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faculty interview: physics

Multidisciplinary Approach to Research: An Interview with Dr. Bradley Newcomer

Toral Patel

Mostly known as a scientist and professor to many, Dr. Bradley Newcomer, Ph.D. serves many important roles at UAB. Some of his current roles include being a professor in the Department of Clinical and Diagnostic Sciences; an Associate Scientist at Minority Health and Health Disparities Research Center (MHRC), UAB Diabetes Research and Training Center (DRTC), UAB Center for AIDS Research; and the Director of Experiential Learning Scholars Program. It may seem strange that Dr. Newcomer is involved with many centers of research both nationally and internationally, but his passion for magnetic resonance (MR) spectroscopy and motivating scientists is a unifying factor.

Dr. Newcomer began his scientific journey at Juniata College in Huntingdon, PA, where he received his Bachelor's in Physics. He continued his graduate studies at Wright University in Dayton, OH, where he pursued both a Master's in Physics and then a Ph.D. in Biomedical Sciences. As a generalist, Dr. Newcomer was eager to learn how everything works; so he decided to shift gears into Biomedical Sciences where his interests pertained to medical imaging and medical physics. Not only was he able to take medical sciences such as human physiology, anatomy, and cell biology, he was also able to take computer engineering and electrical engineering. Tailoring his classes to better customize to his dissertation and career goals gave him the opportunity to create his own interdisciplinary curriculum.

His research interests stemmed from the "thrill of the chase." Dr. Newcomer enjoys solving and identifying problems, critiquing current understandings, finding the holes and gaps in terms of unanswered questions, and determining a way to solve them. Dr. Newcomer admits that "As soon as I was done with one project, I would hand them onto someone else and begin a new one."

After finishing his doctoral work, Dr. Newcomer came to the University of Alabama at Birmingham to begin his post-doctoral fellowship by working on one of the world's largest MR machines at UAB. After working on MR spectroscopy, he was able to become a Professor at the School Of Health Professions to teach an MR curriculum.

But as a professor, Dr. Newcomer did not halt his curiosity. His current research projects include using proton and 31phosphorous spectroscopy to study lipid metabolism, body composition research, and muscle energetics. Dr. Newcomer uses proton MR spectroscopy to look at intramuscular fat and determine if fat is stored inside the muscle as triglycerides within the mitochondria or outside the cell in the muscle sheaths. This lipid metabolism is analyzed in terms of exercise training, diabetes, and/or obesity. MRI imaging is used to look at muscle mass changes in the elderly and pre and post- intervention to decrease muscle atrophy. He also uses 31phosphorous spectroscopy to analyze muscle's energetic and metabolic efficiencies in different patient populations. His work allows him to collaborate with investigators all over the United States as he assists in the planning and execut-

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ing of experiments. For example, Dr. Newcomer collaborates with facilities in UT Southwestern in Dallas, TX, to do bed-rest experiments for NASA, studying muscle atrophy, metabolic changes, and mitochondrial function changes due to space flight. He also uses aging models for amino acid supplementation and is involved in mitochondrial myopathy studies.



What impact do these projects have on the world of science? Dr. Newcomer states that "In theory, if we really can create these research measurements and move them into clinical rounds, you are now getting to a point where you can non-invasively test individuals for specific anomalies since each patient is different." With these non-invasive tests, investigators are able to individually treat patients with tailored interventions for each underlying cause. He believes that science and medicine are trying to go forward to "individualized medicine" by using MR imaging techniques, proteomics, and genetic screening.

But how does his research affect his position as the director of the new honors program? The Experiential Learning Scholars Program and Dr. Newcomer's research have one commonality: both consist of an interdisciplinary, if not multidisciplinary, approach to solving problems. Both the honors program and his research bring groups of people together with their own specialties to solve wide-scale problems in the real world. The "Strength of UAB is its research facilities," and both Dr. Newcomer and the new program capitalize on this existing strength.

Dr. Newcomer would welcome undergraduate students to do research with him, but with his new position he has decreased his time he spends in the lab. However, with his extensive networking and collaborations around the country and UAB, he is always open to helping students find a position to experience undergraduate research. By viewing himself more as “a mentor and facilitator,” Dr. Newcomer has opened up a new way of looking at research by not gearing it himself but acknowledging the teamwork effort. He believes that “In today’s world, in today’s scientific environment, you cannot do research in a bubble anymore or in your own lab. If you

do it on your own, the costs of humans and those working with you is terrible. So it really matters in whether you value people and humanity or people as commodities and what they can bring in.”

His selfless attitude is quite evident as he perseveres to excel students and other investigators in their careers and research. I hope that every UAB student can one day find what they enjoy and excel in their careers by helping others just as much as Dr. Newcomer does.