

Rachel Marine

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RESEARCH INTERESTS:

Environmental Microbiology, Next Generation Sequencing, Metagenomics, Bioinformatics

EDUCATION:

Doctor of Philosophy

**2009- Sept 2015
(expected)**

University of Delaware, Newark DE

Department: Biological Sciences

Advisors: K. Eric Wommack, Ph.D. & Shawn W. Polson, Ph.D.

Dissertation Title: An exploration of aquatic phage communities through shotgun metagenomic sequencing; examining methodologies, novel phage genes and fine-scale community dynamics

Bachelor of Science, *summa cum laude*

2005-2009

Salisbury University, Salisbury MD

Major: Biology

Minor: Chemistry

HONORS/AWARDS:

University of Delaware Dissertation Fellowship (2014- 2015)

University of Delaware Graduate Fellowship (2013- 2014)

Special Teaching Conference Travel Fellowship (2013)

Institute of Soil and Environmental Quality Fellowship (2009-2012)

Henson Scholar (2007-2009)

Salisbury University Student Academic Research Award (2008)

Phi Kappa Phi Induction (2008)

Tri Beta Induction (2008)

Salisbury University Academic Scholarship (2005-2009)

New Jersey Board of Realtors Scholarship (2005, 2006)

Outstanding Chemistry Student, American Chemical Society (2005)

PEER-REVIEWED PUBLICATIONS:

- 1) **Marine, R.**, McCarren, C., Vorrasane, V., Nasko, D., Polson, S., Wommack, K.E. 2014. Caught in the middle with multiple displacement amplification: the myth of pooling as a means to avoid amplification bias in a metagenome. *Microbiome*. 2:3.
- 2) Ng., T.F., **Marine, R.**, Wang, C., Simmonds, P., Kapusinkszky, B., Bodhidatta, L. Bamidele, S.O., Wommack, K.E., Delwart, E. 2012. High

variety of known and new RNA and DNA viruses of diverse origins in untreated sewage. *Journal of Virology*. 86(22):12161-12175.

- 3) **Marine, R.**, Polson, S.W., Ravel, J., Hatfull G., Russell, D., Sullivan, M., Syed, F., Dumas, M., Wommack, K.E. 2011. Evaluation of a transposase protocol for rapid generation of shotgun libraries from nanogram quantities of DNA. *Applied and Environmental Microbiology*. 77(22):8071-8079.

MANUSCRIPTS IN PREPARATION OR UNDER REVIEW:

- 1) **Marine, R.**, Polson, S., Wommack, K.E. 2015. Novel phage-encoded chaperonin genes are prevalent in aquatic viromes. In prep.

PROFESSIONAL EXPERIENCE:

Research/Work Experience

Graduate Fellow/Research Assistant

2009-2012, 2013-current

Department of Biological Sciences

University of Delaware, Newark DE

- Performed experiments examining the applicability and biases of library preparation techniques in microbial metagenomic analyses
- Designed and performed experiments to examine temporal dynamics of virioplankton communities
- Prepared metagenomic and amplicon libraries for DNA sequencing and conducted bioinformatic/phylogenetic analyses on resulting data
- Managed laboratory functions including ordering and organization

General Biotechnician

Summer 2008

Assateague Island National Park

Berlin, MD 21811

- Duties included water quality monitoring, mosquito monitoring, protection of endangered plant species and removal of invasive plant species

Cellular Biology Laboratory Assistant

2007-2009

Department of Biological Sciences

Salisbury University, Salisbury MD

- Responsible for setting up equipment and chemicals/solutions needed to perform Cellular Biology laboratory experiments

SU Chemistry Internship, DoD Grant

Summer 2007

Department of Chemistry

Salisbury University, Salisbury MD

- Synthesized a potential prostate cancer prodrug
- Developed basic research skills such as managing a scientific notebook, laboratory safety and reading scientific papers

Teaching/Mentoring Experience

Teaching Assistant, BISC104 (Principles of Biology) 2012-2013

Department of Biological Sciences

University of Delaware, Newark DE

-Laboratory instructor for 2-3 lab sections of BISC104 per semester

-Graded assignments and met with students who needed additional help

Group Tutor, BISC104 2012-2013

Office of Academic Enrichment

University of Delaware, Newark DE

-Taught weekly tutoring sessions for students enrolled in BISC104

Mentor, Summer Scholars Program 2012-2014

Undergraduate Research Program

University of Delaware, Newark DE

-Guided research projects for four summer interns

-Instructed students on fundamental laboratory skills and organization

Volunteer, DBI Outreach Program 2011-2014

-Assisted in outreach activities at the Delaware Biotechnology Institute for visiting middle school and high school students including hands-on scientific activities, Q&A panels and building tours

-Served as a judge for the 2012 Sussex County Science Fair/Delaware BioGENEius Challenge

PRESENTATIONS/POSTERS:

- 1) Harrison, A. *, **Marine, R.**, Polson, S.W., Wommack, K.E. Watching the clock: Estuarine virioplankton populations demonstrate rapid changes in abundance. 5th Annual Undergraduate Research and Service Celebratory Symposium. August 14, 2014. Newark, DE. (*Poster*)
- 2) McCarren, C. *, **Marine, R.**, Fadrosh, D., Ma, B., Polson, S.W., Wommack, K.E. Dynamics of estuarine bacterioplankton populations over a single day. 4th Annual Undergraduate Research and Service Celebratory Symposium. August 8, 2013. Newark, DE. (*Poster*)
- 3) **Marine, R.** *, Nasko, D., Williamson, S., Polson, S., Wommack, K.E. High resolution shotgun metagenomic analysis of diel virioplankton dynamics. 14th International Symposia on Microbial Ecology. August 19-24, 2012. Copenhagen, Denmark. (*Poster*)
- 4) McCarren, C. *, Vorrasane, V., **Marine, R.**, Wommack, K.E. Assessment of PacBio sequencing for viral shotgun metagenomics. 3rd Annual Undergraduate Research and Service Celebratory Symposium. August 9, 2012. Newark, DE. (*Poster*)

- 5) **Marine, R.***. Shotgun metagenomics as a window on viroplankton dynamics. Center for Environmental Genomics Metagenomics Workshop. Dec. 16, 2011. Lewes, DE. (*Presentation*)
- 6) **Marine, R.***, Polson, S.W., Ravel, J., Hatfull G., Russell, D., Sullivan, M., Syed, F., Dumas, M., Wommack, K.E. Less is more: Evaluation of a low input, transposase-mediated protocol for rapid generation of high-throughput sequence libraries. General Meeting of the American Society for Microbiology. May 21-24, 2011. New Orleans, LA. (*Poster*)
- 7) **Marine, R.***, Mitchell, M. Synthesis of tripartate prodrug and antiprostatic testing with PSA-secreting and non PSA-secreting cell lines. National Conference on Undergraduate Research. April 9-12, 2008. Salisbury, MD. (*Presentation*)

CURRENT PROFESSIONAL SOCIETIES/ORGANIZATIONS:

American Society for Microbiology (ASM)

International Society for Microbial Ecology (ISME)