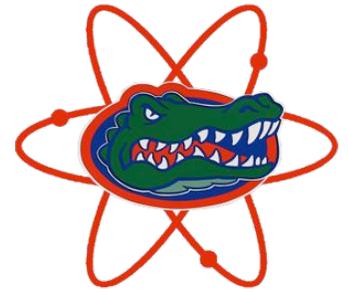


NUKE NEWS

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ANS Fall Retreat 2013 by Hannah Morbach

At the annual ANS Fall Retreat, ANS club members gathered at Ichetucknee Springs for a day of fun activities. Chelsea's summer home, situated right on the banks of the Ichetucknee River, was the perfect setting for us to relax and get to know more about new and current members. We played some interesting games, like Two Truths One Lie, to learn more about each other. ANS provided delicious Pub subs, chips, and cookies for lunch. After eating, we were ready to jump in the river. We grabbed floats, noodles, and various other flotation devices to make the journey. It was a relaxing trip until some of the more adventurous swimmers climbed a tree and jumped into the river! All in all, it was the best break from our busy college lives. The summer retreat was an experience that we won't forget. I'm looking forward to the next retreat, and I hope you can join us there!



When Internships Work—A Journey From Intern to New Hire

It is important to have an intern program. Yes, but why? Internships, when done correctly, create a win-win for all parties - the intern benefits from the experience and the company benefits from the increase in productivity and proactive training. How much better could it be?

Through AREVA's summer intern program, more than 40 students from a variety of colleges across the country were placed in a wide variety of roles and business groups throughout several of AREVA's North American offices. Although the 2013 summer intern program has come to a close, for some interns this is just the beginning of their experience with AREVA. So how exactly does all this work? Meet Devin Kelley (pictured right).



“As a graduating college senior with graduate school approaching, I knew I wanted to gain experience in the industry during the summer. Having a nuclear engineering background I was immediately sold on AREVA’s devotion and commitment to clean, safe, and reliable energy”, said Devin as he reflected on what drew him to the opportunity to work for AREVA.

Over the summer, Devin supported several projects as an intern, including Bellefonte, US EPR, and future prospective ventures. He also contributed to the preparation activities for an NRC inspection and drafted and distributed the monthly Regulatory Environment Assessment. Devin reported to Project Licensing Manager, Jennifer Musgrave (pictured below).



We hired Devin immediately after he completed the summer intern program because he proved himself to be a vital asset to our team. He couples his nuclear engineering background with an innovative mindset to offer an insightful perspective to our team. We have found that the intern program is a great way to bridge the vast age gap in our industry and continue the critical process of knowledge transfer,” Jennifer said.

Once completing his internship, Devin was hired on as a Product Licensing could be the poster child for a successful internship and one of the most his ability to now relate to his peers and be an ambassador for AREVA in more talent.

“Honestly I can’t stop talking about AREVA to my friends and family. Since I am back for graduate school at my alma mater, The University of Florida, I have advised all my friends and engineering colleagues to consider a position in the energy industry at AREVA. I am personally blown away by the amazing work environment and benefits at AREVA; it is hard for me to not promote the company at social gatherings.”

This is what a successful internship program looks like. By experiencing day-to-day business and pitching in on projects, interns walk away with valuable experience that leads them to consider pursuing a career with the company and provides the talent pipeline necessary to be successful.

“AREVA values having an intern program because we see the value in hiring quality students to increase our productivity as well as provide a sourcing structure for our

entry level full-time positions. The duration of the internship allows the manager time to assess the interns skills as well as train a high potential candidate for a full-time role,” said Nikki Harris, Manager, University Relations and Programs.

The intern program will return in May of 2014 but it isn't too early to start considering having an intern in your group. Take it from Jennifer, you will be glad you did!

“Our customers currently face unique challenges—many of which are unprecedented in our industry. The current generation of young professionals are an energetic and innovative group, and their enthusiastic approach to problem-solving is exactly what our customers need to solve their regulatory issues. Our team chose to have an intern to incorporate a fresh new perspective into the mix. The intern program also ensures that these young professionals will be in constant contact with a large group of their peers. The interns develop both friendships and working relationships, and that helps them to maintain a good work-life balance. I think this is extremely important for retention purposes.”

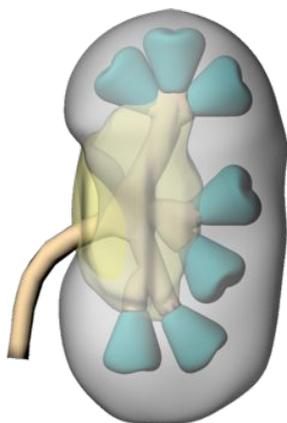
AREVA NP, Inc. is the sole owner of the above article.

Modeling Targeted Alpha Particle Therapy of Cancer: Image-Based Dosimetric Models of Bone and Kidney by Amy Geyer

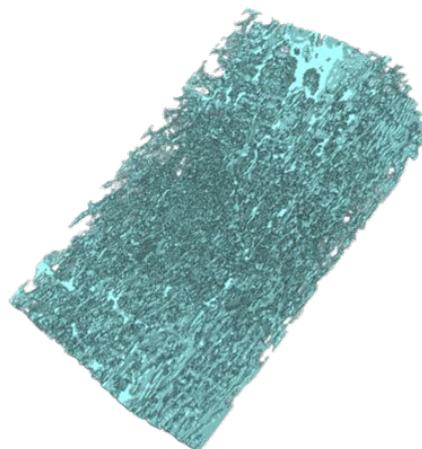
The scope of my research is to develop and test specific models for the organs most at risk from alpha-particle radioimmunotherapy at the anatomical or function sub-unit level. These include both active bone marrow and the kidneys. To aid in dose assessments, 3D anatomic models of these structures are used at both the macro- and microscopic levels.

To explore improved methods of assessing mean dose to hematopoietic stem and progenitor cells from internally incorporated alpha-particle emitters in the skeletal tissues, microCT images of several cadaveric bone sites taken from a 40-year male and 45-year female, respectively, are used for radiation transport simulation of monoenergetic alpha particles. Sources regions include the trabecular bone volume, trabecular bone surfaces, active marrow, and inactive marrow. Target regions will include active marrow and endosteum. Based upon recent data collected at UF on the depth profile of stem and progenitor cell concentrations in the marrow cavities, absorbed fractions will be assessed as a function of depth from the bone-marrow interface in 50-micrometer increments.

To quantify possible individual variations in skeletal radionuclide S values for several beta-particle and alpha-particle emitters used in radionuclide therapy of cancer, three bone sites taken from the UF 40-year male cadaver will be selected – lumbar vertebra, parietal bone, and ribs – and systematically varied according to three individualized parameters as might be seen in radionuclide therapy patients: (1) overall size (indicative of patient stature), (2) bone marrow volume fraction of spongiosa (indicative of patient bone mineral density status), and (3) bone marrow cellularity (indicative of possible age-related changes in marrow fat fraction). Values of monoenergetic electron and alpha particle absorbed fractions will be calculated through radiation transport simulation, followed by assemble of radionuclide S values. Overall conclusions will be drawn regarding which parameters are important for accurate dosimetry over different energy ranges and particle types.



Computational model of an adult kidney featuring the cortex, medullary pyramids, renal pelvis and fat within the renal sinus.



Voxel model of the trabecular bone and marrow volume cavities within the L1 lumbar vertebra.

A series of 10 to possibly 20 whole-kidney models for dosimetric analysis of beta-particle and photon emitting radionuclides that might localize in the organ during radionuclide therapy will be created. Cadaveric sources of whole-kidney will be imaged by NMR microscopy at either 11 T or 4.7 T with subsequent segmentation of the renal cortex, medullary pyramids, and renal pelvis. Variations in kidney size, fractional volumes of kidney substructures, and number of medullary pyramids will be quantified. A representative reference kidney model will be created in which monoenergetic photons and electrons will be simulated for cortex, medulla, and pelvic sources of emissions. S values will be generated for a variety of radionuclides of interest to radionuclide therapy.

A series of microscopic anatomic models of the nephron to include the Bowman's capsule, proximal convoluted tubules, loop of Henley, distal convoluted tubules, and possibly the collecting ducts will be created. These models will be created through a combination of tissue section, immunohistological staining, and 3D optical microscopy – specific techniques to be determined. Emphasis will be placed on exploring intra-kidney anatomic variations, as well as inter-patient anatomic variations. Cellular level alpha particle absorbed fractions and radionuclide S values will be calculated through radiation transport simulation for a variety of source and target tissue regions.

Upcoming Events

Tailgate for UF vs. Arkansas (Outside NSC building)	October 5th
Westinghouse Fuel Fab. Tour (Columbia, SC)	October 10 th
ANS Florida Section BBQ Dinner (RSVP by October 16th)	October 25th
ANS Boy Scouts Nuclear Science Merit Badge Workshop	October 26 th
Winter Conference (Washington, D.C.)	November 10th-14th

What is ANS @ UF?

The American Nuclear Society Student Chapter at the University of Florida is an organization of Nuclear and Radiological engineering students dedicated to the promotion of nuclear science and technology for the benefit of humanity. This chapter is instrumental in informing the public of everyday radiological applications.

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If you would like to join ANS or have potential news for the next issue, please contact the Secretary, Nicholas Yap, at ufl.ans.secretary@gmail.com.