



ECE CONNECTIONS

NEWSLETTER TO GRADUATES AND FRIENDS
OF ELECTRICAL AND COMPUTER ENGINEERING
FALL 2004

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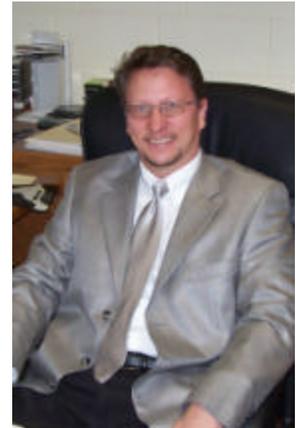
David DuShane, Computer Technician

Pam Gahner, Administrative Secretary

Priscilla Schlenker, Administrative Secretary

FROM THE CHAIRMAN:

It's great to be in touch with you again, since we last communicated we've made significant and exciting strides towards our goal of creating a scholarly, intellectual and creative environment within the ECE department and we're excited to tell you about them. As usual, our main source of excitement is our students who still consistently place at, or well above, the national averages on the national Fundamentals of Engineering exam. Another source of excitement, from my point of view, is our faculty members, who continue to be overworked, underpaid, but yet remain enthusiastic about their chosen career path of educating the next generation of electrical and computer engineers.



We've continued our weekly assessment meetings where we discuss educational issues of significance facing us. Throughout this letter, you'll see examples of the fruits of this important labor. In my view, the most notable is our new educational approach now being piloted Fall 2004, "The Academy Concept" and "scholar teams". I urge you to read the details of this approach found later in this publication, we think you'll be impressed. A faculty and staff team has taken a critical look at our own floor space usage with the astounding result of providing 330 sq ft of laboratory space for each faculty member. Student groups have won awards, faculty have published and gotten grants - in a few words -- we're making good progress.

Watch for a new alumni service to be launched early in 2005. Under the guidance of Professor Val Tareski and his scholar team, we'll be videotaping our research seminars and placing them on our website for you to peruse at your leisure, watch our website for updates on this project.

Thanks to all of you for your support.

Dr. Dan Ewert

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SPACE UTILIZATION:

By Pam Gahner

In the Spring of 2004 Dr. Ewert formed a Space Utilization Committee. Dr. Rajesh Kavasseri was the Chair of the Committee. Staff Members: Oscar Blaskowski and Pam Gahner. Student Members: Michael Maassel and John Becker. Dr. Ewert challenged us to come up with a plan that would allow each faculty member to have some research lab space within the building while maintaining adequate lab space for instruction. The committee met through April and May and came up with a plan where each faculty member would have access to about 400 square feet of lab to use for their research. This proposal was approved by the ECE Faculty members. During the summer Oscar Blaskowski and his assistant Darin Blaskowski re-configured Senior Design throughout the building and moved equipment so that this fall we had research labs dedicated to various areas of specialties.

Our reorganized lab space is broken into the following areas of specialty:

Dr.'s Joo, Kavasseri, Yuvarajan and Rao Room 105 Power Lab: Renewable Energy & Conversion Room 109 Power Lab: Computation & Economics	Dr. Glower Room 223 RFID, Electronics & Control Lab
Dr. Ewert Room 115A Cardiovascular Engineering Lab	Dr.'s Lima & Rogers Room 225 Biophotonics & Biophysics Lab Room 227 Photonics & Bioengineering Lab
Dr. Nelson Room 113 EMC Lab: Electromagnetic Compatibility	Dr. Katti & Prof. Tareski Room 233 Computer Architecture Lab
Dr.'s Farden, Green and Prof. Patterson Room 201 Communications Lab Room 239 Signal Acquisition & Processing Lab	Dr. Schroeder Room 241 Neuroengineering Lab

Instructional Lab Spaces:

Room 205 RF & Applied Electromagnetics Lab
Room 207 Electronics
Room 209 Circuits
Room 211 Study/Teaching Lab. Study space for students & some faculty hold office hours here.
Room 235 Digital Systems
Room 237 Signal Processing & Systems

OUR NEWEST FACULTY MEMBER



Sung-Kwan Joo is currently an Assistant Professor in the Electrical and Computer Engineering Department at North Dakota State University; he joined the department in August 2004.

Dr. Joo received his B.S.E.E. degree from Korea University in 1995. He received his M.S.E.E. and Ph.D. degrees from the University of Washington at Seattle in 1999 and 2004, respectively.

Prior to joining NDSU, he was a research associate in Advanced Power Technologies (APT) Center at the University of Washington where he has collaborated on several research projects with groups of researchers from various industries to develop innovative methods for interdisciplinary research involving power engineering and economics. Early in his career, he worked at DACOM Corp. where he developed the Network Management System (NMS) for telecommunication networks.

His research interests are focused on multi-disciplinary research related to power systems, involving such areas as economics, information technologies, advanced control, and intelligent systems. He is a System Economics Subcommittee member of IEEE PES Power Systems Analysis, Computing and Economics Committee. He is a manuscript reviewer for IEEE transactions on power systems. He is also a Technical Steering Committee member of the 13th International Conference on Intelligent Systems Application to Power Systems (ISAP), 2005.

TED ZITZOW RETIRES



Ted and wife Nancy

Theodore "Ted" Zitzow, custodian of Facilities Management at North Dakota State University, retired on May 31 after more than 38 years of service at NDSU. Ted Zitzow has done building maintenance in the Electrical Engineering building for the last 27 years. A reception was held in his honor in May 2004

ACADEMY CONCEPT AND SCHOLAR TEAMS:

by Dr. Ewert

The Electrical and Computer Engineering department at NDSU currently has 15 full-time faculty, 50 graduate students and over 470 undergraduate students. As a department we produce, in teaching effort alone, the equivalent of 22 Faculty. This workload demand, along with our broad engineering accreditation requirements, has required us to design an innovative approach we term the “*Academy Concept*” to achieve the educational and economic challenges issued by our political leaders. All members of the *Academy* (faculty, staff, and students) are dedicated to realizing its three principles;

- 1) better understand current knowledge,
- 2) discover and disseminate new knowledge, and
- 3) develop the human spirit.

The methodology for progressing towards this ideal *Academy* is known as the *scholar team*. *Scholar teams* consist of freshman through faculty working on a problem of mutual engineering interest. Briefly, ideas are conceived by faculty, who then recruit students at every academic level (freshman, sophomore, juniors, seniors and graduate students) to assist them in developing the idea and progressing towards the *Academy* ideals. In this way, teaching, research, and advising functions are unified such that scholarly work may occur within a high teaching load environment. Dissemination of results from the scholar teams is required every year and may include: technical reports, seminars, conferences, refereed journal manuscripts, proposals, intellectual property generation and spin-off companies. We hope that this will enable us to achieve the intellectual, creative and scholarly environment we seek. This concept was launched Fall 2004 where 13 of 15 faculty and 20% of the student body volunteered for this project (see Table 1 for list of current projects).

“Start-up” funding for this initiative is by returned indirect costs and ½ of student program fees (\$75/student/semester). We hope that increased and sustained funding will come from a consortium agreement with industrial partners. After discussing this concept with four industrial partners, one has already agreed to join the consortia, with three others expressing considerable interest. Consortia agreements are currently being developed with University counsel and will likely include the following features:

- 1) Consortia members sign on for a three year commitment and pay an annual membership fee
- 2) Consortia members are given priority IP consideration
- 3) Consortia members have access to scholar team educational benefits (i.e. new techniques and technologies)
- 4) Consortia members have access to students as potential employees with specialized knowledge in emerging technologies and techniques.

Our current level of funding has resulted in 13 active scholar team labs (each lab is about 330 sq ft) outfitted with most common electrical and computer engineering research tools and over 115 researchers at all levels of education – freshman through faculty. We expect this approach will improve undergraduate education resulting in more sophisticated engineering efforts and eventually much-improved graduate research as these better educated undergraduates begin their graduate work.

In summary, the *Academy* concept, along with *scholar teams* and *consortia* funding is a viable approach to meet the educational and economic development challenges issued by our political, business and educational leaders.

Project Descriptions	Faculty
Cardiac Elastance Catheter -- a novel medical catheter to assess cardiac health	Ewert
Ventricular Assist Device – a cardiac assist device in cooperation with Univ of Louisville	Ewert
Video Streaming of Technical Seminars – Web based video information service to alumni	Tareski
Time-Reversed Signal processing – New signal processing technique	Farden
Biophotonics – development of optical techniques for assessing pathogens	Lima*
Autonomous Vehicle –R and D platform for “smart” vehicle technology	Glower
Disposable Sensors – RFID based small sensors for crop monitoring	Glower
RFID tether – a vehicle safety device for ID and rider position based on RFID	Joo*
Electric Market Simulator – Software to allow efficient electrical market analysis	Joo*
Discovery Team – Free forming exploration of various EE paradigms	Rogers
Power Conversion for Renewable Energy Sources – Fuel cell and Photovoltaic research	Yuvarajan
Brain-Computer Interface – Using EEG signals to control computer function	Schroeder*
Digital Signal Processor – development of proprietary DSP hardware	Green
Cryptography – Development of elliptical curve codes for digital security	Katti
Neurocomputing for quadruped gaits – using biologically-inspired computing for robots	Kavasseri*
Coincident Detection, Separation, and Localization – Signal processing technique	Patterson

If you desire more information on any of these scholar team projects, please visit our website at: <http://venus.ece.ndsu.nodak.edu/ece/research/scholar/>

SENIOR DESIGN

by Dr. Schroeder and Jeff Wandler

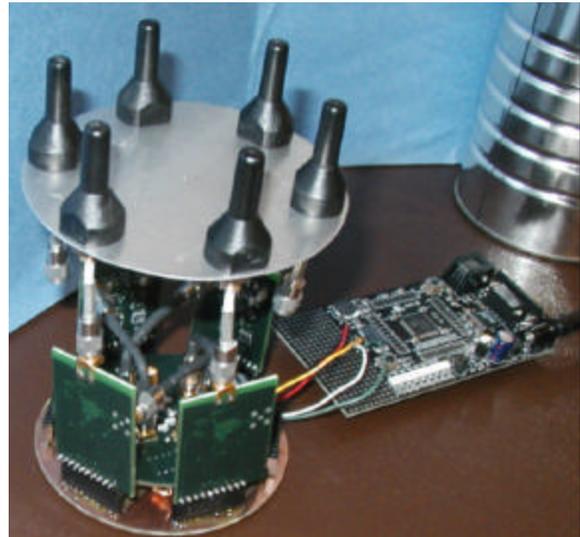
The capstone Senior Design courses are still going strong. Along with curriculum changes, the design courses have seen some changes of their own. The two semester series has been stretched to three semesters. The change was made in order to allow students more time to develop their design skills and produce a more comprehensive and complete project. Students are now assigned to a group at the end of semester one and therefore have two full semesters to devote to the design and development of the project. Additionally, a mini-project is developed in the first semester in order to expose the students to design tools and development methods prior to beginning their main projects.

All design groups now reside in the lab space of their project advisor. Many of the groups are also part of the advisor's Scholar Team. These changes were made in hopes of producing a more synergistic environment between design teams, undergraduate students, graduate students, and the design and research projects they are working on. Currently, some of the new projects that are also Scholar Team projects include the Ventricular Assist Device, the Autonomous Vehicle, a Brain Computer Interface, and Time Domain Reflectivity for transmitted waves. Other ongoing projects include a Bocci Ball project for the North Dakota Special Olympics, a Wireless Keypad Tallying system for a local work activity center, and a Navy Project to help train personnel about the dangers of radiated energy.

Some of the projects completed last year include three RFID data collection and transmission projects, a directional antenna to produce a gain in the direction of the signal, and a Seatbelt project for a driver without arms, to allow him to engage and disengage a seatbelt. This project was installed in April 2004, and the client stated "This is the first time in 27 years I can drive wearing a seatbelt". The ASME Robotic Minesweeper

project competed in the regional ASME competition in March and received 2nd place. Also, for the third time, there was a NASA group who developed a project to study the effects of 0 Gz on the elastance of a heart model. Conformational changes such as elongation in high G or becoming spherical in 0G, may affect the operation of the heart. They carried out their study aboard NASA's KC 135 aircraft from Houston Texas and they collected 30 sets of data in both weightlessness and 2G.

Watch for the students to show off their skills at the end of every semester in the Memorial Union Alumni Lounge. For additional information or to discuss sponsoring a project, contact either Mark Schroeder (mark.j.schroeder@ndsu.nodak.edu) or Jeff Wandler (j.wandler@ndsu.nodak.edu).



Senior Design Project: Directional Gain Antenna

2004-2005 GRADUATE PROGRAM

by Dr. Glower

The graduate program in Electrical and Computer Engineering offers both a Master's of Science degree and a Ph.D. degree. For Fall, 2004, we had 57 students enrolled in our graduate program, with 32 in the Master's and 15 in the Ph.D. portion. Applications to this program remains strong, with 93 applications received for Fall 2004, of which approximately 25% were accepted.

Students in our graduate program continue to work on projects - both within our department as well as in close collaboration with other departments. This fall, for example, our graduate students are working in collaboration with Veterinary and Range Sciences, Polymers and Coatings, the Center of Nanoscale Science and Engineering, and Mathematics. In addition several of our faculty received significant grants this year for their research, including grants in the areas of cryptology and electromagnetics. Such collaboration and grants continue to establish our department as a center of excellence for electrical and computer engineering in this state.

FACULTY PUBLICATIONS DURING 2004

1. Characterization of an Adult Mock Circulation for Testing Cardiac Support Devices: D.L. Ewert, K.J. Gillars, G.A. Giridharan, S.C. Koenig, G.M. Pantalos. *ASAIO Journal* 2004, pp. 50:37-46
2. Evidence of Crossover Phenomena in Wind Speed Data: R. Kavasseri. *IEEE Transactions on Circuits and Systems Part I: Fundamental Theory and Applications*
3. Hemodynamic and Pressure-Volume Responses to Continuous and Pulsatile Ventricular Assist in an Adult Mock Circulation: D.L. Ewert, K.J. Gillars, G.A. Giridharan, S.C. Koenig, G.M. Pantalos. *ASAIO Journal* 2004, pp. 50:15-24
4. Improving Objective Digital Images with Neuronal Processing: A computational Approach: R.G. Kavasseri, G. Mahalingam. *International Journal of Architectural Computing*, issue 2, vol. 2, 2004, pp. 143-153
5. Integrated Data Acquisition System for Medical Device Testing and Physiology Research in Compliance with Good Laboratory Practices: G. Drew, D.L. Ewert, K. Gillars, L. Gray, S. Koenig, G. Pantalos, L. Unger, C. Woolard. *Biomedical Instrumentation & Technology* 2004, pp. 38:229-240
6. Steady State of Analysis of Induction Generator Infinite Bus Systems: R. Kavasseri. *International Journal of Power and Energy Systems*
7. Using Measured Characteristics of Surface Mount Components in Time-Domain Simulation of High Speed Analog Circuit: A. Fallah, Y. Feng, R.M. Nelson, M. Pavicic. *Proceedings of the 2004 International Symposium on Electromagnetic Compatibility*, January 2004 pp. 315-320
8. A Comparative Study of Single-Section Polarization-Mode Dispersion Compensators: G. Biondini, W.L. Kath, A.O. Lima, I.T. Lima Jr., C.R. Menyuk. *IEEE/OSA Journal of Lightwave Technology*, April 2004, pp. 1023-1032
9. SMT-MEMS Integrated Process Design for Implantable Thermal Imaging Biosensors: K. Gunasekaran, M.J. Schroeder, J. Stone, J. Suresh. *Proceedings of the 2004 Medical Electronics Symposium* May 2004.
10. The Effect of Fluid Levels on the Distribution of Electromagnetic Fields in the Body: A. Sadasiva, M.J. Schroeder. *Proceedings of the 36th Annual Conference on Bioelectromagnetics*, June 2004, pp. 299-300
11. Effective Permittivity of Biological Materials: An Analysis on the Role of Water Content using Mixing Formulas: R.M. Nelson, A. Sadasiva, M.J. Schroeder. *Proceedings of the 36th Annual Conference on Bioelectromagnetics*, June 2004, pp. 298-299
12. Monopol Antenna Design: J. Jorgenson, D. Kakumanu, B. Morlock, M. Schmitz, B. Thurow. *Circuit Cellar*, June 2004 pp. 28-30
13. HEART: An Automated Beat-to-Beat Cardiovascular Analysis Package using Matlab®: D.L. Ewert, S.C. Koenig, B. Perreault, M.J. Schroeder. *Comput. In Biol. And Med.* July 2004, pp. 371-388
14. The Effect of Heart Rates, Preload, and Afterload on the Viscoelastic Properties of the Swine Myocardium: D. Ewert, B. Wheeler, C. Doetkott, C. Ionan, G. Pantalos, S. Koenig. *Annals of Biomedical Engineering*. Vol. 32, No. 9, September 2004, pp. 1211-1222
15. A Novel Power Converter for Photovoltaic Applications: S. Xu, D. Yu, S. Yuvarajan. *Journal of Power Sources*, Vol. 135, September 2004, pp. 327-331
16. Optimization Techniques for Available Transfer Capability (ATC) and Market Calculations: S.K. Joo, J. Lawarree, C.C. Liu, Y. Shen, Z.B. Zabinski. *IMA Journal of Management Mathematics*, October 2004 Vol. 15, pp. 321-337
17. Work in Progress – Ethics Integrated Into Engineering Courses: P.F. Ribeiro, D.A. Rogers. *ASEE/IEEE Frontier in Education Conference, SIE-22*, October 2004
18. Wacky Electoral Skepticism: R. Green, *IEEE Potentials*, October/November 2004, pp 44-45
19. Evidence of Crossover Phenomena in Wind Speed Data: R.G. Kavasseri, R. Nagarajan. *IEEE Transactions on Circuits and Systems I - Fundamental Theory and Applications*, November 2004

ALUMNI NEWS

Outstanding NDSU Alumni honored. The NDSU Alumni Association has announced recipients for the 2004 Alumni Awards. Alumni Achievement Awards are given to alumni who have excelled in their profession. One of the two Alumni Achievement Awards was presented to **Donald R. Laskowski**, BS 1960, Retired, Founder of Wood-Mizer Products. The awards were presented at the NDSU Alumni Honors Dinner on Friday October 15, 2004, during Homecoming Week activities.

Donald Putnam, 89, BS 1937, was the last surviving son of C.S. Putnam, who helped establish NDSU'S Gold Star Band in the early 1900's. Donald Putnam worked as an electrical engineer for General Electric Co. for more than 30 years. He also sold real estate for Barnwell & Jones in Waynesboro, VA., for many years. Putnam, who played drums in his father's band during his college career, maintained a variety of hobbies throughout his life, including photography, sketching, painting, writing music, playing piano and drums and performing in more than 30 plays through local theatre. He and his wife Frances, now deceased, had one daughter. Putnam lived in Wausau, WI.

ALUMNI SUPPORT

by Pam Gahner and Dr. Ewert

Alumni, Friends and Faculty of the ECE Department have contributed money to the Electrical and Engineering Scholarship Fund or started specific funds to honor friends or relatives. The interest from these funds provides scholarships for ECE students. Contributions should be directed to the NDSU Development Foundation. You can specify which fund you wish your donation to be added.

The following funds have been established for Electrical & Computer Engineering Scholarships:

<u>Fund Name</u>	<u>Principal Balance</u>	<u>FY2004 Scholarship Recipients (\$500 ea)</u>
Eugene Aas	\$ 10,424	Brandon Voller
Ed and Kay Anderson	\$ 32,597	Paul Ytaskis & John Becker
Ernest Anderson	\$ 7,359	Paul Haugen
Ernest Hoaby	\$ 46,604	Sasha Pross & Brian Rounds
Duane Nagle	\$ 4,579	Jacob Derek
Jordan Saharieff	\$ 21,292	Shaun Elhard & Kary Martin
Garber Trambley	\$ 11,840	Kristen Schroeder
EE Scholarship	\$ 18,075	Jason Raabe

The Electrical & Computer Engineering also has two funds specifically designed to assist the department

- ECE Development: Used to enhance and improve the departments role in education by providing:
 - matching funds for new faculty
 - equipment purchases
 - assist faculty and students educational needs
- ECE Research: Used to enhance the lab and research role in the department.

If you are interested in starting a specific fund or assisting the department in establishing an endowed fund for research or administrative purposes, please contact James C. Miller, Executive Director or Jason Wohlman, Associate Director, NDSU Development Foundation, 1120A 28th Avenue North, Fargo, ND 58102. Telephone: 701-271-0296 for information about the requirements and process

BIOMEDICAL ENGINEERING SOCIETY RECEIVES OUTSTANDING PERFORMANCE AWARD

The North Dakota State University chapter of the Institute of Electrical and Electronics Engineers-Engineering in Medicine and Biology Society (IEEE-EMBS) received the 2004 Outstanding Performance Award. The chapter was notified of the honor in a June 10 letter from Barbara Oakley, IEEE-EMBS vice president for member and student activity.

The international award is given to a student club or chapter for demonstrating outstanding performance in promoting interest and involvement in biomedical engineering. The award includes a \$300 club honorarium and complimentary registration and travel for one officer to the annual international conference scheduled for Sept. 1-5 in San Francisco. In addition, a club officer will give a talk about the group's activities at the conference and will be featured in the Engineering in Medicine and Biology Magazine.

Mark Schroeder, assistant professor of electrical and computer engineering and BME Society faculty adviser, said, "The group did an exceptional job this last year and is very deserving of the award and national recognition. Much effort was devoted to making the society a success. Their activities have provided a richer experience for their peers and area students."

Group activities included seminars from invited professionals, company tours in Minneapolis, facilitation of Engineer's Day for high school students and judging area science projects.

The chapter is made up of approximately 30 engineering students. Officers include president John Becker, a senior electrical and computer engineering major from Albertville, Minn.; vice president Robyn Crussel, a senior mechanical engineering major from Bismarck, N.D.; secretary Sasha Pross, a senior from Fargo majoring in electrical and computer engineering; and treasurer Nathan Grenz, a senior from Bismarck majoring in electrical and computer engineering.

Other awards and honorable mention went to chapters at the Beijing Institute of Posts and Telecommunications, United Kingdom-Republic of Ireland, Carleton University and the University of Massachusetts at Amherst.

The IEEE-EMBS is the world's largest international society of biomedical engineers, with about 8,000 members. The society's field of interest is the application of concepts from the physical and engineering sciences to the fields of medicine and biology.

Reprinted from It's Happening at State 07/21/2004

THREE NDSU STUDENTS HAVE RETURNED FROM THE JOHNSON SPACE CENTER

Three North Dakota State University electrical engineering students have returned from the Johnson Space Center, Houston, where they conducted experiments on how the human heart reacts to a reduced gravity atmosphere.

During spring break, seniors Reese Weber, Corey Schwartz and Elisabeth Quistad participated in NASA's Reduced Gravity Student Flight Opportunities Program, which allows selected undergraduate teams to conduct an experiment of their choice in a reduced gravity environment. The NDSU group was one of 69 student teams selected to be part of this program out of 150 applicants.

The student program is part of NASA's Reduced Gravity Research Program that was started in 1959 to investigate human and hardware reactions to operating in a weightless environment. Originally only used by astronauts to support NASA missions, the weightless environment has more recently been made available to researchers in government, academic and commercial areas.

At Johnson Space Center, the reduced gravity environment is achieved by using a specially modified KC-135 turbojet transport, which flies parabolic arcs to produce weightless periods of 20-25 seconds. The student teams flew 60-80 minute flights for two consecutive days. During each flight they experienced approximately 30 zero-gravity parabolic maneuvers over the Gulf of Mexico.

Graduate student Jeff Wandler accompanied the student researchers on their nine-day trip to Houston, but did not participate in the experiments.

Reprinted from It's Happening at State 03/31/2004

FOURTEEN NDSU STUDENTS HAVE BEEN SELECTED FOR THE 2004-05 MCNAIR SCHOLARS PROGRAM

Fourteen NDSU students representing 12 disciplines have been selected for the 2004-05 McNair Scholars Program. Three are from Electrical & Computer Engineering: they are Jaden Ghylin, Benjamin Torrens and Thinkh Phan.

Each scholar is supported by a faculty and library mentor. Roger Green, assistant professor of electrical and computer engineering, is the faculty mentor for Ghylin; Jake Glower, associate professor of electrical and computer engineering, is the faculty mentor for Torrens and Phan.

Students chosen for the McNair Scholars program are college juniors and seniors who show interest in research and have the aptitude to pursue a doctorate. In addition to a monthly research stipend and an opportunity to attend conferences related to their studies, the program provides educational and support services to help prepare the scholars for post-graduate work. It is anticipated that the scholars will pursue careers in college teaching and research upon completion of their doctorates.

The program is named after Ronald E. McNair, a member of the Challenger space shuttle crew. The NDSU McNair Scholars Program, one of the original 14 programs in the nation, has been on campus since 1989. The program is funded by the U.S. Department of Education and is administered by the Office of TRIO Programs in the Division of Student Affairs.

For complete article go to
<http://www.ndsu.nodak.edu/ndsu/news/state/ihas/2004/ihas.08252004.pdf>

Reprinted from It's Happening at State 08/24/2004

DR. RAJENDRA KATTI HAS RECEIVED A GRANT FROM THE NATIONAL SCIENCE FOUNDATION

Rajendra Katti, North Dakota State University associate professor of electrical and computer engineering, has received a three-year, \$150,000 grant from the National Science Foundation for the project "Optimal Recoding of Binary Numbers for Cryptographic Operations."

Funded by the Division of Computer and Communication research, part of the Directorate for Computer and Information Science and Engineering, the research is intended to lead to an efficient method for recoding numbers that are input to elliptic curve cryptosystems, resulting in less expensive cryptographic hardware for wireless applications such as "smart cards."

Reprinted from It's Happening at State 09/01/2004

ND EPSCoR HAS ANNOUNCED THE WINNERS OF THE SUMMER 2004 ADVANCED UNDERGRADUATE RESEARCH AWARDS (AURA) PROGRAM.

The North Dakota Experimental Program to Stimulate Competitive Research (EPSCoR) has announced the winners of the summer 2004 Advanced Undergraduate Research Awards (AURA) program. AURA provides undergraduate students up to \$2,800 and the opportunity to participate in faculty-mentored research projects at North Dakota State University and the University of North Dakota.

Competing students submit applications based on research topics submitted each fall by faculty from the sciences, engineering and mathematics. A faculty review committee ranks each student's application, and awards are given directly to the winners. North Dakota residents and students enrolled at North Dakota University System institutions are eligible.

The NDSU campus award winners, their hometowns and mentors are:

- Chavanin Siripiom, Bangkok, Thailand, Victoria Gelling, polymers and coatings;
- Nathan Grenz, Bismarck, N.D., Dan Ewert, electrical and computer engineering;
- Mark Goetz, Bismarck, N.D., Michael Robinson, psychology;
- Amanda Meyer, Pierz, Minn., Jagdish Singh, pharmaceutical sciences;
- Shanna Morlock, Wilton, N.D., Linda Langlely, psychology;
- Crystal Rafferty, Watford City, N.D., Mukund Sibi, chemistry;
- Jennifer Thorstad, Hoffman, Minn., Ken Lepper, geosciences;
- Rebecca Wenzel, Verndale, Minn., David Rider, entomology;
- Travis Johnson, Vergas, Minn., Seth Rasmussen, chemistry.

The AURA program has grown from a three-student pilot program in 1987, to an average of 20 students each year between NDSU and UND. A total of 326 undergraduate students have received the awards.

ND EPSCoR is a federally and state funded program designed to improve the ability of university researchers to compete more effectively for federal, regional and private research grants in the sciences, engineering and mathematics. For AURA program information, visit www.ndsu.nodak.edu/epscor or contact David R. Givers at 231-7516.

Reprinted from It's Happening at State 03/17/2004

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