Dr. Hwan Choi - Biomedical Engineering: Muscle and tendon together form the ultimate actuator system of the human body, enabling us to perform a wide variety of dynamic movements. In this project, students will explore how these biological structures function by using ultrasound imaging, sensors that measure electrical signals from muscles, and musculoskeletal modeling software. Through hands-on experimentation and analysis, students will gain an understanding of the mechanical and biomechanical properties that make human movement possible. This engaging experience will give them a deeper appreciation of biomechanics and its applications in science and engineering. **NOTE: This project requires at least 3 days at the Lake Nona Campus. Students MUST have their own transportation to and from this campus on Tuesday, Wednesday, and Thursday.** Required experience: Students should have completed a Physics course by the start of the program.

Dr. Robert Steward - Biomedical Engineering: For a tissue to develop or cancer cell to migrate, a group of cells must move as a collective to a desired location. As groups of cells move, they experience a range of diverse, external stimuli that influence how slow or fast they will reach their destination. For this project, students will investigate the influence various environmental conditions have on the ability of a cell to move. Students will specifically conduct experiments investigating the influence substrate stiffness and surface chemistry has on cell migration speed. Students will also get to visualize proteins that exist within the cell and that are important for cell movement. **NOTE: This project requires at least 3 days at the Lake Nona Campus. Students MUST have their own transportation to and from this campus on Tuesday, Wednesday, and Thursday.** Required experience: None

Dr. Jing Hu - Civil, Environmental, and Construction Engineering: Students will participate in a hands-on project using sorption media to remove pollutants from water. Activities will include water sampling, analysis of pollutant concentrations, and evaluation of removal rates. Required experience: Students must have completed Chemistry I with a B or higher.

Dr. Jongouk Choi - Computer Science: This project introduces high school students to electromagnetic interference (EMI) through hands-on experiments with sensors and embedded systems. Students observe how invisible noise can cause devices to behave incorrectly, then design software-based defenses such as filtering, validation, and fault

detection. By focusing on resilience rather than attacks, the project teaches core ideas in hardware security, signal processing, and reliable system design. Required experience: Students should have completed Physics with a B or higher by the start of the program.

Dr. Needa Brown - Materials Science and Engineering: The NanoBio Lab is centered around understanding and leveraging inherent material-biological interactions to design next-generation nanomaterial drug delivery systems. Students will get the opportunity to learn first-hand fundamentals of nanoparticle design, characterization, testing, and clinical relevance coupled with hands-on experience making their own nanoformulations within the lab. Students will get the opportunity to learn the theory as well as participate in formulation techniques (e.g. thin-film hydration and bottom-up synthesis), physiochemical characterization (e.g. high performance liquid chromatography, dynamic light scattering, zeta-potential), and biological characterization (e.g. cell culture) with the goal of producing a functional nanoformulation for drug delivery. **NOTE: This project requires at least 3 days at the Lake Nona Campus. Students MUST have their own transportation to and from this campus on Tuesday, Wednesday, and Thursday.** Required experience: Students must have completed Biology, Chemistry, and Physics with a B or higher by the start of the program.

Dr. Shin Young Jeong - Mechanical Engineering: During this week-long project, students will explore how ordinary sand can be heated to high temperatures and used to store renewable energy for later use. They will work hands-on with real laboratory equipment to investigate how efficiently sand absorbs, stores, and releases thermal energy. Students will also perform simple data analysis and compare how sand-based thermal energy storage differs from more familiar systems like batteries. By the end of the week, they will gain a practical understanding of how advanced energy-storage technologies can help power future clean-energy systems. Required experience: Students should have completed Physics I or show a strong interest in physical science. Basic comfort with algebraic problem-solving. Interest in engineering, energy systems, or hands-on laboratory activities.

Dr. Like Li - Mechanical Engineering: Students will gain hands-on experience in supporting the design, computer modeling and experimental testing of various thermal batteries, i.e., bench-scale devices that will be charged with electricity and can discharge high-temperature heat for different applications, including high-efficiency power generation and energy-intensive industrial processes such as calcination and metal and alloy processing. Required experience: Must have completed basic Chemistry and Physics by the start of the program.

Dr. Kerri Donaldson Hanna - Physics: In the Donaldson Hanna lab, we use laboratory spectroscopic measurements of analog materials to interpret spacecraft observations of the Moon and other airless Solar System bodies. For this project, students would collect laboratory spectral measurements of rock and mineral samples using two of the spectrometers in our lab. If students have experience with Excel or Python, they will analyze and interpret the data collected. In addition, students will learn how to work with spacecraft observations of the Moon and how to compare spacecraft data with those they collected in the lab. Required experience: None

Dr. Adrienne Dove - Physics: The surfaces of the Moon, asteroids, and Mars are all covered with layers of fine dust and rocks - this is a big challenge for planetary exploration! In the Microgravity Center labs, we work on projects to test how this dust behaves in vacuum and lower gravity, and develop ways to measure it's behavior. You will work with a group doing image processing to study data from microgravity flight tests, or on hardware in the lab to test sensors and designs. Required experience: Some computational knowledge (python, image processing) or hands-on experience with robotics, Arduinos, etc. preferred.