Billy E. **Geerhart III**

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Personal Statement

My two passions are programming and physics. I used my two passions to work on computational projects to earn both a BS and MS degree in physics. Although I have no experience with the Unreal Engine or gaming related physics engines, my computational physics background has forced me to learn various programming languages and software to get work done. In other words, I am confident I could learn any programming languages or software required for the position. By the way, I love games: https://www.youtube.com/watch?v=W9Hfk7_uFk0

Education

MS in Physics - Expected September 2016 **GPA: 3.6** *Oregon State University*

BS in Physics - June 2012 3.48 *Corvallis, OR*

Equivalent courses to a BS in Math -

Experience

Oregon State University

Corvallis, OR

Graduate Research *January 2011 - Present*

- Used Linux in combination with GIT and SLURM to work on a project requiring thousands of Markov Chain Monte Carlo simulations; the data from each work unit was stitched together to generate the thermodynamic observables of a square-well fluid.
- Programmed in CUDA to explore a non-linear wave using finite element analysis in combination with RK45.
- Used the mpi version of NAMD to explore the feasibility of a computational biophysics project.
- Worked as a team helping others debug and create code in both Python and C++.

Undergraduate Research

- Used LAMMPS to create hundreds of molecular dynamics simulations that contained both a liquid and a solid at the same time. The data was used to recreate the liquid-solid phase coexistence of the Lennard-Jones 12-6 potential.
- Created an algorithm that identified whether an atom was in a liquid or solid state. The algorithm determined the state by how the nearest neighbors fluctuated. Over time, an atom in a liquid state will generally swap nearest neighbors; on the other hand an atom in a solid state will usually keep the same nearest neighbors.
- Created an efficient density calculation algorithm. The initial algorithm took 60 seconds per computation while the optimized algorithm took only 2 seconds per computation. I optimized the algorithm by combining bisection and Monte Carlo integration; I also applied geometry to a special case in the bisection algorithm that reduced the unsorted boundary volume elements from a 2d surface down to a 1d wire frame. The reduced boundary naturally decreased the computation time. I recognized the opportunity to apply a second special case that could reduce the unsorted boundary volume elements from a 1d wire frame down to a handful of points. This second special case had the potential to decrease the computation time from $O(2^n)$ down to $O(n)$, but I decided the added time to build and test the new code would not be offset by the time saved from the computations.

Graduate Teaching Assistant

- Lead laboratory and recitation sections for introductory algebra and calculus based physics courses.
- Graded thousands of exam problems by finding each students mistake so that I could award maximum points.
- Motivated students to do well in class. I accomplished this by first gaining the students respect by telling them my perspective on the universe, then I used the physics to transition to philosophy in which I challenged the students to question their own place in the universe. I ultimately wanted the students to realize they weren't being forced to take physics as a requirement for their degree; rather I wanted the students to realize they were the ones that signed up in the hopes of doing what they wanted to do in life.

May Trucking Company

Salem, OR

Class A Truck Driver *January 2004 - October 2010*

- Drove 60+ hours a week while away from home; I usually drove the night shift.
- Maintained a zero accident history despite driving thousands of miles per week all year long.

Skills

Programming Experience CUDA, C/C++, Python, Java

Software Experience SolidWorks, Maple