

Karyna Rosario, Ph.D.
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RESEARCH INTERESTS

Environmental virology, with an emphasis on the use of metagenomic approaches to describe viral diversity in different environments and organisms. Recent work focuses on investigating novel single-stranded DNA viruses in insects and fungi.

EDUCATION

- 2006 – 2010 **University of South Florida, St. Petersburg, FL**
Ph.D. Biological Oceanography (Virology)
Dissertation: “Enhancing Virus Surveillance through Metagenomics: Water Quality and Public Health Applications” (Major advisor: Mya Breitbart, Ph.D.)
- 2003 – 2005 **University of Arizona, Tucson, AZ**
M.S. Environmental Science (Microbiology)
Thesis: “Bacterial Community Changes during Plant Establishment at the San Pedro River Mine Tailings Site” (Major advisor: Raina Maier, Ph.D.)
- 1998 – 2002 **University of Puerto Rico, Mayagüez, PR**
B.S. Industrial Microbiology

APPOINTMENTS

- 2013 – Present Research Associate, University of South Florida
2011 – 2013 Postdoctoral Fellow, University of South Florida

FUNDED RESEARCH GRANTS

- 2012 – 2017 National Science Foundation - Assembling the Tree of Life. “Collaborative Research: AToL: ACCESS DNA Viruses: A Comprehensive Survey of Circular Ekaryotic Single-Stranded DNA Viruses in Invertebrates and Fungi” (\$995,371); P.I.: M. Breitbart, Co-P.I.: **K. Rosario**.
- 2010-2012 University of South Florida - College of Marine Science Interdisciplinary Research Grant Program. “Development of a Serological Assay for the Detection of Sea Lion Anellovirus (ZcAV)” 2010 – 2012 (\$50,000); P.I.: M. Breitbart, Co-P.Is: L. Dishaw, **K. Rosario**.
- 2010 National Science Foundation - East Asia and Pacific Summer Institutes. “Metagenomic Analysis of Geminiviruses in Insect vectors from the South Pacific Islands”. 2010 (\$5,617); P.I.: **K. Rosario**.

HONORS AND AWARDS

- 2013 Career Development Grant for Postdoctoral Women, American Society for Microbiology (one of four grants awarded nationwide), \$1,500
- 2012 Sackett Prize for Innovative Research, College of Marine Science, University of South Florida (award recognizes the most meritorious research completed within the College of Marine Science at the University of South Florida)
- 2010 Selected for Outstanding Student Presentation Session, American Society for Microbiology Student Travel Grant, American Society for Microbiology Distinguished Graduate Achievement Award, University of South Florida
- 2009 First Place Oral Presentation Award, College of Marine Science, University of South Florida Best Oral Presentation Award, Microbiology Session, Society for the Advancement of Chicanos/Hispanics in Science Elsie and William Knight, Jr. Endowed Fellowship, \$37,500 over three semesters Honorary Mention Robert D. Watkins Graduate Research Fellowship, American Society for Microbiology Abstract award, The Scientific Committee on Ocean Research Viral Ecology Group
- 2008 First Place Oral Presentation Award, College of Marine Science, University of South Florida
- 2007 Selected to participate in the NSF-sponsored International Polar Year – Research Opportunities in Antarctica for Minorities program, University of Texas at El Paso Successful Latina Student Award, University of South Florida Third Place Outstanding Student Oral Presentation Award, Florida Branch of the American Society for Microbiology St. Petersburg Progress Endowed Fellowship, College of Marine Science, University of South Florida, \$20,00 Alfred P. Sloan Minority Ph.D. Fellowship, \$30,000
- 2006 NSF Bridge to the Doctorate Fellowship, \$90,000 over three years

PEER-REVIEWED PUBLICATIONS (*Indicates co-first authorship)

- 2014 **K. Rosario**, H. Capobianco, T. F. F. Ng, M. Breitbart, and J. E. Polston. RNA viral metagenome of whiteflies leads to the discovery and characterization of a whitefly-transmitted carlavirus in North America. *PLoS ONE*. 9: e86748.
- 2013 L.D. McDaniel, **K. Rosario**, M. Breitbart and J. H. Paul. Comparative metagenomics: natural populations of induced prophages demonstrate highly unique, lower diversity viral sequences. *Environmental Microbiology*. 16: 570-585.
- A. Dayaram, K. A. Potter, A. B. Moline, D. D. Rosenstein, M. Marinov, J. E. Thomas, M. Breitbart, **K. Rosario**, G. R. Argüello-Astorga and A. Varsani. High global diversity of cycloviruses amongst dragonflies. *Journal of General Virology*. 94: 1827-1840.
- M. Padilla-Rodriguez, **K. Rosario** and M. Breitbart. Novel cyclovirus discovered in the Florida woods cockroach *Eurycotis floridana* (Walker). *Archives of Virology*. 158: 1389-1392.

- D.S. Dunlap, T.F.F. Ng, **K. Rosario**, J. G. Barbosa, A. M. Greco, M. Breitbart and I. Hewson. Molecular and microscopic evidence of viruses in marine copepods. *Proceedings of the National Academy of Sciences of the United States of America*. 110: 1375-1380.
- K. Rosario**, M. Padilla-Rodriguez, S. Kraberger, D. Stainton, M. Breitbart, D.P. Martin and A. Varsani. Discovery of a novel mastrevirus and alphasatellite-like circular DNA in dragonflies (Eiprocta) from Puerto Rico. *Virus Research*. 171: 231-237.
- 2012 **K. Rosario**, A. Dayaram, M. Marinov, J. Ware, S. Kraberger, D. Stainton, M. Breitbart and A. Varsani. Diverse circular single-stranded DNA viruses discovered in dragonflies (Odonata: Eiprocta). *Journal of General Virology*. 93: 2668–2681.
- K. Rosario**, S. Duffy and M. Breitbart. A field guide to eukaryotic circular single-stranded DNA viruses: Insights gained from metagenomics. *Archives of Virology*. 157: 1851-1871.
- D. Stainton, S. Kraberger, M. Walters, E.J. Wiltshire, **K. Rosario**, S. Lolohea, M. Halafihi, I. Katoa, T.H. Faitua, W. Aholelei, S. Taufua, J.E. Thomas, D.A. Collings, D.P. Martin and A. Varsani. Evidence of inter- and intra-component recombination and reassortment amongst *Banana bunchy top* isolates. *Journal of General Virology*. 93: 1103-1119.
- 2011 **K. Rosario** and M. Breitbart. Exploring the viral world through metagenomics. *Current Opinion in Virology*. 1: 289-297.
- K. Rosario**, M. Marinov, D. Stainton, S. Kraberger, E. Wiltshire, D.A. Collings, M. Walters, D.P. Martin, M. Breitbart and A. Varsani. Dragonfly cyclovirus, a novel single-stranded DNA virus discovered in dragonflies (Odonata: Anisoptera). *Journal of General Virology*. 92:1302-1308.
- 2010 S. Svraha*, **K. Rosario***, E. Duizer, H. van der Avoort, M. Breitbart and M. P. G. Koopmans. metagenomic sequencing for virus identification in a public health setting. *Journal of General Virology*. 90: 2846 – 2856.
- 2009 O. Blinkova, **K. Rosario**, L. Li, A. Kapoor, B. Slikas, F. Bernardin, M. Breitbart and E. Delwart. Frequent detection of highly diverse *Cardioviruses*, *Cosaviruses*, *Bocaviruses* and *Circoviruses* in US sewage. *Journal of Clinical Microbiology*. 47: 3507-3513.
- 2009 **K. Rosario**, C. Nilsson, Y. W. Lim, Y. Ruan and M. Breitbart. Metagenomic analysis of viruses in reclaimed water. *Environmental Microbiology*. 11: 2806-2820.
- K. Rosario***, E.M. Symonds*, C. Sinigalliano, J. Stewart and M. Breitbart. *Pepper mild mottle virus* as an indicator of fecal pollution. *Applied and Environmental Microbiology*. 75: 7261-7267.
- K. Rosario**, S. Duffy and M. Breitbart. Diverse circovirus-like genome architectures revealed by environmental metagenomics. *Journal of General Virology*. 90: 2418–2424.
- 2007 **K. Rosario**, S. L. Iverson, D. A. Henderson, S. Chartrand, C. McKeon, E. P. Glenn and R.M. Maier. Bacterial community changes during plant establishment at the San Pedro River mine tailings site. *Journal of Environmental Quality*. 36: 1249-1259.

2003 K.L. Van Alstyne, K.N. Pelletreau and **K. Rosario**. The effects of salinity on DMSP production in the green alga *Ulva fenestrata* (Chlorophyta). *Botanica Marina*. 46: 650-356.

RESEARCH EXPERIENCE

- 2013 - Present **Research Associate:** University of South Florida, St. Petersburg, FL
Expanded the known diversity and biogeographical range of a group of plant viral pathogens (geminiviruses) by targeting insect vectors from different parts of the world. In addition, supervised and led a diverse research team to investigate a novel group of single-stranded DNA (ssDNA) viruses in fungi and invertebrates.
- 2011 - 2013 **Postdoctoral Fellow:** University of South Florida, St. Petersburg, FL
Characterized DNA and RNA plant viral pathogens in insect vectors through metagenomic sequencing. In addition, discovered and described a diversity of novel ssDNA viruses in insects through metagenomics and restriction enzyme analysis.
- 2006 - 2010 **Graduate Research Assistant:** University of South Florida, St. Petersburg, FL
My research allowed me to: 1) Characterize the viral community in reclaimed water, identifying viral plant pathogens as a potential threat to water reuse efforts in agricultural settings; 2) Propose, develop, and evaluate a plant virus as a viral indicator of sewage pollution; and 3) Develop methods to characterize novel ssDNA viruses by combining metagenomics, bacterial protein expression, and immunotechnology.
- 2003 - 2005 **Graduate Research Assistant:** The University of Arizona, Tucson, AZ
Investigated plant-microbe interactions in heavy metal contaminated soils by monitoring and characterizing soil bacterial community changes during plant establishment as part of a phytoremediation field trial using culturing and molecular techniques.

INTERNATIONAL RESEARCH EXPERIENCE

- 2010 **New Zealand and Kingdom of Tonga**
Participated in the NSF-funded East Asia and Pacific Summer Institutes. Traveled to Christchurch, New Zealand and the South Pacific Archipelago of Tonga to conduct a research project investigating ssDNA viruses found in insect vectors.
- 2008 **Bermuda**
Collaborated on research project addressing viral community dynamics in the Sargasso Sea. As part of my collaboration, I was stationed at the Bermuda Institute of Ocean Sciences and participated in a 4-day research cruise to the Sargasso Sea.
- 2007 **Argentina and Antarctica**
Participated in the NSF-funded educational program IPY-ROAM (International Polar Year – Research Opportunities in Antarctica for Minorities). Traveled to Ushuaia, Argentina and participated on a 10-day cruise to the Antarctic Peninsula, mentored undergraduate students, and conducted a research project investigating the diversity of bacterial polyketide synthase genes in the Southern Ocean.
- 2006 **Mexico**
Collaborated on a research project that investigated microbial dynamics in microbialites found in Cuatro Ciénegas, Mexico. Traveled to Cuatro Ciénegas to perform field work and collect samples.

PROFESSIONAL ACTIVITIES

Applicant Review Panelist

Minorities Striving and Pursuing Higher Degrees of Success in Earth System Science Program

Grant Ad Hoc Reviewer

Communicable Diseases Public Health Research Grant Proposal, The Ministry of Health, Singapore

Journal Ad Hoc Reviewer

Frontiers in Microbiology, Infection, Genetics and Evolution (Journal of Molecular Epidemiology and Evolutionary Genetics of Infectious Diseases), Journal of Visual Experiments, Environmental Microbiology, Applied and Environmental Microbiology, Virus Research (An International Journal of Molecular and Cellular Virology), International Society for Microbial Ecology (ISME) Journal, Journal of General Virology, Virology Journal

Organizations

2014 - Present Society for Invertebrate Pathology

2004 - Present American Society for Microbiology

2008 - 2011 Society for Advancement of Chicanos and Native Americans in Science

LANGUAGE SKILLS

Bilingual: English and Spanish

TEACHING EXPERIENCE

Formal Instruction

2012 **Teaching assistant: Genetics Lab.** Prepared teaching and laboratory materials for senior undergraduate students and conducted the labs.

2007 - 2012 **Guest instructor: Marine microbiology lab section, Biological Oceanography.** Prepared teaching materials for graduate students and conducted the lab.

Mentoring

2004 - 2013 **Supervised, trained, and mentored** students with diverse skill levels and hosted international scientists to teach them methods used in environmental virology and participate in collaborative research projects.

Outreach

2014 **Educator,** Laura Mercado School in San Germán, Puerto Rico. Developed and conducted a two-day workshop for seventh graders at a rural school to teach students about virology and collect insect specimens for a virus discovery research project.

2012 - 2014 **Exhibitor** at the St. Petersburg Science Festival. Prepared exhibit materials and taught the general public about microbiology.

2012 **Graduate student panelist** at the Bridge to the Doctorate Student Retreat in Tampa, FL. Shared my experiences regarding graduate school, dissertation preparation, and publishing with graduate students from underrepresented groups.

2010 **Science leader** for fieldtrips to Caladesi Island, FL coordinated by the Educational Student Travel Organization WorldStrides. Taught intermediate and high school level students about physical processes that affect the beach.

- 2010 **Science judge** at the Florida-Georgia Louis Stokes Alliance for Minority Participation (FGLSAMP) Expo and Research Conference in Tampa, FL. Judged posters and talks presented by undergraduate students.
- 2008 **Educator** at the Girl Scout Marine Science and Technology Workshop held at the University of South Florida, College of Marine Science. Taught girls from intermediate and high school levels about marine microbiology.
- 2007 **Graduate student panelist** at the Florida-Georgia Louis Stokes Alliance for Minority Participation (FGLSAMP) Expo and Research Conference in Tampa, FL. Shared my experiences regarding graduate school with students from underrepresented groups.
- 2006 **English to Spanish translator and narrator.** Translated and narrated educational videos about microbialites found in Cuatro Ciénegas, Mexico for the local community (<http://www.marine.usf.edu/genomics/videos.shtml#CuatroCienegas>).

PRESENTATIONS

Invited Talks

- 2014 **K. Rosario.** Catch that bug! Exploiting insect vectors and predators for virus discovery. Tampa Bay's Tiniest Beings Microbiology Seminar Series, St. Petersburg, FL.
- K. Rosario.** Exploiting insect vectors to investigate plant pathogen diversity and biogeography. Plant Pathology Seminar, University of Florida, Gainesville, FL.
- K. Rosario.** Exploring the viral world through metagenomics. 20th Annual International Meeting on Microbial Genomics. Lake Arrowhead, CA.
- 2011 **K. Rosario.** Virus discovery through metagenomics. Ecology and Evolution Graduate Program Seminar, Rutgers University, New Brunswick, NJ.
- K. Rosario.** Enhancing virus surveillance through metagenomics: Water quality and public health applications. Clearwater Christian College, Clearwater, FL.
- 2010 **K. Rosario.** Viruses en aguas reclamadas y bioindicadores. Centro Hemisférico de Cooperación (CoHemis) SciTeCC 2010, Universidad de Puerto Rico, Recinto de Mayagüez, PR.
- 2008 **K. Rosario** and M. Breitbart. Metagenomics for viral discovery: Surprises around every corner. American Society for Microbiology 108th General Meeting, Boston, MA.

Selected Talks

- 2014 **K. Rosario,** A. Dayaram, J. Ware, M. Marinov, M. Breitbart and A. Varsani. Discovery of circular single-stranded DNA viruses in top insect predators. 47th Annual Meeting of the Society for Invertebrate Pathology and International Congress on Invertebrate Pathology and Microbial Control. Mainz, Germany.

- 2010 **K. Rosario.** M. Marinov, D. Stainton, S. Kraberger, D.P. Martin, M. Breitbart and A. Varsani. Discovery of a novel single-stranded DNA virus in dragonflies. 6th International Symposium on Geminivirus and the 4th Comparative single-stranded DNA Virology Workshop. Guanajuato, Mexico.
- 2009 **K. Rosario** and M. Breitbart. Viruses in reclaimed water. Society for Advancement of Chicanos and Native Americans in Science (SACNAS) National Conference. Dallas, TX.
- K. Rosario** and M. Breitbart. Novel single-stranded DNA viruses in the marine environment. The Scientific Committee on Ocean Research Viral Ecology Meeting. Newark, DE.
- 2008 **K. Rosario.** Surface waters of the Antarctic Peninsula show novel polyketide synthase type I genes. Society for Advancement of Chicanos and Native Americans in Science (SACNAS) National Conference. Salt Lake City, UT.