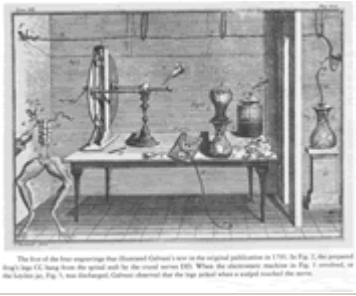
March 2001

The Future of Electrical Engineering is ... Biology(?)

I recently attended the National Electrical Engineering Department Heads Association meeting where Dr. James Plummer, Dean of Engineering at Stanford, gave the plenary address on the future of Electrical Engineering education. I thought you might be interested in some of his comments. The whole program is available on the NEEDHA web site.



(Click image to enlarge Galvani's electrostatic nerve stimulator - 238 kB)

We are in a time of dramatic change in engineering education.

At its core, EE is the engineering discipline that provides the technology for sensing, processing, storing and communicating information.

Electrical engineering is the discipline that, ***more than any other,*** *produces the technology for handling information****.*** *Because of the exponential growth in information technology in recent decades, the processing, storage and communication of information have come to dominate electrical engineering. That growth in turn has been driven in large measure by advances in electronics technology and the understanding of the basic mathematical and physical sciences that underpin it. Electrical engineering pervades every aspect of handling information, from sensing and acquisition, through communications, networking, switching, processing, and storage, to display and printing.*

The ***single biggest driver for change is the impact biology will have*** *in the coming decades.*

The biological opportunities are diverse and include:

- *Melding biology and microelectronics technology*
- *Applications of the sophisticated signal processing techniques to problems across the spectrum of biology and medicine.*

Interdisciplinary research opportunities are the primary driver for Bio-X (?from molecules to man?). There are four research themes:

- *Single Molecule Analysis & Molecular Structure*
- *Tissue Engineering*
- *Imaging*
- *Biocomputation*

Dr. Plummer also mentioned other **major influences on Electrical Engineering education** in the future:

- Photonics
- Materials
- Computational Math and Engineering
- Distance Education

Senior Projects

This semester, ECE juniors are writing up the specifications for their Senior Projects. They must draw up a contract this semester and spend the next two semesters building a system that will satisfy the specifications. Achieving the specifications will earn the students a "C". Exceeding the specs allows them to earn a higher grade. If you're so inclined, please take a minute to respond to the students. If their email is not on the web page, respond to me (musavi@eece.maine.edu), and I'll forward your comments.

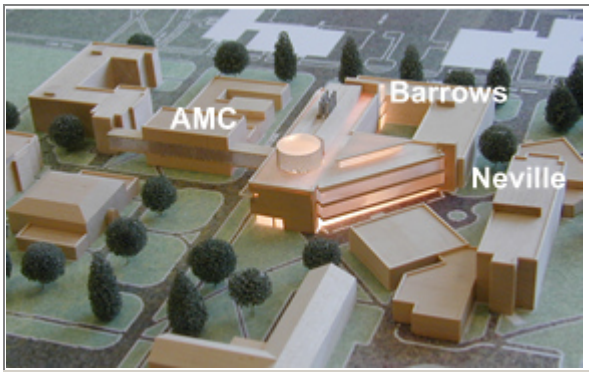
Electronic Guitar Tuner
Telephone Ring Detector
PRBWEB Proposal
Rotor Planning/Tracking Database
Hand-Held Ammonia Concentration Measurer
Automated Venetian Blind Adjuster
Hand Held Metal Detector
Block Diagram Based Program Generator
Piece Identification System 1.0
High Current Magnetic Coil Projectile Launcher
Web Based Systems Monitor
Advanced Robotics Programming with LEGO Mindstorms
Class D Power Audio Amplifier
Humidity Sensor & Controller
Active Subwoofer Crossover
PC Infrared Remote Control Receiver
THE TIME KING
RTD Calibration Unit
Infrared Remote Control For A Simple Robo

Alumni Anecdotes

My memory says that from 1959 to 1963, attrition reduced the Maine EE class of '63 ***from 108 to 16****. Since my undergraduate years were spent betting cups of $0.08 coffee on how many minutes into a class before Prof Parsons drew a $ sign on the board, I easily could be way off. Isn't it strange the things we remember? Prof Parsons taught business to EE students. If I had paid more attention to him, I might not have needed two businees degrees to upgrade my education.* - Sumner Lymburner '63

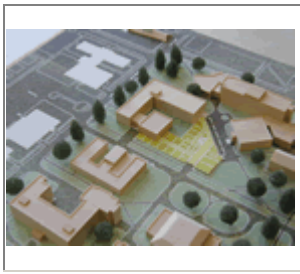
This is a funny story that happened during the farewell words by the dept head to the entire class of EE Graduates (12) in June 1938. The Eccles-Jordan flipflop had just been invented. "You graduates have had the benefits of four years studying the fundamentals of good engineering practices. ***Stick to these fundamentals and don't waste any time or disgrace yourself working on things like flipflops.****" In all fairness to the dept head, he was a 60-cycle power man.* - Rich Ireland '38

Engineering and Science Building Update ...



Engineering and Science Building (Click on the image to enlarge - about 300kB)

We've been working with Shepley Bulfinch Richardson and Abbott on the design of our new Engineering & Science Building. Though we haven't finalized a design, we seem to be converging on a general theme as shown by the scale model on the left. The E&S Building will house the ECE Department, the Mechanical Engineering Department, and the Laboratory for Surface Science and Technology (LASST). We hope construction will begin next year and be complete in three years.



Old Barrows (Click to enlarge)

New Barrows (Click to enlarge)

Tidbits ...

Spring Banquet - We will hold our annual Spring Banquet during the afternoon of Sunday, May 6, at the Oronoka Restaurant. We will award scholarships and other prizes, and give Al Whitney a chance to roast us all.

We'd like to encourage alumni/ae and friends to attend. We'd love to introduce you to our current students and reminisce with the faculty. If you would like to come, please contact Ryan Taylor (ryan.taylor@umit.maine.edu).

Registration - April 10 is the first day of pre-registration. Students are urged to look over the ECE Registration FAQ to answer questions about the curriculum. If you have other questions you think should be on the FAQ, send them to me. Thanks.

Summer Courses - Several summer courses will be taught this year, including Linear Circuits and Systems (ECE314), Electronics I (ECE342), Electrical Networks I (ECE210 for non-majors or as a course repeat), Explorations in Electrical and Computer Engineering (ECE105 for non-majors), Wave Propagation ECE552, and Advanced Industrial Computer Control ECE578. In addition, Power System II (ECE427) will be taught over the web.

And finally ...

"If a trainstation is where the train stops, what's a workstation?"

'If the automobile had followed the same development cycle as the computer, a Rolls-Royce would today cost $100, get one million miles to the gallon, and explode once a year, killing everyone inside." -- Robert X Cringely

"What goes up must come down. Ask any system administrator."

"Never trust a computer you can't throw out a window." -- Steve Wozniak

"I do not fear computers. I fear lack of them." -- Isaac Asimov

Publications, proposals, etc.

UNIVERSITY/COLLEGE/DEPT SERVICE
M. DaCunha, R. Eason, M. Musavi, J. Patton, H. Ressom, and Segee attended Bauer Seminar, March 13

R. Eason and A. Sheaff gave lab tours to five groups of 6th graders participating in the Maine State GEAR UP Program, March 14.

D. Kotecki attended the Teaching and Technology Fellows meeting, March 30

M. Musavi attended Faculty Senate meeting, March 28.

M. Musavi participated in the Research Council Meeting, April 2.

INDUSTRY/SCHOOL VISITS: DATE(S) INDUSTRY SCHOOL

Faculty/Description:

M. Musavi, H. Ressom, C. Domnisoru 3/27/01 Jackson Lab, Bar Harbor

GRANTS RECEIVED
M. Musavi (70%), R. Van Beneden (15%), H. Ressom (15%), C. Domnisoru, "An Accurate DNA Base Caller," NSF, $425,030, March 15.

J. Vetelino, "National Science Foundation RET Supplement," NSF, $10,000, March 12.

PROPOSALS SUBMITTED
J. Patton, "Improving Connections - ECE Women Students and Alumnae," proposal for a Women in the Curriculum Grant, $3,000, March 12.

J. Vetelino (29%), P. Millard (42%), C. Kim (29%), Sea Grant Preproposal, "A Biosensor Platform for Detection of Fish Pathogens," R&D, March 8, $133,458.

D. Hummels (50%), D. Kotecki (50%), "Mixed Signal Integrated Circuit Design for Advanced Communication Systems," NSF/SRC, $504,482, March 23.

PATENTS

D.E. Kotecki, and W.H. Ma, U.S. Patent #6,191,469, "Overhanging Separator for Self-defining Discontinuous Film," February 20, 2001.

D.E. Kotecki, C.J. Radens, J.P. Gambino, and G.B. Bronner, U.S. Patent #6,201,272, "Method for Simultaneously Forming a Storage-Capacitor Electrode and Interconnect," Mar. 13, 2001.

H.Shen, D.E.Kotecki, R.Laibowitz, K.L.Saenger, S.D. Athavale, J.Lian, M. Gutsche, Y.Y.Wang, and T. Shaw, U.S. Patent 6,207,584, "High Dielectric Constant Material Deposition to Achieve High Capacitance," March 27, 2001.

PROFESSIONAL ACTIVITY

J. Patton attended National Electrical Engineering Department Heads Association Meeting, San Diego, CA, March 16-20.

R. Eason reviewed textbook on Embedded Systems for Wiley, March 16.

J. Patton attended Schreyer National Conference, State College, PA, March 30, 31, April 1.