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Stephanie Shiu
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Staff Operations Manager
Los Alamos National Laboratory

Dear Stephanie,

My name is Ben Brown, and I am a graduating 5th year electrical engineering student at Rochester Institute of Technology. I'm seeking employment as a Space Data Processing Post-Baccalaureate Student at Los Alamos National Laboratory. I believe that I have several specific attributes that would result in particularly synergistic employment in this position, and I would like to outline them below, in order of listing on the job description:

Minimum Requirements:

- **Programming Experience:** Through my education surrounding deep learning and related computational techniques, I have gathered 4+ years of experience in Python. Learning to code efficiently, legibly, and consistently has been critical in my overall success in both research and production. In addition, I have exposure to several other languages through classes or related co-op work, specifically C/C++ in both high- level and embedded environments.
- **Operating System Experience:** During my time with the DeFake Project, we developed all of our models and scripts on a dedicated remote SSH server running Ubuntu, which I had to learn and navigate quickly in order to deliver results on pace with the rest of the team. This involved monitoring processes, navigating deep file directories, and using the command line for executing code. Through my coursework and extracurriculars, I have also had the opportunity to develop on Windows and Linux-like Windows systems (Cygwin, WSL). This breadth of exposure in environments makes me a versatile developer in any platform or research setting.
- **Version Control System Experience:** After my first co-op experience, I began using Git and private GitHub repositories to store any project that required more than three files. This allowed me to easily transfer projects between devices, and get used to git's version control ecosystem at the same time. This allowed me to carry lessons I had learned from my own experimentation into future work experiences to accelerate my integration into new teams, and also push for better version control practices on teams that haven't adapted them yet.
- **Collaboration/Teaming:** In my two-semester senior design class, I took the role of Project Lead for our 4-person team early on. The duties of this position involved being the primary point of contact for our client that owns our project, organizing all the design reviews and check-ins with our faculty guide, and keeping the team working efficiently and effectively. This allows me to be a more effective team member and gives me the utility to step up when the opportunity presents itself.
- **Communication:** RIT engineering focuses heavily on laboratory classes, which means that students are required to write reports summarizing labs in nearly every class. Doing this has given me years of practice in communicating ideas from semiconductor processes to analog circuit design in a manner that is concise and manageable. This directly transfers to research and white-paper reports that I have worked on in the industry.
- **Education/Experience:** I plan to graduate this May with a BS in Electrical Engineering and an immersion in Applied Statistics. I intend to pursue higher education with the end goal of obtaining a Ph.D.

Desired Qualifications:

- **Satellite Senors and Programs** Through my senior design project, I have learned about integrating and taking measurements from a specialized SWIR sensor that uses a MEMS light filter and a photodiode to detect magnitude of light across a certain wavelength. I've also worked with complex real-time datasets in the context of titanium manufacturing. This has equipped me with the skills required to tackle complex, real-world sensor problems, like one that may come from a satellite using tools in python such as Pandas, Numpy, Scikit-learn and Pytorch. It also equips me with the bare metal knowledge required to interpret the mechanical and electrical phenomena that may come from the hardware side of sensors.
- **Scientific Algorithm Development** During my term as a research assistant for the DeFake project, I had the opportunity to write a modular, scalable experiment framework to assess the performance of Deepfake Detection models and their robustness. The

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skills I learned in the development of that framework would be easily applied in creating modular, repeatable experimental code at LANL.

- **Data Processing and Engineering** In my artificial intelligence education and applied statistics immersion, I have learned techniques for processing large amounts of data using software like Python, as well as drawing statistically relevant inference from the data using JMP and DOE principles. This allows me to not only design effective research experiments, but also interpret the data in a way that is provably significant.
- **Unit and Integration Testing** Digital design via HDL is a core aspect of our curriculum as electrical engineers. Digital Design validation requires writing exhaustive test benches to verify system functionality. The skills learned through writing these scripts can be easily transferred to software unit testing.
- **Debugging Tools** While I am less familiar with GDB, I have used it for our introductory C course to debug C code. I have also used several other debuggers, most of the time built into an IDE. I have plenty of practice debugging code without dedicated debuggers as well across both high and low level languages.
- **HDF5 and Similar Data Formats** Through my work in data science, and specifically with the Neurotechnology Exploration Team, I've had to work with many diverse file formats, like the traditional CSV and JSON, as well as XDF and BRC files. While I have not used HDF5 yet, I possess the skills to learn such a standard as I have learned others in the past.

In short, being on the cutting edge of research and development is and always will be a primary motivation for my work. That is why I want to work at LANL, so I can push the boundaries of human knowledge in an environment of people that want the same. I enjoy facing problems that have never been solved before, and I learn voraciously in order to overcome obstacles that face me.

I'm excited to hear more about this Post-Baccalaureate position. I believe that the Lab possesses everything that I need in order to grow into a successful researcher focused on the greater good. Please refer to my resume for further details about my skills and experience, and feel free to reach out to me with any other questions.

Thank you for your consideration,

Ben Brown