BIOGRAPHICAL SKETCH: Tristan Carmeci

NAME: Carmeci, Tristan Peter

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POSITION TITLE: PhD Student in Biophysics

INSTITUTION AND LOCATION	DEGREE (*if applicable*)	Completion Date MM/YYYY	FIELD OF STUDY
University of Portland, Oregon	B.S	05/2018	Chemistry
University of Colorado	MS.	05/2021	Bioengineering
Case Western Reserve University	Postdoctoral	In Progress	Physiology and Biophysics

A. Personal Statement

I have been passionate about the life sciences, physics and mathematics for my entire academic career. Before I was exposed to CryoEM I started off as an undergraduate getting my bachelor's degree in chemistry. Physical chemistry was my favorite class despite the mathematical rigor that came with it. Because of my physical chemistry course, I decided that I wanted to learn more mathematics to become more proficient in physics and physical chemistry. I embarked on a journey of learning linear algebra, vector and tensor calculus, differential equations, functional analysis and much more. I also was part of a lab at the Oregon Health and Science University (OHSU) studying the epigenetics of heart disease with Dr. Fred Tibayan. In this lab, I played an integral role in acquiring histological data on sheep arteries to quantify the amount of collagen and elastin in each. Our sample sheep were administered with varying degrees of stress during pregnancy and the effects of their main arteries were measured short after. We did similar studies on neonatal sheep and second-generation sheep. After I graduated, I got accepted into a master's program in Denver, Colorado focusing on bio-engineering where I learned practical computer programming and engineering skills. It was during my time as a master's student that I became introduced to CryoEM. I was unique in the sense that I chose to work outside of my department that I was getting my master's degree in. My lab work was part if the biochemistry department and my course work was in the bioengineering department. The result was me learning practical engineering skills such as using MatLab and Python and building artificial intelligence-based machines that mimicked bionic arms along-side learning CryoEM, biochemistry and biophysics. The lab I worked for, run by Dr. Jeffery Keift, was one in which tRNA was the primary interest. CryoEM was the mode of tRNA structure analysis in this lab. I quickly began to learn how to use CryoSparc and Relion to analyze structures that were being acquired by the post-doc that I was working for. These became the primary tools that I used. I was also exposed to learning how to properly prepare CryoEM grids. It was during this time as a master's student that I began to increasingly fall in love with CryoEM and so I decided to apply to PhD programs. On top of it all, I was also a tutor in mathematics at Mathnamsium of Stapleton where I help underprivileged children in Denver understand beginner's level mathematics. I enjoyed every minute of my master's but when I heard the news that I was accepted into Case Western Reserve University I was prepared to take the position. Upon arriving to Case Western, I rotated in multiple labs before I made my official decision to study glutamate receptors in for Dr. Nami Tajima. She employed all the methods that I was aiming to master. I am now a second year PhD student learning CryoEM more in-depth as well as electrophysiological methods to measure ionotropic glutamate receptor currents. In this lab I aim to better understand how accessory proteins called NETO proteins modulate the functionality as well as the structure of these receptors. These NETO proteins are also important in receptor localization and synchronization. They are found throughout the brain but some of them are highly specific to nerve cells in the hippocampus which is associated with memory formations

and learning. By using CryoEM to study these proteins we will get a better understanding of the molecular basis of memory consolidation and learning. I believe that this training opportunity will help me get closer to to my goals of being able to understand and work independently on CryoEM data collection methods to investigate how glutamate receptors are modulated by NETO proteins in the human brain..

1. Increased systolic load causes eccentric growth but decreases elastin in the developing aorta. Sarah Walcott-Sapp, MD1,2; Samantha Louey, PhD1; Isa Lindgren, PhD1; Herbert M. Espinoza1, MS; **T. Carmeci**; Sonnet S Jonker, PhD1; Kent L Thornburg, PhD1; George D Giraud, MD, PhD1,3; Frederick Tibayan, MD1,2. 1Department of Surgery, 2Division of Cardiothoracic Surgery, 3Center for Developmental Health, 4Knight Cardiovascular Institute, Oregon Health Science University, Portland, OR, 97239, 5VA Portland Health Care System, Portland, OR, 97239. Accepted in the Journal of Physiology.

2. A New Model of the Developmental Origins of Adult Cardiac Valvular Disease. R. Macfie1, A. Bridges1, S. Walcott-Sapp1, S. Louey3,4, I. Lindgren3, T. Belcik4, **T. Carmeci**, K. Thornburg3,4, G. Giraud3, 4, 5, F. Tibayan1,2, 3, 4 1Department of Surgery, 2Division of Cardiothoracic Surgery, 3Center for Developmental Health, 4Knight Cardiovascular Institute, Oregon Health Science University, Portland, OR, 97239, 5VA Portland Health Care System, Portland, OR, 97239. Accepted in the World Society for Pediatric and Congenital Heart Surgery.

B. Positions and Honors

Positions and Employment

2017–2018	Teacher's Assistant, Organic Chemistry Lab, Univeristy of Portland, OR
2000–2002	Mathematics Tutor, Mathnasium of Stapleton, CO
2019–2020	Bio-engineering Teacher's Assistant, University of Colorado, Aurora, CO

Other Experience and Professional Memberships

2023–	Student Leader and Rep, Inter-school Quantitative Bio-science Program, Case Western Reserve University, OH

Honors

2018	Award for Outstanding Work, American Chemical Society