TOPICS

- ECE Department
- Vision/Mission
- Degree Programs
- Faculty
- Research Capabilities
- Contact Information
TOPICS

✓ Background
  ✓ UTEP
  ✓ College of Engineering
✓ ECE Department
  ✓ Vision/Mision
  ✓ Degree Programs
  ✓ Faculty
  ✓ Student Organizations
  ✓ BSEE Program Summary
  ✓ Research Laboratories
✓ Contact Information
THE UNIVERSITY OF TEXAS AT EL PASO

- Founded in 1914 as the Texas State School of Mines and Metallurgy
  - Texas’ mining school
- Joined the UT system in 1919 as its third member institution, after UT Austin and UT Medical Branch in Galveston
- Became Texas Western College in 1949
- Name changed to The University of Texas at El Paso in 1967
- Student enrollment of over 22,000 students (22,640 in 2011).
- Over 75% Hispanic Students (77.4% in 2010)
UTEP: ACCESS AND EXCELLENCE

- Located in El Paso-Juárez, a binational metropolitan area of two million people, UTEP enrolls more than 22,000 students, 90% of whom are from this U.S.-Mexico border region, and who reflect this region’s demographic profile.

- The University has rejected the assumption that there must be a trade-off between promoting higher education access to a traditionally underrepresented student population and achieving excellence in research and teaching.

- UTEP’s success in achieving both these goals is not only "Closing the Gaps" in Texas, but also serving as a model for U.S. higher education in the 21st century.
Washington Monthly ranks universities based on their contributions to the public good in three categories: **social mobility** (enrolling low-income students and helping them earn degrees), **research production** (recognizing undergrads who go on to get Ph.D.s), and a **commitment to service** (valuing students who give back with their time through volunteering).

<table>
<thead>
<tr>
<th>Rank</th>
<th>University</th>
<th>Social Mobility Ranking</th>
<th>Net Price</th>
<th>Students receiving Pell grants</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>University of California, San Diego</td>
<td>64</td>
<td>$12,209</td>
<td>44%</td>
</tr>
<tr>
<td>2</td>
<td>Texas A&amp;M University</td>
<td>23</td>
<td>$11,808</td>
<td>21%</td>
</tr>
<tr>
<td>3</td>
<td>Stanford University</td>
<td>168</td>
<td>$20,358</td>
<td>15%</td>
</tr>
<tr>
<td>4</td>
<td>University of North Carolina at Chapel Hill</td>
<td>13</td>
<td>$9,013</td>
<td>18%</td>
</tr>
<tr>
<td>5</td>
<td>University of California, Berkeley</td>
<td>139</td>
<td>$15,825</td>
<td>26%</td>
</tr>
<tr>
<td>6</td>
<td>University of California, Los Angeles</td>
<td>80</td>
<td>$13,796</td>
<td>30%</td>
</tr>
<tr>
<td>7</td>
<td>Case Western Reserve University</td>
<td>246</td>
<td>$25,560</td>
<td>20%</td>
</tr>
<tr>
<td>8</td>
<td>University of Washington, in Seattle</td>
<td>6</td>
<td>$8,921</td>
<td>22%</td>
</tr>
<tr>
<td>9</td>
<td>University of California, Riverside</td>
<td>68</td>
<td>$11,455</td>
<td>46%</td>
</tr>
<tr>
<td>10</td>
<td>Georgia Institute of Technology</td>
<td>21</td>
<td>$8,167</td>
<td>14%</td>
</tr>
<tr>
<td>11</td>
<td>Harvard University</td>
<td>106</td>
<td>$16,459</td>
<td>15%</td>
</tr>
<tr>
<td>12</td>
<td>University of Texas at El Paso</td>
<td>1</td>
<td>$2,466</td>
<td>64%</td>
</tr>
<tr>
<td>13</td>
<td>University of Michigan, in Ann Arbor</td>
<td>66</td>
<td>$14,355</td>
<td>15%</td>
</tr>
<tr>
<td>14</td>
<td>University of California, Santa Barbara</td>
<td>60</td>
<td>$13,310</td>
<td>34%</td>
</tr>
<tr>
<td>15</td>
<td>Massachusetts Institute of Technology</td>
<td>192</td>
<td>$18,644</td>
<td>19%</td>
</tr>
</tbody>
</table>

For a complete list, visit [www.washingtonmonthly.com](http://www.washingtonmonthly.com).
Growth in Research Expenditures, 1991-2011

In Millions

1991: 7.8
1994: 10.4
1997: 13.8
2000: 17.3
2003: 28.0
2006: 31.1
2009: 32.9
2011: 46.4
2014: 56.5
2017: 66.0
2020: 69.5
UTEP STRATEGIC PLAN FOR RESEARCH – PRIORITY AREAS

➢ Built on established foundation

➢ Aligned with assets derived from UTEP’s accomplishments
  ➢ expertise of faculty
  ➢ growth and development of doctoral programs, and
  ➢ major infrastructure investments

➢ Aligned with unique characteristics of UTEP’s location and regional needs and opportunities

➢ Contribute to regional economic development and quality of life
Research Priorities and Cross-Cutting Research Themes

Cross-Cutting Research Themes
- Cyberinfrastructure and Collaborative Environments
- U.S.-Mexico and Latin America: Social and Behavioral Issues
- Emerging Technologies
We believe:

Diversity Drives Innovation
Collaboration Creates Opportunities
Research Fuels Preeminence
Balance Secures Sustainability

Our Vision is to change the face of engineering.
Our Mission is to provide access to excellence.
UNDERGRADUATE PROGRAMS/DEPARTMENTS

MS PROGRAMS
Civil Engineering
Computer Science
Computer Engineering
Electrical Engineering
Environmental Engineering
Industrial Engineering
Information Technology
Manufacturing Engineering
Mechanical Engineering
Metallurgical & Materials Engineering
Systems Engineering
Construction Management

PhD PROGRAMS
Civil Engineering
Electrical & Computer Engineering
Computer Science
Environmental Science & Engineering
Materials Science & Engineering
Computational Science
COLLEGE AT A GLANCE: 2011

- Enrollment: 2600 BS, 430 MS, 150 PhD
- Graduates: 300 BS, 150 MS, 15 PhD
- 85 Faculty
- $15 M research expenditures
- $17 M total endowments
UTEPE COLLEGE OF ENGINEERING IS THE:

- #2 producer of Hispanic American BS in the continental US
- #4 producer of Hispanic American MS
- #9 producer of Hispanic American PhD
- #3 Best Engineering School for Hispanics (Hispanic Business Magazine)

**Bachelor's Degrees Awarded to Hispanics by School**

1. Univ. of Puerto Rico, Mayaguez 526
2. Polytechnic Univ. of Puerto Rico 383
3. Florida International University 359
4. University of Texas, El Paso 220
5. University of Florida 167
## CoE Growth

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Enrollment</td>
<td>2530</td>
<td>3130</td>
</tr>
<tr>
<td>PhD Enrollment</td>
<td>84</td>
<td>151</td>
</tr>
<tr>
<td>PhD Graduates</td>
<td>8</td>
<td>17</td>
</tr>
<tr>
<td>Proposals</td>
<td>$7M</td>
<td>$74M</td>
</tr>
<tr>
<td>Expenditures</td>
<td>$7.4M</td>
<td>$19M</td>
</tr>
<tr>
<td>Annual Giving</td>
<td>$1M</td>
<td>$6M</td>
</tr>
<tr>
<td>Endowment</td>
<td>$16M</td>
<td>$18.5M</td>
</tr>
<tr>
<td>Faculty</td>
<td>75</td>
<td>81</td>
</tr>
</tbody>
</table>
VISION

The Department of Electrical & Computer Engineering will provide programs of the highest quality to produce world class engineers who can address challenges of the millennium.
MISSION

The Department of Electrical & Computer Engineering will:

1: Dedicate ourselves to providing our students with the skills, knowledge and attitudes that will allow its graduates to succeed as engineers and stand out as leaders.

2: Recognize and act upon the special mandate to make high quality engineering education available to the residents of El Paso and the surrounding region, a large part of whom belong to the fastest growing demographic in the 21st century.

3: Strengthen our graduate programs and our graduate student body to a size and reputation befitting a national research university.

4: Strengthen our infrastructure and multiply our accomplishments to create a vital, state-of-the art research enterprise, which provides our students and faculty with opportunities to create, innovate, apply and disseminate knowledge.
OBJECTIVES

1. Increase the quality and quantity of our graduates.
2. Increase community interaction, recruitment activities, and continue to expand partnerships with external constituents.
3. Improve the quality and increase the enrollment of our graduate programs.
4. Facilitate the growth of research, increase research funding and publications.
ECE DEGREE PROGRAMS

✓ B.S. Electrical Engineering (128 credits)

➤ Concentrations:
  - Computer Engineering
  - Fields and Devices
  - Systems and Communications

✓ M.S. Computer Engineering (31 - 34 credits)

✓ M.S. Electrical Engineering (31 - 34 credits)

✓ Ph.D. Computer Engineering (42 credits beyond master )*
## Bachelor's Degrees Awarded to Hispanics by School

1. Univ. of Puerto Rico, Mayaguez 526
2. Polytechnic Univ. of Puerto Rico 383
3. Florida International University 359
4. University of Texas, El Paso 220
5. University of Florida 167

## Electrical Engineering Degrees Awarded by School

1. Georgia Institute of Technology 200
2. Univ. of Illinois, Urbana-Champaign 177
3. Pennsylvania State University 175
4. University of California, Los Angeles 175
5. Purdue University 172
6. University of Washington 156
7. North Carolina State University 153
9. University of Minnesota, Twin Cities 122
10. University of Texas, Dallas 120
11. University of Florida 118
11. University of Maryland, College Park 118
13. California State Poly. U., Pomona 116
14. University of Michigan 108
15. Texas A&M University 102
16. University of Texas, El Paso 100
16. Virginia Tech 100
ENGINEERING PHD DEGREES AWARDED AT UTEP

- Civil Engineering [CENG]
- Computer Science PhD [CSCI]
- Elect. & Computer Engineering [ELCE]
- Computational Science [CPS]
- Environmental Science and Engineering PhD [ESE]
- Materials Science and Engineering PhD [MASE]

Year 2006-07: 1 Civil, 2 ESE, 2 ELCE, 2 MASE, 4 Materials
Year 2007-08: 2 Civil, 1 CSCI, 1 ELCE, 2 Materials
Year 2008-09: 1 Civil, 1 CSCI, 1 ELCE, 3 Materials
Year 2009-10: 1 Civil, 1 CSCI, 1 ELCE, 1 CPS, 4 Materials
Year 2010-11: 1 Civil, 1 CSCI, 1 ELCE, 1 CPS, 1 ESE, 6 Materials
ECE PROGRAM STATS (2012-2013)

✓ Pre-major undergraduate students
  in the Pre-Engineering Program
  (820 students for the College)

✓ 370 Undergraduate students in the B.S.E.E. Program
  308 Male, 62 Female (17%),
  82% Hispanics, 91% US Citizens

✓ 55 Master students in 2 programs:
  41 EE and 7 CpE
  48 Male, 7 Female (13%),
  51% Hispanics, 53% US Citizens

47 Ph.D. Students
  42 Male, 5 Female (11%),
  38% Hispanics, 55% US Citizens
ECE FACULTY

6 Professors
- Flores, Nava, Pierluissi, Qian, Starks, Velez

9 Associate Professors
- Cabrera, MacDonald, Nazeran, Moya, Quinones, Rumpf, Sarkodie-Gyan, Usevitch, von Borries, Zubia

2 Assistant Professors
- Bolborici, McGarry

1 Senior Lecturer
- Gonzalez

5 Lecturers
- Granda, Lazzari, Pallares, Verdin, Woo

14.5 Faculty/Student Ratio
FACULTY RECOGNITION

- Technical Society Fellows: Qian (AIMBE), Sarkodi-Gyan (InstMC), Velez-Reyes (SPIE)
- Presidential Award Recipients: Flores
- UT Regents Awards: Nava, Quiñones, Gonzalez
- DARPA Young Investigator Award: Rumpf
- IEEE Third Millennium Medals: Flores, Nava
- IEEE Centennial Award: Pierluissi
- IEEE Walter Fee: Velez-Reyes
- ABET President’s Awards for Diversity: Flores
- MAES National Outstanding MAEStro Award: Zubia
- PECASE: Velez-Reyes
ECE STAFF

Office (academic processes)
- Ms. Linda Romero, Admin. Assistant
- Student Assistants

EE Lab Tech (Laboratory needs)
- Mr. Ralph Loya
- Student Lab Assistant

ECE Lab Coordinator (ECE Computer systems)
- Mr. Nito Gumataotao
- Student Operators
STUDENT ORGANIZATIONS WITHIN ECE DEPARTMENT

- Institute of Electrical and Electronics Engineers (IEEE) and Eta Kappa Nu (HKN) – EE Honor Society
  - Office for UTEP Student branch within IEEE
  - Student Lounge
- HKN has become a branch of IEEE and will now be called IEEE-HKN. Also new HKN inductees must be IEEE members as well
- Student Chapter of the IEEE Robotics and Automation Society
STUDENT ORGANIZATIONS

COLLEGE-WIDE

- Tau Beta Pi (ΤΒΠ) – Engineering Honor Society
- Society of Hispanic Professional Engineers (SHPE)
- National Society of Black Engineers (NSBE)
- Society of Women Engineers (SWE)
- Mexican-American Engineering Society (MAES)
BSEE PROGRAM 2010

✓ ABET Accredited

✓ 57 Non-major credits (including core) [60 in older degree plans]
  ▪ University Studies
  ▪ Science (Physics, Chemistry, Biology)
  ▪ English Comp. and Prof. Communications
  ▪ Math (Calculus, Diff. Eq., Matrix Algebra)
  ▪ History and Political Science
  ▪ Art, Economics, Humanities

✓ 71 EE credits [68 in older degree plans]
ECE CRITICAL PATH
OF COURSES
2011-2012
EE UPPER DIVISION

Final Year

- 12 concentration credits (EE)
- Technical elective (3 credits)
- Senior Project I and II
BSEE CONCENTRATIONS (12 CREDITS)

- Systems and Communications
- Computer Engineering
- Field and Devices
ECE Research Expenditures

- **F'08**: 3,500,000
- **F'09**: 2,500,000
- **F'10**: 3,000,000
- **F'11**: 2,500,000

**Legend**:
- Federal
- State
- Local
- Industry
- Private
RESEARCH CENTERS AND LABORATORIES

ASICS Lab:  http://www.asics.ece.utep.edu/asicslab.html
NanoMIL:  http://research.utep.edu/Default.aspx?alias=research.utep.edu/nanomil
Medical Imaging Informatics Lab:  http://engineering.utep.edu/imaginginformatics/
Distributed Computing Laboratory:  http://wwwold.ece.utep.edu/research/webdcl/
EMLab:  http://emlab.utep.edu/
LIMA:  http://lima.utep.edu/
W.M. Keck Center for 3D Innovation:  http://wmkeck.utep.edu/
Research Institute for Manufacturing and Engineering Systems (RIMES):  http://rimes.utep.edu/
Mission

• Professional and Academic Development

• Stimulating Research

Expertise and Capability in Electronic Materials and Devices

• Nanofabrication Facility: Class-100/1000, 2,500 s.f. cleanroom
  • Deposition, Etching, Lithography, Oxidation, Diffusion
  • Silicon and Compound Semiconductor Processing

• Analytical Capability:
  • HP-SEM with Zyvex Nanomanipulator
  • Bruker HR-XRD
  • Varian UV-Vis photospectrometer
  • Hall-Effect, Film Thickness

• Expertise:
  • Nanomechanics
  • Patterned solar cells
  • Nanoscale crystal growth
  • Magnetic materials
  • MEMS devices and packaging
  • Radiation-Hardened CMOS design

• Research Foci:
  • ZnCdTe-based Solar Cells
  • SnO$_2$-based Memristors

Funders & Partners

SnO$_2$ Memristors for Radiation-Hard Non-Volatile Memory (RH-NVM)

Contact: David Zubia (915) 747-6970, dzubia@utep.edu  Website: research.utep.edu/nanomil/
Mission/Scope of Work

• Formed within the W. M. Keck Center for 3D Innovation.

• Research focus in the following areas:
  o 3D Printing of Structural Electronics
  o Radiation hardened electronics and shielding
  o Body conforming and wearable electronics
  o Low Power, Fault Tolerant VLSI

Expertise/Capability

• 3D Structural Electronics
• Radiation-Hardened, Low Power Electronics

Funders/Partners

• Intelligence Community
• DARPA
• Air Force Research Lab
• Lockheed Martin (Denver and Palmdale)
• Sandia
• Office of Naval Research
• nScrypt
• Universidad Técnica Federico Santa María (Chile)

Representative Recent Project
The ASIC lab recently fabricated a chip at MIT Lincoln Labs and funded by DARPA to explore a design technique that provides both ultra-low power and robustness (Rad-Hard for Space).

Contact: Dr. Eric MacDonald, (915) 747-6959, emac@utep.edu
### Mission
Fabrication enhancement of advanced materials through the acquisition of state-of-the-art engineering technology.

### Scope of Work
- Enhance student expertise in materials fabrication and characterization.
- Use of inexpensive fabrication techniques to fabricate high quality structures for infrared, X-ray imaging and advanced applications related to micro- and nano-structures.

### Expertise/Capability

<table>
<thead>
<tr>
<th>Capability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Close Spaced Sublimation</strong></td>
</tr>
<tr>
<td>o Inexpensive</td>
</tr>
<tr>
<td>o High Quality CdTe growth</td>
</tr>
<tr>
<td>o High Growth Rates</td>
</tr>
<tr>
<td><strong>Improvement of Quality and Structure</strong></td>
</tr>
<tr>
<td>o Nano-selective growth</td>
</tr>
<tr>
<td>o Doping</td>
</tr>
<tr>
<td>o Fabrication methods and parameters</td>
</tr>
<tr>
<td>o TEM/FIB characterization</td>
</tr>
<tr>
<td><strong>Nanostructured Materials</strong></td>
</tr>
<tr>
<td>o CdTe(111)/CdTe(211)/ZnTe/Si(211)</td>
</tr>
<tr>
<td>o CdTe/Si(100), CdTe/Si(111), CdTe/Si(211)</td>
</tr>
</tbody>
</table>

### Funders/Partners
- Army Research Lab (ARL)
- MRC – UT Austin
- Forest O. and Henrietta Lewis Professorship

### Representative Recent Project
Selective growth of CdTe by Close Space Sublimation with a Si$_3$N$_4$ mask and without the use of a mask for infrared detector and X-ray imaging applications. Quality of CdTe growth characterized by scanning electron microscopy (SEM) and transmission electron microscopy (TEM).

Contact: Stella A. Quiñones, Ph.D., (915) 747-6939, stellaq@utep.edu
Mission
Contribute to resources on the nanoHUB.org website funded by NSF Network for Computational Nanotechnology.

Scope of Work
• Increase the number resources, the visibility and number of users of the nanoHUB.org website.
• Improve student interest, understanding and learning experience associated with nanotechnology theory and concepts.

Expertise/Capability
• Educational Materials
  o Applied Quantum Mechanics Course Website
  o Simulation of PN Junctions, MOS-C, MOSFET, Quantum Dots, Resonant Tunneling Diodes

• Simulation Tools
  o Circuit Theory
  o Semiconductor Devices

• Software Development/iApps
  o Development of modules using X-Code for iApps
  o Development of modules using MATLAB for nanoHUB tools

Funders/Partners
• National Science Foundation
• Purdue University
• Norfolk State
• Northwestern University
• Massachusetts Institute of Technology (MIT)
• Molecular Foundry
• UC Berkeley
• University of Illinois

Representative Recent Project
The NCN UTEP group develops simulations, iApps and educational materials related to nanotechnology device and circuit applications.
An example is a set of iApps to help students understand, visualize and model circuit elements, measurements and configurations.

Contacts: Stella A. Quiñones, Ph.D., (915) 747-6939, stellaq@utep.edu
### Mission/Scope of Work

- Formed within the W. M. Keck Center for 3D Innovation.
- Mission to evolve digital manufacturing for electromagnetics and to discover new and revolutionary device concepts that it enables.
- Research focus in the following areas:
  - metamaterials
  - antennas
  - all-dielectric electromagnetics
- Strengthen electromagnetics expertise at UTEP

### Expertise/Capability

#### Electromagnetic Design and Analysis
- Ansoft HFSS, CST Microwave Studio, MATLAB
- Comprehensive suite of custom modeling tools including: finite-difference time-domain, finite-difference frequency-domain, rigorous coupled-wave analysis, plane wave expansion method, method of lines, beam propagation method, method of moments, finite element, fast marching method, and more.
- World class capabilities in design and analysis of all-dielectric structures.
- Synthesis of continuous spatially variant periodic structures.

#### Experimental Capabilities
- Anechoic facilities for free space measurement
- Impedance measurements of discrete components
- Materials characterization including permittivity, permeability, and dielectric breakdown

#### Technologies
- Metamaterials: manufacturing, all-dielectric, anisotropic, spatially variant
- Structural electronics and impedance elements
- Thin wire antennas with distributed impedance loading
- All-dielectric electromagnetics

### Funders/Partners

- DARPA
- Air Force Research Lab
- Prime Photonics
- Lockheed Martin
- Harris Corporation
- nScrypt
- Clemson University
- University of Central Florida

### Representative Recent Project

The EM Lab is currently funded through a DARPA Young Faculty Award for “Direct Digital Manufacturing of 3D Metamaterials Devices.”

Contact: Dr. Raymond C. Rumpf, (915) 747-6958, rcrumpf@utep.edu
**Mission**
To advance the state of the art of communication network technologies. Primary foci of media access control protocols for access networks and mechanisms for the delivery of video information.

**Scope of Work**
Dynamic bandwidth allocation to optimize performance measures for optical access networks
Error recovery mechanisms for video communication
Bandwidth forecasting

**Accomplishments**

**Dynamic Bandwidth Allocation for Ethernet Passive Optical Networks (EPONs)**
Identification and exploration of the three dimensional design space for EPON DBA algorithms. Discovery of the *Just-in-Time Online scheduling framework* and the *Shortest Propagation Delay (SPD) scheduling policy* for achieving high channel utilization and low queueing delay. **Over 400 combined citations** for our published articles in this area. The **2009 IEEE Communications Society Best Tutorial Paper Award** for our survey article on DBA for EPON.

**Video Bandwidth Forecasting**
Discovery of *Feed Forward Bandwidth Indication (FFBI)*, a simple and accurate mechanism to forecast future video frame sizes; will be useful for video bandwidth allocation mechanisms

**Sponsors/Partners**

**Current Work**
Investigating the use of video bandwidth forecasts to empower intelligent proactive congestion control in packet switched networks like the Internet.
Investigating the use of caching to minimize the delay and energy consumption of Automatic Repeat reQuest (ARQ) error recovery of video information.
**Research Interests** – Digital signal processing, time-frequency analysis, wavelet transforms, Fourier transform, tomographic imaging, statistical signal processing. Signals are one-dimensional or multidimensional, acquired with dense sensor arrays, and processed with computationally intensive algorithms running in parallel on computer clusters. Applications: tomographic imaging, radar imaging, remote sensing, and human bioelectric potentials analysis (EEG, EMG and ECG). Other interests: digital and analog hardware architecture and design to create dedicated instrumentation needed for the research.

**Projects**
- Wavelet denoising
- Filter bank time-frequency analysis
- Microwave tomographic imaging
- Lidar compressive sensing
- Modeling stochastic signals
- Clustering and classification
- Parallel processing in Matlab and R
- Data visualization

**Collaborators**
- R. von Borries, PhD
- J. H. Pierluissi, PhD
- B. C. Flores, PhD
- B. Verdin, PhD
- H. Nazaran, PhD
- P. Debroux, PhD, ARL
- G. von Borries, PhD, UnB

**Instrumentation** – High-resolution infrared camera (640x480 pixels, 7 to 14 microns); arbitrary waveform generator (Tektronix, 10 GHz, 12 Gsamples/second, 10 bit resolution, 2 channels, interleaved high bandwidth output and fast sequence switching); digital serial analyzer (Tektronix) with remote sampling module (2 units of 2 channels each, 30 GHz), and amplifiers (Picosecond 25 dB at 2.5 kHz to 10 GHz, and B&Z Tecnologies 24 dB at 100 Hz to 12 GHz).
Mission

• Professional and Academic Development

• Stimulating Research

Expertise and Capability in Research, Development, Testing, and Validation of Technologies to Improve Chronic Health Conditions

• Biomedical Engineering Research and Teaching Facility
  • Impulse Oscillometry, Wireless Physiological Monitoring
  • Modeling and Simulation

• Expertise:
  • Biomedical Instrumentation
  • Physiological Systems Modeling
  • Biomedical Signal Processing
  • Heart Variability Signal Analysis
  • Sensitive Diagnostic Test for Pulmonary System
  • Nonlinear Dynamics Systems Analysis

• Research Foci:
  • Sleep Apnea
  • Asthma, COPD, Cystic Fibrosis
  • Diabetes
  • Dissemination of Biomedical Engineering Research and Education

Funders & Partners

Contact: Homer Nazeran  (915) 747-8937, hnazeran@utep.edu  Website: http://research.utep.edu/Default.aspx?tabid=71272
### Expertise/Capability

Image archival, retrieval, and analysis for a variety of modalities including X-ray, magnetic resonance imaging, magnetic resonance spectroscopy, computed tomography PET, SPECT, Ultrasound, Nuclear medicine imaging etc. on linking developments in cancer imaging to commercial activities.

### Mission/Scope of Work

- **Research focus in the following areas:**
  - To integrates image processing, computer vision, mathematics, physics, and statistics into computerized techniques that assist physicians in their medical decision-making processes.
  - Quantitative measurements for Medical Imaging, Biomedical Imaging and Molecular Imaging
  - The classification of lesions and the quantification of disease and anatomic structures (including volumetric analysis, disease progression, and temporal response to therapy), risk assessment, and physiologic evaluation.

### Funders

- NCI/NIH
- DoD
- Texas Emerging Tech Funding
- Texas State University System
- Department of Education
- Norma Heckerman Program
- The Susan G. Komen Breast Cancer Foundation

### Partners

Texas Tech Health Science Center, MD Anderson Cancer Center & H. Lee Moffit Cancer Center at USF

### Contact

Dr. Wei Qian, 915 747 8090, wqian@utep.edu
Mission/Scope of Work

- Founded in 2005 to improve the health and wealth of our nation through research
- Our mission is to create an infrastructure to provide medical rehabilitation researchers with access to expertise, technologies, and resources from allied fields such as neurosciences, engineering, applied behavior, and social sciences. The research lab promotes multidisciplinary collaborators and develops research opportunities.
- Research focus in the following areas:
  o Neuromusculoskeletal systems
  o Computational intelligence
  o Instrumentation, measurements, Robotics
- Strengthen multidisciplinary education at UTEP

Sponsors/Partners

- Stars Award
- Stern Foundation
- Delsys, Inc.
- Paul L. School of Medicine, Texas Tech University

The Expertise and Capabilities within our Research Laboratories involve the development of methodologies to illuminate our understanding of the neurophysiology/biomechanics of gait dynamics and augment objective measurements of mobility and functional status.

Expertise:

- Precision Bio-Instrumentation
- Precision Measurements of Neuromorphic data
- Development of research skills for the future of leaders in applied health research
- Quantitative and Differential Analysis of Human Dynamic Behavior in Space

Research direction:

- Proprioceptive Sensory Feedback Mechanisms
- Synergistic Motion Systems
- Categorization of Human Dynamic Behavior in Space
- Development of innovative biosensors and mechanisms

Contact: Dr. T. Sarkodie-Gyan (915) 747-7011, tsarkodi@utep.edu
**THE ELECTRIC POWER LAB**

**Mission/Scope of Work**

- Formed within the Engineering College at the University of Texas at El Paso.
- Research focus in the following areas:
  - Power Electronics
  - Electric Power
  - Electro-thermal Modeling of Electric Energy Storage Devices
  - Modeling and Control of Hybrid Electric Energy Storage Systems
  - Modeling and Control of Piezoelectric Traveling Wave Rotary Ultrasonic Motors
- Strengthen power electronics and power systems expertise at UTEP.

**Expertise/Capability**

- **Modeling, Design and Analysis of Piezoelectric Devices**
  - COMSOL, MATLAB, SIMetrix
  - Modeling of simple piezoelectric devices with the Finite Volume Method.
  - Modeling of complex piezoelectric devices with the Finite Volume Method.
  - Modeling of the stator of piezoelectric traveling wave rotary ultrasonic motors with the Finite Volume method.
  - Circuit form implementation of models for piezoelectric devices modeled with the Finite Volume Method.

- **Modeling, Design and Analysis of Hybrid Electric Energy Storage Systems**
  - COMSOL, MATLAB, SIMetrix
  - Multi-physics modeling of batteries and ultracapacitors
  - Modeling and control of hybrid electric energy storage systems

- **Experimental Capabilities**
  - Characterization of piezoelectric traveling wave rotary ultrasonic motors and other piezoelectric devices
  - Characterization of energy storage devices such as Li-Ion batteries and ultracapacitors
  - Characterization of hybrid electric energy storage systems

**Funders/Partners**

- University of Texas at El Paso
- El Paso Electric

**Representative Project**

The Power Electronics Lab is currently funded by the UTEP. Future funding expected from NSF and industry.

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## Expertise/Capability

- Develop novel information extraction algorithms from remote or minimally intrusive sensor systems
  - Advanced mathematical concepts
  - Novel computational methodologies
- Provide a multi-disciplinary environment for training and research to undergraduate and graduate students in state of the art tools and technologies in signal and image processing
  - Partnerships with end users and industry
- Develop technology and tools to solve relevant societal problems
  - Environment, Homeland Security, Defense, Biomedical

## Mission/Scope of Work

## Funders

- NSF
- NASA (with UPRM)
- UTEP Office of the Provost IDR
- UT System STARS

## PARTNERS/COLLABORATORS

- CenSSIS/ALERT, Spectral MD, UPR Mayaguez

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