

BIOLOGY/ALLIED HEALTH DEPARTMENT

Insights From the Professor

Allied Health



A lab assistant teaches Anatomy & Physiology students.

The Biology/Allied Health Department at Southern Adventist University is uniquely positioned to prepare students for a wide variety of careers. A degree in biology is the first step in preparing students for careers in the fields of biology, medicine, dentistry, and many other areas of the medical and research world. It is affirming to see the high number of medical and dental school admissions coming from Southern. In addition to the biology curriculum, roughly one-third of our students in the department are pursuing careers in allied health. These professions play an important role in patient healthcare. So what are allied health professions?

These careers include occupations such as physical therapy, occupational therapy, nutrition/dietetics, speech language pathology, dental hygiene, medical lab science, and physician's assistant. Many students in our department are pursuing pre-professional education that will qualify them to transition into their professional programs.

As the primary allied health adviser on campus, I have trained as a physical therapist, then taught and advised for several years, and I have developed a knowledge base that is essential when helping students explore and connect with the many allied health options available. The pre-professional preparation can take two-to-four years, depending on what major a student chooses to pursue. After completing their academics, many students will transition into their professional program at one of the following Adventist institutions: Advent Health University, Andrews University, Kettering College, Loma Linda University, and Union College. These



Anatomy & Physiology students collaborate in lab.

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Life Sciences

Allied Health, from page 1

institutions offer multiple allied health programs. I work closely with students to tailor their pre-professional education to meet the requirements of the institution and program they are pursuing.

Allied health students are exposed to multiple activities to help them feel confident about their chosen path. In the class Southern Connections, I work with freshmen to connect them with resources that can help them make a more informed decision on their major of choice. I also teach Introduction to Health Professions, offered every fall semester. This seminar course provides valuable insight into many allied health

careers. Speakers present very pertinent and up-to-date information on what their profession involves. Students are exposed to professions that they may have never heard of. Educating students on what options are available is key to the student making a good decision. Students are also required to shadow two different professionals for multiple hours. This experience provides first hand knowledge of the careers they are considering. Additionally, they have the opportunity to interview a professional in the field they are considering. Delving deeper into questions related to their chosen career can really make a difference in the decision-making process. Another valuable tool they complete is PathwayU.

This career assessment test helps expose students to a range of careers that may be a good fit based on their interests and abilities. This test can be instrumental in the decision process, as well.

Many students at Southern have found their calling in the allied health professions, which open up a wide variety of career paths. It is exciting when students find their calling, move forward, succeed in their career goals, and then begin successfully ministering to those in their field. We are privileged to play a vital role in that process.

By Randy Bishop

Students in Service

Alexa Muchiutti (in Brazil with ADRA Feeding Project)

As a student missionary for one semester in Porto Alegre, Brazil, I worked with Adventist Development Relief Agency (ADRA) at a lunch project, feeding 300 homeless people per day. They brought in their disaster relief truck, which has a full working kitchen, laundry room, and a “restaurant” where about 70 people could eat. Each day, the homeless would line up on the road in the morning waiting for their meal. At 10 a.m., we had an inspirational feature, where a variety of presenters would talk to the homeless—sometimes about the Bible, at other times about how they could better their lives—and other times we would show a movie. I helped by cutting vegetables and fruit to prepare the meal,

cleaning dishes, cleaning up the kitchen afterward, and serving the food. I also was in charge of organizing the volunteers for a period.

We individually served each person food, which was such a blessing. While serving, I was able to meet many of the homeless and get to know them. It was incredible to see how their disposition changed—from not making eye contact, to looking you in the eye, smiling, and holding a conversation as they frequented the project. On Fridays, we offered a Bible study and fed them soup afterward. It was incredible to see how God used this time. We had a number of drug dealers come frequently. It was during this time that we saw a decrease in their violence toward each other, at least within our “restaurant” gates. I learned an unimaginable amount during my semester abroad. A few of my greatest takeaways were that serving



Volunteers in the kitchen of the ADRA relief trailer making lunches.

can, and should, be done anywhere. There were many Brazilians who rearranged their work schedules to volunteer there daily or weekly. It was inspiring to see how, even though they were busy, they made time for others. Another great takeaway was that the homeless are people, too. I know this sounds obvious, but it is amazing how much a smile and asking someone how their day is going brings a sense of humanity and normalcy to them. My favorite verse throughout this whole experience was Matthew 25:40, which states, “The King will reply, ‘Truly I tell you, whatever you did for one of the least of these brothers and sisters of mine, you did for me.’”

*By Alexa Muchiutti
Senior Biology Major*



ADRA volunteers interacting with people who came to eat.

Department Happenings

David Nelsen has a new baby girl, Ruby-Estelle. Congratulations to David and his wife, Marie. Our department is growing! In between helping to care for their three little girls, he had time to provide a lead quote for *National Geographic*, clarifying the difference between a poisonous and a venomous animal. If you are a subscriber, it can be found at “nationalgeographic.com/animals/reference/venomous-poisonous-snakes-toxins/.” It was published Jan. 7, 2020.

Debbie Strack, office manager, has been busy getting the department ready for her retirement at the end of this school year. However, on January 31, she had a fall on her stairs that led to a smashed tibia on her left leg and a broken femur on the other. Fortunately, orthopedic surgeon Matt

Higgins (Southern alumnus) was able to put things back together again with plates, screws, and rods. It is expected to take about 12 weeks for ambulatory recovery. If you wish to send her a card, please send it to: Debbie Strack, Biology Dept., P.O. Box 370, Collegedale, TN 37315. Even though she has not yet retired, we already miss her.

Aaron Corbit, David Nelsen, Rick Norskov, and Keith Snyder have all had papers accepted for the upcoming Biblical Foundations presentations and publication. The previous three publications in this series have drawn the highest number of hits for publications at Southern.

E.O. Grundset lectures have started out strong, with alum, Richard Moody '89, presenting his journey as a family physician

from his undergraduate studies at Southern through medical school and into clinical practice. Pre-DVM Molly Theus presented her experience from Southern and becoming a veterinarian. This series was truncated due to the virus, but we will have Douglas Axe, PhD, present next year.

Meet the Firms—More of our students are attending these great opportunities to meet future employers and practice essential core skills such as interpersonal communication, professional dress, poise, and professional interactions. We encourage all of our students to use these free venues to build their interviewing skills.

Happenings, on page 6

The Amazing Gift of Hearing

(This article is an excerpt from a chapter by one of our professors, Lucinda Hill, in the book, *Design and Catastrophe in Nature*, which will be published by Andrews University Press.)

Have you ever thought about what life would be like without sound? No music, no bird songs, no sounds of laughter or the voices of our loved ones. No warnings of danger from a train whistle or the barking of a dog. This world would be a very different place without the gift of sound.

But have you ever wondered what gives you the ability to hear the familiar sounds of life? The design of the structures and mechanisms required for hearing is truly amazing.¹

Sound is a vibration that is transmitted through the air, through liquids, and through solids. These vibrations—or sound waves—occur at different amplitudes and frequencies. The amplitude of the sound wave relates to the volume or loudness of the sound. Sound waves for loud sounds have a higher amplitude, while soft sounds come from sound waves with a lower amplitude.

Sound wave frequency relates to the pitch. A rapid rate of vibration, or high-frequency sound wave, results in a high-

pitched sound. A low-frequency sound wave has a slower rate of vibration and results in a low-pitched sound.

The external ear is designed to funnel sound waves to the tympanic membrane, or eardrum, which then vibrates at the same frequency as the sound wave. In the middle ear, three tiny bones, called ossicles, transmit these vibrations from the eardrum to the cochlea, which is in the inner ear.

The cochlea is shaped like a snail shell and is filled with a fluid called perilymph. This spiral-shaped tube contains a smaller tube called the cochlear duct, like the inner tube of a bicycle tire. The cochlear duct is formed by the basilar membrane and vestibular membrane and also contains fluid called endolymph.

When vibrations from the eardrum are transmitted to the cochlea, it causes waves in the perilymph and endolymph. These waves cause distortions of the basilar membrane of the cochlear duct. Different tones cause distortions in different areas of this membrane.

As the basilar membrane moves with the sound vibrations, a complex mechanism causes a nearby nerve cell to transmit an electrochemical signal to

the auditory portion of the brain. How the brain then interprets these signals from the cochlea as beautiful music, or as noise—or as the familiar voices of our loved ones—is a mystery we have barely begun to explore.²

The gift of hearing is the result of an integrated system of complex structures that work in coordination to transmit signals to the brain. These signals are then processed to give meaningful sensory input that is valuable for our lives. The intricate design required for the amazing gift of hearing speaks to us of a Designer and suggests that this Designer is an audiophile, who understands the importance of sound and hearing for our happiness.

¹For a general introduction to human hearing, see Seeley's *Anatomy & Physiology*, 12th edition by Cinnamon Van Putte, Jennifer Regan, Andrew Russo. (2019) McGraw Hill, pp.534-548.

²Frühholz, S., Trost, W., & Kotz, S. A. (2016). The sound of emotions—Toward a unifying neural network perspective of affective sound processing. *Neuroscience & Biobehavioral Reviews*, 68, 96-110.

Allied Health Graduates 2019-2020



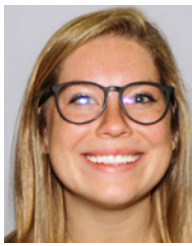
Nadchen Aralquez
Nutrition/Dietetics



Britni Barlow
Nutrition/Dietetics/HILSC



Jenica Barrett
Medical Lab Science



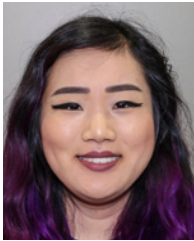
Jessica Bell
Nutrition/Dietetics/HILSC



Lianette Chavez
Medical Lab Science



Caleb Chen
Medical Lab Science



Jennifer Cho
Speech Pathology



Sherri Anne Dela Cruz
Physical Therapy/HILSC



Amy Herrera
Speech Pathology



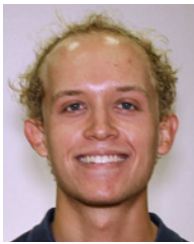
Ashlyn Howell
Speech Pathology



Shelby Huse
Nutrition/Dietetics



Julia Johnson
Physical Therapy



Ryan Kamieneski
Physical Therapy



Josh Kim
Physical Therapy/HILSC



Esther Lee
Dental Hygiene/HILSC



Matti Nafie
Nutrition/Dietetics/HILSC



Thalla Palomino
Medical Lab Science



Enoch Razafindrabe
Physical Therapy



Sharlyn Rumambi
Medical Lab Science



Astacia Sigaraki
Speech Pathology



Paul Simons, Jr.
Dental Hygiene/HILSC



Sakari Tallmadge
Medical Lab Science



Joshua Tefft
Physical Therapy/HILSC



Mahayla Toews
Speech Pathology



Jamison Tsuchiya
Speech Pathology/HILSC



Maki Tsuchiya
Speech Pathology

Biology Graduates 2019-2020



Michael Baranda
BS Research/PT/HILSC



Nathan Batres
BS Biomedical



Tori Bolin
BS Biomedical



Chandler Bozarth
BA Biology



Claire Brewer
BS Research



Alaina Burrowes
BA Biology



Joseph Chang
BS Biomedical



Young Choi
BA Biology



Victoria Cowley
BA Biology

Biology Graduates 2019-2020 (continued)



Devin Cummins
BS Biomedical



Chase Czaykowski
BS Research



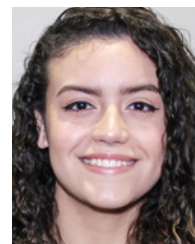
Emily David
BS Biomedical



Emily DeWind
BS Research



Jorald Feliciano
BS Medical Science



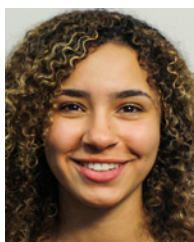
Daniele Fonseca
BA Biomedical



Sierra Garrett
BA Research



Eveling Grajales
BA Biology



Victoria Hansbury
BA Biomedical



Chelsea Henry
BS Biomedical



Savannah Hodgkin
BA Biology



Sunny Huh
BA Biology



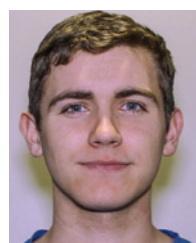
Mi So Kim
BA Biology



Preston Kim
BS Biomedical



Yeji Kim
BS Biomedical



Joel Knuppel
BS Biomedical



Jung Lee
BA Biology



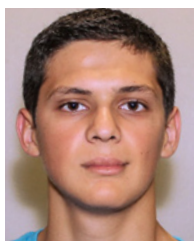
McKenzie Martin
BAA Biology



Taylor Mikel
BS Biomedical



Alexa Muchiutti
BS Biomedical



Ivan Muchiutti
BS Biomedical



Lindsey Nakashima
BS Medical Science



Reyna Pergerson
BS Biomedical



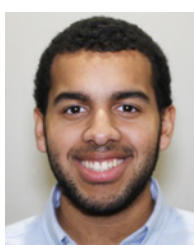
Melanie Ramirez
BS Biomedical



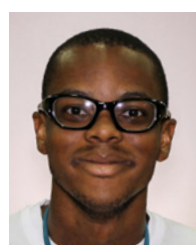
Sherley Registe
AS Biology



Eli Robinson
BS Research



Joshua Salguero
BA Biology



Jonathan Shephard
BS Biomedical



Ethan Simler
BS Biomedical



Grace Smith
BA Biology



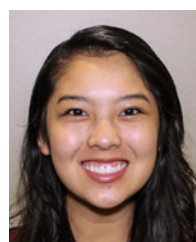
Reiner Sokolies
BS Biomedical



Jake Tsai
BS Biomedical



Allison Verrill
BA Biology



Cheryl Wang
BS Biomedical



Matt Wilson
BS Medical Science



Everett Young
BS Biomedical



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Lucinda Hill, MD
David Nelsen, PhD
Rick Norskov, MD
Keith Snyder, PhD
Debbie Strack, Office Manager
Ben Thornton, PhD
Tim Trott, PhD



Happenings, continued from page 3

Tim Trott has been using his sabbatical time this semester to develop several new research opportunities for students within two areas of his expertise, Plant Cell Biology and Genetics. One project will involve students investigating the function of a unique type of cell wall protein found in plants by describing physical and physiological changes present in mutant plants that lack this protein. A second project will use metagenomics to describe soil microflora across 10 study sites on White Oak Mountain and to correlate any differences with observations of plant diversity and abundance. Metagenomics uses modern technologies to sequence the DNA obtained from a sample and then identify all organisms present in that soil by referencing this information to existing DNA sequence databases.

Research is moving ahead rapidly on several fronts. Aaron Corbit and David Nelsen took students Chase Czaykowski, Davis Carter, Alexandra Lang, and Elisabeth Sewell to present

at Venom Week 2020 during the first week of March. We are thankful for two endowed scholarships which are helping to fund this research and subsequent presentations at professional meetings. Please contact the Biology Department if you are interested in helping even more students participate in life-changing research.

Southern Adventist University in Collegedale has been awarded a Level One Accreditation by The ArbNet Arboretum Accreditation Program and The Morton Arboretum for achieving particular standards of professional practices deemed important for arboreta and botanic gardens. The ArbNet Arboretum Accreditation Program is the only global initiative to officially recognize arboreta at various levels of development, capacity, and professionalism. Southern is also now recognized as an accredited arboretum in the Morton Register of Arboreta, a database of the world's arboreta and gardens dedicated to woody plants.

By Keith Snyder