2. Candidate Background

As I complete my three-year clinical (40 hours/week in the outpatient clinic setting) J1-visa waiver period (July 2008 – June 2011), I look forward to pursuing my career as an independent clinical researcher. During my high school years, I was fascinated by sciences, especially biology and mathematics. It was then that I began contemplating a research career in genetics. I decided to pursue a degree in medicine as it would afford me an opportunity to participate both in patient care and biomedical research. True to my desire for a research career, as a medical student I volunteered in an immunology laboratory and participated in research projects that were presented at national and international meetings. In my senior year of medical school, I completed an independent research project under the guidance of academician Laurentiu M. Popescu, current President of the Romanian Academy of Medical Sciences, which culminated in my graduation thesis entitled "Immune cells in the liver", a descriptive study of the resident immune cells in the liver using flow cytometry and immunohistochemistry methods. The work was also presented as a poster at the Romanian National Immunology Meeting in 1999. I was the recipient of the Carol Davila University of Medicine and Pharmacy Scholarship for the duration of my medical studies. In 1999, I completed medical school in the top 8% of my class.

My research experience as medical student stimulated me to follow my interest in biomedical research by pursuing graduate studies with a focus on genomics and immunology at University of Victoria (UVic), Canada under the mentorship of Dr. Chris Upton. In addition to the UVic fellowship, I was awarded the highly competitive Howard E. Petch research scholarship given yearly to seven UVic graduate students. I attended courses in immunology, proteomics and bioinformatics which helped me complete my thesis "The analysis of the complete genome of ectromelia virus, strain Moscow, the causative agent of mousepox". For my thesis, I collaborated with investigators at Saint Louis University Health Sciences Center, MO, and University of Alabama at Birmingham (UAB) who conducted the genomic sequencing and phylogenetic prediction, respectively. As part of this project, I applied *in silico* techniques for genome assembly, annotation and analysis. Specifically, the genome assembly was performed using Staden package; Artemis and the Viral Genome Organizer and EMBOSS Programs were used for gene prediction and comparative analyses with other pox virus genomes. My research at the University of Victoria resulted in two publications: one as an equally contributing first author in *Virology* and another as co-author in *Journal of General Virology*.

Although I enjoyed the intellectual stimulation provided by my research projects, I missed the interaction with patients in the clinical setting. After obtaining my Masters of Science in Microbiology, I moved to United States and served my residency in Internal Medicine at University of Illinois at Chicago / Advocate Christ Medical Center. During that time I continued my academic pursuits and gave several oral presentations and published a case report in the *Journal of Clinical Rheumatology*. In addition, with investigators at Northwestern University, I participated in a research project which proposed the use of Disease Ontology for Annotating the Human Genome. This work resulted in a publication in *BMC Genomics* in 2009.

After residency, as a natural extension of my prior work in immunology, I pursued a rheumatology fellowship at UAB. During my first year of rheumatology training, I collaborated to the development of American College of Rheumatology (ACR) 2008 clinical guidelines for the use of the non-biologic and biologic disease modifying antirheumatic drugs (DMARDs) in rheumatoid arthritis (RA). This work was presented at the ACR National Meeting in November 2007 and was published in *Arthritis and Rheumatism* in 2008.

Given my determination to pursue a career in clinical research, I applied and was selected to participate in the UAB K30 Clinical Research Training Program (CRTP). The CRTP is a formal training program which provided me with the skills and conceptual framework needed to establish and develop a clinical research project. Because of my interest in patient-oriented research and outcomes of rheumatic diseases, under the guidance of Dr. Graciela Alarcón, I completed an independent research project evaluating the contribution of systemic lupus erythematosus damage domains to mortality using data from a multiethnic lupus cohort. This was my first research project involving a large population dataset. In executing this project I learned to extract and analyze in a stepwise fashion data from a large disease specific cohort. This effort resulted in a poster presentation at the ACR Annual Meeting in 2008 and was published as a first author original research publication in *Rheumatology (Oxford)*.

Given my interest in the role of human genetics in individualizing the therapeutics and the assessment of risk of human disease, I joined the research group of Dr. S. Louis Bridges, Jr., Director of the Division of Clinical Immunology and Rheumatology and collaborated in several externally funded projects. Dr. Bridges' commitment and experience in genetics of rheumatic diseases played a pivotal role in my accepting a clinical training position in rheumatology at UAB. Under the mentorship of Dr. Bridges, I have gained some experience with data analysis in the important area of identifying ethnic-dependent genetic markers for

susceptibility, disease outcome, or treatment response. This work has resulted in several publications in *Annals of Rheumatic Diseases, Arthritis Care and Research,* and *Arthritis Research and Therapy.*

In July of 2008 I became Assistant Professor in the Division of Clinical Immunology and Rheumatology as a full-time clinician. Because of obligations to fulfill a J1-visa waiver, I was required to serve as a full-time clinician for a period of three years. During this period, I have averaged 8 half-day clinics in the outpatient setting and 2 months per year on the rheumatology inpatient consultation service. Despite my 100% clinical position and the restrictions imposed by my visa status, I have continued to participate in the research activities in Dr. Bridges' lab. In addition, I have first-authored one manuscript and co-authored five other manuscripts.

My past and current scientific endeavors attest my commitment to an academic career in clinical research where I can combine my interest in translational science with patient care. I have a clinical and research background in rheumatology and expertise in immunology and molecular biology, but seek to enhance my research and skills in genetic epidemiology and statistical genetics to increase my level of competency as I transition to an independent investigator in genetics of rheumatic diseases. I have assembled a strong interdisciplinary mentoring team with long history of successful mentorship and academic accomplishment in rheumatology, epidemiology and statistical genetics. Moreover, I have the assurance from the Division of Clinical Immunology and Rheumatology and the Department of Medicine that my time will be protected if awarded the K23 grant. During the proposed K23 patient-oriented research career development award I will commit at least 9 person-months (75% of full-time professional effort) to this program and related career development activities.

3. Career Goals and Objectives

My overall career goal is to develop the skills and expertise necessary to become an independently funded investigator in genetics of rheumatic diseases. Specifically, I will focus on:

1. Understanding the relationship between the human genome and the development of complex diseases such as RA and other rheumatic diseases.

2. Developing prediction models for disease outcomes in RA and other rheumatic diseases using clinical and genetic data.

The ultimate goal of genetics is to improve human health by converting the genetic discoveries into meaningful applications at the individual and population level. While the goal of this endeavor is very broad and requires tremendous personal commitment, I believe that Dr. Bridges, Dr. Arnett and the mentoring team are very strong and the academic environment at UAB is outstanding. The UAB Division of Clinical Immunology and Rheumatology, the UAB Department of Epidemiology and the Section on Statistical Genetics (SSG) are nationally and internationally renowned units staffed with collaborative researchers, several of whom are consultants on this K23 application. I believe that with my proposed training plan and under the guidance of my superb mentoring team I will achieve my goal of becoming a successful independent investigator in genetics of rheumatic diseases.