Dr. Bryan Rasmussen is an associate professor in the Department of Mechanical Engineering and director of the Industrial Assessment Center at Texas A&M University. "We are working in conjunction with Texas A&M Utilities and Energy Management Division and testing some of our ideas on university campus buildings. This is a hugely interdisciplinary project, and students from different fields of engineering have a lot of fun working together."

Please tell us about your field of research and your focus in the area.

Our research has two main thrusts. First, in the Industrial Assessment Center, we train students to conduct energy audits of industrial facilities, and take them on weekly visits to regional manufacturers. The students then compile a report of potential cost-saving measures for the facility through energy efficiency improvements, waste minimization, and productivity changes.

Second, in our research lab we develop methods to improve building energy efficiency, specifically by using intelligent controls. The goal is to reduce energy usage while maintaining occupant comfort. In most building energy management systems, one can achieve the same result in various ways. Our goal is to automatically choose the ways that use the least amount of energy, so the occupant is still comfortable but the system as a whole is using less energy. For example, in a building system, the primary chiller and the various air handling units (AHUs) work together to provide air conditioning. You may be able to run the chiller harder while using less fan power, or vice versa, to achieve the same amount of air conditioning, our systems coordinate the actions between the different systems so that they use the least amount of energy as a whole.

Our projects also include work for air conditioning companies such as Honeywell and Emerson, in modeling and controlling their systems.

What is the most exciting project you are working on?

The project we are most excited about is funded by the National Institute of Standards and Technology (NIST). We are working in conjunction with Texas A&M Utilities and Energy Management Division and testing some of our ideas on university campus buildings, and determining how much energy is saved.
What is the most unique project you are working on?

For the past two years, we have designed UAVs (Unmanned Aerial Vehicle) in the form of quadcopters and hexacopters, which are small helicopters that function with rotors, that we fly through buildings to conduct autonomous energy assessments and thus help reduce the amount of resources required to conduct energy audits. We also integrate the UAV with laser technology, to create a system that generates three dimensional internal and external models of the buildings as the UAV flies through, and around the building. These models can be integrated with building rendering and analysis programs and other simulation software used for research. This project is part of the AggiE-Challenge program, and is a hugely interdisciplinary project, and students from different fields of engineering have a lot of fun working together.

Can you elaborate on the multidisciplinary nature of this project?

We have in the team, students from mechanical engineering who do the mechanical system design and sensor selection. Team members from computer science help us with the computer vision and coding aspects of the project. Electrical engineering students help us solve our power problems with both the vehicle and the sensors. Students studying aerospace engineering help us fly the vehicles, and civil engineering and architecture students help us understand how we can make the system work in real buildings with real occupants.

What is the impact of your research?

Reducing energy usage is the most direct way our research impacts the environment. Besides that, smart management and operation of building systems helps reduce the consumption of refrigerants, which ultimately helps reduce global warming. We also add value in terms of student education. Energy conservation is a significant issue in today’s world, and what we do in training students and finding opportunities to save energy is directly beneficial to the community.

“Energy conservation is a significant issue in today’s world, and what we do in training students and finding opportunities to save energy is directly beneficial to the community.”

Dr. Rasmussen with his Interdisciplinary Research Group at the Texas A&M Industrial Assessment Center.
DEPARTMENT OVERVIEW

ENROLLMENT
Texas A&M University - 58,809
Dwight Look College of Engineering - 13,948
ME Undergraduate - 970
ME Graduate - 400

STUDENT QUALITY
ME Average SAT Score - 1281
Texas A&M average SAT Score - 1220
ME average GRE Score - Verbal 153/170, Quantitative 164/170
Dwight Look College of Engineering average GRE score - Verbal 152.8/170, Quantitative 166/170

SCHOLARSHIPS
This past year, over $400,000 in undergraduate scholarships and graduate student fellowships were awarded to students.

DEGREES AWARDED (8/2012-5/2013)
Bachelors - 240
Masters - 52
Ph.D. - 45

RANKINGS
Undergraduate - #8
Graduate - #9

COMPANY RECRUITING
Over 300 companies interview on campus each year to recruit mechanical engineers.
Placement of Ph.D students - 86%

STUDENT BODY
Undergraduate - 16% female
Graduate - 20% female

FACULTY
College Station Faculty - 52
Professors - 24
Associate Professors - 14
Assistant Professors - 14
Qatar Faculty - 14

ENDOWED POSITIONS
Chairs - 5
Professorships - 9
Development Professors - 3
Faculty Fellowships - 1

PROFESSIONAL SOCIETY FELLOWS
Faculty - 46%

RESEARCH FUNDING

RESEARCH FUNDING TOTAL - $17 MILLION

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