Rachel Marine

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EDUCATION

Doctor of Philosophy, Molecular Biology and Genetics **2009-2015**
University of Delaware, Newark DE

Bachelor of Science, Biology, *summa cum laude* **2005-2009**
Salisbury University, Salisbury MD

PROFESSIONAL EXPERIENCE

Presidential Management Fellow **Aug 2016-present**
Regular Fellow **Feb-Aug 2016**
Polio and Picornavirus Laboratory, DVD, NCIRD, CDC, Atlanta GA

- **Research Project**: As part of the Advanced Molecular Detection (AMD) initiative, I develop optimized protocols for next generation sequencing (NGS) of viral pathogens. Responsibilities include managing the AMD team within my branch, designing/performing NGS projects, analyzing NGS data and writing manuscripts on resulting data.
- **Teaching/Instruction**: Organized several trainings on NGS and bioinformatics analyses for state public health laboratories and international partners.
- **Laboratory Techniques**: viral purification, DNA/RNA isolation and amplification, library preparation and sequencing of RNA and DNA viruses on Illumina and IonTorrent platforms, computational analyses using bioinformatics software and the high performance computing cluster at the CDC.

Graduate Fellow/Research Assistant/Teaching Assistant **2009-2015**
Department of Biological Sciences, University of Delaware, Newark DE

- **Dissertation Project**: Worked with Dr. K Eric Wommack and Dr. Shawn Polson on examining the applicability and biases of library preparation techniques in microbial metagenomic analyses, as well as the application of metagenomics to studying virioplankton diversity and temporal dynamics. This involved the preparation metagenomic and amplicon libraries for DNA sequencing and bioinformatic/ phylogenetic analyses on resulting data.
- **Laboratory Techniques**: field sampling, bacteria and virus isolation, DNA/RNA extraction and purification, gel electrophoresis, pulsefield electrophoresis, gel extraction, flow cytometry, epiflourescent microscopy, PCR, qPCR, DNA shearing (Covaris), genomic/metagenomic library preparation
- **Computational Techniques**: Data analysis included running a variety of command-line tools and software including custom perl scripts, CLC, Geneious, QIIME, SamTools, USearch, PhyML, RAxML, FastTree and BLAST. Computational work was analyzed using a high performance computing cluster at the University of Delaware. Statistical work was performed using R, JMP and Past3.

- Laboratory instructor for BISC 104: Principles of Biology (Fall 2012/Spring 2013)
- SOP writing, including protocol for virus purification from aquatic samples
- Managed laboratory functions including ordering and organization

General Biotechnician **Summer 2008**
Assateague Island National Park, Berlin MD

- Worked with several departments at Assateague Island National Park on a variety of biological fieldwork projects
- 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 preparing 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
- **Laboratory Techniques**: chemical extraction, NMR, thin layer chromatography, rotary evaporation
- Developed basic research skills such as managing a scientific notebook, laboratory safety and reading scientific papers

PEER-REVIEWED PUBLICATIONS

1) Ng TFF, Montmayeur A, Castro C, Cone M, Stringer J, Lamson DM, Rogers SL, Wang Chern S-W, Magaña L, **Marine R**, Rubino H, Serinaldi D, George K, Nix WA. 2016. Detection and genomic characterization of Enterovirus D68 in respiratory samples isolated in the United States in 2016. *Genome Announcements*. 4(6):e01350-16.
2) **Marine R**. McCarren C, Vorrasane V, Nasko D, Polson S, Wommack KE. 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.
3) Ng TFF, **Marine R,** Wang C, Simmonds P, Kapusinkszky B, Bodhidatta L, Bamidele SO, Wommack KE, 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.
4) **Marine R**, Polson SW, Ravel J, Hatfull G, Russell D, Sullivan M, Syed F, Dumas M, Wommack KE. 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,** Nasko D, Wray J, Polson S, Wommack KE. 2017. Novel chaperonins are prevalent in the virioplankton and link to viral biology and ecology. *ISME J*. Submitted.
2) **Marine R**, Castro C, Magaña L, Ng TFF, Aswath K, Collins N, Park G-W, Vinjé J, Oberste MS. 2017. Genomic characterization of three melon necrotic spot viruses detected in human stool specimens. *Genome Announcements*. In clearance.

PRESENTATIONS/POSTERS

1) **Marine R**, Ng TFF, Magaña L, Montmayeur A, Schmidt A, Nix A, Rogers S, Maher K, Burns C, Iber J, Chen Q, Bankamp B, Icenogle J, Chen MH, et. al. Evaluation, development, and dissemination of next generation sequencing approaches for viral pathogen detection. CDC AMD Day. September 26, 2016. Atlanta, GA *(Poster)*
2) **Marine R**, Polson SW, Wommack KE. You gotta know how to fold 'em: Novel chaperonins are prevalent in the virioplankton and reveal the presence of marine archaeal viruses. General Meeting of the American Society for Microbiology. May 30-June 2, 2015. New Orleans, LA. *(Poster)*
3) **Marine R**, Nasko D, Williamson S, Polson S, Wommack KE. High resolution shotgun metagenomic analysis of diel virioplankton dynamics. 14th International Symposia on Microbial Ecology. August 19-24, 2012. Copenhagen, Denmark. *(Poster)*
4) **Marine R**. Shotgun metagenomics as a window on virioplankton dynamics. Center for Environmental Genomics Metagenomics Workshop. Dec. 16, 2011. Lewes, DE. *(Presentation)*
5) **Marine R**, Polson SW, Ravel J, Hatfull G, Russell D, Sullivan M, Syed F, Dumas M, Wommack KE. 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)*
6) **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)*

HONORS/AWARDS

Presidential Management Fellowship (2016-2018)
ASM Student Travel Award $500 (2015)
University of Delaware Dissertation Fellowship (2014- 2015)
University of Delaware Graduate Fellowship (2013- 2014)
Special Teaching Conference Travel Fellowship (2013)
University of Delaware Professional Development Award $500 (2011, 2012)
Institute of Soil and Environmental Quality Fellowship (2009-2012)
Henson Scholar (2007-2009)
Salisbury University Student Academic Research Award $500 (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)

VOLUNTEER/OUTREACH ACTIVITIES

Volunteer, 4-H Environmental Education Program (2009-2015)
Volunteer, DBI Outreach Program (2011-2015)
Volunteer, Art of Living, Nonprofit (2010-2016)
Mentor, Summer Scholars Program (2012-2015)
Group Tutor, BISC104, UD Office of Academic Enrichment (2012-2013)