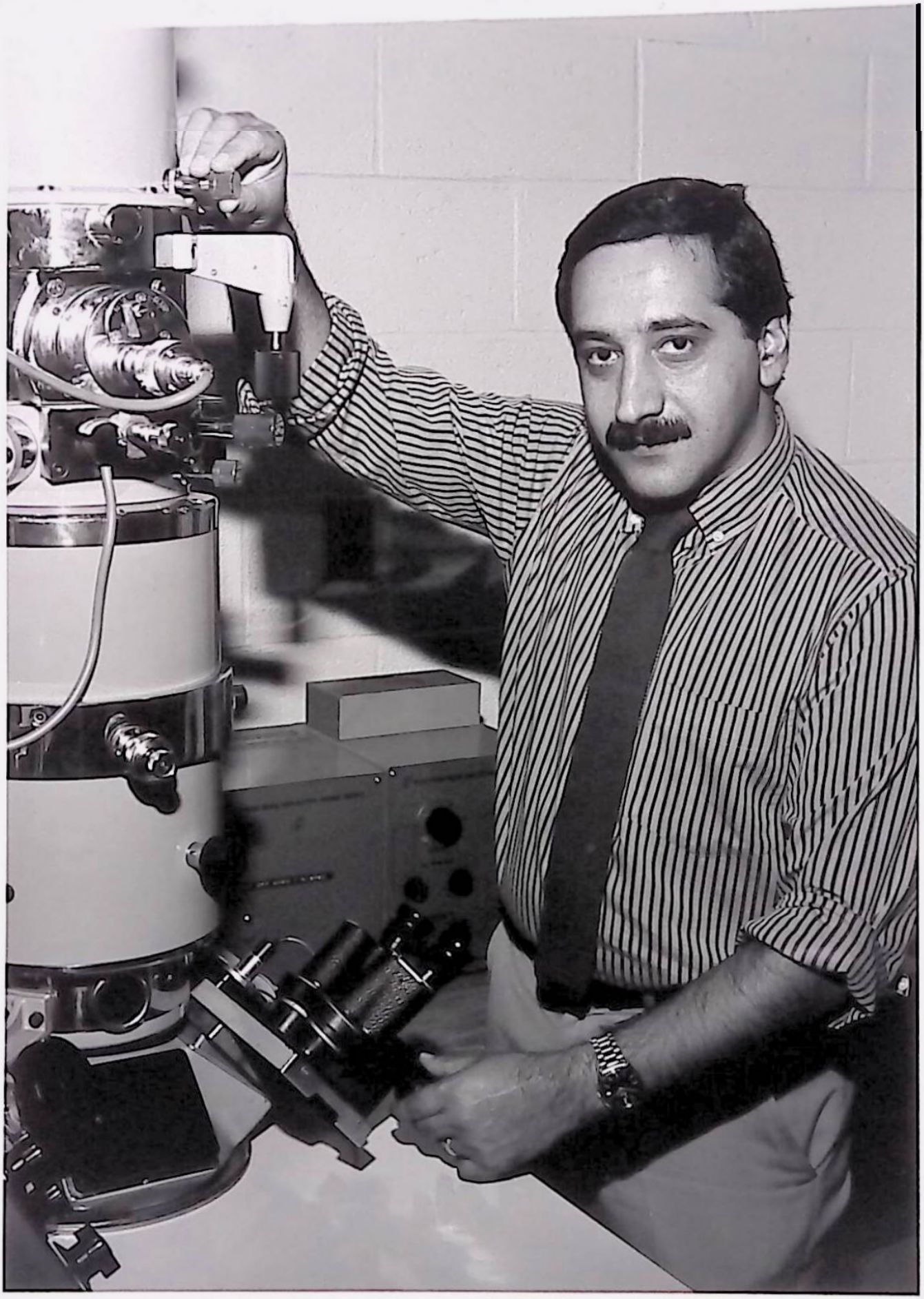


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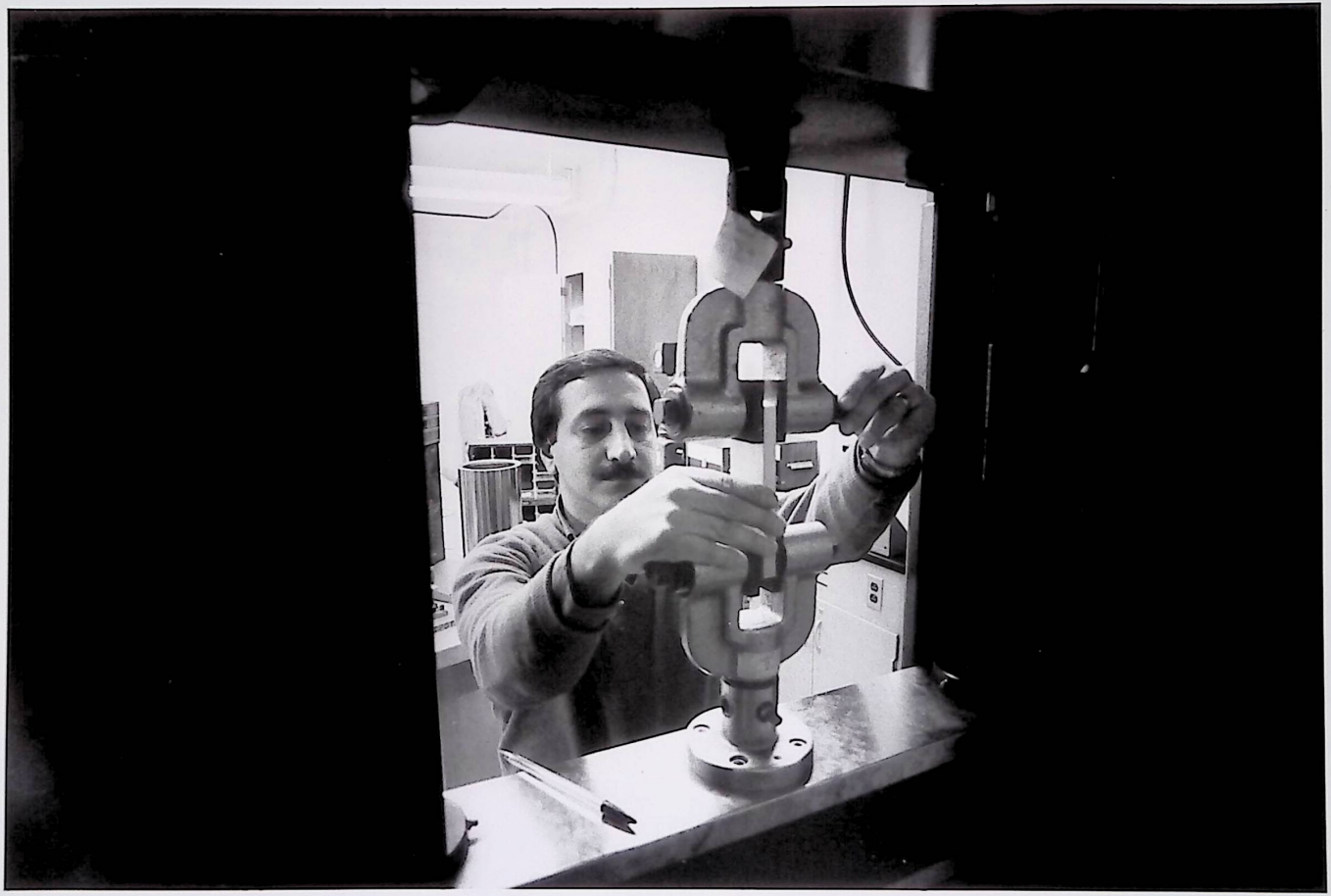

SCIENCE

Shades of the Future

■ Wilkes University students and professors are researching thin films —materials that can block blinding laser beams or electromagnetic radiation

By KIM STROSNIDER
Times Leader Staff Writer

Wilkes University senior Larry Yudiski has more to worry about than tests or grades.

He also must stick to a budget, work with a large company and make headway in a cutting-edge area of technology.

Yudiski is one of a handful of Wilkes engineering students exploring the evolving technology of thin films.

Thin films are "a very thin layer of one material on another material, thinner than (a strand of) your hair," says Ali Razavi, an associate professor of materials engineering.

The films of metals and oxides can be coated onto eye wear to block blinding laser beams on the battlefield or in the hospital operating room.

On airplane cockpits, thin films could keep electromagnetic radiation generated by a nuclear explosion from disabling a plane's vital electronic equipment, says Umid Nejib, dean of the Wilkes School of Science and Engineering.

Thin films also may be used to make airplane navigational equipment more accurate, compact and sensitive.

Two thin film projects are now under way at the school's Department of Mechanical and Materials Engineering:

■ a $169,800, two-year project (now in its second year) with the Carbondale-based Gentex Corp. to research thin film use for eye wear. That project is being conducted with a Ben Franklin Partnership grant from the state.

■ a $30,000 project with the Naval Command Control and Ocean Surveillance Center near Philadelphia. That project is to employ superconducting thin films in aircraft navigational equipment called gyroscopes.

The projects are led by faculty and conducted with undergraduate and graduate students, according to Nejib.

Both projects, which will be completed this year, are part of an on-going commitment the school has to work with industry.

Thin films themselves are not new. They've been known since the late 1930s and have been used on welders' glasses for almost 20 years, according to Robert A. Sallavanti of Gentex.

But only in the last three to four years has thin film technology broadened to embrace applications like those being researched at Wilkes, Sallavanti says.

In a laboratory, Wilkes students place transparent pieces of a plastic called polycarbonate in a vacuum chamber. The pressure in the chamber is very low, akin to that of outer space.

The impact-resistant plastic is bombarded with microscopic ions and electrons to prepare it for application of the thin films.

In the vacuum chamber, the metal or oxide films and the polycarbonate "grab each other," Razavi says, and stick together so well they couldn't be scraped apart with a sharp tool.

■ See SHEER, page 4B

TIMES LEADER/DON CAREY

■ Larry Yudiski is one of a handful of Wilkes engineering students exploring the evolving technology of thin films. Above the senior materials engineering student displays a pair of laser goggles

Some uses for thin film technology

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■ The films of metals and oxides can be coated onto eye wear to block blinding laser beams on the battlefield or in the hospital operating room.

■ On airplane cockpits, thin films could keep electromagnetic radiation generated by a nuclear explosion from disabling a plane's vital electronic equipment.

■ Thin films also may be used to make airplane navigational equipment more accurate, compact and sensitive.

Sheer

(Continued from Page 1B)

In addition to figuring out how to prepare the polycarbonate surface to receive thin films, the students also determine the number and thickness of layers to use for different purposes.

Then, they measure how the thin films aid in the transmission and reflection of certain wavelengths of light.

Sallavanti, who is Gentex's corporate scientific adviser, says "a wedding cake of these thin films" layered onto military goggles and visors can interfere with potentially-blinding laser beams that are part of modern warfare. By interfering, the films nullify the beams' effects on the eye.

On the battlefield, thin films also can display information on the lenses of Stealth pilot goggles and can be used to cut down on "glint," or reflection, of soldiers' eye wear.

"The uses are really wild," says Sallavanti.

Thin films also have many non-military applications, Sallavanti says.

They can be applied to eye wear used by surgeons, dentists and other scientists who work with lasers; to ordinary eyeglasses to make them anti-reflective; and to expensive, high-end sunglasses like those worn by Olympic athletes.

"Wilkes has an excellent materials program," says Sallavanti, a 1963 graduate of the school who holds a doctorate from the University of Pennsylvania. "There is no other university that is doing quite the same thing."

"It's an asset that I think is immense."

Sallavanti, whose company has hired several Wilkes graduates, says undergraduate students have some excellent ideas. "If you get an 18 year old or a 20 year old," Sallavanti says, "he's probably having the best ideas of his life."

> **"Whatever nation comes up with the materials is going to control the technology. Material advancement is the whole ball game."**
>
> **Ali Razavi**
> Associate professor

Besides undergraduates like Yudiski, a 21-year-old Exeter resident who has worked on the Gentex project, Wilkes University graduate students are also involved in thin film research.

Hamid Karimy, a 35-year-old Kingston resident, enrolled in graduate electrical engineering studies at Wilkes after the consulting firm that employed him went out of business.

The Iranian native is researching superconducting thin films that could be applied to airplane navigational equipment, making aircraft easier for pilots to maneuver.

Only one other school — Stanford University in California — is doing similar research, says Karimy. He will present a paper on the topic this spring at a scientific meeting in San Francisco.

Razavi, the associate professor of materials engineering, says the field of new materials is of key importance for a nation's competitiveness and security.

"Whatever nation comes up with the materials is going to control the technology," says Razavi "Material advancement is the whole ball game."

Faculty Resume Information Sheet

Full Name Razavi (Last) Ali (First) (M.I.)

School or College and Department Engineering & Physical Sciences

Age as of September 1, 1988, Date of Birth 9-20-50

Academic Rank assistant professor

Full-Time [X] Part-Time [ ]

Non-Wilkes College Teaching, If Part-Time

Earned Degrees	Name of Institution	Location	Area, Field or Major	Degree Received	Date Conferred
	Drexel University	Phila, PA	Materials Engr.	March 1982	June 1982
	M.S.	UMIST, England	"	Nov. 1976	Nov. 1977
	B.S.	Tehran Univ.	Physical Chem.	Nov. 1974	Nov. 1975

Teaching Experience Incl.Wilkes	Name of Institution	Location	Subjects/ Fields Taught	Full or Part-Time Rank	Dates of Service From—To
	Katholike University	Belgium	Materials Engr.	Full	April 1982
	Leuren, Belgium			Asst. Prof.	May 1983
	Drexel University	Phila. PA	Materials Egr.	Post-Doct.	1984-85

Non-Teaching Experience

	Firm or Organization or Self-Employed	Duties	Title	Dates of Service From - To
Full-Time				
Part-Time				

List Major Consulting Activities

WEA, Manufacturing Inc. , Olyphant, PA

Bibliographic Citation of Principal Publications - Last Five Years

A. Razavi & E. Acrnout, Texture Controls in Copper-Base Memory metal material, 1988, Netherlands

A. Razavi, T.Hughes, Effect of Oxygen Partial Pressure on Optical Properties of Vo2 in non-linear prop/

A. Razavi, T. Hughes, J. Antinovich, Temperature Effect on Structural and Optical Properties of RF Sputtering VO2

Presentation accepted for publication at AVS Journal, Oct.1988

(OVER)

Memberships in Professional and Scientific Societies

Organization Name	Scope: Local, State, Regional, National	Offices Held
American Vacuum Society	Nat'l	New York
Optical Society of America	"	Washington D.C.
National Research Society	"	Pittsburgh, PA

Teaching at Wilkes 1988-89 (including teaching overloads)

	Course Title	Hrs. of Lecture per Week	Hrs. of Recitation per Week	Contact Hrs. of Laboratory per Week	# of Day Sections; Enrollment	# of Evening or Weekend Sections/ Enrollment
Fall '88 Total of Students Taught 30	MAE 342	4	3	2	15	
	MAE 384	5	3	4	15	
	MAE 392		5	5	3	
Spring'89 Anticipated Total of Students Projected 25	MaE 231	3	3		15	
	MaE 398	3	3	2	10	

Other Duties Performed for Base Salary, 1988-89 (Full-Time Faculty)

Duty/Activity	Hours per Week	
Advising	10	# of Advisees: 10
Research/Scholarship	10	
Committee Work	3	
Department Chairperson		

Other Duties for Extra Compensation, 1988-89 (Full-Time Faculty)

Duty/Activity	Hours per Week

esc

9-26-88

Wilkes College
News

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contact: Ken Swisher
Assistant Director
Public Relations

WILKES ENGINEERING PROFESSORS BUSY THIS SUMMER

WILKES-BARRE--According to a recent article in "The Chronicle of Higher Education," salaries of engineering faculty members across the country led in faculty pay scales for the fifth straight year. And at Wilkes College, the engineering professors are earning their pay even in the summer. At least three professors, Dr. Vasundrha Choudry, Vijay K. Arora, and Dr. Ali Razavi, are involved with special summer activities which will enhance their knowledge and teaching skills.

Dr. Choudry, assistant professor of engineering and physical sciences, attended a special summer program sponsored by the Massachusetts Institute of Technology entitled "Advanced VSLI Design."

Choudry is also enrolled in two of the American Society Of Engineering Education 1988 Continuing Education Programs for Electrical Engineering Faculty. The first, "Unix System/C Language," is for two weeks in July at AT&T Bell Labs in Holmdel, N.J., and the second, "Engineering Workstation," is for two weeks

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in August at Rice University in Houston, Texas.

Vijay K. Arora, professor of electrical engineering, attended an MIT summer school on "Structure and Interpretation of Cumputer Programs," for two weeks. The course was one of a series of courses organized by the American Society of Engineering Education to continually educate the engineering faculty in the wake of the computer revolution and its application to Computer-Aided Knowledge Engineering, popularly known as the Applied Artificial Intelligence.

This participation has enhanced the capability of the School of Engineering and Physical Sciences at Wilkes to offer courses that focus on techniques for controlling the organizational complexity of large-scale software systems and its applications in engineering design.

Arora has also been selected as a candidate for inclusion in the 17th edition of "American Men and Women of Science," the premier scientific biographical reference source, which records the careers of major American scientists and engineers and is due to be published in February, 1989.

Both Arora's and Choudry's seminars were made possible in full or in part by a $300,000 Pew Grant which Wilkes received three years ago. The grant was designed for just such faculty development programs.

Dr. Ali Razavi, assistant professor of engineering, was on

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the other side of the podium recently as he lectured to a group of research scientists at Grumman Aerospace Corporation in Long Island, N.Y. His topic was "Nonlinear Optical Properties of Vanadium Dioxide." Grumman has an interest in Vanadium dioxide, and Dr. Razavi spoke about its unusual properties as well as his work on thin film fabrication.

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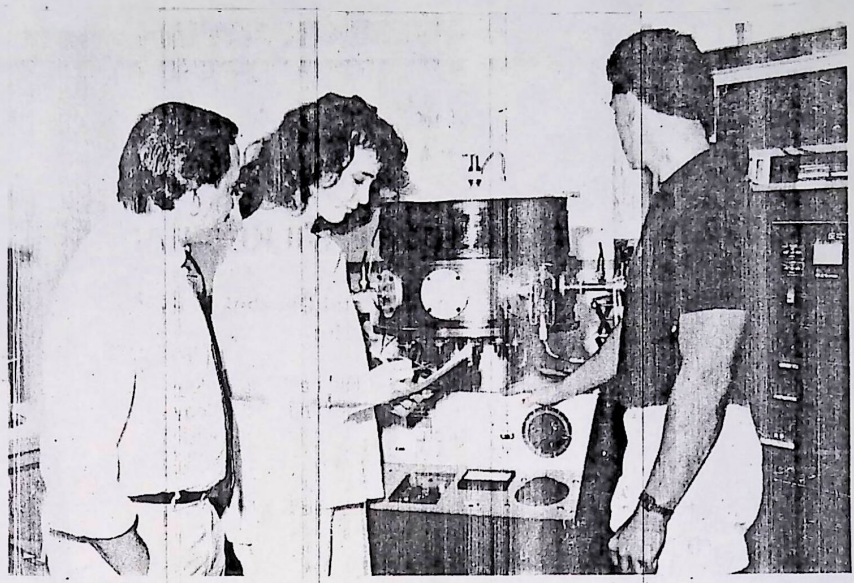

Wilkes professor, students complete research papers

One and one-half years of research by an engineering professor and several students at Wilkes College has resulted in the completion of two research papers.

Dr. Ali Razavi, assistant professor of engineering at Wilkes, and those students will present the papers on the topic of electrical optical application at two separate conferences. The high technology research was conducted by both undergraduate and graduate students and was sponsored by the U.S. Navy.

The papers will be presented at a topical meeting on nonlinear optical properties of materials at Rensselaer Polytechnic Institute in Troy, N.Y., Aug. 22-25. Then in October, they will present a similar research paper at the 35th National Symposium of the American Vacuum Society.

Shown from left in Wilkes Materials Processing and Diagnostics Center are Dr. Ali Razavi; Laurie Bobyak, junior, Wilkes-Barre; Thomas Hughes, first-year graduate student, Nanticoke.

Others who participated are 1988 graduates Joe Antinovitch, Pittston, and John Hoffman, Easton, now employed by General Electric and Dupont, respectively.

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