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PROFESSIONAL GOALS

Teach physics at the High School or College level.
Modernize physics curriculum.
Apply computing to education generally, and physics in particular.

FORMAL EDUCATION

First Class Bachelor of Arts in Natural Science Physics from University of Oxford with specializations in Theoretical Physics, and Modern Optics and Laser Physics. The Oxford University program is a 3-year course based on a tutorial system with an emphasis on Mathematical Physics. My practical work was singled out for special praise by the examiners.

SELF-DIRECTED AND EXPERIENTIAL LEARNING

Self-taught Software Architect and Computer Programmer. I learned to program in a scientific setting at the Royal Signals and Radar Establishment in the U.K. After moving to the United States I founded a software company and have evolved with the changing technologies. I am proficient with low-level languages such as C and C++, scientific/academic languages such as Fortran and Python, and commercial languages such as Java, Scala and JavaScript. I have worked for several large companies including TIBCO, Thomson Reuters and Amplify, as well as having leadership roles in startup companies.

Continuing studies in Physics and Mathematics. I have always maintained and extended my knowledge and skills in physics with a view to either returning to a more academic setting or teaching and mentoring. A central theme in my studies has been to make the geometrical aspects of physics more explicit through better mathematical notation. This would make it more accessible to a younger audience and accelerate their learning. Examples include Geometric Algebra and Lie Groups. In 2013 I implemented a website that allows the student to create mathematical physics simulations using the Python programming language running in a web browser.

Mentoring preparation in AP Physics and High School Mathematics. In 2013 I began focused preparation for tutoring students in the traditional High School curriculum, and with attention to the Common Core and Next Generation Science Standards.

NCSU Modeling Physics. Audited class given by Matt Greenwolfe.

EXPERIENCE

Tutoring students at High School and College levels. I have tutored students on an ad-hoc basis, usually in some form of crisis situation. I pride myself on my patience with students, born of a belief that they can succeed and my ability to present subjects from multiple perspectives.

Citizen Schools volunteer in Durham, NC. I volunteered in a Middle School program for "turnaround schools" to teach game programming. The experience involved preparing a course as well as lesson planning, execution and extra-curricular visits. Students presented their games at completion. The underlying idea is to foster engagement. It was very gratifying to work with the students and I enjoyed seeing the thrill they would get as I helped them make links between their mathematical studies and game programming.

Architect and developer of on-line Geometry-Zen educational software. I have a conviction that programming should be part of the modern day curriculum, not just because it is a 21st-century skill, but for the benefit it has in fostering the learning of mathematical and physical concepts. In 2013 I created a programming environment that allows a student to perform 2- and 3-D simulations using only a web browser. The program uses Python as the user language and was extended so that Geometric Algebra and Units of Measure could be programmed in a natural way. I have used the program with students as young as 9 years-old and it is currently used all over the world.

skulpt contributor and Google Summer of Code mentor. I am a contributor to the skulpt open source project that is used by universities to teach Python programming in Computer Science. I was recently invited, and have accepted the invitation, to become a mentor on the Google Summer of Code program.

Architect for (Bill and Melinda Gates Foundation) K-12 Education Software Platform. In 2012 I worked for the educational hardware/software provider Wireless Generation (now Amplify) on the development of a national project to provide a K-12 repository as the foundation for personalized learning. I was an architect and team leader, and was selected as the liaison for external standards organizations.

Student Pilot, Royal Air Force. I was awarded a gliding and flying scholarship while at school and ultimately joined the Royal Air Force. I attended the Officer training at RAF College Cranwell and went on to train as a pilot.

INTERESTS

Running, Swimming, Cycling. I have competed in Olympic-distance triathlon and ran the Boston Marathon in 2010. I continue to run and swim for fitness and pleasure.

Theoretical Physics. Whenever I have free time I study physics. I occasionally read historical accounts and find them very valuable, but mostly like to learn new theories and mathematical techniques.

REFERENCES

Steven Peha. A independent educational consultant and colleague on the Bill and Melinda Gates K-12 Educational Software Platform.

Kimberley Swoboda. A teacher in the Durham school system. Kimberley was my co-teacher and mentor in the Citizen Schools program.

Dorothea Erxleben. A student at NCSU that I helped with Classical Mechanics.