

Ryan O Schenck, MSc

Curriculum vitae



ORCID

Research Interest I believe there is significant utility in bridging the mechanistic and genomic view of cancer. My aim is to integrate bioinformatics, experimental tumor biology, and computational biology with mathematical modeling to better understand cancer evolution and ecology.

Highlighted Skills

Computational:

Programming Languages: Python, R, Java, Bash, HTML & CSS, Javascript, D3.js, PHP, SAS.

Bioinformatic Tools: GATK, Biopython, Samtools, IGV, multiSNV, Platypus, netMHC(pan), Bioconductor, Primer Design.

Experimental:

Techniques: PCR, Cell Culture, Transmission Electron Microscopy, RT-PCR, DNA Extraction, sanger sequencing, cesium chloride DNA separation.

Education

D.Phil. (PhD) Genomic Medicine and Statistics (Expected) (2017—Present)

University of Oxford, Oxford, United Kingdom
Medical Sciences Doctoral Training Centre

M.S. Bioinformatics and Computational Biology (2015—2016)

University of South Florida, Tampa, Florida
Department of Molecular Medicine, College of Medicine

B.S. in Molecular and Cellular Biology (2009—2013)

University of Arizona, Tucson, Arizona

Research Experience

Wellcome Centre for Human Genetics and Moffitt Cancer Center (2018—Present)

Probationary D.Phil Student

Co-advised by Drs. Simon Leedham and Alexander R.A. Anderson examining evolutionary dynamics imposed by homeostatic tissue and the impacts on dysplasia. This is accomplished through integrating histology, NGS sequencing, and mechanistic mathematical modeling from datasets of various underlying disease states and normal tissue.

Skills emphasized: Python, R, Java, neoantigen predictions, computational modeling, next generation sequence analysis.

Moffitt Cancer Center (2015—2017)

Research Associate

Under the advisement of Dr. Alexander Anderson and Dr. Trevor Graham at Barts Cancer Institute I am exploring colorectal cancer progression and evolution in the context of the immune microenvironment through the integration of multi-region whole exome sequence data, bioimage informatics, and mathematical modeling.

Skills emphasized: Python, R, Java, neoantigen predictions, computational modeling, next generation sequence analysis.

College of Medicine, University of South Florida (2015—2016)

Graduate Student Researcher

Conducted research under the guidance of Dr. Vladimir Uversky to explore the intrinsic disorder present in all vertebrate viral proteomes in order to determine if viral proteins of particular function exhibit conserved fractions of intrinsic disorder.

Skills emphasized: Python, R, bash, sequence data analysis, proteomics.

Roche (2015—2015)

Bioinformatics Intern

Responsible for developing a pipeline for variant annotation from next generation sequence data from patient tumor samples to prepare data for relational database storage and biostatistical analysis.

Skills emphasized: Python, R, next generation sequence analysis, whole exome variant analysis.

Marine Genomics Laboratory, University of South Florida

(2013—2015)

Research Assistant

Research focused on examining the diversity and evolution of single-stranded DNA viruses found in marine invertebrates as well as developing a computational approach to the characterization of proteins.

Skills emphasized: metagenomics, next generation sequencing (NGS), PCR screenings, pJet cloning, sequence assembly, whole genome amplification, virus purification, cell culture, RT-PCR, R, Python, Unix Cluster.

PureMolecular, LLC

(2013—2015)

Consultant

Implemented new primers for sequencing Crustacea DNA to add to sequence repository for seafood testing. Helped to modify companies website.

Skills emphasized: PCR, sequencing, and programming.

Sullivan Laboratory, University of Arizona, Dr. Matthew Sullivan

(2011—2013)

Undergraduate Researcher

Performed research and assisted postdoctoral researchers Dr. Jennifer R. Brum and Dr. Melissa Duhaime. The focus of my research was on quantitative Transmission Electron Microscopy (TEM) as a means to assess viral populations from the Tara Oceans Expedition samples. My Other research involvement was in targeted viral metagenomics with illumina next generation sequencers, heterophages isolations, and finishing the ‘Phage Head and Packaging Subsystem’ in PhageRast.

Skills emphasized: TEM, statistical analysis, bacterial culturing, PCR screenings, DNA extractions, cesium chloride gradients, next generation sequence assembly, and epifluorescence microscopy.

Arizona Genomics Institute, University of Arizona, Dr. Rod Wing

(2009—2011)

Student Laboratory Assistant

Worked as part of the template production team for high throughput DNA sequencing. Primary responsibilities included selective culture preparation and inoculation, plasmid/DNA extractions, performing PCR and direct sequencing reactions, DNA precipitation, loading Sanger sequencers and next generation sequencers (454) and training new students and employees.

Skills emphasized: PCR, sequencing, DNA extraction.

Publications

RO Schenck, E Lakatos, C Gatenbee, TA Graham, ARA Anderson. NeoPredPipe: High-Throughput Neoantigen Prediction and Recognition Potential Pipeline. *BMC Bioinformatics*. 20:264. **2019**. <https://doi.org/10.1186/s12859-019-2876-4>.

C Gatenbee*, A Baker*, **RO Schenck**, ARA Anderson, TA Graham. Niche engineering drives early passage through an immune bottleneck in progression to colorectal cancer. *bioRxiv*. **2019**. <https://doi.org/10.1101/623959> *Co-first authors.

RO Schenck, E Kim, RR Bravo, J West, S Leedham, D Shibata, A Anderson. Clonal Architecture of the Epidermis: Homeostasis Limits Keratinocyte Evolution. *bioRxiv*. **2019**. <https://doi.org/10.1101/548131>

J West, **RO Schenck**, C Gatenbee, M Robertson-Tessi, ARA Anderson. Tissue structure accelerates evolution: premalignant sweeps precede neutral invasion. *bioRxiv*. **2019**. <https://doi.org/10.1101/542019>

E Lakatos, MJ Williams, **RO Schenck**, WCH Cross, J Househam, B Werner, C Gatenbee, CP Barnes, ARA Anderson, A Sottoriva, TA Graham. Evolutionary dynamics of neoantigens in growing tumours. *bioRxiv*. **2019**. <https://doi.org/10.1101/536433>

R Bravo, E Baratchart, J West, **RO Schenck**, A Miller, D Basanta, M Robertson-Tessi, ARA Anderson. Hybrid Automata Library: A modular platform for efficient hybrid modeling with real-time visualization. **2018**. (*bioRxiv*). <https://doi.org/10.1101/411538>

M Strobl, M Wicker, V Adhikarla, A Shockey, E Lakatos, P Pooladvand, **RO Schenck**, L Saputro, C Gatenby, Martijn Koppens, S Cruz Garcia, R Wenham, M Damaghi, JA Gallaher. Connecting the Microenvironmental Niche to Treatment Response in Ovarian Cancer. **2018**. (*bioRxiv*) <https://doi.org/10.1101/452052>

E Kim, **RO Schenck**, J West, W Cross, V Harris, J McKenna, H Cho, E Coker, S Kramer, K Tsai, E Flores, CD Gatenbee. Targeting The Untargetable: Predicting Pramlintide Resistance Using a Neural Network Based Cellular Automata. **2017**. (*bioRxiv*). <https://doi.org/10.1101/211383>

RO Schenck, S Kramer, JD Kaczaral, G Mabry, F Loritano, NZ Heimbach, VN Uversky. Classification of Putative Capsid Proteins in Circular Replication-Initiation Encoding Single-Stranded DNA Viruses Utilizing Machine Learning. **2017**. (*Zenodo*) <https://doi.org/10.5281/zenodo.1408708>

VN Uversky, I Na, KS Landau, **RO Schenck**. Highly disordered proteins in prostate cancer. *Current Protein Peptide Science*. 17. **2016**. doi:10.2174/1389203717666161028145848

KS Landau, I Na, **RO Schenck**, VN Uversky. Unfoldomics of Prostate Cancer: On the abundance and roles of intrinsically disordered proteins in prostate cancer. *Asian Journal of Andrology*. 18. **2016**. doi:10.4103/1008-682X.184999

K Rosario, **RO Schenck**, RC Harbeitner, SN Lawler, M Breitbart. Novel circular single-stranded DNA viruses identified in marine invertebrates reveal high sequence diversity and consistent intrinsic disorder patterns within putative structural proteins. *Frontiers in Microbiology*. 6: 296. **2015**. doi:10.3389/fmicb.2015.00696

Symonds EM, MM Cook, SM McQuaig, RM Ulrich, **RO Schenck**, JO Lukasik, ES Van Vleet, M Breitbart. Removal of nutrients, microbes, and personal care products in domestic wastewater by a benchtop electrocoagulation unit. *Scientific Reports* 5: 9380. **2015**. doi:10.1038/srep09380

Brum JR, **RO Schenck**, MB Sullivan. Global morphological analysis of marine viruses shows minimal regional variation and dominance of non-tailed viruses. *ISME J* 7: 1738-1751. **2013**. doi:10.1038/ismej.2013.67

Select Presentations

RO Schenck, RR Bravo, E Kim, D Shibata, A Anderson. Clonal Architecture of the Epidermis: Homeostasis Limits Keratinocyte Evolution. Integrated Mathematical Oncology Workshop 8: Evolutionary Therapy, Tampa, Florida, **2018**. *Poster Presentation*.

RO Schenck, RR Bravo, E Kim, D Shibata, A Anderson. Clonal Architecture of the Epidermis: Neutral vs. Non-Neutral Keratinocyte Evolution. European Conference on Mathematical and Theoretical Biology, Lisbon, Portugal, **2018**. *Poster Presentation*.

RO Schenck, R Brown, D Wedge, G Lunter. Learning Regulatory Sequences in the Human Genome: Non-Coding Driver SNV Identification. Cancer Evolution & Ecology: Theory and Clinical Practice, St Petersburg, Florida, **2018**. *Poster Presentation*.

RO Schenck, RR Bravo, E Kim, D Shibata, A Anderson. Clonal Architecture of the Epidermis: Homeostasis Limits Keratinocyte Evolution. Integrated Mathematical Oncology Workshop 7: Stroma, Tampa, Florida, **2017**. *Poster Presentation*.

RO Schenck, RR Bravo, E Kim, D Shibata, A Anderson. The Role of Homeostatic Epidermal Structure in Clonal Architecture and Evolution Pre-Tumorigenesis. Moffitt Scientific Symposium, Tampa, Florida, **2017**. *Poster Presentation*.

C Gatenbee, **RO Schenck**, A Baker, P Martinez, M Robertson-Tessi, T Graham, A Anderson. Evolution of colorectal cancer heterogeneity in the context of the immune microenvironment: A multiscale data driven approach. Evolutionary Biology and Ecology of Cancer Advanced Course. Cambridge, United Kingdom, **2016**. *Poster Presentation*.

RO Schenck, K Rosario, R Harbeitner, J Cannon, M Breitbart. Single-stranded DNA viruses in marine crustaceans. 47th Annual Society for Invertebrate Pathology Meeting. Mainz, Germany, **2014**. *Oral Presentation*.

RO Schenck, K Rosario, R Harbeitner, J Cannon, M Breitbart. Single-stranded DNA viruses in marine crustaceans. American Society for Microbiology: Southeastern Microbiology Summit. Ponte Vedra, Florida, **2014**. *Oral Presentation*.

RO Schenck. Discovery, evolutionary analysis, and characterization of circular single-stranded DNA viruses in marine invertebrates. Mote Marine Laboratory Summer Seminar Series. Sarasota, Florida, **2014**. Oral Presentation. *Invited Speaker*.

Brum JR, **RO Schenck**, MB Sullivan. Global morphological analysis of marine viruses shows minimal regional variation and dominance of non-tailed viruses. Aquatic Viral Workshop 7. Saint Petersburg, Florida. **2013**. *Poster Presentation*.

RO Schenck, JR Brum, MB Sullivan. Quantitative morphological characterization of viral communities throughout the global oceans. ASLO Ocean Sciences Meeting 2012. Salt Lake City, Utah. **2012**. *Poster Presentation*.

Professional Development

Integrated Mathematical Oncology Workshop 8: Evolutionary Therapy (Fall 2018)

Moffitt Cancer Center, Tampa, Florida

Worked as a small team led by experimentalist Dr. Michalina Janiszewska, clinician Dr. Zeynep Eroglu, and mathematical modeller Dr. Eunjung Kim to develop a clinical trial for BRAF-mutant melanoma patients to cycle immunotherapy and BRAF inhibitors. Winner of \$50,000 pilot grant.

Integrated Mathematical Oncology Workshop 7: Stroma (Fall 2017)

Moffitt Cancer Center, Tampa, Florida

Worked as a small team led by experimentalist Dr. Mehdi Damaghi, clinician Dr. Robert Wenham, and mathematical modeller Dr. Jill Gallaher to explore how phenotypic heterogeneity arises at the primary tumor site in Ovarian Cancer contributes to the seeding of different metastatic sites. (<https://egtheory.wordpress.com/2017/11/08/ovarian-cancer/>).

Integrated Mathematical Oncology Workshop 6: Resistance (Fall 2016)

Moffitt Cancer Center, Tampa, Florida

Worked as a small team led by experimentalist Dr. Elsa Flores, clinician Dr. Kenneth Tsai, and Dr. Chandler Gatensee to develop a predictive model to partition basal cell carcinoma patients for clinical trials. Through the use of cell line mutational status, microRNA expression levels, and glycolytic activity we were able to build an in silico tissue bank to evaluate a patients susceptibility to a particular novel treatment option.

Evolutionary Biology and Ecology of Cancer Summer Course (July 2016)

Wellcome Genome Campus, Cambridge, United Kingdom

Short course designed to teach advanced evolutionary and ecological concepts that have been and could be applied to oncology research.

Data Carpentry Workshop (May 2015)

University of South Florida, Saint Petersburg, Florida

Bioinformatician led workshop which taught the necessary skills in python programming, SQL Databases, and UNIX language to increase data handling efficiency.

Aquatic Virus Workshop 7 (November 2013)

University of South Florida, Saint Petersburg, Florida.

Workshop sponsored by the University of South Florida, Dr. John Paul, and the Gordon and Betty Moore Foundation.

Presentation Bootcamp (August 2013)

University of South Florida, Saint Petersburg, Florida.

Sponsored by Centers for Ocean Sciences Education Excellence.

Environmental Virology Workshop (January 2013)

University of Arizona, Tucson, Arizona.

Workshop sponsored by the University of Arizona, Dr. Matthew Sullivan, and the Gordon and Betty Moore Foundation. Taught children (ages 3-18) the importance of arthropods as vectors for disease through interactive exercises such as building an 'insect vector' and viewing vectors using iPhone/iPad clip on microscopes.

Skills/Projects

High Performance Computing: Bash, Python, Java, Objective-C (Ongoing)

Performing single and multi region variant calling, neoantigen predictions, machine learning techniques. Developed method to assess neutral versus positive selection within normal human skin using an epidermis framework model and publicly available genome data.

Web Development: Javascript, d3.js, CSS, HTML, PHP (Ongoing)

Responsible for creating data analytics platform to visualize model results and perform side by side comparisons of model parameters for Integrated Mathematical Oncology. (<http://www.imomodelview.com>)

iOS Application: Kivy, Python, Objective-C (Fall 2016)

Created two game modes, creation and survival, using John Conway's cellular automaton, the Game of Life. Free promo codes are available to download from the Apple Store. (<http://itunes.apple.com/us/app/gol-game->

Awards	Wellcome Trust Consumables Supplement 6,000 GBP	(2019)
	Integrated Mathematical Oncology Workshop 8 Pilot Grant 50,000 USD	(2018)
	Clarendon Fund Scholar (Paid International Fees)	(2017—Present)
	Wellcome Trust Centre Studentship, Oxford EU Fees and Stipend	(2017—Present)
	Oxford Radcliffe—Graduate Scholarship, 10,000 GBP/Year	(2017—Present)
	Roche/ARCS Foundation Scholar Award, 15,000 USD	(2015)
	C.W. Bill Young Fellowship Award, 13,000 USD	(2015)
	University of Arizona Honors College Student	(2009—2010)
	Robert A. Carter and Kathryn Watson Scholarship, 2,000 USD	(2009)
Phi Theta Kappa Honors Fraternity	(2007—Present)	
C.E.O. Mentoring Program at Gilbert Mercy Medical Center	(2008)	
Leadership Experience	Yachting Rear Commodore, Oxford University Yacht Club	(2019—Present)
	<i>University of Oxford</i>	
	Yachting Cruising Secretary, Oxford University Yacht Club	(2018—2019)
	<i>University of Oxford</i>	
	Social Secretary, Clarendon Council	(2017—2018)
	<i>University of Oxford</i>	
Teaching Experience	Vice President, Marine Science Advisory Committee	(2014—2015)
	<i>College of Marine Science University of South Florida</i>	
	Representative, Honors and Awards Committee	(2014—2015)
	<i>College of Marine Science University of South Florida</i>	
	Representative, Marine Science Advisory Committee	(2013—2014)
<i>College of Marine Science, University of</i>		
Teaching Experience	Instructor, Cell Biology Laboratory	(Spring 2015)
	<i>University of South Florida Saint Petersburg, St. Petersburg, Florida</i>	
	Adapted Spodoptera Frugiperda cell line as a model system for use in an undergraduate teaching laboratory. Developed teaching labs that apply commercially available assays to investigate molecular processes in the Spodoptera frugiperda cell line. Graduate Teaching Assistant to Dr. Jeffry Fasick	
	Instructor, Cell Biology Laboratory	(Fall 2014)
<i>University of South Florida Saint Petersburg, St. Petersburg, Florida</i>		
Adapted Spodoptera Frugiperda cell line as a model system for use in an undergraduate teaching laboratory. Developed teaching labs that apply commercially available assays to investigate molecular processes in the Spodoptera frugiperda cell line. Graduate Teaching Assistant to Dr. Jeffry Fasick.		
Teaching Assistant, Biology of the Oceans	(Fall 2012)	
<i>University of Arizona, Tucson, Arizona.</i>		
Assisted Dr. Matthew Sullivan in teaching and logistical support for lecture and the laboratory component at different locations along the southern California coast.		
Outreach	Code for Tampa Bay: St. Pete National Day of Civic Hacking	(Summer 2016)
	<i>The Iron Yard, St. Petersburg, Florida</i>	
	Worked in a small group to develop a web application to connect parents within the St. Petersburg community to community resources. My primary role was research and the development of a d3.js wizard that helped the end user navigate the site without the need for the search bar.	
Annual Junior Kindergarten Field Trip Activity	(Spring 2014—Spring 2015)	
<i>The Experiential School of Tampa Bay, Shorecrest Preparatory School, Saint Petersburg, Florida</i>		
Developed and implemented a field trip activity for three junior kindergarten classes that take place at Spa		

Beach where three colleagues and I teach children about oceanographic research methods and the Tampa Bay area through interactive activities (e.g. seine netting).

St. Petersburg Science Festival

(Fall 2013)

University of South Florida St. Petersburg, St. Petersburg, Florida

Taught children (ages 3-18) the importance of virology through interactive exercises such as building icosohedron virus models using starbursts and toothpicks.

Outreach Instructor, "Ocean viruses: From isolates to genomes"

(Spring 2011)

Tucson High Magnet School, Tucson, Arizona

Taught high school students how to isolate marine bacteriophages on *Pseudoalteromonas* using molecular techniques in Margaret Wilch's Biotechnology classes as per protocols developed by Dr. Jennifer Brum.

Certifications

Yachtmaster Offshore

(Expected 2020)

Royal Yachting Association (RYA)

Day Skipper

(2018)

Royal Yachting Association (RYA)

Global Marine Distress and Safety System (GMDSS)

(2018)

Royal Yachting Association (RYA)