

# Get to Know the Math Faculty: John Carter

*Part of a series of Math faculty profiles*



## **Where did you grow up?**

I grew up on a cherry and apple orchard a few miles outside of The Dalles, Oregon. It's a small, rural town located on the Columbia River on the east end of the Columbia River Gorge.

## **If you are not from Seattle, when and why did you come here?**

I've spent most of my life in the Pacific Northwest. It's about a four-hour drive from Seattle to my hometown. I went to the University of Puget Sound in Tacoma. After grad school, I returned to the PNW because I wanted to be close to family and friends. Plus, I love the PNW's combination of mountains, cities, and water.

## **When and how did you first become interested in math?**

I always enjoyed math (and science) growing up. However, it was the differential equations I took as a sophomore at UPS that really sparked my interest in mathematics. After that, I started working as a math tutor and discovered that I love teaching.

## **Where did you go to college and what was your major?**

I majored in (pure) mathematics and minored in chemistry at the University of Puget Sound. After graduating, I spent a semester on a National Outdoor Leadership School (NOLS) course in the Southwest US. I went to graduate school in applied mathematics at the University of Colorado at Boulder. For my doctoral thesis, I studied partial differential equations, numerical methods, and fluid dynamics.

## **When did you start teaching at Seattle U. and how did that come about?**

I started teaching at Seattle U in the fall of 2001. As a graduate student, I knew I wanted a job at a teaching-focused university in the PNW. Through a friend, I made a connection with John Sylvester at the University of Washington, who put me in contact with his wife, Donna Sylvester who was already teaching at Seattle U. During one of my trips to Oregon, I visited Seattle, met with Donna, and toured SU. Donna and I had a nice chat and I got a great first impression of the University. Sometime later, I applied for a position and was eventually hired. Many thanks to Donna for helping me get this great job!

## **What is your favorite class to teach and why?**

My favorite class to teach, without a doubt, is MATH 2340: Differential Equations. I love the material. It's the first class that covers valuable real-world models. (Most of the real-world problems in classes before this one are unrealistic or fabricated.) The course is especially fun because it requires the active use of material from Calc 1, 2, 3, and Linear Algebra throughout the quarter.

**What is the most exciting math project you've ever been involved with?**

The most exciting math project I've been involved with is "frequency downshift" (FD). This is a problem that my PhD advisor (Harvey Segur) and I thought about a lot while I was working on my dissertation. FD is a surface water wave phenomenon that has been observed in laboratory experiments and in the ocean. Although my advisor and I were not able to solve this problem while I was a student, we continued to work on it. In 2008, questions related to FD came up while working on an associated problem with one of my research students, Cynthia Contreras. Ten years later, Alex Govan (another research student) and I derived a partial differential equation model for surface water waves that exhibited FD. That work required extensive asymptotics and Mathematica usage. A few years after that, Isabelle Butterfield (another research student) and I, showed that the model accurately predicted FD in certain laboratory experiments. This work required laboratory experiments (conducted by Diane Henderson at Penn State) and numerical solutions of PDEs. Last year, Camille Zaug (another research student) and I studied FD in the ocean. We found that the model reasonably accurately modeled the evolution of swell traveling large distances in the Pacific Ocean. This problem required a true team effort, many aspects of applied mathematics, and a lot of time.

**What is your favorite pastime, other than math?**

Spending time outdoors. I enjoy hiking, snowshoeing, trail running, mountain biking, and white-water kayaking. In the city, I enjoy live music (mostly heavy metal).

**What is your most prized possession?**

I'm not really a collector of things. That being said, I have collected a large number of band autographs. When I was working in college radio as an undergraduate, I interviewed one of my favorite bands of all time (Savatage). The singer/lyricist wrote out lyrics for my favorite part of my favorite song of theirs and signed it. I have that framed in my office!

**If you could give college students one piece of advice for success in school, what would it be?**

Dedicate significant time to activities outside of the classroom. Join a band, be a DJ at the campus radio station, participate in the debate club, play sport, ... Some of the things you learn outside the classroom are more important than anything you learn inside the classroom.

**If you could give college students one piece of advice for success in life, what would it be?**

Do what you enjoy. Spend time with good friends.

**Anything else we should know about you?**

I love getting to know other countries. I've used my sabbaticals to live in Santiago, Chile (July-December 2008), Madrid, Spain (July-December 2016), and Bergen, Norway (January-June 2017).