DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

# ECE-UNLV News

Volume 5 2005

## Message from the Chair's Desk…

Greetings to colleagues, alumni, students, board members and friends! Once again, it is time to update you on the exciting new things happening in the ECE Department.

On the undergraduate front, the ABET accreditation visit for the electrical engineering and computer engineering programs went well in fall 2004. Satisfactory corrective actions have been taken for the two weaknesses identified by the visitors. It is hoped that both programs will get accredited for 6 years. As part of improving the laboratories, the department hired Brandon Blackstone, alumnus and graduate students, as a laboratory manager (equipment, software and facilities-in-charge). He will work closely with Kevin Forcade (Laboratory Director-curriculum-in-charge)

On the research front, ECE faculty have garnered several new grants from federal funding agencies and the private sector. Total research expenditures for last year exceeded $1,800,000 for the first time. The number of graduate students supported on a teaching or research assistantship is about 35. Several undergraduate students are also actively involved in research with ECE faculty members. The active research programs are in nanotechnology, controls, circuit and sensor design, image processing, embedded systems, radiography, and renewable energy. The Department faculty have submitted application for creating two research centers-Energy Materials Interaction and Testing Institute of Nevada (EMITION) led by Dr. Schill Jr. and Center for Information and Computer Technology (CICT) led by Dr. Latifi. Nanotechnology laboratory has acquired and installed a field emission SEM and Nanodep- a versatile deposition system for nano-particles with precise particle size control under the guidance of Dr. Das.

Our graduating seniors, Drew Hall and Tondra De, came first in the IEEE Southwest Region 6 Micromouse competition in San Diego beating some of the top schools from the area. Interestingly, this is the first time our Department fielded a team to this competition. Also, seniors Nathaniel Workman and Andrew Murphy took the top prize of $2,500 for the spring 2005 Senior Design Competition conducted by the College of Engineering and sponsored by Harriet and Fred Cox, for their project "Child Detection System." This project was inspired by the need for preventing children who are left in the car by their caretakers from dying of dehydration.

The ECE web site http://www.ee.unlv.edu/ is constantly updated with news and information. Please contact us for more information.

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## Biologically inspired adaptive control systems for underwater vehicles

Denizens of the aquatic world have a splendid ability to perform swift, complex and intricate maneuvers employing oscillating fins. ECE graduate students, Aditya Simha and Mukund Narasimhan under the able guidance of Dr. Sahjendra Singh, are developing biologically inspired control of bio-robotic autonomous undersea vehicles (BAUVs). An adaptive control system has been developed for maneuvering of BAUVs in the dive-plane by the cambering of dorsal fins. This Office of Naval Research sponsored research project is done in collaboration with the George Washington University. (Figure 1).

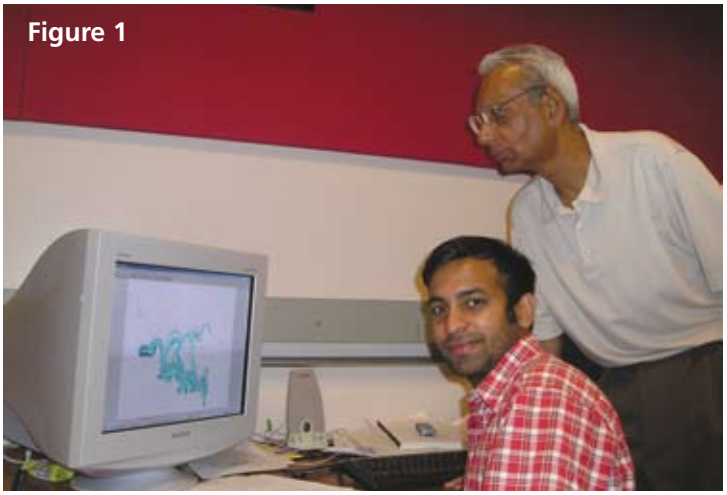
Figure 1

## Applied Research with IGT

Drs. Regentova and Muthukumar have successfully completed a study of sensors for interactive and virtual inputs for gaming machines. This project was funded by International Gaming Technology under UNLV's Applied Research Initiative grant. This summer, as part of the phase II of this project, prototype development and testing of a system for tracking the player's eye-ball using video processing techniques for interactive gaming, will be carried out. A variety of cameras, high resolution, low resolution, black & white, color and infrared, will be used in experiments. Three undergraduate students, Aaron Ponzio, Tan Wu and Zach Devlin will be working with the professors as summer research students and gain valuable hands-on research experience. (Figure 2).

Figure 2

## NASA Information Grant

Drs Regentova, Jiang and Yang have received NASA Space Grant for the project entitled "Introducing NASA Information System Technology Projects to UNLV Computer Engineering Program." Seven undergraduate students are selected for the program. These students are attending summer intensive course to learn on data compression and classification and learn on the hardware design for on-board implementation. (Figure 3).

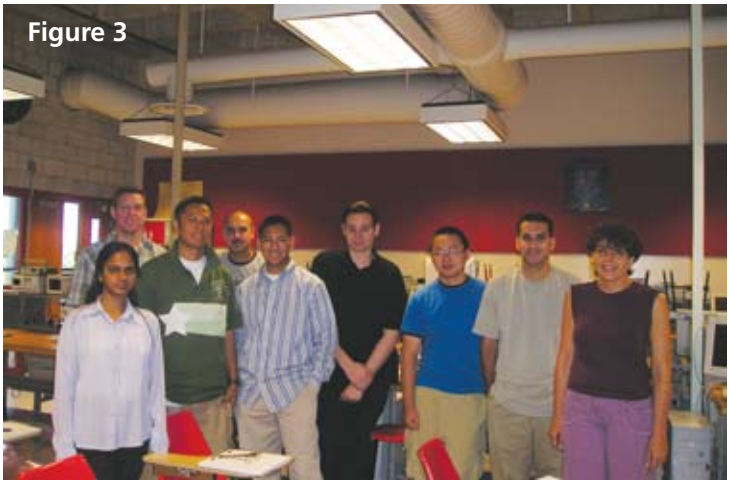
Figure 3

## E.M.I.T.I.O.N - A new center for material-energy interaction

The Electromagnetics and Pulsed Power Laboratories are joining forces with others on campus and in the community to form the Energy Material Interaction Testing Institute of Nevada (EMITION) center. The center melds pulsed sources (electromagnetic, laser, electron beams, x-rays, etc.) to study the properties of materials and, in the future, to develop new materials. Currently, the AFSOR and DOE are supporting the laboratories in their research endeavors. Industrial, environmental and biomedical applications abound. The laboratory houses a secondary electron emission test stand that appears to be the only one of its kind. Please visit the electromagnetics and pulsed power website at http://EMandPPLabs.nscee.edu . Board of Regents approval for the center is anticipated early in the summer of 2005. You are cordially invited to learn more about the upcoming center and its resources for your industrial and business needs. (Figure 4)

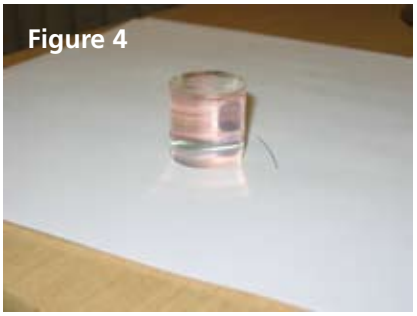
Figure 4


Figure 5

## ALDEC, a local computer engineering company plays a significant role in ECE programs

Aldec, Inc. has been working with Dr Henry Selvaraj since 1998 and contributed to the establishment of the "Aldec Digital Design Laboratory" in 1999. Since then it has been continually supporting the laboratory in various ways. Most recently, Aldec provided a grant of $45,000 to Dr Selvaraj for procuring electronic design automation software. The software is used for training undergraduate students in designing state-of-the-art digital circuits based on Programmable Logic Devices. The software is also used by graduate students in research. The training has resulted in students using advanced design techniques in senior projects that have won wide appreciation from local industry. Aldec has also committed to sponsoring the International Conference for Systems Engineering (ICSEng '05) and the International Conference of Computational Intelligence and Multimedia Applications (ICCIMA '05), to be hosted by UNLV during August 2005. (Figure 5).

## Rapidly growing Nanotechnology lab

The Nanotechnology Laboratory at UNLV (under the guidance of Dr. Biswajit Das) is one of the newest and fastest growing multidisciplinary facilities for nanostructure device fabrication, characterization, and research in the nation. In addition to state-of-the-art imaging facilities, the lab has one of the few ultra high vacuum nanocluster deposition systems available. Current research includes the development of high efficiency solar cells, quantum wire infrared photodetectors, an electronic nose that can detect noxious or hazardous gases, and nonlithographic techniques to manufacture nanoscale devices. More information about the Nanotechnology Laboratory can be found at www.unlv.edu/labs/nanotrp. (Figure 6).

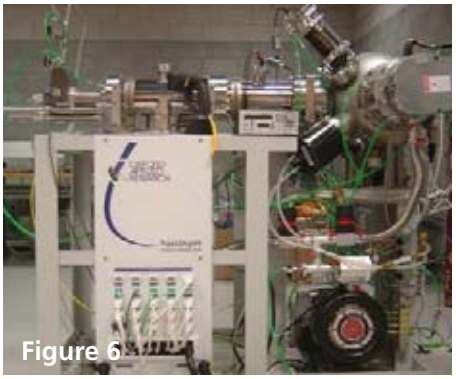
Figure 6

## ECE Students Receive Senior Design Project Competition Awards

Under the able instruction of our alumnus and ECE Advisory board member, Bill O'Donnell (Research Associate, Physics Department, UNLV), the senior design students built several interesting and commercially viable projects, in fall 2004 (9 projects) and spring 2005 (7 projects). The competition is sponsored by Harriet and Fred Cox. The projects are judged by three individuals from the industry. The awards carry a cash prize and a medallion. The following students received awards:

### ECE WINNERS FOR FALL 2004:

**Overall Winners:** "Electrostatic Automotive Air Filter,", June Light (EE), Daniel Lowe (ME) and Matthew Voegele (ME) (Figure 7).

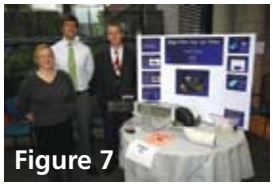
Figure 7

**Interdisciplinary Project Winners:** "Surface Climbing Automated Robot," Michael Boykin (EE), Willy Hsieh (ME), Robert OBrien (ME) and Zachary Van Cleve (ME) (Figure 8).


Figure 8

**Electrical and Computer Engineering Winners:** 1st Place: "Modular Low Power Wireless Sensor network," Nikita Agarwal and Krikor Hovasapian (Figure 9); 2nd Place: "Wireless Driverless USB," Jason Erickson (Figure 10).


Figure 9


Figure 10

### ECE WINNERS FOR SPRING 2005:

**Overall Winners:** "Child Detection System," Nathaniel A. Workman (EE) and Andrew Murphy (EE) (Figure 11).


Figure 11

**Interdisciplinary Project Winners:** "Solar Tracking Concentrator Array," Wade Carter (CE), Tanner Hartcraft (CE), Anthony DeLeon (CE), Gary Nielsen (ME), Sergio Castellano (ME) and Mike Reynolds (CoE) (Figure 12).


Figure 12

**Electrical and Computer Engineering Winners:** 1st Place: "Micromouse: Autonomous Navigation System," Tondra De and Drew Hall (Figure 13); 2nd Place: "Sleep/DUI Detector," Patricia Rodriguez and Diana Lopez. (Figure 14).


Figure 13


Figure 14

## Outstanding Graduating Senior Awards

June Light received the "Outstanding ECE Senior Award" for the fall 2004 and Tondra De and Drew Hall received the honor for spring 2005. The award is sponsored by Sprint and the ECE professors selected the awardees (Figures 15, 16 & 17). In addition to this award, Drew received the following awards: Tau Beta Pi Fellow, Phi Kappa Phi Award of Excellence, Rebel Yell Featured Student (Nov 29th). Tondra received the following awards: UNLV Undergraduate Regents' Scholar Award. Tondra and Drew also shared the following awards: First Place in the Nevada NASA Space Grant Student Paper Contest, First Place in the IEEE Las Vegas Chapter Student Paper Contest, First Place in the IEEE Region 6 Southwestern Area Micromouse Competition, Second Place in the IEEE Region 6 Southwestern Area Student Paper Contest.


Figure 15


Figure 16


Figure 17

## IEEE Student Chapter News

The IEEE Student Chapter, UNLV elected the following officers for the 2004-2005 year:
Chair - William Downer
Vice Chair - Houston Osemwengie
Secretary - Michael Sadowitz
Treasurer - Vernon Wells
Special Projects Chair - Diana Lopez
Last year, the chapter organized several informational meetings and hosted three guest speakers.

## Faculty Awards

Professor Singh received the Nevada Power sponsored "ECE Outstanding Professor Award" (Figure 18) and Dr. Venkat received the Tau Beta Pi sponsored "Outstanding Teacher of the Year Award." Dr. Venkat was also inducted in the Phi Kappa Phi honor society.


Figure 18

## Several Students Inducted in to Tau Beta Pi

ECE students in leadership role with the organizarion are: Mike Sadowitz (President-elect), Kristal Sauer (Recording Secretary-Elect). The students inducted into the society last year were: Ganesh Magenti, Kristal Sauer, Mukund Narasimhan, Nathaniel Workman, Naveen Anne, Pavan Singaraju, Mike Sadowitz, Shaoru Garner, Tan Wu, Gopinath Balakrishnan, Patraratorn Penparkgoon, Saurabh Mookerjea, and William Downer.

## ECE Students win IEEE Micromouse and Student Paper Contests

Drew Hall and Tondra placed first in the Southwest Regional IEEE Micromouse Contest, beating schools such as Arizona State University, University of Arizona, University of New Mexico, and University of California, San Diego. They also received second place in the Southwest Area IEEE paper contest. This is the first time our Department fielded a team for the contest.

## ECE Graduates

### B.S. EE/CoE Graduates

**Fall 2004:** Mark A. Adan BS EE, Michael S. Boykin BS EE, Jason D. Erickson BS EE, Michael A. Faine BS EE, Michael R. Hales BS EE, June M. Light BS EE, Andy T. Luong BS EE, Kellen A. Phillips BS EE, Nathan G. Quigley BS EE, Neesken Thongphanh BS EE, Michael J. Villanueva BS EE, Krikor V. Hovasapian BS CoE, Cuneyt Soylemez BS CoE, Justin V. Veilleux BS CpE
**Spring 2005:** Ronald Baroody BS EE, Tondra De BS EE, Shaoru Garner BS EE, Robert D. Henderson BS EE, Diana Lopez BS EE, Jennifer Pais BS EE, Patricia Rodriguez BS EE, Nathaniel A. Workman BS EE, Drew A. Hall BS CoE, Cory L. Nichols BS CoE, Bilal Raja BS CoE, Michael F. Reynolds BS CoE

### M.S. EE Graduates

**Fall 2004:** Ayman N. Dodin MSEE, Sushma Gujjula MSEE, Pradeep Kumar Koppula MSEE, Vijay Anand Subramanian MSEE, Mahesh M. Venkateswaran MSEE, Xiaolong Wu MSEE
**Spring 2005:** Archan Reddy MSEE, Aditya Simha MSEE, Elena Zagustin MSEE.

## ECE Board of Visitor's Corner

The board held two meetings (October 2004, April 2005) and discussed current and future activities, with about 10 members in attendance. They made several suggestions with respect to the survey instruments we use. The Department has adopted the suggestions.. Mr. Bill Vassilakis (Vice President Corporate Research and Advanced Development, Powerwave Technologies, Ltd.), Angela M. Davison (Intellectual Property Counsel, Ross Controls) and Adam C. Godrov (Project Manager, Nevada Power) are new and active members of the board. Powerwave Technologies has agreed to fund the "Outstanding Graduating Graduate Student Award" at the level of $750 per year. Angela has been a regular contributor to ECE development. She has also taken an interest in helping senior students take their project through the patent process. With a strong interest and detailed input from John Fountain (COX Communications), Adam Godrov and Shelley Freid (Bechtel Nevada), the Department has been working on improving the course offerings in the area of Networks. A new laboratory course has been proposed in this area and the first offering of the course is expected to be in spring 2006.

## ECE Alumni Corner

The graduate education and encouragement that I received from the ECE Department's faculty and staff were instrumental in strengthening my expertise and knowledge in scientific research and helping me plan and achieve my career goals. I am grateful for their support. I am currently working with the Custom Integrated Circuit division at Cadence, developing next generation Fast Spice tools and chip design flows. As part of my effort to give back to UNLV, I actively participate in the ECE board of visitors' activities. Under Professor Venkat's watch, the Department has focused on increasing the industrial network and involvement, listening to and implementing suggestions from industrial partners in curriculum and program developments.

Natarajan Krishnan, M.S.E.E, 2000 (Figure 19)
nataraja@cadence.com

Figure 19

## ECE Gift Fund

The Ramon Martinez Honorary Fund gathered $775, and this entire fund is being spent on the ECE undergraduate laboratories. The Department appreciates monetary donations from its alumni and industrial partners, as these funds can be used directly in improving programs, laboratories, etc. If you would like us to dedicate your contribution to any particular program or laboratory within ECE, we will make sure that your wishes are carried out. If your employer participates in a "matching gift" program, let us know whom to contact. Suggested levels for your contributions are: $250, $500 and $1000. Donations at any level are welcome. Please make the checks payable to the UNLV Foundation, with a memo line for the ECE Gift Fund. Send your contributions to:

**Dr. Rama Venkat**
**Department of ECE**
**Attn: ECE Gift Fund**
**University of Nevada, Las Vegas**
**4505 S Maryland Pkwy, Box 454026**
**Las Vegas, NV 89154-4026**

In-kind contributions such as equipment and services are also welcome. Thank you in advance for your support.

## Alumni, Community and Industrial Support

The ECE Department gratefully recognizes the following individuals and organizations for their generosity:

| | |
|---|---|
| Angela Davison | (BSEE, 1999) |
| Bachir E. Karam | (BSEE, 2003) |
| Richard Schneider | (BSEE, 1983) |
| Stanley F. Golfarb | (Volunteer) |
| ALDEC | (Local Company) |
| Philip M. Dalpiaz, Jr. | (BSEE) |
| Instrument Society of America | (Local Organization) |
| Christopher James Lovett | (BSEE, 2000) |
| Tyrone Lavonne Roach | (BSEE, 2001) |
| SigmaTron International, Inc. | (Local Company) |
| Sprint | (Local Company) |
| Nevada Power Company | (Local Company) |

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# ECE Alumni Survey
# Summer 2005

The following is a survey ECE department is conducting to obtain input from our alumni (BS) in order to improve our program. This effort is also a part of the ABET accreditation process. Please take a few minutes to answer the following questions.. **Please return the completed survey to us.** Thank you very much for your input.

1. What was your year of graduation?
2. Were you an electrical engineering or computer engineering major?
3. Have you pursued a graduate degree program or programs? If so, what is the name of the degree and in what area of specialization?
4. What is your current occupation? Provide company, address, and position title.
5. Have you taken the Fundamentals of Engineering Exam? Please state your scores.
6. Have you obtained Professional Engineer licensure? If so, when and in which state(s)?

**How well did UNLV ECE's department prepare you in each area ?**

| | High | Average | Low |
|---|---|---|---|
| Ability to work independently | | | |
| Ability to work in teams | | | |
| Ability to manage time efficiently | | | |
| Ability to communicate (oral) | | | |
| Ability to communicate (written) | | | |
| Ability to complete a task | | | |
| Ability to adopt to changes | | | |
| Meeting deadline | | | |
| Punctuality | | | |
| Confidence in the field | | | |
| Knowledge and awareness of safety | | | |
| Sense and knowledge of professional ethics issues | | | |
| Sense and knowledge of current societal and environmental issues related to your profession | | | |
| Awareness of need for life long learning | | | |

| | Engineering Core | | | | Elect/Comp Conc | | |
|---|---|---|---|---|---|---|---|
| | **High** | **Average** | **Low** | | **High** | **Average** | **Low** |
| Ability to comprehend the problem | | | | | | | |
| Ability to formulate the problem | | | | | | | |
| Ability to solve the problem | | | | | | | |
| Ability to analyze and interpret the solution | | | | | | | |
| Ability to design and conduct experiments | | | | | | | |
| Ability to design, build and test component | | | | | | | |
| Ability to design, build and test system | | | | | | | |
| Ability to build and test | | | | | | | |