

# **Department of Manufacturing and Industrial technology**

## **2010-2011 Annual Report**

Ahmed H. ElSawy, Professor and Chairperson; Fred L. Vondra and Ismail Fidan Professors; Ahmed Kamal, Associate Professor; and George Graham, Assistant Professor; Barry L. Allison, Engineering Laboratory Technician; and Pauline R. Ward, Secretary III.

### ***Mission Statement***

The Department of Manufacturing and Industrial Technology offers a four-year baccalaureate degree program designed to prepare technologists and applied engineering workforce dedicated to solving complex technological problems. Additionally, the Department supports the College, the University and the Community at large through academic activities, extended education courses, research, certification and professional development activities.

### ***Year in Review***

The academic year 2010-11 was another exciting year for the Department of Manufacturing and Industrial Technology's students, faculty, and staff. Through team work, the department had several successes in the last academic year. The department received the Association of Technology, Management and Applied Engineering (ATMAE) accreditation for another 6 years till 11/1/2016; student enrollment increased; Dr. George Graham joined the Department as an Assistant Professor; students' academic achievement and national recognition; students successful extracurricular activities through professional organizations; laboratories' renovation and development; increase in the amount of scholarships the students received; successful addition of iLearn components for the Metal Manufacturing Technology, Advanced Welding Technology and The Industrial Automation courses as well as lab renovation to the MIT curriculum; faculty receiving research grants and publications of their research results in archived publications and professional meetings; and also offering NSF sponsored Rapid Prototyping (RP) workshops to high school teachers, and 2- and 4- years colleges faculty. Furthermore, the Department worked with Chattanooga State Community College on an articulation partnership for the VW academy.

## 1. Enrollment, Graduation and Grants Activation

### **Manufacturing Industrial Technology**

| FY      | Fall Enrollment |    |     | Graduation |    |     | Grants      |
|---------|-----------------|----|-----|------------|----|-----|-------------|
|         | U'grad          | MS | PhD | U'grad     | MS | PhD | Activations |
| 2006-07 | 145             |    |     | 30         |    |     | \$74,373    |
| 2007-08 | 161             |    |     | 47         |    |     | \$78,418    |
| 2008-09 | 172             |    |     | 37         |    |     | \$102,196   |
| 2009-10 | 158             |    |     | 38         |    |     | \$65,637    |
| 2010-11 | 161             |    |     | TBD        |    |     | * \$24,011  |

\* These activations are from July 1, 2010 through February 28, 2011

### **Degree Innovations**

The MIT Department is committed to industrial automation the most needed technical area for the foreign automotive industry in the southeast USA and in particular Volkswagen Chattanooga. To achieve this goal, Dr. George Graham was hired in the fall 2010, the MIT 4210 – Programmable Logic Controllers and the MIT 4220-Industrial Automation were revised and new lab equipment were ordered from funds provided by TTU's Central Administration and SCF office to achieve this goal.

## 2. **Faculty Research**

### **2.1.GRANTS STATUS**

#### **Dr. Ahmed ElSawy**

- Ahmed ElSawy (PI), project entitled: “Advanced Systems Development of the MRWS: a Remote Climbing Robot for Automating Welding Processes in the Ship Building Industry”, Agreement # 2010-637, \$24,011 (12/15/10 – 1/30/12).

#### **Dr. Ismail Fidan**

- CCLI Type 1 project entitled The Development of Remotely Accessible Rapid Prototyping Laboratory (still active.)
- CCLI Type 1 project supplement entitled US-Turkey Workshop on Rapid Technologies (still active).
- ITEST Strategy project entitled From Art to STEM- a Creative Journey of Discovery: A Transformational Project for Nashville Middle School Students (still active).
- Senior Faculty Investigator, RET: Research Experience for Teachers in Manufacturing

for Competitiveness in the United States-RETainUS, National Science Foundation, \$499,980.00 (June 2009-May 2012).

- Senior Faculty Investigator, STEP: Math Success for STEM Majors, National Science Foundation, \$900,000.00, (June 2010-May 2013).
- PI, Implementing the TTU QEP objectives into Green Manufacturing, TTU QEP Program, \$2,500.00 (completed in August 2010).
- PI, Regional STEM Outreach Program, TTU QEP Program, proposed and funded, \$2,800.00 (September 2010-August 2011).

### **Dr. Ahmed Kamal**

- Ahmed Kamal (PI), TTU Office of Research Faculty Grant for study of nonlinear dynamics Autonomic function in patients with dialysis, accepted for funding for \$4,000.00 (April 2009-June 2010)

## **2.2.PUBLICATIONS**

### **Journal Publications**

- I. Anitsal, M. Meral Anitsal, B. Barger, I. Fidan, M. Allen, "**Achieving Quality Enhancement Program (QEP) Objectives: Impact of On-line and On-ground Course Characteristics by Undergraduate Student Personality Traits,**" *Academy of Educational Leadership Journal*, v. 14, n. 1, pp. 37-55, 2010.
- Ahmed Kamal "**Assessment of autonomic function in Epileptic patients**" published in *Neuroscience Journal*, Vol. 15(4), pp. 224-248, October 2010.

### **Conference Publications**

- Chinyere Mbachu, Pedro Arce, Dennis George, and Ahmed ElSawy, "**A Preliminary Investigation into Using of Pulsed Corona Discharges/TiO<sub>2</sub> to Eliminate Humic Acid From Drinking Water**" 2010 AIChE Annual Conference, Nashville, TN.
- Steve Canfield, Jamie Beard, and Ahmed ElSawy, "**Developing a Mobile, Climbing, Robotic Welding System**" ShipTech 2010 conference, March, 2010, at the Beau Rivage Resort & Casino in Biloxi, MS.
- Presented a paper entitled: "**Managing Virtual Teams in a Senior Project Course**" and chaired/co-chaired several engineering sessions in the association of Egyptian American scholars' 37<sup>th</sup> annual international conference "the role of information technology and its scientific applications for Egypt's advancement in the 21st century" which was held in December 26<sup>th</sup> – 29<sup>th</sup>, 2010 Cairo University & Zagazig University – Egypt.

- I. Fidan, "**Forming Collaborative Links between Turkey and the United States: International Workshop on Rapid Technologies,**" *2010 ASEE Annual Conference*, Louisville, Kentucky, June 20-23, 2010.
- Ahmed Kamal "**Assessment of autonomic linear function in patients with chronic renal failure using nonlinear method**" published at Biomedical Eng Conference Proceeding p 219, held in Austin, Texas, October 2010.

#### **Books published**

- I. Fidan, "College and University Education and Research in Additive Manufacturing," pp. 201-218, *Wohlers Report 2010. (Book Chapter)*, ISBN: 0-9754429-6-1

### **3. Innovation resulting in savings, efficiency and/or improved outcomes**

To improve the product design outcome of the curriculum, the MIT Department revised the curriculum by adding a Statics and Strength of Materials course (3 SH) to be used as a prerequisite for the Applied Machine Elements course. This addition was needed to improve the rigor of the degree program and improve the students understanding of the product design outcome. To balance the number of credit hours in the curriculum, the MATH 1730 (5 SH) was changed to MATH 1720 (3 SH) and the Introduction to Engineering (1 SH) was removed from the curriculum. These changes were necessary to maintain the 120 SH required to complete the BS in Industrial Technology.

### **4. Faculty, staff and student awards**

#### **Faculty Awards**

- Dr. Fidan received the 2010 Fulbright Senior Scholar Award-Lecturing for Turkey by the State Department.
- Dr. Fidan received 2010 Members' Choice Award by the Society of Manufacturing Engineers.
- Ismail Fidan awarded 2011 Brown-Henderson award. Fidan has brought in five National Science Foundation grants totaling more than \$500,000 and Society of Manufacturing Engineers scholarship funds of more than \$50,000 in the past seven years. Additionally, Fidan has established a remote laboratory for rapid prototyping, which is available to other Tennessee Board of Regents institutions and more than 50 out-of-state institutions.
- Dr. Ahmed Kamal recently was invited to participate in two high profile events sponsored by the National Institute of Health and the National Science Foundation. The first fellowship earned placed him at a workshop focusing on the informatics for data and resource discovery in addiction research held at NIH's Neuroscience Center in Rockville, Md. The second fellowship, awarded by Maricopa Advance Technology Education Center and NSF, led Kamal to dual events: the Critical Issues and Best Practices Forum

and the High Impact Technology Exchange Conference held in Orlando, Fla., in late July 2010.

### **Students Awards**

- The MIT scholarship for fall 2011 will receive \$500. The four recipients are Kyle Grace, Peter Nelson, Hiteskumar Petal, and Lance Reid.
- The MITAB scholarship for fall 2011 is \$500. Two students Steve Ngwira and Matthew Shepard.
- The Anderson Scholarship are \$1000 for fall 2011, totaling \$3,000. Gilbert Humburg, Jeffrey Johnson, and Peter Nelson will receive the scholarship.
- The MIT minority student, Steve M Ngwira, was selected as a NSBE BCA Scholar for 2011! The scholarship award is in the amount of \$3,000 presented at the Golden Torch Awards ceremony. As a NSBE Scholarship recipient, Steve has shown great achievement in the academic arena and dedicated service to NSBE and TTU campus community.
- The MIT seniors surpassing the national pass rate average by more than 37 percent. Tennessee Tech University manufacturing and industrial technology students again earned accolades on the latest national certification exam in their field. Tennessee Tech's MIT students achieved more than a 95 percent pass rate on the fall 2010 certified technology manager (CTM) exam given by The Association of Technology, Management and Applied Engineering (ATMAE). The average national pass rate was just under 58 percent. The MIT students always achieve a 95 to 100 percent pass rate, which is above the national average in most categories when compared to 34 institutions around the country." The MIT Department maintains an innovative curriculum; TTU provides a good general education, and all of our students minor in business." In all the content areas of the exam, TTU students scored above the national average. Content areas include chemistry, English, management and quality control. The report compared TTU's students to a composite group of more than 1,000 examinees from more than 20 other organizations. Twice a year, graduates in the department take the standardized exam that tests their knowledge of core educational concepts and allows students to be compared against similar programs across the country. ATMAE, formerly the National Association of Industrial Technology, certifies members who obtain a college degree and pass a certification exam.
- TTU's NASA Moonbuggy Team participated in the 18th Annual Great Moonbuggy Race which was held April 1 - 2, 2011 in Huntsville, Alabama, at the U.S. Space & Rocket Center with one side-by-side buggy. The students designed a buggy that addressed a series of engineering problems that are similar to problems faced by the original Moonbuggy team. The Moonbuggy should be human powered and carry two drivers, one female and one male, over a half-mile simulated lunar terrain course including "craters", rocks, "lava" ridges, inclines and "lunar" soil. As a part of the competition, and prior to course testing, the un-assembled Moonbuggy entries must be

carried to the course starting line, with the unassembled components contained in a volume of 4' x 4' x 4' (dimension requirements similar to those for the original Lunar Roving Vehicle). At the starting line, the entries will be assembled and readied for course testing and evaluated for safety. Assembly occurs one time prior to the first course run. Tennessee Tech assembly time was 20 seconds, the course run was 7:29 minutes with 5:00 minutes penalty totaling 12:49 minutes. The team ranked 15 among 42 international teams from USA, Puerto Rico, Canada, India, Pakistan and Ethiopia. The other teams from Tennessee Christian Brothers university team II ranked 17 with total run time 15:08 minutes and MTSU ranked 20 with total run time 38:32 minutes.



Moonbuggy Racer 2011 – Ashley Dull and Daniel Anderson



The 2011 TTU's Moonbuggy Team

## 5. Community service activities

### Rotary Club/TTU Saudi Club

Dr. Ahmed ElSawy assisted the Rotary Club of Cookeville – Breakfast in organizing their **2nd Annual Rotary International Night**, January 29, 201, 6:00-9:30 p.m., [Clarion Hotel](#), 970 South Jefferson Avenue, Cookeville, TN. This collaborative effort between RC of Cookeville (Breakfast) and The TTU Saudi Club. This is a **Supporting International and Humanitarian Service Work of Rotary**, Honored Country: Kingdom of Saudi Arabia. The speakers for the event where: [Dr. Mody Alkhalaf – Director of Social and Cultural Affairs, Royal Embassy of Saudi Arabia, Washington, DC](#) and [Ms. Barbara Ferguson – Washington Bureau Chief, Arab News & Consultant to the U.S. Marine Corps](#).



This event was well attended and the Rotary Club of Cookeville (Noon) were represented by Dr. and Ms. Robert Bell, Dr. Susan Elkins, Dr. Mark Stevens, Dr. David Huddleston from TTU among others.

## 6. Faculty Collaborative Efforts

- Dr. Ismail Fidan TAC of ABET Accreditation Visited NVCC, Connecticut in fall 2010.
- Dr. Ismail Fidan organized an Art2STEM Project TTU Visit for the 160 Metro Nashville Public School Girls on October 30, 2010. In his latest NSF project, "Art2STEM," Fidan works with the Pencil Foundation, Alignment Nashville and Adventure Science Center, where he creates and delivers a professional development series in advanced design and additive manufacturing technologies.



Oct 30, 2010 -Art2STEM Program