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I have recently completed my Master's degree in Mechanical Engineering, with a focus in nano-materials and renewable energy at Rowan University. I believe that my research experience, combined with my relevant coursework has provided me with the necessary background to be a strong candidate for the position.

While pursuing my Master's degree, I was the lead researcher for a project involving the scalable fabrication of perovskite solar cells, which was the topic for my thesis. During this time, I was heavily involved in methods of chemical synthesis, including the production of nanomaterials. I also ran two classes called Engineering Clinic and Advanced Laboratory, which involved teaching students how to conduct research in a proper manner. Also, I instructed students on how to use equipment such as X-Ray diffraction, Fourier Transform Infrared Spectroscopy, and Scanning Electron Microscopes, while also instructing on chemical synthesis and thin film fabrication methods such as sol-gel, spin coating, and dip coating. I also helped other students with their projects involving nanomaterials, and as such, have experience with piezoelectric and thermoelectric devices. Two courses, Renewable Energy and Principles of Nanotechnology, have helped me gain knowledge about the underlying physics of these devices, along with other methods of nanomaterial fabrication, such as Physical Vapor Deposition and Chemical Vapor Deposition. Another course, Process Optimization, allowed me to gain the skills needed to optimize many different processes ranging from chemical synthesis, to supply chain management, using multi-objective optimization techniques such as genetic algorithm.

While pursuing my Bachelor's degree in Physics, also at Rowan University, I was involved with three separate research projects. The first project involved thin films of silver oxide fabricated through reactive magnetron sputtering, for use as an antibacterial agent inside the body. I was directly involved with the fabrication of these films, as well as characterization of using an XRD. This was my first experience in a research setting, and I thoroughly enjoyed it. The second project involved bulk nanomaterial fabrication through ball milling of metal hydrides for hydrogen fuel cells. After bulk powder fabrication, samples were moved into a glove box for characterization preparation. Again, the powders were analyzed using an XRD, and the corresponding data was used to form a profile of the powders. The main goal of this research project was to lower the desorption temperature of complex hydrides using simpler hydrides. One such sample was titanium hydride with nickel hydride as a dopant. The third project was an internship with the Department of Homeland security through the Oak Ridge Institute of Science and Education, for contraband and explosives detection. During this time, I obtained a security clearance. The focus of this project was to use Dual Energy X-Ray computed tomography to obtain a cross section of the amount of X-Rays absorbed by the material, and compare the results with simulated samples generated using MATLAB. At the end of my time at the department of homeland security, the collected data and the code were given to Boston University, for large scale implementation in airports.

In closing, I am extremely interested in this position, and feel that my background makes me a strong candidate. I enjoy research and development of new technologies, and have a passion for learning. Attached is my resume, which details a summary of my qualifications. Thank you for your time and consideration.

Best regards,
Joseph Iannello