MAE 586 Projects for DE Students

Topic: Numerical Study of Shear Wave Propagation in Human Skulls
Adviser: Dr. Yun Jing
In this project, the student will use Matlab-based, open source software K-WAVE (http://www.k-wave.org/index.php) to model ultrasound wave propagation in human skulls. Particularly, results with shear wave taken into account will be compared with the ones without considering shear waves.

Topic: Micropump using novel piezoelectric microactuators
Adviser: Dr. Xiaoning Jiang
Micropump has been studied for microfluid handling including drug delivery, bioanalysis, and electronics cooling. With the recent advancement of piezoelectric materials, structures and actuators, new micropump design and fabrication may further advance micropump technology and bring in new applications.

Topic: Advances in automotive vehicle technologies
Prof. Jay F. Tu
Students can address the latest development of automotive technologies, such as unmanned vehicles, electric cars, steering stability control, safety and accident prevention, etc. Students will have bi-weekly discussion with Prof. Tu during the project period to complete the report.

Topic: Precision in manufacturing and product design
Prof. Jay F. Tu
Students can choose a process, a machine or a product related to his/her own work in the company and discuss their precision improvement. Students will have bi-weekly discussion with Prof. Tu during the project period to complete the report.

Topic: Science of music and musical instruments
Prof. Jay F. Tu
Students can pick a music instrument and apply the theory of science to analyze the quality, characteristics, as well as psychological aspects of the sound. Students will have bi-weekly discussion with Prof. Tu during the project period to complete the report.

Topic: Instrumentation, sensors, and measurement systems
Prof. Jay F. Tu
Students can address a specific sensing problem by discussing suitable instruments, sensors, and measurement systems. Grounding and noise attenuation will be an important part of any measurement systems. Students will have bi-weekly discussion with Prof. Tu during the project period to complete the report.

Topic: Magnetic Field Effects on Reaction Zones
ME or AE: Either is fine
Faculty Adviser: Dr. Kevin Lyons (Lyons@ncsu.edu)

Topic: Combustion control using electric fields
ME or AE: Either is fine
Faculty Adviser: Dr. Kevin Lyons   (Lyons@ncsu.edu)

Topic: Hydrocarbon Flame stability
ME or AE: Either is fine
Faculty Adviser: Dr. Kevin Lyons   (Lyons@ncsu.edu)

Topic: Investigation of an atomized fuel in a reaction zone
ME or AE: Either is fine
Faculty Adviser: Dr. Kevin Lyons   (Lyons@ncsu.edu)

Topic: Flame/Flow interaction
ME or AE: Either is fine
Faculty Adviser: Dr. Kevin Lyons   (Lyons@ncsu.edu)

Topic: Exhaust Gas Recirculation
ME or AE: Either is fine
Faculty Adviser: Dr. Kevin Lyons   (Lyons@ncsu.edu)

Title of the project: Dynamics and Applications of Tethered Aerostats (e.g. blimps,etc.)
ME or AE: Either is fine
Faculty Adviser: Dr. Andre Mazzoleni

Title of the project: Orbital Dynamics of Spacecraft around Binary Asteroid Systems
ME or AE: Either is fine
Faculty Adviser: Dr. Andre Mazzoleni

Title of the project: Deflection of Earth-threatening Asteroids
ME or AE: Either is fine
Faculty Adviser: Dr. Andre Mazzoleni

Title of the project: Wind Turbine Acoustics
ME or AE: Either is fine
Faculty Adviser: Dr. Andre Mazzoleni

Title of the project: Methods for converting compressed air into electrical energy
ME or AE: Either is fine
Faculty Adviser: Dr. Andre Mazzoleni

Title of the project: Finite element modeling of the human spine
ME or AE: Either is fine
Faculty Adviser: Dr. Andre Mazzoleni

• For further inquiry on any of the project, please call or email the faculty adviser.
• Students requesting enrollment to MAE 586 should be instructed to submit a brief project proposal to Annie via email (alwhite7@ncsu.edu). Once she receives the project proposal she will process their enrollment. She will contact you and the student after census day to verify the due date for grades and final projects. She will contact you and the student on the due date to request a grade and final project.