Improving proton therapy
Student contributes to research on new imaging methods

During summer 2014, Howard Heaton, senior mathematics, physics, and computer science major, worked with the Loma Linda University Department of Radiation Medicine in research related to the development of imaging methods to improve proton therapy, a form of cancer treatment.

The imaging methods they are working to develop will use protons to generate computed tomography (CT) images for treatment planning rather than X-rays. “This will reduce the range of uncertainties in treatment planning,” says Heaton, “allowing for more precise treatments with less radiation.”

Heaton is working with small building blocks called basis functions from which the CT images are made. “This is of specific interest to me due to its involvement of higher level mathematics, use of my physics background, and its clear and pertinent application to our society,” says Heaton.

After conversations with Reinhard Schulte, associate professor in the LLU School of Medicine, Heaton says, “I spent a few days engrossing myself in the material by reading and taking notes. The remaining time was spent working to identify the methods necessary for implementing blob basis functions in proton CT scans and also writing code for a basic simulation program to test these methods.”

Heaton says it appears that the research may be extremely beneficial. “We were able to qualitatively make this judgment. We have not yet conducted conclusive experiments with realistic simulations to determine whether the improvements are worth the additional computation time required.”

Heaton will help again with the research project during summer 2015.

A young alumna shares the beauty of math and the joy of life on a small campus

Andrea Hawkins-Daarud ’05 was honored during Homecoming Weekend 2015 as one of four Alumni of the Year. She lives in Seattle with her husband, Justin Daarud, and their son, Eric. Hawkins-Daarud recently shared a few thoughts about WWU and about her love of mathematics.

Q: What degrees do you have?
A: I have a B.S. from WWU in mathematics, a master’s degree in computational and applied mathematics, and a Ph.D. in computational science engineering and mathematics. The master’s and Ph.D. are both from The University of Texas at Austin.

Q: Why did you decide to study math?
A: I went through grade school and high school, math was my favorite subject. When I got to college, I didn’t have a clear idea of what career options I would have if I did major in mathematics and so started as biology/premed. I was hired that first year as a secretary in the math/computer science departments. This close interaction with the math professors showed me that having a degree in mathematics can lead to a very versatile set of careers.

Q: What do you love about WWU?
A: I loved being the secretary in the math department both my freshman and senior years. It came with many perks of getting to know the professors, learning important technical skills, and being a “fly on the wall” getting to observe the camaraderie of the professors. I also loved being an R.A., participating in I Cantori, participating in the math club activities, being in classes that were entirely comprised of my friends, and meeting my now husband (he was also an R.A.).

Q: What advice would you give to current WWU students?
A: Take advantage of the size! Take the time to get to know your professors! They have great advice and the connections can often be helpful in the future.

Q: What is your favorite thing to do when you’re not working?
A: I love reading, gardening, and camping!

Q: If you had to eat one food and one food only for the rest of your life, what would it be?
A: Chips and queso! (If you haven’t had it in Texas, you don’t know what I’m talking about!)

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Senior mathematics students present research projects

Senior mathematics students presented their seminar research projects to the Department of Mathematics faculty during spring quarter.

(The purpose of the seminar is for students to explore an area of mathematics outside the typical WWU undergraduate curriculum, gain experience doing independent research, develop communications skills in mathematics, and share something they are interested in with their fellow students and faculty,” says Jonathan Duncan, mathematics department chair.

Amanda Preston is one of eight students in the senior class this year. She says her presentation, “Connecting Poisson, Hypergeometric, and Binomial Distributions,” taught her how to format and present a scholarly paper and helped her learn more about probability distributions and their approximations.

For the complete interview TRANSCRIPT, visit math.wallawalla.edu/resources/newsletters/