

Dugan Um

Home Address

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**Mechanical Engineering, ST222C
Corpus Christi, TX 78404
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Faculty member: Dugan Um (Mechanical Engineering, Geospatial Computing Sciences)

Highest degree earned/Institution: Ph. D., University of Wisconsin-Madison
Field of study: Manufacturing Systems (Microelectromechanical system), Automation (Sensor, Condition Based Maintenance, Fault Tolerance), Mechatronics, Robotics (Mobile Robot Navigation, Manipulator Motion Planning)

Current Teaching: MEEN 3330: Solid Mechanics, ENTC 3323: Robotics and Automation, MEEN 3340: Solid Modeling/Application, and ENGR 2320: Strength of Material, ENGR 2363: Dynamics.

Date of Appointment at Texas A&M University – Corpus Christi: 1/10/2008

Anticipated Contribution: Teach computer-related courses in the area of Mechanical Engineering and Engineering Technology, perform research in many areas including manufacturing, automation and robotics.

Status: US Citizen

Dugan Um, Associate Professor,
Department of Mechanical Engineering

EDUCATION:

Degree	Date	University	Major
Ph.D.	5/99	University of Wisconsin Madison, WI	Mechanical Engineering (Comp. Sci. Minor)
M.S.	2/91	KAIST Seoul, Korea	Manufacturing Engineering
B.S.	12/88	Pusan National University Pusan, Korea	Mechanical Engineering

EXPERIENCE:

Institute	Position	Date
Texas A&M University- Corpus Christi, TX	Associate Professor Mechanical Engineering	8/14 -
Texas A&M University- Corpus Christi, TX	Assistant Professor Mechanical Engineering	1/08 – 8/14
Texas State University- San Marcos, TX	Assistant Professor Dept. of Technology	1/03 – 12/07
Bradley University Peoria, IL	Lecturer Mechanical Engineering	8/01 – 12/01
Caterpillar Inc. Peoria, IL	Senior Research Engineer Research and Development	5/99 – 12/02
KIST. Seoul, Korea	Application Engineer Research and Development	2/91 – 8/94

The followings are some of my significant teaching related accomplishments:

- The following summer STEM program is planned and directed by me at Texas A&M University - Corpus Christi.

TAMUCC summer STEM institute (6/9-6/15, 2012 -)

Because of huge success in 2012, TAMUCC Has been accommodated two sessions of STEM institute from 2013: one in June and another in July (<http://entc.tamucc.edu/stemsi/>).

□ The following 2 new courses were developed by me and taught first time at Texas A&M University - Corpus Christi.

ENTC 3323: Robotics and Automation
MEEN 3340: Solid Modeling and Application

□ The following 2 new courses were developed by me and taught first time at Texas State University.

MFGE 4376: Control Systems and Instrumentation
MFGE 4395: Computer Integrated Manufacturing

□ Contributed to the development of state-of-the-art semiconductor manufacturing Labs, Robotics Labs for the purpose of enriching student learning and research experiences (2009-2012).

- 10,000 certified cleanroom
- Robotics Laboratory

□ Contributed to the development of state-of-the-art semiconductor manufacturing Labs, Computer Integrated Manufacturing Labs, and Instrumentation and Control Labs in the new Mitte complex for the purpose of enriching student learning experiences (2003-2008).

- Microelectronics Manufacturing
- Computer Integrated Manufacturing
- Instrumentation and Control
- Material Science
- Mechanical System

TEACHING:

A. Courses Taught at Texas A&M University - Corpus Christi:

Undergraduate:

ENTC 3323: Robotics and Automation
MEEN 3340: Solid Modeling and Application
MEEN 3330: Solid Mechanics for Mechanical Engineering
ENTC 2402: Manufacturing Process
ENGR 2320: Strength of Material
ENGR 2300: Material Science
ENGR 2326: Dynamics

B. Courses Taught at Texas State University:

Undergraduate:

ENTC 3316: Solid Mechanics
ENGR 2300: Materials Engineering

ENGR 3315: Engineering Economic Analysis
ENGR 3316: Computer Aided Design
MFGE 4376: Control Systems and Instrumentation
MFGE 4395: Computer Integrated Manufacturing
TECH 4392: Microelectronics Manufacturing
Graduate:
TECH 5390: Research in Technology
TECH 5392: Fundamental of VLSI fabrication

C. Courses Taught At Bradley University:

Graduate:
ME 540: Advanced Mechanical Vibration

D. Faculty Development Activities:

The following training programs were attended with the specific purpose of gaining proficiency with "hi-tech" equipment to be used in technology classes. Incorporating laboratory activities that use these equipment to help our students sharpen their competitive edge in the advanced technology job market of the Austin/San Antonio corridor.

STEM education and Curriculum Development, San Diego, CA, 2015
National Instrument Labview Core I, 2010
National Instrument Labview Core II, 2010
MEMS (MicroElectroMechanicalSystem) Training at Sandia National Laboratory, 2006
Writing a Grant Proposal at office of professional development, Texas State University, 2005.
HAS (Highly Automated System) FMS (Flexible Manufacturing System) Training, 2005

SCHOLARSHIP:

A. Refereed Journal Publications

Anjin Chang, Jinha Jung, Dugan Um, Junho Yeom, Frederick Hanselmann, "Cost-effective framework for rapid underwater mapping with digital imagery and Structure from Motion (SfM)," KSCE Journal of Civil Engineering (SCI journal), in press, 2019.

Dugan Um¹, Jangwoon Park^{2,*}, Jeongsik Shin³, Woo Ho Lee⁴, "A Social Robot, 'Dali,' for Aging in Place Technology," Journal of Robotics (SJR index: 0.23), vol. 2018, pp. 1-8, Aug, 2018.

Dugan Um, Michael Maceda, "RTK enhanced Precision Geospatial Localization Mechanism for Outdoor SfM Photometry Applications," Robotics Research Journal, vol.1, Iss.1, 2018.

Dugan Um, "Safe Manipulation in Unknown, Crowded Environments via Sensor based Interleaving Planner: Interleaving Software and Sensitive skin Hardware," *Robotica*, (Impact Factor 0.824), vol. 35, iss. 5, pp 1176-1191, 2017.

Dugan Um, "Multiple Intensity Differentiation based 3D Surface Reconstruction with Photometric Stereo Compensation," vol, 14, iss. 5, pp 1453-1458, *IEEE Sensors Journal* (Impact Factor: 1.76 – 5 year), 2014.

Um D., Ryu, D., "SPAM for a Manipulator by Best Next Move in Unknown Environments," *ISRN Robotics*, vol. 2013, Article ID 679784, 8 pages, 2013.

Young Sam Ryu, Do Hyong Kohu, Dongseok Ryu, Dugan Um, "Usability Evaluation of Touchless Mouse Based on Infrared Proximity Sensing," *Journal of Usability study*, Vol. 7, Issue 1, November 2011, pp. 31-39 , 2011.

Dugan Um, Bahram Asiabanpour, Dave Foor, Mathew Kurtz, Mary Tellers, Todd McGregor, "Crystallographic Edge Removal of Silicon Dioxide Micro Parts in Bulk Micromachining," *International Journal of Rapid Manufacturing* (Impact Factor: 1.9278), vol. 2, no. 4, pp. 299-315, 2011

Dugan Um, Dongsuk Ryu, MyungJoon Kal, "Multiple Intensity Differentiation for 3D Surface Reconstruction with Mono-Vision Infrared Proximity Array Sensor," *IEEE Sensors Journal* (Impact Factor: 1.76 – 5 year), vol. 11, no. 12, pp 3352-3358, Jun, 2011.

Dugan Um, Dongseok Ryu, "A Framework for Unknown Environment Manipulator Motion Planning via Model Based Realtime Rehearsal," *Journal of automation, Mobile Robotics & Intelligent Systems*, vol. 5, no. 1, 2011.

William Stapleton, Bahram Asiabanpour, Jesus Jimenez, Dugan Um, "An REU experience with Micro Assembly Workcell research," *American Journal of Engineering Education*, vol. 1, No. 1, 2010.

Dugan Um, "Massive Sensor Array Fault Tolerance: Tolerance Mechanism and Fault Injection for Validation", *Journal of Robotics*, vol. 2010, pp. 1-8, Aug, 2010

D. Um, D. Ryu, B. Dong, D. Foor, K. Hawkins, "A novel flexible micro assembly system: implementation and performance analysis," *Journal of automation, Mobile Robotics & Intelligent Systems*, vol. 4, no. 3, pp.10-15, July, 2010.

Dugan Um, Bahram Asiabanpour, Jesus Jimenez, "A Flexible Micro Manufacturing System for Micro Parts Assembly via Micro Visual Sensing and EAP based Grasping," *Journal of Advanced Manufacturing System*, vol. 8, No. 2, pp. 137-152, 2009.

Dugan Um, "How to Tackle Sensor Based Manipulator Planning Problems Using Model Based Planners: Conversion and Implementation", *International Journal of Robotics and Automation* (Impact Factor: 0.206), vol. 24, no. 2, pp. 137-146, 2009.

D. Um, Lie Qui, "Infrared Photometry for 2D Proximity Sensing and 3D Geometry Visualization," *Journal of Engineering and Technology*, vol. 1, pp. 5-9, 2007.

D. Um, V. Lumelsky, "Fault Tolerance via Analytic Redundancy for a Modularized Sensitive Skin". *Intern. Journal of Robotics and Automation (Impact Factor: 0.76)*. Vol. 15, No. 4, 2000.

B. Conference Proceedings:

Jangwoon Park, Dugan Um, "Development of a sleep monitoring system by using a depth sensor: A pilot study," *Applied Human Factors and Ergonomics*, Washing D.C., July, 2019.

Toyin Ajisafe, Dugan Um, "Exploring the feasibility of classifying fundamental locomotor skills using an instrumented insole and machine learning techniques," 21ST International conference on Human-Computer Interaction, Orlando, Florida, 26-31 July, 2019.

Dugan Um, Toyin Ajisafe, "Classifying fundamental locomotor skills - a machine learning approach," *South West Texas Asian Symposium*, 2018. Corpus Christi, 2018.

Dugan Um, Jangwoon Park, Jeongsik Shin, Wooho Lee, "A User Study of Socially Assistive Robot with Social Networking Feature," *US-Korea Conference 2018*, St. Johns, New York, 2018.

Dugan Um, Darion Grant, Jeongsik Shin, and Woo H. Lee, "Autonomous photometric 3D surface construction by Potential Field Motion Planning," *2017 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Vancouver, Canada, presented in Sep., 2017.

Um, Dugan ; Gutierrez, Marco A. ; Bustos, Pablo ; Kang, Sungchul, "Simultaneous planning and mapping (SPAM) for a manipulator by best next move in unknown environments," *2013 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Tokyo, Japan, Nov., 2013.

Dugan Um, Dongseok Ryu, Myungjun Khal, Sungchul Kang, "Short range 3D depth sensing via Multiple Intensity Differentiation," *IEEE International Conference on Robotics and Automation*, St. Paul, MI, May, 2012.

D. Um, B. Asiabanpour, D. Foor, M. Kurtz, M. Tellers, M. T. McGregor, "Micro Scale Silicon Dioxide Gear Fabrication by Bulk Micromachining process," *Proc. of IEEE International Conference on Nano/Micro Engineering and Molecular Systems*, Xiamen, China, 2011.

D. Ryu, D. Um, P. Tanofsky, H. Do, Y. Ryu, and S. Kang “T-less : a Novel Touchless Human-Machine Interface based on Infrared Proximity Sensing,” *Proc. of IROS (IEEE/RSJ International Conference on Intelligent Robots and Systems)*, Taipei, Taiwan, 2010.

Matthew Kurtz, Dave Foor, Mary Tellers, M. Todd McGregor, Bahram Asiabanpour, Dugan Um, "Microelectromechanical systems, Wet etch, EPW, boron doping," *MicroManufacturing Conference & Exhibits*, Mesa AZ, April 14, 2010.

Tellers, M., Kurtz, M., Foor, D., McGregor, M., Asiabanpour, B., Um, D, “Thin film silicon dioxide micro-scale parts release by Ethylenediamine-Pyrocatechol-Water solution,” *Flexible Automation and Intelligent Manufacturing 20TH International Conference*, California State University, East Bay, July 12-14, 2010.

Dongseok Ryu, Bo Dong, Tim Davidson, Ammanda Burton, and Dugan Um, “Model-based Micro Profile Measurement using Multi-focused Images for Micro Gear Assembly ,” *Proc. of IEEE International Conference on Nano/Micro Engineering and Molecular Systems*, Xiamen, China, 2010.

Dugan Um, Handi Chandra Putra, “Manipulator Path Planning in Unknown Environments using Model Based Planners: Conversion Criteria and IPA Sensor Implementation,” *Proc. of IROS (IEEE/RSJ International Conference on Intelligent Robots and Systems)*, Saint Louise, MO, 2009

Dugan Um, Bahram Asiabanpour, Jesus Jimenez, “Undergraduate Research Project: Development of a Micro/Nano Assembly Workcell Via Micro Visual Sensing,” *Proc. of ASEE (American Society of Engineering Education)*, Austin, TX, June, 2009

Dugan Um, “Development of a Micro/Nano Assembly Workcell Via Micro Visual Sensing,” *Engineering Education NSF Awardees Conference*, Reston, Virginia, Feb., 1-3, 2009.

M. Todd McGregor, Hugo A. Mahlke, Sean M. Dozier, Bahram Asiabanpour, Dugan Um, “Producing micro scale silicon dioxide gears by bulk micro machining process,” *Transactions of the NAMRI/SME*, vol. 37, 2009.

Diego Rojas Bandini, Dugan Um, “Underwater Robotics,” *CAHSI Annual Conference*, Mountain View, CA, Jan. 2009.

D. Um, “Sensor Based Randomized Lattice Diffusion Planner for Unknown Environment Manipulation,” *Proc. of IROS (IEEE/RSJ International Conference on Intelligent Robots and Systems)*, pp.5382-5387, Beijing China, 2006.

D. Um and W.N.Hung, “A Novel Infrared Proximity Array Sensor for Micro-Workcell: Modeling and Applications,” *Proc. of IRAM (IEEE International Conference on robotics, Automation and Mechatronics)*, pp. 381-386, Bangkok Thailand, 2006.

D. Um, "Introductory MEMS technology using Bulk Micromachining in the Semiconductor Manufacturing Technology Curriculum," *Proc. of American Society for Engineering Education*, Chicago, 2006.

D. Um, V. Sriraman " Making Control Systems Theory Relevant to Manufacturing Engineering Students," *International Manufacturing Engineering Education Conference*, Cal Poly, San Luis Obispo, CA., 2005.

B. Asiabanpour, D. Um, A. Tseng, J. Mata, N. Wahed, V. Sriraman, "Mobile Paving System (MPS): A new Large Scale Freeform Fabrication Method," *16th Annual Solid Freeform Fabrication Symposium*, Aug. 1, Austin, 2005.

D. Um, H. Park, "Randomized Lattice Path Planning for Fast and Complete Search via Probabilistic Diffusion," *Proc. of IEEE Industrial Electronics, Mechatronics & Robotics*, vol.2, pp.767-772, Aachen Germany, 2004.

D. Um, S. Lloyd, "An affordable robotic guidance system in highly structured domestic environments utilizing AGV technology," *Proc. of IEEE Industrial Electronics, Mechatronics & Robotics*, vol.1, pp.297-302, Aachen Germany, 2004.

D. Um, V. Lumelsky "Fault Tolerance via Component Redundancy for a Modularized sensitive Skin" *Proc. of IEEE International Conference on Robotics and Automation*, vol.1, pp. 722 - 727. 1999, Detroit.

D. Um, B. Stankovic, K. Giles, T. Hammond, V. Lumelsky "A Modularized Sensitive Skin for Motion Planning in Uncertain Environments" *Proc. of IEEE International Conference on Robotics and Automation*, vol. 1, pp. 7-12, Belgium, May 1998.

D. Um "Local Step Planning for a Robot Arm Operating in an uncertain Environment " *Proc. of SPIE (The International Society for Optical Engineering) International Symposium on Intelligent Systems and Advanced Manufacturing*, 1998, Boston.

B. Book publication:

Dugan Um, "Solid Modeling and Applications: Rapid Prototyping, CAD and CAE Theory," 2nd Edition, Springer, ISBN-13: 978-3319745930, 2018.

Dugan Um, "Digital Dance," BogoMedia, ISBN:979-11-7006-143-42017, 2017.

Dugan Um, "Solid Modeling and Applications: Rapid Prototyping, CAD and CAE Theory," 1st Edition, Springer, ISBN-10: 3319218212, 2016.

C. Funded or Pending Grants for Teaching and Research

1. NSF:NRI: Humanizing CoBots with Hybrid Synthetic Perception for Manned/Unmanned Teaming (\$450,000, PI – Pending)

Source: National Science Foundation – NRI

2. NSF SBIR: iPCO (I Prevent Child Obesity) (Pending)

Total Award Amt.: \$157,500

Source: National Science Foundation – SBIR

Starting Date: 6/01/2019

Ending Date: 12/28/2019

3. Texas Comprehensive Research Fund: Automated Sleep Classification System Using Machine Learning to Monitor Elderly (Co-PI),

Total Award Amt.: \$20,000

Starting Date: 3/01/2018

Ending Date: 2/28/2021

4. Depart of Defense, Proposal No. 70540-RT-REP: Engineering Functional Surfaces and Flexible Smart Sensors by Scalable Microfabrication - Expansion of TAMUCC Facility and Capabilities to Polymeric Meta-Materials (Co-PI),

Total Award Amt.: \$600,000

Starting Date: 3/01/2018

Ending Date: 2/28/2021

4. TRDF: Decreased plantar sensation is associated with increased loading (Co-PI),

Total Award Amt.: \$20,000

Starting Date: 9/01/2018

Ending Date: 8/31/2019

5. NSF-DUE 1458096: Supporting Undergraduates for Careers in Computing and Engineering with Scholarships and Supervision (Co-PI),:

Total Award Amt.: \$612,566

Starting Date: 3/01/2015

Ending Date: 3/31/2021

6. STEM Summer Camp (PI)

Source: CBCF, Time Warner, HEB, HRD, RVE, Tuitions

Total Award Amt.: 2013:\$12,500+\$10,000 (in-kind)+\$20,000 (tuition)

Starting Date: 6/01/2013

Ending Date: -

7. MTS scholarship fund (PI)

Source: MTS Houston

Total Award Amt.: \$15,000/year

Starting Date: 4/01/2013

Ending Date: -

8. NASA MICI Award – Lunabotics (PI)

Source: NASA

Total Award Amt.: \$8,000

Starting Date: 6/01/11

Ending Date: 12/31/12

9. The Distributed Renewable Energy Technology Program of the Texas Comptroller of Public Accounts, RFA No. RE-AG2-1020 (Technical Advisor)

Source: Comptroller of Public Accounts of Texas

Total Award Amt.: \$955,000

Starting Date: 1/01/11

Ending Date: 12/31/11

10. Investigations Into the Effectiveness of a Novel Dual-Rotor Wind Turbine Arrangement (Co-PI)

Source: TRDF

Total Award Amt.: \$40,000

Starting Date: 11/01/10

Ending Date: 06/01/11

11. KIST-09-01: Intuitive gesture inputs for Touchless 3D user interface (in extension of the previous artificial skin project), (PI)

Source: KIST (Korean Institute of Science and Technology)

Total Award Amt.: \$24,180

Starting Date: 11/01/09

Ending Date: 06/01/10

12. Micro/Nano Assembly Workcell via Micro Visual Sensing and Haptic Feedback, (PI)

Source: National Science Foundation – RET (0937058)

Total Award Amt.: \$20,000

Starting Date: 06/01/09

Ending Date: 05/31/10

13. Robotic manipulator compliance and safety accommodation, (PI)

Source: KIST (Korean Institute of Science and Technology) (KIST-08-01)

Total Award Amt.: \$40,000

Starting Date: 09/01/08

Ending Date: 08/31/09

14. Micro/Nano Assembly Workcell via Micro Visual Sensing and Haptic Feedback, (PI)

Source: National Science Foundation – REU (0755355)

Total Award Amt.: \$208,500

Starting Date: 06/01/08

Ending Date: 05/31/10

15. Sensor based under water robotic manipulator path planning (PI)

Source: TRDF

Total Award Amt.: \$12,013

Starting Date: 05/15/08

Ending Date: 08/31/08

16. Teaching MEMS Technology to Undergraduate Physics and Manufacturing Engineering Majors, (Co PI) (0411262)

Source: National Science Foundation - CCLI

Total Award Amt.: \$178,585

Starting Date: 09/01/04

Ending Date: 08/31/06

D. Submitted but not Funded Grants for Teaching and Research

NRI: Small: Smart underwater robotic manipulators in Troubled Water: IMDL based human-robot synthetic operation (\$373,341, PI – Not funded)

Source: National Science Foundation – NRI

Teaching Underwater Vehicle Technology to Mech Eng, Biology, Computer Sc., and K-12 students (\$179,005, PI – declined)

Source: National Science Foundation – CCLI

Innovative Program to Increase the Affordability of Farm Mechanization and Transportation Means of Smallholder Agriculture in the Developing World (\$649,702, Co-PI - pending)

Source: National Science Foundation – BREAD

Acquisition of Atomic Force Microscopes for Nanoscience and Technology (\$280,773, Co-PI - declined)

Source: National Science Foundation – MRI

Collaborative for Undergraduate Research in Nanoscience (\$1,869,450, Co-PI - declined)

Source: National Science Foundation – PREM

Preparing Manufacturing Engineering Majors for Engineering Practice (\$157,997, Co-PI - declined)

Source: National Science Foundation - CCLI

V., *Mobile Paving System* (\$355,315.0, Co-PI - declined)

Source: National Science Foundation – DMI

PATENTS:

A. Infrared sensor apparatus and its sensing method

Patent No.: US 2012/0013745 A1 (6/2014)

B. Color compensation for Infrared sensor apparatus and its sensing method

Patent No.: 10-1180027 (8/30/12)

C. Optical Sensor and Sensing Method using the same

PCT application No.: US 13/407,166

Date filed: 2/28/12

D. Optical Sensor and Sensing Method using the same (IDS – w/t Color compensation)

PCT application No.: US-2012-0229789-A1

Date filed: 9/13/12

E. Simultaneous depth and surface angle measurement

Application No.: 10-2011-0021508

Patent No.: 10-2012-0012362 (2/7/12)

F. Method and apparatus configured to perform viscosity compensation for a payload measurement system

Date issued: 4/22/2003

Patent No.: 6552279

SERVICE:

A. Departmental:

- Mechanical Engineering assistant professors search committee & committee chair, 2010 -
- Served as a mentor of Innovation Academy for Engineering
- Served as a mentor of First Robotics for Collegiate High School
- Participated in ASME engineering day (2/23/11)
- Served for Engineering Olympiad (3/4/11)
- Served as a judge for the Coastal Bend Engineering Competition (3/5/11)
- Served for Science Olympiad, Write It/Do section as an event director (3/26/11)
- Engineering Student recruitment at EM Smith Middle school – Sinton, Texas (6/15/11)
- Attended PLTW Partnership meeting at Flour Bluff High School (8/17/11)
- ABET coordinator search committee, 2010
- Engineering and Technology High/middle competitions, Focused group session (June, 2010)
- Attended a seminar for “ABET: Accreditation Visit from the Program Evaluator Perspective” (Nov, 2010)
- Mechanical Engineering admissions Committee, 2009
- Job expo presentation for Engineering/Technology program at JK Northway Expo center in Kingsville (3/27/09)
- Senior Professor for Mechanical Engineering search committee, 2009
- Lecturer for the summer institute 2003, 2004, and 2005 which is a program sponsored by Capital Area Training Foundation for stimulating engineering initiatives for high school educators.

B. College:

- Committee member of Council of Principal Investigators and Research Administrators (CIPIRA), 9/1/16 -
- Served as a member of Graduate Student Recruiting committee, subcommittee of CIPIRA, 10/1/16 -
- College faculty secretary (2016)
- Summer STEM camp – Director (2012-)
- Engineering curriculum committee (2011)
- McNair Scholars Program advisor for Valerie Ferdin (ME student) (2011)
- Tenth Annual Texas A&M University - Corpus Christi Undergraduate Research Symposium, Judge for research presentation (September, 2010)
- External research funding committee, 2010
- Presented at Austin Science and Engineering Festival Expo, 10/23-10/24/2010
- Member of the Mentor for Moody’s Program by Innovation Academy , 2010
- School of Science and Technology (k-8 school) Annual Robotics Competition Judge (May, 2010)
- Associate Dean of Mechanical Engineering search committee, 2009
- Assistant professor search committee for 1 tenure/tenured track position (associate level) in the Department of Physics.

C. Professional:

- UKC 2018 conference program Co-Chair, 2018
- Ubiquitous robots 2018, Associate Editor, 2018
- President of KSEA south Texas chapter, 3/11/17 -
- National Science Foundation, Board of Review Panelist – NSF S-STEM (2016, 2017)
- Organization chair and President of Texas KSEA Coastal Bend, (10/2016 -)
- IEEE Robotics competition region 5 Director (2014)
- Member of IEEE organization (2013-)
- IEEE Transactions on Image Process - Registered Reviewer (2012-)
- IEEE Workshop on Robot Vision (WoRV) 2013 Program Committee – Financial Chair, (from July. 2012)
- IEEE Workshop on User-Centered Computer Vision, UCCV 2013 Program Committee – Financial Chair, (from Aug. 2012)
- Workshop on Applications of Computer Vision, WACV 2013 Program Committee – Exhibition Chair, (from Aug. 2012)
- UCCV 2013 Program Committee – Exhibition Chair, (from Aug. 2012)
- IEEE International Conference on Robotics and Automation reviewer, 2009, 2010, 2011
- Director of Society of Marine Technology 2011 -
- National Science Foundation Board of review panelist – NSF REU 2009
- Member of American Society for Engineering Education, 2004-2009
- Member of Society of Manufacturing Engineers , 2010
- IEEE Industrial Electronics Society - registered reviewer
- Scientific Journal International – registered reviewer
- Attended Emergency Informatics seminar at Texas A&M University-CC, Fall, 2009

Dugan Um, Ph.D

Degree: Ph.D. from the University of Wisconsin at Madison

Teaching philosophy

Education, to me, is of top priority. This aspect of the professor career is what attracted me to this profession. As a professor, you are entrusted by the university, department, students and society with the education of your students. This is not a small matter. I liken it to my own experience as a father raising my three children. You must give of yourself and serve the interest of the students. There are several things that I believe makes an effective teacher.

First of all, the atmosphere that the professor creates in a classroom is critical. As a professor, you must not just show a clear passion and love for teaching, but it has to be genuine; second nature of sort; a part of who you are, otherwise, you will begin to resent students and the work itself. I have that passion and it is real. The standards for learning must be set high. If you expect little you will get little, this is an important truth. You must clearly demonstrate to the students that you are in control in the classroom. At the same time, the atmosphere should be one of friendless and inviting to students and not of intimidation. From my experience, the most enjoyable and productive courses were those that the professor encouraged discussions during the lecture. This is what I intend to do.

Second, the professor must also motivate the students. In this profession, this is a generic cliché. However, it is true. This motivation is achieved, in my opinion, by showing students that what they are learning is real, useful, and applicable to everyday engineering problems; not just for a letter grade in a class. Through my own experience as a practicing engineer, I have a litany of examples to share with the students in which I applied what I learned directly from my work experiences.

Finally, teaching students also is most effective when hands-on-experience takes place. Establishing creative experiments that cover fundamental topics from the lecture will gain the interest of the student. For example, you can show the student the concept of force by acceleration by running a toy car over a small bump on the table.

Third, the students appreciated the consistency and fairness with which I handled the lab report grading and exam grading. These type of comments appeared on many post-semester evaluations that the students completed after the course concluded. It was a real encouragement to me that the students felt I served them well.

Finally, we all understand that there are different learning styles among students such as visual learners, auditory learners, and kinesthetic learners. To accommodate different learning styles in classes, I try to teach with several different teaching methods that would promote students' learning in different ways. Class projects are good examples that will incorporate multiple learning style together.

Followings are the courses that I'm best interested to teach at Texas A&M University - Qatar.

Robotics, Automatic Control, Vibration, Dynamics
Solid Mechanics, Computer Integrated Manufacturing, Computer Aided Design
Statics
Material Science/Engineering

Dugan Um, Ph.D

Degree: Ph.D. from the University of Wisconsin at Madison

Research Philosophy

Robotics technology is facing a new era transferring their major playground from industry to the close vicinity of human life. The driving impetus is, in no doubt, the desire of human being for better quality of life in 21st century. To cope with such demand, we recognize our home as a new testbed of the next generation robotics technology, whereby ubiquitous robotic solution with affinity to human plays key role, thus focusing on the technology toward the co-existence of human and robot. Nonetheless, we encourage ourselves to create the juxtaposition of such human friendliness and cutting-edge robotics technology intermingled in the vicinity of our daily life. To that end, we are envisioning the futuristic robotics technology with the special emphasis on the home robotics, in which human-robot interactions, proximity emotion sensing, and robot localization techniques are essential. The special area of application of our interest is substitution for so-called chores at home or works to assist handicapped. Could it be a lawn mowing, home cleaning, or rehabilitation assistance, etc.

Another area of research is in the area of micro-mechanical system fabrication and assembly. Demands for micro/nano products and assembly systems have been raised significantly to meet the ever complex technical needs for modern society. Cost effective and repeatable method for releasing high-quality micro-parts from a silicon substrate is the essential area of research interest. Crystallographic shape removal technique on the finally released silicon oxide parts was main interest of study. The combined method of boron doping and polyimide coating produced the best results so far, but has room to be improved for more affordable and precision fabrication technology.

That said, my major research interest is in the area of robotics and automation, especially on **Human machine interaction, micro sensor/actuator and sensor based robotic motion planning**. Current projects include **3D micro infrared imaging/visualization** and **robotic manipulator motion planning** in unstructured environments such as underwater or unexplored planets.

Other research interests include;

- Robotics: HMI (Human Machine Interface), Mobile robotics, Kinematics, Dynamics (matrix method), Sensor based Motion planning & Collision avoidance
- Manufacturing system: CAD/CAM, CIM, Virtual assembly/prototyping
- Fault Tolerance: Sensor fault tolerance, CBM (Condition Based Maintenance)
- Bulk Micro Machining MEMS (MicroElectroMechanicalSystem)

References

Dr. Bahram Asiabanpour,
Phone: (512) 245-3059
Email: ba13@txstate.edu

Dr. Karl Stephan
Phone: (512)-245-2137
E-mail: kdstephan@txstate.edu

Dr. Vladimir Lumelsky
Phone: (301)-286-6621
E-mail: lumelsky@pop600.gsfc.nasa.gov