Meet our Featured Alum:

Garrett E. Granroth, Ph. D.

Stetson Class of 1993

Biography:

Garrett Granroth began his academic career as a Physics major at Stetson University in August of 1989. In the summer of 1992, he worked with Prof. Kevin Riggs characterizing magnetic thin films using primarily the Ferromagnetic Resonance (FMR) technique. He graduated from Stetson University in May 1993. In August of 1993 he began the Ph.D. program in Physics at the University of Florida. He spent five years working with Prof. Mark Meisel on low dimensional magnetic systems and various other systems that have interesting behavior at low temperatures. In 1998 he graduated with a Ph. D. in Physics from the University of Florida. In January of 1998 he started a Post-Doctoral Fellowship in the Center for Neutron Scattering at Oak Ridge National Laboratory in Oak Ridge, Tennessee. Here he worked with Dr. Stephen Nagler using neutron scattering to study several disordered magnetic systems. In 2000 he joined the Spallation Neutron Source (SNS) project as an instrument scientist. Currently he is managing the design and construction of a high resolution chopper spectrometer named SEQUOIA.

Open Letter:

I was very surprised and honored to be asked to be the featured Alum for this year. I have many fond memories of my time at Stetson. Furthermore, I am truly grateful for the broad base of Physics knowledge that I learned at Stetson. It has served me well during the rest of my career. Every day I use something I learned at Stetson. I will briefly

describe my work as an instrument scientist, and my route to become one, followed by a couple of anecdotal incidents where I thought, “I’m glad I learned that at Stetson.”

Since July 2000, I have been on staff with Oak Ridge National Laboratory as an Instrument scientist for the Spallation Neutron Source. My job involves the design and project management of a high resolution chopper spectrometer known as SEQUOIA.

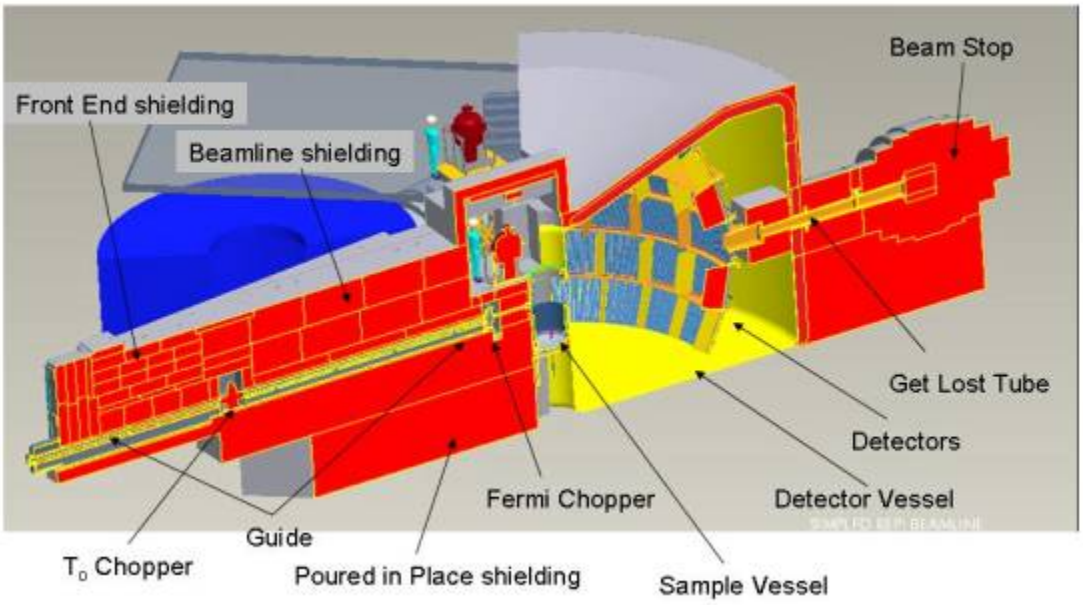

Figure 1 Baseline Design of SEQUOIA spectrometer

The instrument will use neutrons to probe excitations in different condensed matter systems. Neutron Scattering techniques have provided insight into the structure and excitations of almost every condensed matter system that exists and are specifically useful for studying magnetic systems and systems where Hydrogen is important. Neutrons are difficult to generate and national scale facilities are required to provide sufficient quantities incident on a sample. The SNS will be the brightest pulsed neutron source in the world. Because neutron beams are a scarce resource, the first step in the life of a new instrument is a detailed instrument concept showing that the instrument will provide the maximum scientific output. After this conceptual design is approved the instrument moves into a conventional design and construction phase. My job has been to perform the scientific design of the instrument, shepherd it through the approval process, and currently involves overseeing the conventional design and construction phases. The approved design is shown in Figure 1. Figure 2shows the lead engineer David Vandergriff and I by components that were installed in Dec. 2004.

Figure 2 Garrett Granroth (Left) and David Vandergriff (Right) by components for the SEQUOIA shutter

Throughout this process both the analytical, computational, and experimental skills that I acquired at Stetson are used on a daily basis. The skills learned through my research experience with Prof. Riggs are so integrated in my daily process of operation that it is hard to detail. Everything from knowledge of magnetic sample characterization techniques, to thin film preparation, to removing acetone residue with ethanol are skills I use on a daily basis. From my class work, I recently looked back at notes from Prof. Lick's Mechanics II class and Prof. Branton's (Math Department) Differential Equations class for techniques on simulating neutrons in a chopper.

Prior to joining the SNS, I was a postdoctoral fellow for Oak Ridge Associated Universities. Specifically I worked with Dr. Stephen Nagler on Neutron Scattering studies of several magnetic systems. In this work I used primarily the Triple-Axis spectrometers at the High Flux Isotope Reactor (HFIR) at Oak Ridge National Laboratory. My research also took me to perform experiments on spectrometers at the ISIS facility near Oxford, UK and the NIST beam reactor in Gaithersburg, MD. It was during my post doc that I gained the specific experience in neutron scattering to obtain my present position.

My PhD studies were performed at the University of Florida under the tutelage of Prof. Mark Meisel. Mark and I met at an SPS zone 6 meeting where I presented my FMR work from Stetson. The experimental skills that I learned at Stetson allowed me to quickly become an integral part of his research program. I specifically studied problems in low dimensional magnetism. At Florida, I expanded my experimental skills by using the lowest temperature cryostats in the microKelvin Facility, the high magnetic fields at the

National High Magnetic Field Laboratory in Tallahassee, FL and just about everything in between.

Figure 3 Garrett checking the controls of the Cryo-2 microKelvin cryostat during a Liquid He transfer. University of Florida MicroKelvin Facility, 1996.

The culture of Prof. Meisel's research group included interdisciplinary collaborations with scientists across the campus and worldwide, frequent presentations at national and international meetings, and a strong encouragement to get on with my career beyond graduate school. My participation in this highly productive scientific environment, provided additional skills useful later in my career.

That pretty much summarizes my path from Stetson to the SNS. When asked to write this open letter, a couple of specific anecdotal stories came to mind that illustrate how I have used knowledge I gained at Stetson.

In my summer research work with Prof. Riggs at Stetson University, I spent the majority of my time working with a rotational stage for the X-Band electron paramagnetic resonance (EPR) spectrometer in order to use it for Ferromagnetic Resonance (FMR) measurements.

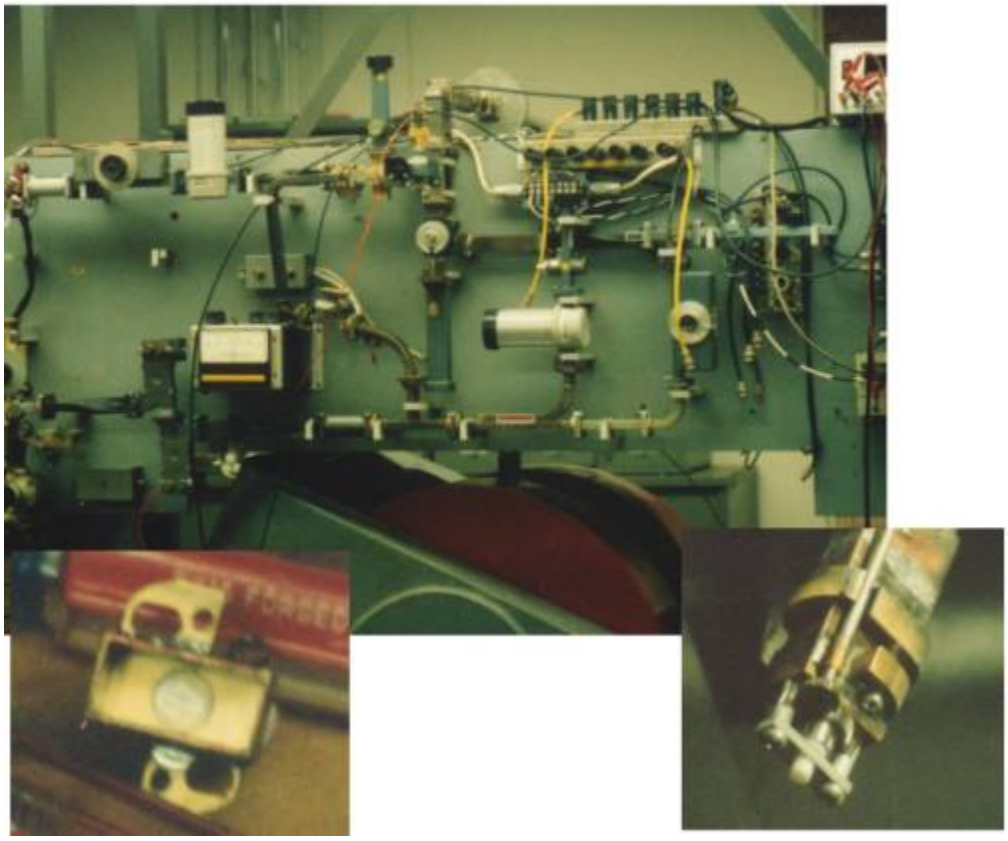

Figure 4 The X- Band EPR spectrometer at Stetson University in 1992

Part of my graduate work involved examining the S=1/2 ends of S=1 magnetic chains. This work involved the analysis of EPR measurements taken in collaboration with Prof. Talham's Chemistry research group. My Stetson experience with this type of spectrometer was helpful in the analysis process. The work resulted in the article; Physical Review B 58, 9312 (1998).

On Friday of the first week of August 1994 I sat down to take the Quantum Mechanics Qualifying exam for the Ph. D. program at the University of Florida. This test was the last of four ½ day qualifying exams. One of the problems dealt with the wavefunction of a cooper pair in a superconducting cylinder. As I examined the problem, Dr. Jusick's voice from Math Methods rang in my head, "Always pick the appropriate coordinate system for the problem." So I started methodically working out Schrödinger's equation in cylindrical coordinates, expanding the solution in a series of Bessel functions and low and behold it worked! The extensive work on solving partial differential equations in several coordinate systems in Dr. Jusick's Math Methods course has been invaluable on the qualifying exam and throughout my graduate and professional career.

In Summary, my Stetson experience has been helpful in many places along my career path. Not only the class work, but also the research experiences and the opportunities to present that research, have provided me with tools that I use on a daily basis in my job as an instrument scientist at the Spallation Neutron.

Best Wishes,

—Garrett Granroth

Contact Information:

Dr. Ganroth has agreed to allow us to publish his contact information -- if you have any questions, you may contact him directly at:

Garrett E. Granroth, Ph.D.
Instrument Scientist
Spallation Neutron Source
Oak Ridge National Laboratory
Oak Ridge, TN 37830
Phone: 865-576-0900
granrothge@sns.gov