R. Thomas Sayre-McCord

Woods Hole Oceanographic Institution Applied Ocean Physics and Engineering Woods Hole, MA 02543 rsayremccord@whoi.edu (919) 451-9601

Education

University of North Carolina at Chapel Hill

Graduated 2012 with Distinction Physics (B.S.) and Mathematics (B.S.) South Road, Chapel Hill, NC 27599 GPA: 3.66

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Employment and Research

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Woods Hole Oceanographic Institution

Research Assistant I, Applied Ocean Physics and Engineering,

Summer 2012 to Present

Fall 2008-Spring 2012

Research in the Department of Applied Ocean Physics and Engineering under the supervision of Dr. John Breier. Work developing, testing, and implementing a variety of custom aquatic samplers.

Project list:

- Developing and testing a prototype aquatic radon detector for use on autonomous underwater vehicles
- Built and programmed elements of several prototype long term river sampler
- Created touch screen user interface for instrument control and data logging of two custom hydrothermal vent samplers
- Rebuilt, tested, and packaged a microbial mat sampler for use on a research cruise
- Use of Inductively Coupled Plasma Mass Spectrometer and processing results

Research Assistant, UNC-Chapel Hill Department of Physics Spring 2009 to Spring 2012
Research in the Nanoscale Science Research Group, directed by Dr. Richard Superfine, performing theoretical and experimental research in biophysics.

Project list:

- Created structural model of cell cytoskeleton mechanics under the application of external force
- Modeled the rheological response of cancer cell lines to a pulse force using a distribution of relaxation times
- Analyzed Gene Expression data of cancer cell lines for correlation with invasion and stiffness
- Tested and advanced a method of chemically labeling micro-scale beads with nanoscale spots for use in cilia experiments
- Modeled the beat pattern of human airway cilia and their response to external stimuli

Summer Student Fellow, Woods Hole Oceanographic Institution

Summer 2011

Conducted research under the guidance of Dr. Houshuo Jiang and Dr. Stace Beaulieu. Analyzed videos of aquatic larvae to quantify swimming behavior.

Project list:

- Developed a novel method of reconstructing three-dimensional swimming trajectories of larvae from two-dimensional video data
- Developed method to track and quantify the jet propulsion of squid paralarvae from particle image velocimetry (PIV) videos
- Processed videos of polychaete larvae from deep sea hydrothermal vents to obtain information about swimming speeds and behavior

Research Intern, UNC-Chapel Hill Department of Physics

Summer 2007

Research in the Nanoscale Science Research Group, directed by Dr. Richard Superfine. Applied and modified a mathematical model of artificial cilia to find artificial parameters that mimic the motion of biological airway cilia

Intern and Mentor, Shodor Education Foundation

Summer 2006

Worked at the Shodor Foundation, a national resource for computational science education. Created material for online mathematics education resources and assisted teaching mathematics camp classes to summer students

<u>Publications and Presentations</u>

(In Review) Sayre-McCord, R. T., S. E. Beaulieu, and H. Jiang. (Submitted 2012) Threedimensional reconstruction of larval swimming trajectories with application to random walk diffusivity. Limnology and Oceanography: Methods.

Sayre-McCord, R. T., S. E. Beaulieu, and H. Jiang. (2012) Three-dimensional reconstruction of larval swimming trajectories with application to random walk diffusivity. Poster presented at the 2012 Ocean Sciences Meeting.

Awards and Honors

Summer Student Fellowship, Woods Hole Oceanographic Institution

2011

Summer research fellowship funded by the National Science Foundation

2011

Scientific Meeting Travel Award, Woods Hole Oceanographic Institution Competitive funding to present at 2012 Ocean Sciences Meeting in Salt Lake City

Pi Mu Epsilon Mathematics Honors Society

2011

Awarded by University of North Carolina at Chapel Hill Mathematics Department

Dean's List, University of North Carolina at Chapel Hill

Fall 2008, Spring 2009, Fall 2009, Fall 2010, Spring 2011, Fall 2011, Spring 2012

Honors Program, University of North Carolina at Chapel Hill

Accepted Fall 2008

Computer Skills

MATLAB
LabVIEW
Embedded systems programming and control R
Mathematics
SolidWorks (Basic modeling)
Microsoft Office

References

Dr. John Breier, Associate Scientist
Department of Applied Ocean Physics and Engineering
Woods Hole Oceanographic Institution
Woods Hole, MA 02543
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ibreier@whoi.edu

Dr. Richard Superfine, Taylor-Williams Distinguished Professor Department of Physics and Astronomy University of North Carolina at Chapel Hill Chapel Hill, NC 27599-3255 (919) 962-1185 rsuper@physics.unc.edu

Dr. Stace Beaulieu, Research Specialist

Department of Biology Woods Hole Oceanographic Institution Woods Hole, MA 02543 (508) 289-3536 sbeaulieu@whoi.edu

Dr. Houshuo Jiang, Associate Scientist
Department of Applied Ocean Physics and Engineering
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Dr. Sean Washburn, Cary Boshamer Distinguished Professor Department of Physics and Astronomy University of North Carolina at Chapel Hill Chapel Hill, NC 27599-3255 (919) 962-9382 sean@physics.unc.edu