Tamar R. (Wheeler) Abel
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EDUCATION

Dartmouth College, Hanover, NH
Guarini School of Graduate and Advanced Studies
Molecular and Cellular Biology Program
Department of Molecular and Systems Biology
PhD Candidate, 2017 – 2023

Relevant Classes: Molecular Info in Biological Systems (P), Molecular Mechanisms of Cell Response (HP), Biostatistics (P), Foundation of Biostatistics II (P), Foundation of Epidemiology I (P), Foundation of Bioinformatics I (HP), Supervised Teaching Biology (HP)

University of Vermont, College of Agriculture and Life Sciences, Burlington, VT
B.S. with Honors, Biochemistry, 2016

Relevant Classes: Biochemistry, Biochemistry Lab, Molecular Cloning Lab, Prokaryotic Molecular Genetics, Methods in Bioinformatics, Molecules & Medicine

ACADEMIC HONORS & AWARDS

Student and Resident ACR/ARP Annual Meeting Scholarship, *Rheumatology Research Foundation* 2019
Outstanding Graduate Student Teacher, *Dartmouth College* 2019
Big Data in the Life Sciences Training Program Fellowship, *Burroughs Wellcome Fund* 2018-2020
Distinguished Undergraduate Research Award, *University of Vermont* 2016
Edward Bresnick Biochemistry Senior Award, *University of Vermont* 2016
Founder's Affiliate Undergraduate Student Summer Fellowship, *American Heart Association* 2015

ADDITIONAL EDUCATIONAL EXPERIENCE

Computational Interspecies Translation in Alzheimer's Disease, The Jackson Laboratory, Farmington, CT 2023

Principles and Techniques for Improving Preclinical Translation in Alzheimer's Disease, 2023
The Jackson Laboratory, virtual attendance

Systems Immunology in Aging and Complex Disease, The Jackson Laboratory, virtual event 2021

Microbial Genomics Workshop, Dartmouth College, Hanover, NH 2019

Applied Bioinformatics, Mount Desert Island Biological Laboratory, ME 2019

Information, Technology, and Consulting Workshops, Dartmouth College, Hanover, NH 2018-2019
R Carpentry, Python Bootcamp, Getting Started Using the Discovery Compute Cluster

Dartmouth Center for the Advancement of Learning, Dartmouth College, Hanover, NH 2017-2019
TA panel, Teaching Statement Workshop, Future Faculty Series (select sessions)

How to Write Winning NIH Grants, Dartmouth College, Hanover, NH 2017, 2018, 2019

RESEARCH EXPERIENCE

The Jackson Laboratory, The Jackson Laboratory, Bar Harbor, ME (2023 – present)

Postdoctoral Research Associate:

Contribute to writing review articles, manuscripts, and analyzing data associated with the MODEL-AD consortium. Develop independent project and write fellowships.

Guarini School of Graduate and Advanced Studies at Dartmouth College, Hanover, NH (2017-present)

Graduate Student Researcher:

Thesis: "Epigenetic Drivers of the Rare Autoimmune Disease Systemic Sclerosis in a 3D Skin-Like Tissue Model"

General Lab Skills: Manage scientific projects, design experiments, and maintain detailed/orderly records. Identify equipment and supply needs and assist in ordering suitable items. Update and improve lab protocols. Mentor new trainees in lab techniques and assist in progress towards independent projects.

Communication: Regularly present results at bi-weekly lab meetings. Prepare written abstracts and deliver oral/poster presentations for retreats, conferences, and focused scientific meetings. Prepare written summaries and figures for grant submissions.

Collaborative Skills: Assist in collaborations with local biotech and research institutions, including regular attendance on all conference calls, training new hires, and collaborating on experiments. Assist in internal collaborative lab projects by applying technical expertise and contributing to experimental design/data interpretation.

Lab Techniques: Maintain cell cultures and stocks. Culture novel 3D self-assembled skin equivalent *in vitro* disease model containing multiple cell types. Generate bulk and single-cell ATAC-seq data using primary cell lines and dissociated 3D tissues. Design and complete basic cell biology, biochemistry, and genetics experiments.

Analysis Skills: Analyze small scale experiments as well as Big Data generated by omic approaches using cutting edge software and computational approaches.

University of Vermont Colchester Research Facility, Colchester, VT (2014-2017)

Laboratory Technician (2016-2017): One-year post-baccalaureate position. Independent project focused on unique single stranded DNA binding transcription factor, purine-rich element binding protein B (Purβ), and biochemical/physiological impact of global *Purb* knockout in mice.

Junior researcher (2015-2016): Completed thesis project entitled "Molecular Basis of *Acta2* Gene Repression by Purine-Rich Element Binding Protein B". Independently performed experiments, prepared written project proposal, and completed oral defense of proposal. Wrote manuscript and presented research in departmental seminar for faculty from University of Vermont Department of Biochemistry.

Laboratory intern (2015): Ten-week summer internship focused on independent research project.

Laboratory volunteer (2014-2015): Learned basics of protein biochemistry and cell culture.

TECHNICAL SKILLS

Laboratory: Proficient in basic methods of protein biochemistry including buffer preparation and dialysis, affinity, ion exchange, and size exclusion chromatography, UV-Vis spectroscopy, SDS-PAGE, Bradford assay, ELISA, Western blotting, and pull-down assays. Experienced in both bacterial and mammalian cell culture. Extensive experience in mammalian cell culture including maintenance of primary cell lines and culturing of 3D tissue organoids. Experience with genetic and -omic techniques including gene cloning, RT- qPCR, ATAC-seq, RNA-seq, and single-cell omics using the 10X platform. Also experience with flow cytometry and imaging/analysis of histology.

Software and Programming Languages: Proficient in Microsoft Word, Excel, GraphPad Prism, PyMOL, EndNote, and Adobe Illustrator. Experienced in various computational tools including R, Python, and UNIX as applied to the statistical analysis of large biological and -omic datasets.

PUBLISHED PAPERS

Rumora, A. E., Ferris, L. A., **Wheeler, T. R.**, & Kelm, R. Jr. (2016). Electrostatic and Hydrophobic Interactions Mediate Single-Stranded DNA Recognition and Acta2 Repression by Purine-Rich Element Binding Protein B. *Biochemistry* 55, 2794-2805. http://pubs.acs.org/doi/abs/10.1021/acs.biochem.6b00006

PUBLISHED ABSTRACTS

Abel, T. R., Kosarek, N., Parvizi, R., Jarnagin, H., Huang, M., Smith, A., Mariani, M., Popovich, D., Yang, H., Wood, T., Garlick, J., Pioli, P., and Whitfield, M. (2022) Single-cell Multi-omic Analysis of a 3D Skin-Like Tissue Model Provides Insights into Molecular and Cellular Drivers of Systemic Sclerosis. *Arthritis Rheumatol.*

Shenk, S., Garlick, J., Brown, L., Riesenberg, J., Evans, C., Jaffe Zweifach, J., Macklin, A., **Abel, T.R.,** Kosarek, N., Huang, M., Smith, A., Wood, T., Torres, G., Pioli, P., and Whitfield, M. (2022) Towards an Autologous 3D Skin-like Tissue Harboring Patient-Derived Fibroblasts, Keratinocytes, T-cells and Macrophages. *Arthritis Rheumatol.*

Popovich, D., Kosarek, N., Parvizi, R., **Abel, T.R.,** Huang, M., Espinoza, M., Smith, A., Shenk, S., Garlick, J., and Whitfield, M. (2022) Computational Drug Repositioning and 3D Skin Models Identify EGFR and PI3K Inhibitors as Anti-fibrotic Targets for Systemic Sclerosis. *Arthritis Rheumatol.*

Popovich, D., **Abel, T.R.,** Kosarek, N., Espinoza, M., Parvizi, R., Garlick, J., and Whitfield, M.L. (2021) Pathway-Driven Drug Repositioning in Systemic Sclerosis from Omics Data. *Arthritis Rheumatol.*

Kosarek, N.N., **Abel, T.R.,** Yang, H., Kolling, F., Huang, M., Smith, A., Garlick, J., Pioli, P.A., & Whitfield, M.L. (2021). Identification of Distinct Fibroblast Populations in Systemic Sclerosis 3D Skin Tissues with Single Cell Omics. *Arthritis Rheumatol.*

Kosarek, N. N., **Wheeler, T.R.,** Toledo, D. M., Huang, M., Pioli, P. A., & Whitfield, M.L. (2020). Single Cell RNA-sequencing Identifies Distinct Fibroblast Subsets in a Human 3D Skin Model of Systemic Sclerosis. *The Journal of Immunology*.

Wheeler, T.R., Chen, J.Q., Toledo, D., Mehta, B., Wang, Y., Brown, M., Bhandari, R. Huang, M., and Whitfield, M.L (2019). Identification of Differential Chromatin Accessibility Using ATAC-seq in a Novel 3D Tissue Culture System of Systemic Sclerosis. *Arthritis Rheumatol.*

ACCEPTED FOR PUBLICATION

Abel, T.R., Popovich, D., Espinoza, M., and Whitfield, M.L. (2023) Omics in Rheumatic disease. *Oxford Textbook of Rheumatology.*

PAPERS IN PREPARATION

Abel, T.R., Kosarek, N., Parvizi, R., Jarnigan, H., Torez, G., Bandari, R., Huang, M., Toledo, D.M., Smith, A., Popovich, D., Mariani, M., Yang, H., Wood, T., Garlick, J.A., Pioli, P.A, and Whitfield, M.L. (2023). Single-cell epigenomic dysregulation of Systemic Sclerosis fibroblasts via CREB1/EGR1 axis in self-assembled human skin equivalents.

Abel, T.R., Parvizi, R., Urvashi, F., Morrison, M., Sullivan, T., Kosarek, N.N., Tammara Wood, Jonathan A. Garlick, Patricia A. Pioli, and Michael L. Whitfield (2023). Epigenetic characterization of African American systemic sclerosis variants in 3D skin-like tissues.

Kosarek, N., **Abel, T.R.,** Torres, G.M., Bhandari, R., Huang, M., Wood, T.A., Smith, A., Watkins, T., Garlick, J., Pioli, P.A., and Whitfield, M.L. (2023). Distinct Fibroblast Populations in a Systemic Sclerosis (SSc) 3D Skin Model with Single Cell Omics.

Toledo, D. M., Huang, M., Wang, Y., Mehta, B. K., Wood, T.A., Smith, A., **Abel, T. R.,** Nesbeth, Y., Ivanovska, I., Hinchcliff, M., Christensen, B. C., Pioli, P. A., Garlick, J., and Whitfield, M. L. (2023). Multi-omic Characterization of Engineered Skin Equivalent Tissues from Patients with Systemic Sclerosis Molecularly Resembles Patient Skin.

Popovich, D., Kosarek, N., Parvizi, R., **Abel, T.R.,** Huang, M., Espinoza, M., Smith, A., Shenk, S., Garlick, J., and Whitfield, M.L. (2024) Computational Drug Repositioning and 3D Skin Models Identify EGFR and PI3K Inhibitors as Anti-fibrotic Targets for Systemic Sclerosis.

ORAL PRESENTATIONS

Single-cell Multi-omic Analysis of a 3D Skin-Like Tissue Model Provides Insights into Molecular and Cellular Drivers of Systemic Sclerosis.
Abel, T. R., Kosarek, N., Parvizi, R., Jarnagin, H., Huang, M., Smith, A., Mariani, M., Popovich, D., Yang, H., Wood, T., Garlick, J., Pioli, P., and Whitfield, M.
American College of Rheumatology Convergence Conference, 2022
Virtual presentation

Single-Cell Chromatin Heterogeneity of Fibroblasts from a Systemic Sclerosis 3D Skin-like Tissue Model
Abel, T.R., Kosarek, N.N., Kolling, F.W., Toledo, D.M., Huang, M., Wood, T., Garlick, J.A., Pioli, P.A., and Whitfield, M.L.
Northeast Regional Institutional Development Award (IDeA) Conference Conference, 2021
Virtual conference

POSTER PRESENTATIONS

Single-cell Multi-omic Analysis of a 3D Skin-Like Tissue Model Provides Insights into Molecular and Cellular Drivers of Systemic Sclerosis.
Abel, T. R., Kosarek, N., Parvizi, R., Jarnagin, H., Huang, M., Smith, A., Mariani, M., Popovich, D., Yang, H., Wood, T., Garlick, J., Pioli, P., and Whitfield, M.
American College of Rheumatology Convergence Conference, 2022
Virtual presentation

Single-Cell Chromatin Heterogeneity of Fibroblasts from a Systemic Sclerosis 3D Skin-like Tissue Model
Wheeler, T.R., Kosarek, N.N., Kolling, F.W., Toledo, D.M., Huang, M., Wood, T., Garlick, J.A., Pioli, P.A., and Whitfield, M.L.
Epigenomics of Common Diseases, 2020
Virtual conference

Epigenetic Insights from Differential Chromatin Accessibility Patterns in Dermal Fibroblasts and Skin-Like Organoids from Patients with Systemic Sclerosis
Wheeler, T.R., Wang, Y., Chang, J., Toledo, D.M., Mehta, B.K., Brown, M.S., Bhandari, R., Huang, M., Wood, T., Pioli, P.A., Whitfield, M.L.
Systemic Sclerosis World Congress, 2020
Virtual conference

Identification of differential chromatin accessibility Using ATAC-seq in a Novel 3D Tissue culture System of Systemic Sclerosis
Wheeler, T.R., Chang, J., Toledo, D.M., Mehta, B.K., Wang, Y., Brown, M.S., Bhandari, R., Huang, M., Wood, T., Whitfield, M.L.
American College of Rheumatology Convergence Conference, 2019
Atlanta, GA

Molecular Basis of Acta2 Gene Repression by Purine-Rich Element Binding Protein B
Rumora, A.E, Ferris, L.A., **Wheeler, T.R.**, and Kelm, R.J.
University of Vermont Student Research Conference, 2016
Burlington, VT

TEACHING EXPERIENCE

Dartmouth Undergraduate Research Mentor, Dartmouth College 2020-2023

Exam Grader, Cell Structure and Function, Dartmouth College 2019

Graduate Teaching Assistant, Cell Structure and Function, Dartmouth College 2018

Undergraduate Teaching Assistant, Biochemistry I and Biochemistry Lab, University of Vermont 2015, 2016

LEADERSHIP EXPERIENCE

Burroughs-Wellcome Big Data in the Life Sciences Fellow, Hanover, NH 2018-2020

Executive Board Member, Dartmouth Graduate Student Council (GSC), Dartmouth College 2018-2019

Student Representative, Dartmouth Graduate Student Council, Dartmouth College 2017-2018