

A day in the life of a Computational Physicist

My work day begins around 9:00, depending on the number 10 bus. Sometimes there isn't one for a half an hour and then they come all at once. I always wonder if five 10s come in a row is that the same as one big 50?

As a physicist, I always think about systems and how they work, whether I am at work or, as usual at 8:45 in the morning, waiting for a bus. For example, when the buses get bunched together, should the drivers wait for the lead bus to get ahead before continuing? But, by waiting, no one goes anywhere. And how does the system work when affected by outside influences (traffic, rain, an accident) or, in the language of physics, perturbed by external forces?

Thinking about how things work, from buses to quantum physics, to laser-produced plasmas, are the hallmarks of all physicists.

Having arrived at my office, I start as almost everyone does by turning on my computer. As a computational physicist who specialises in modelling laser-produced plasmas, I couldn't work without an extremely fast computer, capable of performing more calculations than imaginable. If I am developing a model, I spend the day 'running' and testing my program. All the equations get coded into the program. I have to check for bugs, removing anything from typos to correctly coding an algorithm which is the exact 'recipe' for how to calculate a solution.

Then the program is ready for field testing, comparing the theoretical to experimental results. In the Spectroscopy lab, there are experimental physicists, who record spectra, a picture of the light radiation given off at different frequencies. By comparing theory to experiment, we can understand more about the system, in this case the interaction of light and matter. Today, models are at the core of computational physics.

Modelling physical systems is great fun. It's like a computer game, but instead of warding off evil trolls or jumping plumbers with a joystick, I get to create the game, the physics, to help see how the real world works. What could be more interesting and challenging than trying to predict the outcome of an experiment before the experiment?

At the end of my day, I walk the three miles home. It's nice to give atoms and buses a break. Alas, as I walk, I wonder how the traffic button at a pedestrian crosswalk works. That system I may never understand.

John White

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John White, a PhD researcher at the School of Physics, University College Dublin.