"Americans don't believe in climate change because it is measured in degrees Celsius" a quote from Naomi Klein, an author and social activist, during her lecture at Syracuse University last year. I could not stop laughing but mainly from the irony this humorous statement had in relevance to my life, as climate change research is my true calling. I aim to have a career in atmospheric and environmental sciences to gain a better understanding of our changing climate and the potential environmental consequences it has, exploring the gap between climate and sustainability based on scientific research.

The greenhouse effect is dependent on various compounds, i.e. the greenhouse gases (CO_2, O_3, N_2O, CH_4, etc.) that have been either emitted from or formed through reactions of compounds emitted from anthropogenic sources. We are both directly and indirectly dependent upon the natural environment for our survival and well-being. To pursue a balance between anthropogenic and natural interaction is defined by the EPA as "sustainability". I chose a major in environmental engineering to study the various components of our ecosystems and to investigate sustainable solutions to improving the interaction of our communities and surroundings. My interests have always been stemmed from curiosity of the interdependent systems our natural environment is composed of and what causes them to work. With the most prominent and influential of those topics, for me, being weather and climate.

I have found myself continuously pursing questions related to atmospheric phenomena ranging from how and why various clouds form to the contribution of large scale pressure systems on the dynamics of regional weather systems. As I continue through my academic career, I have already discovered that the answers to my questions are nothing shy of complex and often lead to more questions. I want to pursue a PhD in atmospheric sciences so that I can learn and understand more about our atmosphere, expanding my logic and questioning by taking my curiosity to a new level. My goal of obtaining my doctorate in this field will allow me to research and never stop learning about topics I am genuinely interested in. Post-degree, I would welcome any opportunity that I came across, whether that be in a government or private lab or as a professor teaching and doing research at an institution. The latter is what I primarily can imagine myself doing for I enjoy inspiring others and igniting the same curiosity in them as there is in me. I am interested in making a lasting impression on future generations, as well as in the scientific community, in order to contribute to solutions regarding the more likely severe implications of climate change in the coming decades. The significance of the changing atmosphere increasingly has become and will continue to be an important issue facing the globe. There is no "fix" to climate change as many perspectives outside of academia imagine. There is only increased understanding of the underlying dynamics allowing for better long term decision making and ease of adaptation down the line. That reason, along with many others, are the baselines for why I want to continue my education and make the impacts I feel I had always had the potential for.

My research interests align directly with those at the University of Miami's Rosenstiel School of Marine and Atmospheric Science. There are three primary projects I have taken interest in: Predicting the Coming Decades with Dr. Ben Kirtman, The Role of Saharan Dust in Atlantic Climate Variability with Dr. Amy Clement, and The Low Cloud Response to Smoke Over the Southeast Atlantic with Dr. Paquita Zuidema. I have chosen these projects based on my interests and current level of skills and understanding of the concepts associated with them. I

have already been in contact with all three professionals and had even met with Dr. Amy Clement last August about opportunities with her, as well as others in the department. Miami provided me with a lure that other graduate schools I had visited did not. There was a sense of unity and collaboration, something that I am looking to be a part of. It is located at a different location from the main campus which is appealing because I have attended smaller, close knit schools throughout my life. RSMAS provides unique opportunities involving vast research resources through notable facilities (ex. Cloud-Aerosol-Rain Observatory), collaboration with various government agencies (NOAA, NHC) and well known faculty within the field. Tied together with a tropical location that produces a truly magnificent sky/laboratory to learn and continually be in awe of, I feel that it is one place where I can truly fit in and be excited about the atmosphere along with others.

I have already proven that I am fit for atmospheric research through my undergraduate involvement through the SUNY Research Foundation (RF) as well as NSF's Research Experience for Undergraduates (REU) program. I participated in 2015 under Dr. Steven Shaw of my department with the SUNY RF doing a basic exploration of CMIP5 general circulation models (GCMs) to compare and validate their ability to reproduce the station based North Atlantic Oscillation (NAO) index. The investigation involved 12 GCMs, their historical runs (1900-2005) and also future simulations (2005-2100) based on an atmospheric increase of CO_2 concentrations at a rcp6.0 level. Findings and conclusions revealed that the models were able to reproduce the dipole and somewhat capture decadal trends. However, the models lack an ability to replicate seasonal variability. The study through NSF's REU program took place this past summer at Washington State University's Laboratory for Atmospheric Research where I looked at the scale dependency of model estimates for nitrogen dioxide concentrations in the Western United States. It involved using a temporal decomposition method that allowed for comparison of the Community Multi-Scale Air Quality (CMAQ) model and EPA observational data over a two-year period at varying time scales (short-term (< 46 hours), synoptic (2.5-21 days), and long-term (> 21 days)). Results showed that the longer the temporal scale, the better the model was at capturing the trend, something that could be contributed to model resolution. Additionally, it was evident the short-term component displayed the most significant variance of which the model had the most trouble reproducing. I am currently continuing my research through WSU at my home institution looking at O_3 and PM2.5 in addition to NO_2. The results will be presented via poster at the American Meteorological Society's 19th Annual Atmospheric Chemistry and 16th Annual Student Conference this January in Seattle. I have presented the work I did through my REU at two other conferences; one being an oral presentation at SUNY Oswego's Great Lakes Atmospheric Science Symposium (GLASS) in October, and the other an award winning poster presentation at the Joint Meeting of the Central New York Sections American Industrial Hygiene Association and Air & Waste Management Association earlier this month.

My background has provided me with a strong foundation that will allow me to succeed in any opportunities that I may be a part of. The engineering department I am in is highly focused in hydrology which allowed me to pursue a track that has set me up for a research based career. Courses such as an Introduction into Atmospheric Sciences, Numerical and Computing Methods, Hydrologic Modeling, Advanced Modeling in GIS, Hydrology in a Changing Climate, Hydrology and Hydraulics (applied fluid mechanics), Meteorology, Differential Equations, and

Principles of Remote Sensing have prepared me extensively for what I am trying to accomplish. I am also an undergraduate teaching assistant in both Numerical and Computing Methods and Meteorology which is where I discovered that helping others learn is something not only am I good at, but also what I am interested in. I am highly skilled in Python as well as R, in GIS, and am familiar with programming many solutions and handling large datasets. Also derived from my department, is a sense of leadership, collaboration, and consideration of the environment, sustainability, and community as underlying themes to various concepts.

I am very driven and have proven that I will continue to pursue and excel at the opportunities I have been given regardless of the circumstances. My background has only prepared me for what is to come. While the topics I researched were interesting, I would like to expand to other, more complex issues such as those offered through RSMAS. I would like to gain more research experience, better grasp and understand atmospheric related concepts, advance my computation skills, and improve my technical writing skills in order to effectively communicate and apply my results to the real world. I am ready to take the next step and pursue my passion which I hope to do at RSMAS.