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Wright State University College of Engineering and Computer Science Bits and PCs newsletter, Volume 15, Number 4, April 1999

Wright State University College of Engineering and Computer Science

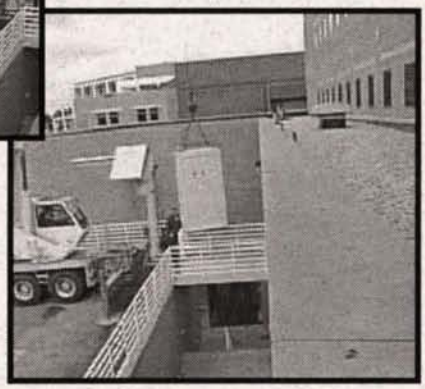
WRIGHT STATE UNIVERSITY

BITs & PCs

COLLEGE OF ENGINEERING AND COMPUTER SCIENCE

April 1999 Wright State University Dayton, Ohio 45435 Vol. 15 No. 4

AXIS Ultra Descends on the Russ Engineering Center



Left and Below: Delivery of the AXIS Ultra was a finely orchestrated event. The huge crates were lowered into the loading dock area—a tight fit, with mere inches of clearance on either side!

With a recent National Science Foundation grant and matching contributions from the Ohio Board of Regents and Wright State University, Dr. Sharmila Mukhopadhyay (ME) has purchased an AXIS Ultra—the latest generation of X-ray Photoelectron Spectroscopy (XPS) instruments. XPS is used to identify what atoms are present on a solid surface and what chemical bonding states they are in. In this age of composites, nano-materials, MEMS, and multilayer thin-film devices, the surface or interface (seam) of a solid is often the region that enables or disables a technology. Therefore, techniques, which can provide insight into interfacial bonds, are becoming very widely sought after.

Above: Dr. Mukhopadhyay receives instruction on the finer points of the AXIS Ultra

There are a few older generation XPS units available in the Dayton area, but none of these machines approach the capabilities of the AXIS Ultra. This particular system will provide XPS information with the highest possible spectral and spatial resolution available in the world today. As feature sizes in modern materials become smaller, the resolution of any analytical instrument becomes a key factor. WSU is the fourth university (and seventh organization) in the United States to obtain this equipment.

The AXIS Ultra will add a new and crucial perspective to the research on composites, solid lubricants, electroceramics, and sensors that are pertinent to aerospace and automotive industries prevalent in this region. The initial collaborators who will be involved with this laboratory include the Air Force Research Laboratory, Michigan State University, University of Dayton, Applied Sciences, and Superconducting Components Inc. (through a NASA program). Future collaborations with aerospace and automotive-related laboratories (such as GE, GM, Allied Signal and NASA) are being discussed.

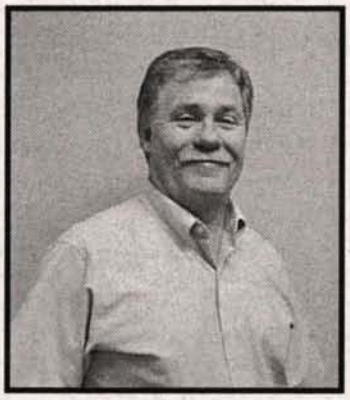
What's Inside?

New Faculty and Staff Join Engineering and Computer Science

Guozhu Dong, Ph.D., has joined the Department of Computer Science and Engineering. Dr. Dong received his Ph.D. and Master's degrees in Computer Science from the University of Southern California. He also holds a B.S. in Mathematics from Shandong University. Prior to joining Wright State University, he held positions with the Computer Science Department of the University of Melbourne (Australia), and with the Computer Science Department of the Flinders University of South Australia.

Dr. Dong is an expert in the field of database systems; he is especially interested in data mining, workflow and active database systems, and data integration and data warehousing; he has also worked on constraint databases, database query languages, and database view maintenance and query optimization. He has over 50 publications to his credit, including papers in JACM and JCSS and has won several research grants from the Australian Research Council, the Australian Equivalent of NSF. Dr. Dong has also been on the program committees of numerous international database conferences, including VLDB 96, ACM PODS 96, DASFAA 97, DOOD 97, PAKDD 98, ICDT 99, and ICDE 99.

Dr. Dong is scheduled to teach CS/CEG 405/605—Introduction to Database Management Systems; CS 701—Database Systems Design; and CS 790—Introduction to Data Mining. If you are interested in these courses or in finding out more about Dr. Dong and his past work or research, you can visit his web page at www.cs.wright.edu/cse/faculty_facts/dong.html. You can find Dr. Dong in his office, 450 Russ, or he can be reached by phone at 775-5113 or by E-mail at gdong@cs.wright.edu.



John Lawless has joined the College of Engineering and Computer Science as the Supervisor of the Instrument Shop. Prior to joining the staff of Wright State University, John worked for Delphi Automotive Systems (GM) for 30 years.

At Delphi, John worked as a model maker in product development and, for the past 2 years, as a metrologist doing inspections of product development. John holds a B.S. in management from Wright State University.

After retiring from (GM), John decided he wasn't quite ready for a rocking chair yet and began looking for a second career. He claims his daily routine here at WSU is more varied than his experiences at GM. John is enjoying being able to follow a project from beginning to end, working on all aspects, rather than micro-managing one small sector of a long-term venture as he did at GM.

John lives in Xenia with his wife and they have two grown sons. John and his wife spend their free time improving a vacation property along the Ohio River. They also pursue a rather unusual hobby—raising Christmas trees.

John is located in 020 Russ. He can be reached by telephone at 775-5166 and by E-mail at jlawless@cs.wright.edu.

Welcome to Wright State!

✔ It Out...

College of Engineering and Computer Scinece Newsgroups:

wright.ecs.announce.events
for club meetings and other upcoming events;

wright.ecs.announce.for-sale
for posting items you would like to sell or are interested in purchasing;

wright.ecs.announce.housing
for posting housing availability and requests for roommates;

wright.ecs.announce.jobs
for help wanted and other employment opportunities;

and

wright.ecs.announce.misc
for posting anything else.

Students Attend AIAA Midwest Regional Student Conference

On March 5 and 6, 1999, four Wright State University graduate students traveled to the Ohio Aerospace Institute in Cleveland to participate in the annual American Institute for Aeronautics and Astronautics (AIAA) Midwest Regional Student Conference. Three of the students competed in the paper and presentation portion of the conference.

Hiroshi Kobayashi (Faculty Advisor Mitch Wolff) presented a paper entitled "The Lumped Parameter Analysis in High Speed Turbomachinery Applications."

Andrew Fenlon (Faculty Advisor Ken Cornielius) presented a paper entitled "A Computational Analysis of the Motion of a Rotating Jet with Drag."

Peter Koch (Faculty Advisor Mitch Wolff) presented a paper entitled "3-D Vortical Forcing Function Variations in a High Speed Compressor."

Tim Leger (Faculty Advisor Mitch Wolff) competed in the graduate presentation-only competition. Tim presented a paper entitled "Improved Determination of Airfoil Flutter in the Transonic Regime Using a Direct Method."

The educational experience for the students was tremendous. They matured by making a professional presentation in a competitive environment. In addition, they have a better understanding of the additional areas of research being investigated by attending the other student presentations and from the invited guest lectures. Everyone involved was quite positive about their experience.

The WSU AIAA and ASME student sections would like to express our sincere appreciation and gratitude to the Dayton/Cincinnati AIAA Section for the financial support provided that enabled WSU to participate in the Midwest Regional Student Conference.

Congratulations

Peter Koch

3rd Place

Graduate Paper and Presentation Competition

Tau Beta Pi Congratulates the Winter 1999 Initiates of the Ohio Mu chapter

Undergraduate Initiates:

Mohammed Alam (EE)
Wendell Booth (EE)
Brooke McNally (BME)
Rachel Salacinski (EE)

Eminent Engineer Initiate:

Dr. Kim Goldenberg, President, WSU

Tau Beta Pi congratulates these new initiates and applauds them for their perseverance, dedication, and character. For more information about Tau Beta Pi, please visit http://www.tbp.org.

BITs & PCs is a monthly newsletter published by the College of Engineering and Computer Science to inform students about activities, news, opportunities and changes occurring in the College. It reports on the achievements of faculty and students; changes in organization, policy and curriculum; scholarship and employment opportunities; and engineering and computer science student club activities.

The current issue of *BITs & PCs* is available on the World Wide Web at **http://www.cs.wright.edu/bitsandpcs/default.html.** Copies are also available in the College office, any Department office, or the Student Club Room.

The next issue will be published the week of May 3, 1999. To submit items for this issue, call the College of Engineering and Computer Science, 405 Russ Center, at (937) 775-5001, or send E-Mail to **kthis@cs.wright.edu** by April 20, 1999.

FACULTY FACTS

Maher Amer, Ph.D., ME, has received funding in the amount of $1,300 from SpecTran Specialty Optics Company for his proposal entitled "Investigation of Graphitic Structure of Carbon Coating on Alumina Fibers." ✶

Guozhu Dong, Ph.D., CSE, presented (with C. Pang and R. Kotagiri) a paper entitled "Incremental FO(+,<) Maintenance of All-pairs Shortest Paths for Undirected Graphs After Insertions and Deletions" and (with J. Bailey) a paper entitled "Decidability of First Order Logic Queries over Views" at the International Conference on Database Theory (ICDT), Jerusalem, January 1999.

Dr. Dong also presented (with R. Hull, F. Llirbat, E. Simon, J. Su, B. Kumar, and G. Zhou) a paper entitled "Declarative Workflows that Support Easy Modification and Dynamic Browsing" at the International Joint Conference on Work Activities Coordination and Collaboration (WACC), San Francisco, February 1999. In addition, he presented (with J. Han and Y. Yin) a paper entitled "Efficient Mining of Partial Periodic Patterns in Time Series Database" and (with X. Cheng, Tzekwan Lau, and J. Su) a paper entitled "Data Integration by Describing Sources with Constraint Databases" at the IEEE International Conference on Data Engineering (ICDE), Sydney, March 1999. ✶

Travis Doom, Ph.D., CSE, gave a presentation entitled "Design recovery for incomplete combinational logic" at the IEEE Great Lakes Symposium on VLSI, March 1999 in Ann Arbor, Michigan.

Fred Garber, Ph.D., EE, (with Steven Worrell) has received funding in the amount of $114,831 from the Department of Defense, Air Force Research Laboratory, for their proposal entitled "Intergovernment Personnel Agreement/Specialized Research." Dr. Garber has also received additional funding in the amount of $50,000 from the Department of Defense, Air Force Research Laboratory, for his proposal entitled "Performance Prediction of ATR Technologies." ✶

A. Ardeshir Goshtasby, Ph.D., CSE, received additional funding in the amount of $102,154 from Kettering Medical Center for his proposal entitled "Registration of Deformed Images using Elastic Surfaces." ✶

Junghsen Lieh, Ph.D., ME, has received funding in the amount of $80,000 from The Ohio State University for his proposal entitled "Phototube Vibration Measurement System." ✶

Joseph Slater, Ph.D., ME, has published an article entitled "Application of the Nyquist Stability Criterion on the Nichols Chart" in the Journal of Guidance, Control, and Dynamics, Vol. 22, No. 2, March-April, 1999, pp. 360-362.

In addition, Dr. Slater (with G. Agnes) has published a book chapter entitled "Nonlinear Modal Control Techniques and Applications in Structural Dynamic Systems" in the book Structural Dynamic Systems Computational Techniques and Optimization," edited by Cornelius T. Leondis. ✶

Isaac Weiss, Ph.D., ME, has received funding in the amount of $25,000 from Research and Development Laboratories for his proposal entitled "In-situ Synthesis of Discontinuously Reinforced Titanium Alloy Composites Via Blended Elemental Powder Metallurgy Processing." ✶

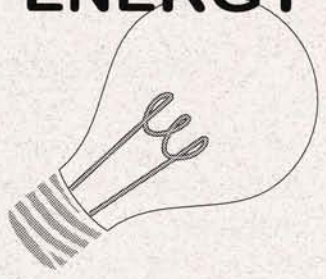
Got a great idea? Tell us about it!

The Suggestion for the Dean Program was initiated to solicit suggestions from Engineering and Computer Science students about ways to improve facilities and/or programs.

A suggestion box is located in front of 405 Russ and forms are available in the Student Club Room, Department Offices, and Student Lounge. You may also submit your suggestions electronically via the College's Internet home page—just choose the information button.

The program runs November 1–April 15. So, send us your good ideas. Appropriate awards will be presented for these suggestions.

CONSERVE ENERGY



Turn off the juice when not in use!

Design Clinic

The College of Engineering and Computer Science Design Clinic Program provides our undergraduate students with real-world industry consulting experience.

Design Clinic participants receive design course and/or technical elective credit in their program of study. Participation also enhances employment opportunities upon graduation by providing relevant industry experience, faculty and industry references, technical team experience, and knowledge of positions which might be available in the companies sponsoring the student projects.

In order to participate in the program, students are required to work as part of a team for three consecutive quarters, starting in fall 1999, on an industry-sponsored project. Students will enroll for four credit hours each quarter (Fall '99, Winter '00, Spring '00) for a total of 12 credit hours.

Each Design Clinic team will have two advisors—one from the College faculty and one from the sponsoring company.

Participants must meet the following minimum requirements:

- 140 credit hours completed in program of study prior to the start of fall quarter or plan to graduate prior to June 2001
- Cannot be graduating before June 2000
- GPA of at least 2.5

Students wishing to participate in Design Clinic may obtain an application form in the Dean's Office, 405 Russ.

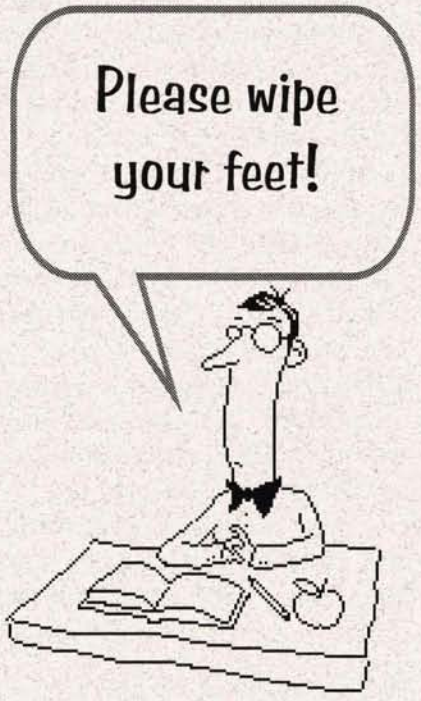
To discover more about the Design Clinic, contact the chair of your department or Dean Brandeberry.

Ty D. Upp says. . . . . .

I'm sure most of you will complain that I sound like your mother, but here it goes, anyway.

Please wipe your feet upon entering the building. Spring is here (isn't it?!?) and that means April Showers and lots of resulting mud. So, please, wipe your feet so you don't track mud throughout the building. Wet trails of mud are a slippery hazard for everyone and dried clumps of mud are an impediment to those using wheelchairs, crutches, or other types of mobility assistance.

Thank you for your cooperation!



Ty D. Upp is a regular feature in BITs & PCs. faculty, staff, and students are welcome to submit prospective topics for Ty D. Upp to address in this column. Just contact kthis@cs.wright.edu or stop by the Dean's Office at 405 Russ to submit your suggestions.

Fritz and Dolores Russ Engineering Center

Bits & PCs
College of Engineering and Computer Science
Wright State University

Dean
James E. Brandeberry, Ph.D., P.E.

Editor and Staff Writer
Karil S. This

Submit questions, articles and ideas to Editor, 405 Russ Engineering Center. The College of Engineering and Computer Science reserves the right to edit all material for publication.

EMPLOYMENT OPPORTUNITIES

SOCHE

Student Research Program

Research opportunities at Materials Lab at WPAFB

- **Flexible work schedules:** 12-14 hours during academic year and 40 hours during summer; full-time alternating terms; or 20 hours week year round. *We will work with you!*
- Career related work experience!
- Earn while you learn ($9.60 - $14.70/hr)
- Undergraduate to graduate students
- Degree seeking students in good standing
- Must be a U.S. Citizen

Project #TBD—Image Analysis of Metal Matrix Composites (any science, engineering, or computer majors): Student will develop computational tools to characterize and model materials microstructures using image analysis and cellular automata. Desired skills include: ability to write Photoshop or NIH image plug-ins, experience with MATLAB, knowledge of C or Pascal, experience with cellular automata, fractals and percolation phenomena, and an understanding of image analysis.

Project #TBD—Synthesis and Characterization of New Organic Compounds & Polymers (chemistry majors): The student will perform or monitor organic reactions following established procedures for synthesis of monomers and polymers, and conduct characterization of the isolated organic compounds and polymers using standard organic analytical techniques.

Project #101—Tribological Evaluation of Candidate Fluid and Lubricant Materials (materials science and mechanical engineering majors): To study the tribological characteristics and behavior of selected base materials, additives and formulated fluids, performance evaluation testing is required. Selected tests will be set up and conducted, and test data will be compiled and evaluated. In-house test equipment to be used may include the traction apparatus, hydraulic pump test stands, the Cameron-Plint test apparatus, 4-ball testers, the Optical EHD tester, etc. Modifications of the existing equipment shall be carried out to adapt to changing test requirements.

Project #107—Coated-fiber Characterization (materials engineering and mechanical engineering majors): Current ceramic matrix composites (CMC) rely on an interface that oxidizes at high temperature. Improvements in CMC properties at high temperatures require a functional and oxidation resistant interface. This requires fiber coating, and characterization of coated fibers. Polished petrographic thin sections of coated fiber cross-sections are prepared. Sections are mounted on TEM specimen washers and ion-milled, and then inspected by TEM. TEM observations of the coatings are related to fiber strength and composite properties. Coated fiber strength is measured by single filament tensile testing of 75 filaments.

Project #125—Advance Materials Sensor Selection and Integration (computer science and electrical engineering majors): The student will work with researchers in selecting sensors for monitoring of material processes and hardware and software integration of sensors. In addition, the student will research methods of sensor integration and develop C code to interface sensors to the computer. The student will gain expertise in integration of instruments with software for process control and data collection, as well as database connectivity.

Project #141—Life Prediction of Aerospace Materials (materials science, physics, and mechanical engineering majors): Results of experimental investigations will be collected and categorized. Data will be interpreted and analyzed in an effort to understand crack initiation and growth phenomena in monolithic alloys, ceramic matrix composites and metal matrix composites. The work will involve characterization of the physical phenomena that cause materials damage and analysis of experimental data to develop physically based models of the damage process.

Project #178—Analysis of Crack Growth Data and Fractographic Study of Constant and Variable Amplitude Loading Test (materials science and mechanical engineering majors): Crack growth under various constant and variable amplitude loading will be investigated to understand crack growth under aircraft spectrum loading. Each load cycle that causes a fatigue crack to grow causes plastic deformation on the fracture surfaces. The fracture surfaces are thus the fingerprint of the loading history that was applied to the sample. Crack growth tests will be conducted using CT-specimens, and the fracture surfaces have to be investigated using optical and scanning electron microscopy. The plastic deformation on the fracture surface is to be correlated with the loading sequence, which contributes to the understanding of crack growth under aircraft loading conditions.

Project #182—Microstructure and Properties of Metal Composites (materials science): The work involved will include metallographic preparation of samples, optical microscopy, scanning electron microscopy and X-ray diffraction. Analysis of the data collected will be done and will include identification and quantification of the microstructures studied. Mechanical tests which will be done may include tensile tests and creep tests.

Project #183—Microstructural Characterization (mechanical engineering and materials science): Major duties shall consist of metallography and fractography support including cutting, grinding, polishing, etching and photographing metallic materials and failed test specimens using metallographic equipment and both optical and scanning electron microscopes. Other duties shall consist of data reduction and analysis of mechanical property data using programs such as Excel and Grapher for Windows. Some time may be spent in the testing of metallic materials including tensile and microhardness measurements.

Call (937) 259-1375 for more information or to receive an application.

Petro Environmental Technologies, Inc., an environmental construction and remediation services company, is seeking an **engineer intern** to work on our Fernald Environmental Management Project in Ross, Ohio.

Responsibilities will include: assisting with landfill cell and cap designs, quality assurance/control related activities, project scheduling, assisting in surface water management and erosion control inspections, and other engineering-related activities as directed. Proficiency in AutoCad (ver. 14) and Primavera Project Planner a plus.

The desired candidate should be dependable and self-motivated. Typical working hours will be 7:00 A.M. to 5:30 P.M., Monday–Friday, 50 hours per week. However, schedule may be adjusted as needed. The position pays $10 per hour up to 40 hours and $15 per hour for anything over 40 hours.

Interested candidates should respond by April 23, 1999, by contacting:

Ms. Jill Hibbard
Petro Environmental Technologies, Inc.
Fernald Environmental Management Project
7400 Willey Road
Ross, OH 43061
Phone: (513) 648-3402
FAX: (513) 648-3407

Dr. Mitch Wolff is seeking several graduate research assistants Summer or Fall Quarters 1999 for research in turbomachinery propulsion and external aerodynamics. Possible projects are computational fluid dynamics applied to unsteady aerodynamics, aeroelasticity, high response experimental pressure measurements, vane/blade interaction, forced response and separated flows. The positions pay a minimum $15,000/yr stipend and a tuition waiver for a minimum of two years. The projects will involve substantial interaction with Wright-Patterson Air Force Base and some interaction with NASA.

Requirements:

- √ US Citizen
- √ Strong interest in fluid mechanics
- √ Computer programming knowledge

If interested, contact Dr. Wolff at 123 Russ Center, by phone at 775-5141, or by E-mail: mwolff@cs.wright.edu.

Scholarship Opportunity

Culture Works is currently accepting applications for the **Leonard P. Roberts Memorial Scholarship** of the Dayton Foundation.

Candidates must be full-time students entering their final year at a two-year Miami Valley institution, or their junior or senior year at a four-year Miami Valley institution. Applicants must be majoring in either business administration, engineering, or performing arts.

Colleges or universities may recommended up to three candidates. Recommendations must come from the Financial Aid office of the institution with endorsement from the appropriate academic personnel.

Candidates will be evaluated on a 100 point scale based upon the following criteria:

financial need	– 20 pts.
one-page typed essay	– 20 pts.
gpa in concentration area	– 20 pts.
overall gpa	– 10 pts.
recommendation letters	– 10 pts.
extra-curricular activities	– 10 pts.
community service	– 5 pts.
work experience	– 5 pts.

For more information, or for application materials, contact your institution's Financial Aid office, or Rebecca Zorich, Programs and Services Associate, Culture Works, (937) 222-2787.

All nominations and applications must be received by the Culture Works office by 5:00 p.m. on Friday, April 23, 1999.

Important Dates To Remember . . .

April 5	—	Faculty Senate, 3:15 P.M.
	—	70% refund of fees begins
April 10	—	Senior registration for Summer Quarter begins
April 11	—	Graduate/unclassified registration for Summer Quarter begins
April 13	—	NEAS+, 9–11 A.M., 145 Russ Center
	—	Last day for 70% refund of fees
April 16	—	Leadership Seminar, 4 P.M., Tait Conference Room, 405 Russ Center
	—	Last day to drop a class without a grade
April 17	—	Junior registration for Summer Quarter begins
April 23	—	Fall class schedules delivered to campus
April 24	—	Sophomore registration for Summer Quarter begins
April 25	—	Freshman registration for Summer Quarter begins
April 30	—	Last day for all but freshmen to drop a class WITH a grade of "W"
May 1	—	Senior registration for Fall Quarter begins
May 2	—	Graduate/unclassified registration for Fall Quarter begins
May 3	—	Faculty Senate, 3:15 P.M.
May 5	—	NEAS+, 9–11 A.M., 145 Russ Center
May 8	—	Junior registration for Fall Quarter begins

WRIGHT STATE
UNIVERSITY

College of Engineering and Computer Science
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Office of the Dean