UNIVERSITY OF PITTSBURGH

SWANSON school of engineering

Department of Electrical & Computer Engineering

October 2015

Mahmoud El Nokali, PhD

Interim Chair


Washington
Oregon
California
Idaho
Nevada
Montana
Wyoming
Utah
Arizona
Colorado
New Mexico
North Dakota
South Dakota
Nebraska
Kansas
Oklahoma
Texas
Minnesota
Iowa
Missouri
Arkansas
Louisiana
Wisconsin
Illinois
Michigan
Indiana
Ohio
Kentucky
Tennessee
Mississippi
Alabama
Georgia
Florida
South Carolina
North Carolina
Virginia
West Virginia
Pennsylvania
New York
Maryland
Delaware
New Jersey
Connecticut
Rhode Island
Massachusetts
Vermont
New Hampshire
Maine
Washington DC
Alaska
Hawaii

City of Pittsburgh

- Located in Western Pennsylvania
- Population: 305,841
- Historically known for its steel industry
- Today its economy is based largely on technology, education, healthcare, robotics and financial services
- Site of other universities such as Carnegie Mellon, Duquesne, Carlow, Chatham, Robert Morris, Point Park, the Art Institute of Pittsburgh, and several other colleges in the greater Pittsburgh region.


UPMC
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PNC PARK
TRIB TOTAL MEDIA
PNC
K&L GATES
PIRATES
Heinz
comcast
NATIONAL LEAGUE
AMERICAN LEAGUE
BUD LIGHT

University of Pittsburgh

- A state-related research university that was founded in 1787
- Commonly referred to as “Pitt”
- Located in Oakland, one of Pittsburgh’s many neighborhoods
- Total enrollment 34,934 students

University of Pittsburgh (con't.)

- Among the top universities in total research expenditures
- Close affiliation with the University of Pittsburgh Medical Center (UPMC), a leading academic medical center and the most active neurosurgical and organ transplant center in the US
- Highly successful NCAA Division 1 athletic programs

University of Pittsburgh (con't.)

Year	1995	2014
Enrollment (FTE)	27,002	34,934
Employee Base	9,761	13,041
Operating Budget		$2 Billion
Net Assets	$997 Million	$4.4 Billion
Endowment	$463 Million	$3.49 Billion
Annual Research Funds	$230 Million	$697 Million
Fresh. Applications	7,825	30,620
Cumulative Research	-	+10 Billion

Ranks

- **Ranks 5th in the National Science Foundation total federal Science and Engineering Research and development support**

1. Johns Hopkins
2. Washington
3. Michigan
4. Penn
5. Pitt
6. UC San Diego
7. Stanford
8. Columbia
9. Wisconsin
10. Duke

Swanson School of Engineering

- **Six engineering departments: Bioengineering, Chemical and Petroleum, Civil and Environmental, Electrical and Computer, Industrial, and Mechanical and Materials Science**
- **Total enrollment: 3404 students**
  - **2,468 undergraduate**
  - **936 graduate students**

Swanson School of Engineering (con't)

- **Employs 164 faculty members, 53 research/ post doctoral associates, and 113 staff members**
- **Faculty and staff are recognized for providing excellent educational programs, for conducting leading edge research, and for creating innovative industrial partnerships**
- **In 2014, the research expenditure for the School was over $90 million**

John A. Swanson

- Graduated from the University of Pittsburgh's School of Engineering with a PhD in 1966
- In 2007, made the largest individual philanthropic commitment in the history of the university, $41 million
- Currently the Swanson School is embarking on the $100 million Benedum Hall Transformation Plan, that will end December 2015

Pitt's ECE Department

1890 Among the First EE Departments in the U.S.
1893 First degrees in EE awarded

ECE Department in 2015

25 Full-Time Faculty
7 Adjunct Faculty
4Joint Appointments
7 Professor Emeritus

436 Undergraduate Students
EE = 196
COE = 240

159 Graduate Students
82 MS, 77 PhD
Electrical Engineering
BS, MS, PhD
Computer Engineering
BS, MS, PhD

ABET Accredited

Faculty Research Areas in 2015-2016

- Photonics / Sensing
- Nano-electronics / Nano-Optics
- Low Power Computers/Architect.
- Signal Processing (incl. for BioMed.)
- Embedded Processing
- RFID Systems and Technology
- Automatic Control
- Mixed Technology Microsystems
- Emerging Memory Technologies
- Image Processing
- Power System Analysis
- Smart Grid
- System Biology, ...

Faculty Distribution in 2015-2016
Technical Areas

- ***Computer Engineering Group (8)***
  - Low power computer architectures, parallel processing architectures, emerging memory technologies, energy harvesting, analysis and control of robotic manipulators, VLSI design, embedded computing, EDA, microsystems on a chip, Memrisistors, Bio-Design Automation
    - Y. Chen, A. Jones, H. Li, Levitan, Mohanram, Yang, S. Dickerson, N. Miskov-Zivanov
- ***Signals and Systems Group (7)***
  - Communications, control theory, biomedical image processing and compression, wavelets, pattern recognition, time-frequency analysis and applications, speech processing, power systems and analysis
    - Akcakaya, El-Jaroudi, Jacobs, I. Jones, C.C. Li, Mao, Sejdic
- ***Energy and Electric Power Systems Group (4)***
  - Advanced power distribution architectures, smart grids, renewable energy integration, energy storage, power electronics and control of power systems
    - Kusic, Kwasinski, Reed, McDermott
- ***Electronics & Photonics Group (6)***
  - Photonic & electronic nano-devices and micro-devices, nano-sensors, nano-robotic characterization techniques, high frequency device fabrication and analysis, organic photovoltaics, power electronics
    - K. Chen, El Nokali, Kim, G. Li, Stanchina, Yun

Master of Science - MS

Two options

- Research Option (30 credits)
  - Thesis required
  - 8 courses
- Professional Option
  - No thesis (projects possible)
  - 10 courses

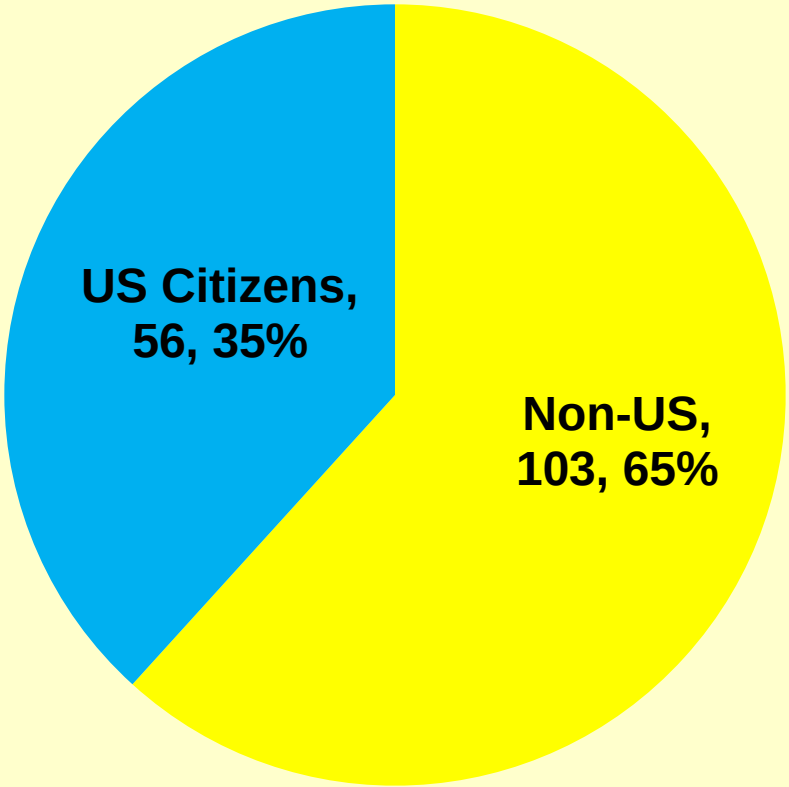
Doctor of Philosophy - PhD

- **Typical Requirements**
  - **72 credits**
  - **PhD thesis is equivalent to 18 credits**
  - **42 credits beyond MS**
  - **Series of exams: Preliminary, Comprehensive, Proposal, Thesis Defense**

Test Scores for Admitted Students 2015

TEST	SCORE
GRE (verbal)	149
GRE (quantitative)	165
GRE (analytical writing)	3.2
TOEFL	95.2

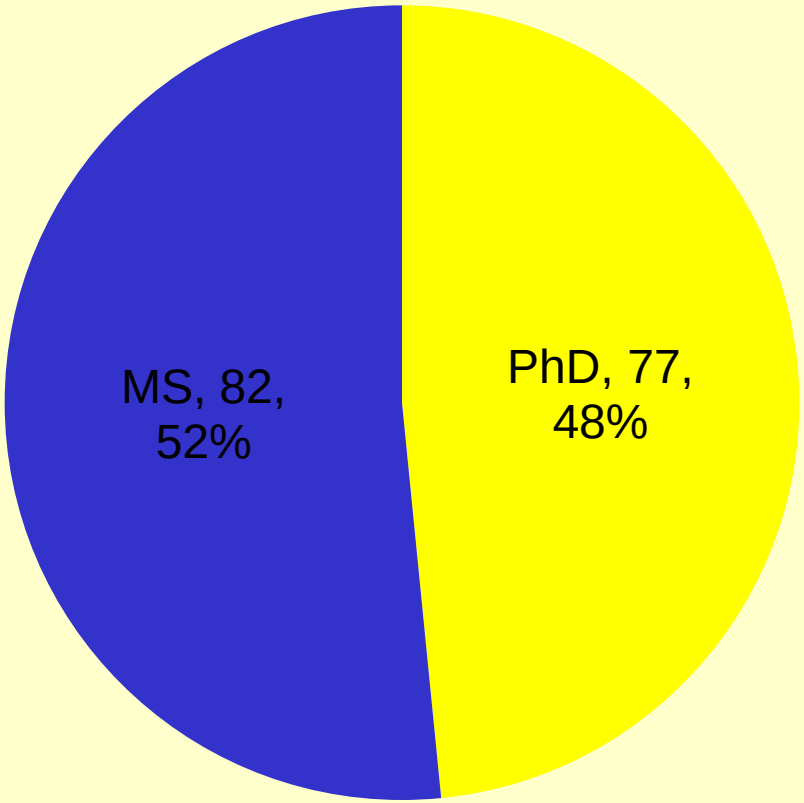
Total Study Body from 2015: US vs Non-US Students



Graduate Students Enrolled by Country from 2015

- US – 58
- China – 70
- India - 5
- Turkey – 2
- France – 2
- Saudi Arabia – 5
- Egypt – 4
- Libya – 1
- Taiwan – 3
- Montenegro – 1
- Iran – 2
- Bangladesh – 2
- Cameroon – 1
- Brazil – 1
- Nigeria – 1
- Korea – 1

Total Study Body: MS vs PhD from 2015



Supported Students

Teaching Assistants	19
Research Assistants	59
TOTAL	78

List of Research Projects for Academic Year 2016-2017

- Evaluating Capabilities of Neural Control in Human-Machine Interaction
- Analysis of Human Gait
- Transcranial Doppler as a New Brain-To-Computer Interface
- Sparse Representation of Biomedical Signals
- Dimensionality Reduction in the Control of the Power Grid

- **Machine Learning and Signal Processing for Electroencephalography (EEG)-Based Brain Computer Interfaces (BCIs)**
- **Machine Learning Techniques for Adaptive Radars in Nonstationary Environments**
- **Physiological Signal Analysis for Health Informatics**
- **Performance Optimization in NAND Flash Based SSD System**
- **The Human Neocortex Inspired Information Processing System**
- **Resiliency Assessment of Power Grids to Natural Disasters**

- **Design of Resilient Advanced Power Distribution Grids to Natural Disasters**
- **Integrated Electric Power Distribution and Information and Communications Technology Infrastructure**
- **Advanced Residential, Commercial and Industrial Power Distribution**
- **Multi-resolution Curvelet-based Texture Analysis and Pattern Recognition**
- **Non-Boolean Computing with Oscillators**
- **Uncovering the Hidden Potentials of GPUs**
- **Signal Processing Applications to Electric Power Systems Identification**

- **Co-simulation of Electric Power Grid and Building Energy Systems**
- **Analysis of Distributed Energy Storage (e.g. batteries, ultra-capacitors, flywheels) on Electric Power Distribution Feeders**
- **Development of Aggregate Distributed Generation (DG) Models for use in Electric Power Transmission Stability Analysis**
- **Lightning Performance of Overhead Electric Power Lines**
- **Human-Vision Perception (HVP) Quality-Assurance OLED Power Management**

Financial assistantship

Type of assistantship	Tuition Paid	Fees Paid	Salary Received	Health Insurance
Full	None	$60/year	$2,150/month	Yes
Three Quarter	None	$60/year	$1,612/month	Yes
Half	$19,445	$30/year	$1,075/month	Yes
None	$38,990	$800/year	None	No

- The tuition paid covers the fall and spring terms
- Salary received is for 8 months, Additional support may be available for the summer term
- The monthly premium for medical insurance is $345/month. The dental premium is $15/month and vision is $6.5/month

Students from ESIGELEC

1. Jean-Marc Coulomb
2. Benoit DeCourrege
3. Alexandre Millecamps
4. Augustin Cremer
5. Banock Ofakem
6. Zhenwei Zhang
7. Lucie Elise Broyde

Students from ENSEA

1. Antoine Du Mortier
2. Etienne Zhand

Students from INSA Lyon

1. Arthur Gatouillat
2. Heloise Bleton

Apply Early

- **Apply online: https://app.applyyourself.com/AYApplicantLogin/fl_ApplicantLogin.asp?id=up-e**
- **Deadline for applications: April 1**
- **Deadline for TA/RA positions: February 1**
- **Requires TOEFL (minimum 85)**
- **Requires GRE (for marginal students)**
- **Two letters of recommendation**
- **Selection of a Research project from the list**
- **Communication with Research advisor**

Questions?

- Electrical and Computer Engineering
- 412 624-8001
- elnokali@engr.pitt.edu
- weisberg@engr.pitt.edu
- http://www.engineering.pitt.edu