Exploring ecosystem processes and specifically how plant physiological function fits into the regulation of these processes is a passion of mine that developed during my diverse set of experiences. My academic and research background has given me a strong foundation in ecology that will aid me in critically investigating these processes and how they will be influenced by imminent global change. During my undergraduate career, I obtained a major in Environmental Science and a minor in Biology at Boston University (BU). At BU, I pursued interdisciplinary coursework that introduced me to theoretical and applied science and most importantly how to translate science into the management of ecosystems in a rapidly changing world. My studies at BU, and my subsequent employment at Harvard University, helped influenced my career decision to investigate the restoration of damaged ecosystems and directly apply these findings to managing ecosystem recovery.

As an undergraduate at BU, I began my career in ecological research as a volunteer in Dr. Adrien Finzi's lab whose research focuses on global change and biogeochemical cycling. In his lab I collaborated with a PhD student who was examining the impact of an invasive herb on soil nutrient cycling. During my involvement with this project, I became intrigued with the complexity of biogeochemical cycles and how they could be driven by organisms on the scale of individual plants to microbes. My assistance with the development of initial research questions to the preparation of data for publication sparked my passion for ecological investigation and encouraged me to conduct independent research for the remainder of my academic studies.

As part of the BU Tropical Ecology Program, I had the opportunity to conduct research at the Tiputini Biodiversity Station in the Ecuadorian Amazon. At Tiputini, I became fascinated with phytotelma, bodies of water held in plants, in heliconias and bromeliads. The ability of these plants to regulate the environmental conditions in their bracts led me to study the influence of these conditions on phytotelmatic insect communities. I found the diversity of those communities were directly dependent on phytotelmatic pH, dissolved oxygen concentration and plant health. Exposure to field research in one of the most complex and diverse ecosystems greatly broadened my ecological interests and encouraged me to study the influence of plant physiology on community and ecosystem function.

Upon my return to the United States, I became an REU intern at the Harvard Forest LTER in Petersham, MA, under the supervision of Dr. Steven Wofsy and Dr. J. William Munger. That summer, I worked on a project at the Harvard Forest Environmental Measurement Site (HFEMS) which aimed to couple the terrestrial carbon (C) and nitrogen (N) cycles. This served as a catalyst for my senior thesis at BU, where I further investigated this relationship. During my thesis work, I discovered the trees at Harvard Forest are utilizing N more efficiently in addition to increasing N uptake over time. Complex ecosystem dynamics such as these, which can be regulated by plant function and forest successional dynamics, are challenging to study because these factors work concurrently to drive ecosystem function. This challenge is appealing to me as I hope to advance the understanding of these multifaceted systems**.** In order to continue investigating the changing dynamics of the C-cycle at the HFEMS, I accepted a research assistant position at Harvard University following my graduation from BU.

In my current position at Harvard, I manage the ongoing ecological measurements and the development of new projects at the HFEMS (*see 'Previous Research Experience'*). In addition to these responsibilities, I had the opportunity to independently mentor three REU students, as well as an undergraduate Department of Energy Global Change Education Program (DOE GCEP) fellow, during their research projects. I also advised the DOE GCEP fellow on her Middlebury College senior thesis. These opportunities not only solidified my passion for

mentoring, but also enabled me to discover the importance of outreach in scientific research. All of my students approached research in a different way and it was an enriching experience for me to introduce them to ecological research and to see them grow as scientists throughout the summer.

This experience enabled me to teach students from various academic backgrounds, which led me to develop more creative ways to present information while mentoring. Given my success with past mentorship I intend to continue mentoring undergraduates through the Northwestern and Chicago Botanic Garden REU program in Plant Biology and Conservation (PBC). In addition I have further interest in mentoring middle school students traditionally under-represented in science careers through the Junior Science Club at Northwestern (*see 'Proposed Plan of Research'*). I will integrate hands-on learning techniques into my teaching strategy, as it was my exposure to hands-on research that initially convinced me to pursue a PhD in ecology.

My PhD dissertation will focus on plant ecophysiology and ecological restoration. I am interested in exploring the effectiveness of ecological restoration, from a physiological perspective, with the following overarching questions: While initial restoration may significantly increase the health of an ecosystem, will the lack of diversity in a restored system leave it more vulnerable to future damage? If a disturbed ecosystem undergoes some form of ecological restoration, is there an efficient way to evaluate the success of that restoration? There has been a call for the integration of physiological parameters into the evaluation of restoration techniques (1), and the project I propose will directly address this gap in previously conducted research.

My plan to track the effectiveness of ecological restoration, using ecophysiological tools to monitor the efficiency of plant community recovery, will be a novel approach to these questions. Dr. Daniel Larkin, my preferred advisor in the Northwestern University and Chicago Botanic Garden Plant Biology and Conservation program, addresses similar questions in tracking the rejuvenation of ecosystem services after disturbance. The PBC program, which is composed of faculty who conduct research and directly apply it to ecosystem management, will allow me to place my research in a broader context which can be directly applied to the management of restoration in a diverse set of ecosystems.

Ultimately, my goal is to use common, physiologically focused, plant functional traits to scale up to whole-ecosystem processes. This research will influence management decisions and be applied to damaged ecosystems that could benefit from some form of ecological restoration. By focusing on determining the factors that influence the resiliency of plant species to anthropogenic influenced environmental change, it will be possible to create management plans that rapidly increase the health of ecosystems and make those ecosystems resistant to further damage. I will therefore conduct research that not only advances scientific understanding but also can be directly applied to management strategies. The National Science Foundation Graduate Research Fellowship would allow me to advance the understanding of my proposed questions, as well as to approach the evaluation of restoration techniques in an original framework. The US Forest Service highly reveres restoration as a technique to revive damaged ecosystems (2), and my '*Proposed Plan of Research'* has the opportunity to advance policy by creating an index for the evaluation of the success of these programs.

(1) Cooke SJ & Suski CD. 2008. *BioScience* **58**:957-68. (2) United States Congress. Omnibus Public Land Management Act of 2009 – Title IV. 2009. 111th Congress.