2008 Searle Scholar

**Postdoctoral** Human Frontier Science Program Long-Term Fellowship, 2002 – 2005

**Graduate** Natural Environment Research Council Studentship, 10/1998 – 9/2001

**Undergraduate** Greek Foundation of State Scholarships, Undergraduate Studentship for Studies Abroad, 10/1997 – 6/1998

### RESEARCH INTERESTS

- Phylogenetics, phylogenomics of fungi and animals, early animal evolution
- The molecular origins of multicellularity and development in fungi and animals
- Origin and evolution of fungal genetic pathways involved in mating and secondary metabolite production

### TEACHING

**Instructor** BSCI-320: Graduate Seminar in Biological Sciences

part of the *Ecological and Evolutionary Genetics* 3<sup>rd</sup> year undergraduate course, Autumn terms 2000, 2001, University of Edinburgh, United Kingdom.

part of the *Evolution in Action* 2<sup>nd</sup> year undergraduate course, Autumn term 2001, University of Edinburgh, United Kingdom.

**Guest Instructor** Programming for Biology, Cold Spring Harbor Laboratory, NY, USA, 2006.

### **SERVICE**

**Ad hoc grant reviewer** National Science Foundation (USA), Biotechnology and Biological Sciences Research Council (UK), The Wellcome Trust (UK), Marsden Fund, Royal Society (New Zealand).

**Selection committee member** Workshop on Molecular Evolution, Marine Biological Laboratory, MA, USA, 2003 – 2007.

**Editorial Board** Genomics Insights

**Ad hoc journal reviewer** *Anim. Biodiv. Conserv.*, *Bioinformatics*, *BMC Bioinformatics*, *Curr. Biol.*, *Development*, *Europ. J. Entomol.*, *Evolution*, *Gene*, *Genes Dev. Evol.*, *Genome Res.*, *Heredity*, *Integr. Comp. Biol.*, *J. Theor. Biol.*, *Mol. Biol. Evol.*, *Mol. Ecol.*, *J. Mol. Evol.*, *Mol. Phylog. Evol.*, *Nature*, *Plant Cell*, *Plasmid*, *PLOS Biol.*, *PLOS Genet.*, *PLOS Comp. Biol.*, *Proc. Roy. Soc. Lond. Ser. B.*, *Science*, *Trends Ecol. Evol.*, *Trends Genet.*, *Zoology*.

### **PROFESSIONAL AFFILIATIONS**

Society for Molecular Biology and Evolution, Society for the Study of Evolution, Society of Systematic Biologists, Mycological Society of America.

### **INVITED TALKS (LAST 5 YEARS)**

**2009** (scheduled) “Genome evolution and the origin of novel gene functions”, 100th International Titisee Conference, Black Forest, Germany.

IGERT Deep Genomics Symposium, Arizona University, Tucson, AZ.

“Evolutionary Biology: 150 Years After *The Origin*”, University of Michigan Life Sciences Institute Eighth Annual Symposium, Ann Arbor, MI.

Department of Biology, IGERT Seminar Series, Indiana University, Bloomington, IN.

International Symposium on Deep Metazoan Phylogeny, Berlin, Germany.

Department of Integrative Biology, University of Guelph, Ontario, Canada.

**2008** Entomological Society of America Annual Meeting, Reno, NV.

Department of Genetics, Washington University in St. Louis, MO.

XII International Congress of Mycology, International Congress of Microbiological Sciences, Istanbul, Turkey.

33rd FEBS Congress - 11th IUBMB conference on “Biochemistry of Cell Regulation”, Athens, Greece.

Annual Meeting of the Society of Molecular Biology and Evolution, Barcelona, Spain.

Infectious Disease Rounds, Vanderbilt University Medical Center, Nashville, TN.

**2007** 2<sup>ND</sup> ESF-EMBO Symposium on “Comparative Genomics of Eukaryotic Microorganisms”, San Feliu de Guixols, Spain.

Department of Plant Pathology, Pennsylvania State University, PA.

Symposium on “Aspergillus systematics in the genomics era”, CBS Fungal Biodiversity Centre, Utrecht, The Netherlands.

“Tree of Life” Symposium, University of Iowa, IA.

Department of Biology, Johns Hopkins University, MD.

Department of Biology, Boston College, MA.

Department of Biology, Georgetown University, DC.

**2006** Earth History and Paleobiology Seminar Series, Department of Earth & Planetary Sciences, Harvard University, MA.

Marine Biological Laboratory, MA.

Department of Biological Sciences, Vanderbilt University, TN.

Department of Biology, Clark University, MA.

Department of Biology, Duke University, NC.

IX<sup>TH</sup> International Fungal Biology Conference & 16<sup>TH</sup> New Phytologist Symposium on “Impact of Genomics on Fungal Biology”, Nancy, France.

Joint meeting of American Phytopathological Society, Canadian Phytopathological Society & Mycological Society of America. Quebec City, Canada.

Chemical Oceanography Seminar Series, Department of Earth, Atmospheric and Planetary Sciences, MIT, MA.

Darwin Day Speaker, Department of Biology, St. John’s University, NY.

**2005** Phylogeography and Phylogenetics Workshop, Mathematical Biosciences Institute, Ohio State University, OH.

The Broad Institute of MIT & Harvard, MA.

Department of Biology, New York University, NY.

Department of Biology, Boston College, MA.

## **PEER-REVIEWED PUBLICATIONS**

- 2009** **Rokas, A.** & P. Abbot. Harnessing genomics for evolutionary insights. *Trends Ecol. Evol.*: **24**: 192-200.
- Gibbons, J. G. & A. Rokas.** Comparative and functional characterization of intragenic tandem repeats in ten *Aspergillus* genomes. *Mol. Biol. Evol.* **26**: 591-602.
- Rokas, A.** The effect of domestication on the fungal proteome. *Trends Genet.* **25**: 60-63.
- 2008** **Rokas, A.** The origins of multicellularity and the early history of the genetic toolkit for animal development. *Ann. Rev. Genet.* **42**: 235-251.
- Rokas, A.** The molecular origins of multicellular transitions. *Curr. Opin. Genet. Dev.* **18**: 472-478.
- Rokas, A., & S. B. Carroll.** Frequent and widespread parallel evolution of protein sequences. *Mol. Biol. Evol.*: **25**: 1943-1953.
- Mathee, K., G. Narasimhan, C. Valdes, X. Qiu, J. M. Matewish, M. Koehrsen, **A. Rokas**, C. N. Yandava, R. Engels, E. Zeng, R. Olavarietta, M. Doud, R. S. Smith, P. Montgomery, J. R. White, P. A. Godfrey, C. Kodira, B. Birren, J. E. Galagan, and S. Lory. Dynamics of *Pseudomonas aeruginosa* genome evolution. *Proc. Natl. Acad. Sci. USA* **105**: 3100-3105.
- King, N., M. J. Westbrook, S. L. Young, A. Kuo, M. Abedin, J. Chapman, S. Fairclough, U. Hellsten, Y. Isogai, I. Letunic, M. Marr, D. Pincus, N. Putnam, **A. Rokas**, K. J. Wright, R. Zuzow, W. Dirks, M. Good, D. Goodstein, D. Lemons, W. Li, J. Lyons, A. Morris, S. Nichols, D. J. Richter, A. Salamov, JGI Sequencing, P. Bork, W. A. Lim, G. Manning, W. T. Miller, W. McGinnis, H. Shapiro, R. Tjian, I. V. Grigoriev, and D. Rokhsar. The genome of the choanoflagellate *Monosiga brevicollis* and the origins of metazoan multicellularity. *Nature* **451**: 783-788.
- Stone, G. N., R. J. Atkinson, **A. Rokas**, J.-L. Nieves-Aldrey, G. Melika, Z. Acs, G. Csóka, A. Hayward, R. Bailey, C. Buckee and G. A. T. McVean. Evidence for widespread cryptic sexual generations in apparently purely asexual *Andricus* gallwasps. *Mol. Ecol.* **17**: 652-665.
- 2007** **Rokas, A.,** G. Payne, N.D. Fedorova, S.E. Baker, M. Machida, J. Yu, D. R. Georgianna, R. A. Dean, D. Bhatnagar, T.E. Cleveland, J.R. Wortman, R. Maiti, V. Joardar, P. Amedeo, D.W. Denning and W.C. Nierman. What can comparative genomics tell us about species concepts in the genus *Aspergillus*? *Studies in Mycology* **59**: 11-17.
- Stone, G. N., R. J. Challis, R. J. Atkinson, G. Csóka, A. Hayward, G. Melika, S. Mutun, S. Preuss, **A. Rokas**, E. Sadeghi, & K. Schönrogge. The phylogeographic clade trade: Tracing the impact of human-mediated dispersal on the colonisation of northern Europe by the oak gallwasp *Andricus kollari*. *Mol. Ecol.* **16**: 2768-2781.
- Stone, G. N., R. J. Challis, S. Mutun, J.-L. Nieves-Aldrey, S. Preuss, **A. Rokas**, A. Aebi, E. Sadeghi, & M. Tavakoli. Longitudinal range expansion and cryptic eastern species in the western Palaearctic oak gallwasp *Andricus coriarius*. *Mol. Ecol.* **16**: 2103-2114.
- Ane, C., B. Larget, D. A. Baum, S. D. Smith, and **A. Rokas**. Bayesian estimation of concordance among trees. *Mol. Biol. Evol.* **24**: 412-426.

- 2006** Rokas, A. & Carroll, S. B. Bushes in the Tree of Life. *PLOS Biol.* **11**: e352.
- Jeong, S., A. Rokas & S. B. Carroll. Regulation of body pigmentation by the Abdominal-B Hox protein and its gain and loss in *Drosophila* evolution. *Cell* **125**: 1387-1399.
- Prud'homme, B., N. Gompel, A. Rokas, V. A. Kassner, T. M. Williams, S.-D. Yeh, J. R. True & S. B. Carroll. Repeated morphological evolution through cis-regulatory changes in a pleiotropic gene. *Nature* **440**: 1050-1053.
- 2005** Rokas, A., D. Krueger & S. B. Carroll. Animal evolution and the molecular signature of radiations compressed in time. *Science* **310**: 1933-1938.
- Rokas, A. & S. B. Carroll. More genes or more taxa? The relative contribution of gene number and taxon number to phylogenetic accuracy. *Mol. Biol. Evol.* **22**: 1337-1344.
- 2004** Hittinger, C. T., A. Rokas & S. B. Carroll. Parallel inactivation of multiple *GAL* pathway genes and ecological diversification in yeasts. *Proc. Natl. Acad. Sci. USA* **101**: 14144-14149.
- 2003** Rokas, A.\*, B. L. Williams\*, N. King & S. B. Carroll. Genome-scale approaches to resolving incongruence in molecular phylogenies. *Nature* **425**: 798-804. (\*equal contributors)
- Rokas, A., E. Ladoukakis, & E. Zouros. Animal mitochondrial DNA recombination revisited. *Trends Ecol. Evol.* **18**: 411-417.
- Rokas, A., R. J. Atkinson, L. W. I. Webster & G. N. Stone. Out of Anatolia: Longitudinal gradients in genetic diversity support a Turkish origin for a circum-mediterranean oak gallwasp *Andricus quercustozae*. *Mol. Ecol.* **12**: 2153-2174.
- Cummings, M. P., S. A. Handley, D. S. Myers, D. L. Reed, A. Rokas & K. Winka. Comparing bootstrap and posterior probability values in the four taxon case. *Syst. Biol.* **52**: 477-487.
- Rokas, A.\*, N. King\*, J. R. Finnerty & S. B. Carroll. Conflicting phylogenetic signals at the base of the metazoan tree. *Evol. Devel.* **5**: 346-359. (\*equal contributors)
- Rokas, A., G. Melika, Y. Abe, J.-L. Nieves-Aldrey, J. M. Cook & G. N. Stone. Lifecycle closure, lineage sorting, and hybridization revealed in a phylogenetic analysis of European oak gallwasps (Hymenoptera: Cynipidae: Cynipini) using mitochondrial sequence data. *Mol. Phylog. Evol.* **26**: 36-45.
- 2002** Cook, J. M., A. Rokas, M. Pagel & G. N. Stone. Evolutionary shifts between host oak species and host plant organs in *Andricus* gallwasps. *Evolution* **56**: 1821-1830.
- Stone, G. N., R. J. Atkinson, G. Brown, & A. Rokas. The population genetic consequences of range expansion: a review of pattern and process, and the value of oak gallwasps as a model system. *Biodiversity Science*, **10**: 80-97.
- Rokas, A., R. J. Atkinson, J.-L. Nieves-Aldrey, S. A. West & G. N. Stone. The incidence and diversity of *Wolbachia* in gallwasps (Hymenoptera; Cynipidae) on oak. *Mol. Ecol.* **11**: 1815-1829.

- Rokas, A.,** J. A. A. Nylander, F. Ronquist & G. N. Stone. A maximum likelihood analysis of eight phylogenetic markers in gallwasps (Hymenoptera: Cynipidae); implications for insect phylogenetic studies. *Mol. Phylog. Evol.* **22**: 206-219.
- 2001 Rokas, A.,** R. J. Atkinson, G. S. Brown, S. A. West & G. N. Stone. Understanding patterns of genetic variation in the oak gallwasp *Biorhiza pallida*: demographic history or a *Wolbachia* selective sweep? *Heredity* **87**: 294-304.
- Stone, G. N., R. J. Atkinson, **A. Rokas**, G. Csóka & J.- L. Nieves-Aldrey. Differential success in northwards range expansion between ecotypes of the marble gallwasp *Andricus kollari*: a tale of two refugia. *Mol. Ecol.* **10**: 761-778.
- 2000 Rokas, A.** & P. W. H. Holland. Rare genomic changes as a tool for phylogenetics. *Trends Ecol. Evol.* **15**: 454-459.
- Averof, M., **A. Rokas**, K. H. Wolfe & P. M. Sharp. Evidence for a high frequency of simultaneous double-nucleotide substitutions. *Science* **287**: 1283-1286.
- 1999 Rokas, A.,** J. Kathirithamby & P. W. H. Holland. Intron insertion as a phylogenetic character: the *engrailed* homeobox of Strepsiptera does not indicate affinity with Diptera. *Insect Mol. Biol.* **8**: 527-530.

#### **BOOK CHAPTERS**

- 2008 Rokas, A.** & S. Chatzimanolis. From gene-scale to genome-scale phylogenetics; the data flood in but the challenges remain. In “Phylogenomics” W. J. Murphy (Ed.), Methods in Molecular Biology series, Humana Press, Totowa, NJ, pp. 1-12.
- Geiser, D. M., R. A. Samson, J. Varga, **A. Rokas** and S. M. Witiak. A review of molecular phylogenetics in *Aspergillus*, and prospects for a robust genus-wide phylogeny. In “*Aspergillus* in the Genomics Era”, Varga, J., and R. A. Sampson (Eds.), Wageningen Academic Publishers, pp. 17-32.
- Rokas, A.** & J. E. Galagan. The *Aspergillus nidulans* genome and comparative analysis with other Aspergilli. In “The Aspergilli: Genomics, Medical Applications, Biotechnology, and Research Methods”, Osmani, S. A. and G. H. Goldman, CRC Press, pp. 43-55.
- 2006 Atkinson, R. J., A. Rokas** & G. N. Stone. Longitudinal patterns in species richness and genetic diversity in European oaks and oak gallwasps. In: “Phylogeography in southern European refugia: Evolutionary Perspectives on the origins and conservation of European Biodiversity”, S. Weiss, N. Ferrand (Eds). Kluwer, The Netherlands.
- 2003 Stone, G. N., R. J. Atkinson, G. Brown, A. Rokas** & G. Csóka. The population genetic consequences of range expansion: oak gallwasps as a model system. In: “Genes in the Environment”, R. S. Hails, J. E. Beringer and H. C. J. Godfray (Eds), Blackwell and the British Ecological Society, pp. 46-62.

#### **SELECT COMMENTARIES**

- 2008 Rokas, A.** Lining up to avoid bias. *Science* **319**: 416-417.
- 2007 Rokas, A.** and C. T. Hittinger. Transcriptional rewiring: The proof is in the eating. *Curr. Biol.* **17**: R626-628.

- 2006** **Rokas, A.** Different paths to the same end. *Nature* **443**: 401-402.
- Rokas, A.** Genomics and the tree of life. *Science* **313**: 1897-1898.