THERESA ANN ALEXANDER
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EDUCATION

UNIVERSITY OF MARYLAND, COLLEGE PARK — College Park, MD
College of Computer, Mathematical, and Natural Sciences
Doctor of Philosophy in Computational Biology, Matriculation: August 2018

CASE WESTERN RESERVE UNIVERSITY — Cleveland, OH
Department of Epidemiology and Biostatistics
Master of Science in Genomic Biostatistics and Bioinformatics, December 2017

UNIVERSITY OF MARYLAND, COLLEGE PARK — College Park, MD
College of Computer, Mathematical, and Natural Sciences
Bachelor of Science in Pure Mathematics, December 2015

RESEARCH

January 2019 – Present
Corrada-Bravo Lab: Research Assistant — College Park, MD

- Develop statistical methods for evaluation of spatial gene expression with respect to cell structural components
- Evaluate single cell RNA sequencing workflows to evaluate differential expression-based cell type clustering methods
- Investigate alternatives to PCA for low dimensional embeddings to describe latent structure in data with hidden cluster architecture

September 2017-2018
NIH/NIAMS: Post-Baccalaureate Trainee — Bethesda, MD

- Provide bioinformatics support for research project on Scleroderma in African American cases
- Developed data analyses workflows on several genomic data types including genotype data, whole exome sequence data, and gene expression data (RNAseq and Allele specific expression). Produced novel pipelines for HLA amino acid analysis as well as known software and pipelines for imputation, common and rare variant analyses, and pathway analyses

May-August 2017
NIH/NHGRI- Computational and Statistical Genomics Branch – Intern — Baltimore, MD

- Performed quality control for population-based and family-based datasets from exome-focused SNP genotype data using various packages in R, PLINK, and other related software
- Conducted both population-based and family-based studies through linkage analysis and genome-wide association analysis

May-August 2013
NIH/NCI: Summer Research Intern — Bethesda, MD

- Through PCR based processes, created library of single chain variable fragments of B cells from patients' peritumoral B cells to then be screened against the tumor to be tested for reactivity
- Poster title: PCR-based Cloning of Combinatorial Single Chain-Variable Fragment (scFv) Libraries from Melanoma Patients' B cells

May-August 2012
NIH/NCI: Summer Research Intern — Bethesda, MD

- Grew and maintained several tumor cell lines and transformed bacterial cells
- Created a standard curve for the effects of a cytotoxicity assay (cytotoxGLO) for three tumor cell lines

TEACHING

August-December 2018
Teaching Assistant: BSCI171- Principles of Molecular and Cellular Biology Laboratory

January-June 2019
Teaching Assistant: MATH136- Calculus for Life Sciences

HONORS AND AWARDS

COMBINE Fellowship ($35,869) Fall 2019, University of Maryland

The COMBINE fellowship is a competitive grant funded by the NSF awarded to graduate students dedicated to further interdisciplinary research which incorporates a network-based, data-driven approach.

Dean's Fellowship ($2,500) Fall 2019, University of Maryland

The Dean's Fellowship is awarded to outstanding students who show great promise in their fields of study.

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Outstanding Poster Award May, 2018, National Institutes of Health

The National Institutes of Health holds a yearly Poster Day for undergraduate and graduate students to present their current work. My poster: “HLA Types of African Ancestry Increase Scleroderma Susceptibility in African Americans and Define Scleroderma Specific Autoantibodies” was in the top 20% of posters presented.

PUBLICATIONS

Alexander, T.A., Machiela, M.J. LDpop: an interactive online tool to calculate and visualize geographic LD patterns. *BMC Bioinformatics* **21,** 14 (2020). https://doi.org/10.1186/s12859-020-3340-1

Pravitt Gourh, Sarah A. Safran, Theresa Alexander, et al. (2020). *HLA* and autoantibodies define scleroderma subtypes and risk in African and European Americans and suggest a role for molecular mimicry. *Proceedings of the National Academy of Sciences*, 117(1):552-562. doi:10.1073/pnas.1906593116.

Musolf AM, Simpson CL, Alexander TA, Portas L, Murgia F, Ciner EB, Stambolian D, Bailey-Wilson JE. (2019). Genome-wide scans of myopia in Pennsylvania Amish families reveal significant linkage to 12q15, 8q21.3 and 5p15.33. *Human Genetics*, 138(4):339-354. doi:10.1007/s00439-019-01991-0.

Gourh, P. , Remmers, E. F., Boyden, S. E., Alexander, T., Doumatey, A. , Bentley, A. R., Shriner, D. , Domsic, R. T., Medsger, T. A., Steen, V. D., Ramos, P. S., Silver, Morgan, N. D., Shah, A. A., Mayes, M. D., R. M., Korman, B. , Varga, J. , Schiopu, E. , Khanna, D. , Hsu, V. , Gordon, J. K., Saketkoo, L. A., Gladue, H. , Kron, B. , Criswell, L. A., Derk, C. T., Bridges, S. L., Shanmugam, V. K., Kolstad, K. D., Chung, L. , Jan, R. , Bernstein, E. J., Goldberg, A. , Trojanowski, M. , Kafaja, S. , Maksimowicz-McKinnon, K. M., Mullikin, J. C., Adeyemo, A. , Rotimi, C. , Boin, F. , Kastner, D. L. and Wigley, F. M. (2018), Whole-Exome Sequencing to Identify Rare Variants and Gene Networks that Increase Susceptibility to Scleroderma in African Americans. Arthritis Rheumatol. Accepted Author Manuscript. doi:10.1002/art.40541

Abate-Daga, D., Alexander, T. A., Arons, E., Ho, M., Robbins, P. F., Rosenberg, S. A., & Morgan, R. A. (2013). Melanoma-associated B cells are distinct from peripheral blood-derived B cells, and may serve as a source of tumor-targeting antibodies. *Journal for Immunotherapy of Cancer*, *1*(Suppl 1), P180. http://doi.org/10.1186/2051-1426-1-S1-P180