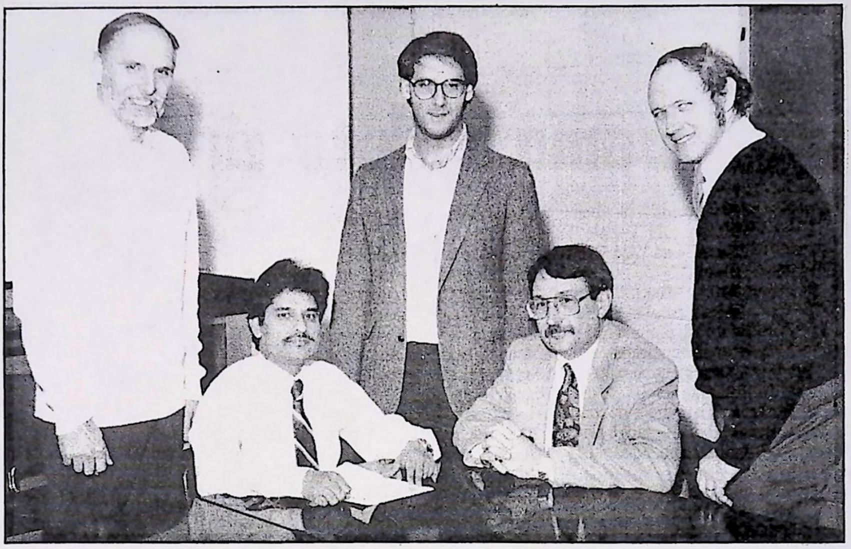
Citizens' Voice, Wilkes-Barre, Pa. Thursday, February 6, 1992 — 26



Wilkes Engineering Expo for high schoolers Feb. 21

The Wilkes University Department of Engineering has scheduled its annual Expo for Friday, Feb. 21, from 9 a.m. to 3 p.m., in the Stark Learning Center on the Wilkes campus.

Wilkes engineering faculty and students have developed displays and exhibits featuring robotics, metalography, ceramics, the photolithography process, and many others.

Students from all area school districts are invited to attend the day of exhibits, displays and lectures.

Engineering faculty and admissions staff will be available to answer questions from visiting students. For more information, contact Wilkes at 824-4651, ext. 4827.

Among the many faculty members and students involved in presentation of Engineering Expo, front row, seated, from left, are Dr. S.M. Perwez Kalim, assistant professor, engineering, and Emory P. Guffrovich Jr., acting dean of admissions; back row: Dr. John L. Orehotsky, professor, engineering; Dr. Cliff Mirman, assistant professor, engineering, and Dr. John Gilmer, assistant professor, engineering.

Wilkes College
News
OFFICE OF PUBLIC RELATIONS • WILKES-BARRE, PENNSYLVANIA 18766
TELEPHONE: (717) 822-8413

Faculty File

Jane Manganella
Assistant Director

DR. JOHN OREHOTSKY, PROFESSOR OF ENGINEERING AT WILKES COLLEGE, RECEIVES RESEARCH AWARD FROM NASA AND DEPARTMENT OF ENERGY

WILKES-BARRE--Dr. John Orehotsky, professor of Engineering at Wilkes College, is the recipient of a research award from NASA and the Department of Energy. The award is administered through the California Institute of Technology and is associated with the solar cell-alternate energy program currently under the jurisdiction of the Jet Propulsion Laboratories in Pasedena, California.

The laboratory's program is directed toward advancing the technology of polymer encapsulated silicon solar cells housed in modular panels, as an alternate energy device for terrestrial applications.

Many current problems in the present technology involve the properties of the encapsulant materials. These polymer encapsulants must be electrically nonconductive, structurally stable in hostile environments, transparent to sunlight, mechanically sound, nondegradable when exposed to sunlight and heat, water repellent and ionically nonconductive, to avoid solar cell corrosion problems.

The primary goal of the research activity at Wilkes is to develop advanced polymer materials with superior electrical insulation properties. This goal will be approached by investigating the electrical resistivity and the dielectric breakdown characteristics of potentially-promising advanced polymer composite systems.

(more)

The polymer development activity at Wilkes also includes an investigation of the mechanical, structural, optical, and stability characteristics of the emerging advanced polymer systems.

The research award also involves an investigation of both the corrosion mechanisms in metallized p-n junction silicon semiconductor devices and the physical principals of power generation on solar cells.

Dr. Orehotsky has considerable experience in semiconductor devices and their applications. He has been the recipient of two NASA Summer Faculty Fellowships at the Laboratories in Pasedena, where he has been associated with the p-n junction silicon solar cell program. His past industrial experience in semiconductor devices includes work in field effect transistors and bipolar junction transistors at IBM.

His areas of research interest includes magnetism, magnetic materials and magnetic devices. His activity in magnetism has resulted in numerous publications in technical literature, presented at international conferences. His prominence in the field of magnetism has resulted in research fellowship awards including a Fulbright-Hayes Fellowship in the Department of Physics at the University of Porto, Portugal; a National Canadian Research Council Fellowship at the Nova Scotia Technical College in Halifax. He is the past recipient of research support awards for magnetic work from the National Science Foundation and from the Pennsylvania Science and Engineering Foundation.

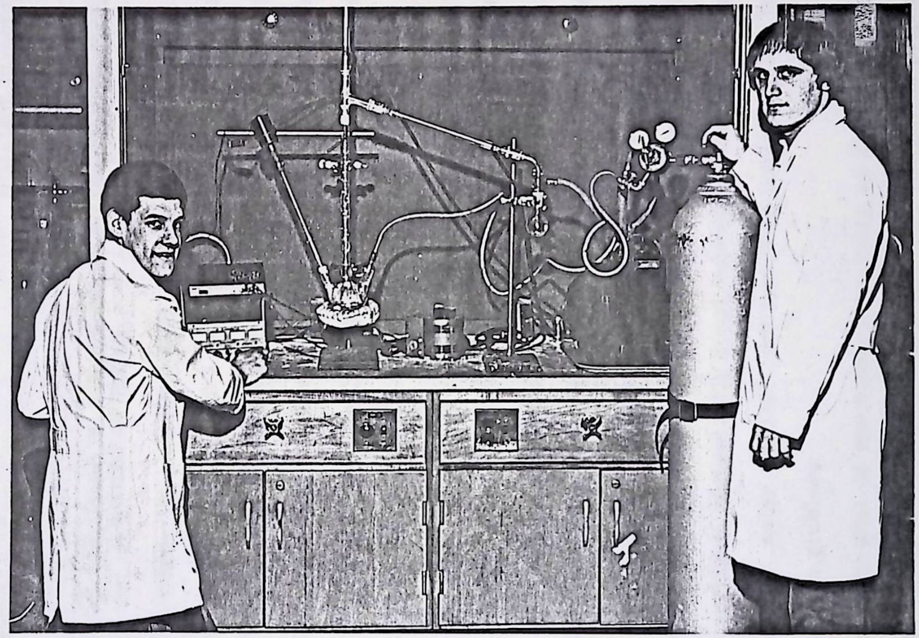
Dr. Orehotsky and his students are currently involved in several other research programs of fundamental interest. These programs include an investigation of the magnetic properties of platinum-cobalt alloys, photoconductivity in semiconductors, fast recovery p-n junction silicon diodes, and the thermodynamics of the lead-tin alloy system as determined by measurements of the heat capacity and heats of sublimitation.

(more)

The Wilkes professor has over thirty technical publications in engineering, solid state physics and electrochemistry, many of which were written jointly by Dr. Orehotsky and his students in engineering at Wilkes.

Shown are two of those students, at work in Wilkes Laboratories, from left Joseph Dill, Polaskie, Pa. and Edward Urbanski, Kingston.

-30-



WILKES-BARRE, PA
DEC 11 1980
Times Leader
(all day)
Circ. 67,938

Wilkes profs honored

WILKES-BARRE — Two Wilkes College engineering professors have been recognized for their outstanding research in engineering.

Dr. John L. Orehotsky has been given a Fulbright Award by the Board of Foreign Scholarships and the U.S. International Communication Agency.

Dr. Robert Aston has been selected to teach and advise on special courses in Cairo, Egypt, from Dec. 22 to Jan. 11. He will serve as a consultant in Biomedical Engineering Programs under the secretariat of "Project Hope."

Orehotsky received the award for his research on measurements of critical point phenonmenon in transition metal and rare earth materials. Last year he was recognized as one of six researchers in the country working on "unassisted photo electrolysis," the process of creating hydrogen from water and sunlight.

The program involving Dr. Ashton, which is designed to improve the Egyptian health and manpower capabilities, is a collaboration between "Project Hope," the Health Resources Administration and the Arab Republic of Egypt.

College news

WILKES

Dr. John Orehotsky, professor of engineering at Wilkes College, received a research award from NASA and the Department of Energy.

The award is administered through the California Institute of Technology and is associated with the solar cell-alternate energy program at the Jet Propulsion Laboratories in Pasedena.

The primary goal of the research activity at Wilkes is to develop advanced polar materials with superior electrical insulation properties. It also includes an investigation of the mechanical, structural, optical and stability characteristics of the emerging advanced polymer systems.

Orehotsky is the recipient of two NASA summer faculty fellowships at the laboratories in Pasedena. His area of research interest includes magnetism and has resulted in numerous publications in technical literature, presented at international conferences.

He has received fellowship awards including a Fulbright-Hayes Fellowship in the Department of Physics, University of Porto, Portugal; a National Canadian Research Council fellowship at the Nova Scotia Technical College in Halifax. He is the recipient of awards from the National Science Foundation and from the Pennsylvania Science and Engineering Foundation.

He and his students are involved in numerous investigations of the magnetic properties of various materials.

He has published more than 30 technical publications in engineering, solid statephysics and electrochemistry.

T.L. 4/12/84

Orehotsky File

PLASTICS TECHNOLOGY

NEW YORK, NY
13-TIMES/YEAR 49,600

JAN 1 1996

BURRELLE'S

Low-Pressure SMC & Pultrusion Star at SPI Composites Conference

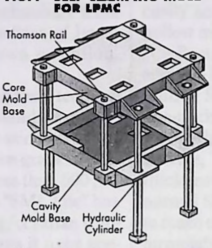
203nw p.34

The SPI Composites Institute's annual conference next month in Cincinnati will for the first time highlight a subject that has attracted growing attention in recent years: low-pressure SMC. Four papers will address new materials and equipment for "LPMC," as it is sometimes called. Pultrusion is the one other area for which much new processing information will be presented. Other major topics of the conference are three hot market opportunities—infrastructure, building construction, and mass transit.

This year's meeting will depart from its traditional format in two respects. First, there are several scheduled live processing demonstrations. Premix Inc., N. Kingsville, Ohio, will show off a new self-clamping tool that molds LPMC without a press. Hardcore/DuPont Composites, New Castle, Del., will demonstrate the SCRIMP process for vacuum-assisted RTM, which attracted considerable interest at last year's meeting (see *PT, March '95, p. 11*). A paper on SCRIMP marine applications will also be presented. In addition, Liquid Control Corp., North Canton, Ohio, will demonstrate standard RTM.

The second new element of the meeting will be five symposiums on topics of growing importance in the regulatory arena. One session addresses handling of hazardous waste in composites manufacturing. Two others discuss how to deal with styrene emissions—including ventilation design and OSHA's new respirator program. And two more are concerned with new EPA and state regulatory programs requiring manufacturers to obtain so-called "Title V" permits to emit air pollutants (see *PT, March '95, p. 67*). One of those two sessions addresses stringent "MACT" (Maximum Achievable Control Technology) requirements that take effect next year.

FIG. 1—SELF-CLAMPING MOLD FOR LPMC



In Cincinnati, Premix will demonstrate low-pressure SMC molding without a press. This low-cost, self-clamping mold does the job at 100 psi.

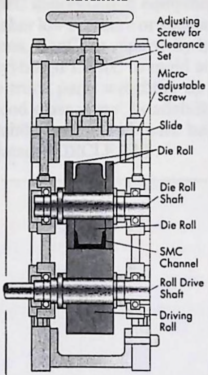
Application of MACT to pultrusion, SMC, and marine fabrication will be specifically addressed. The Composites Fabricators Association (CFA) will also present its MACT program.

SPOTLIGHT ON LPMC

LPMC technologies have been gathering momentum because they offer the potential for reducing tooling and press costs so that SMC can be competitive in shorter runs with RTM, spray-up, and hand lay-up (*PT, April '94, p. 15; April '95, p. 37*). One development that addresses this need directly is Premix's new self-clamping mold. By eliminating the need for a compression press, Premix says that its self-clamping mold concept offers a way for processors to break into the SMC market without large capital investment. As shown in Fig. 1, the system consists of a pair of mold bases plus hydraulic cylinders and guide rails. The complete molding cell includes a hydraulic power pack and hot-oil mold-temperature controller. Premix's apparatus is capable of generating up to 600 psi, though only around 100 psi is generally required for LPMC.

Premix also demonstrated the use of low-cost tooling—in this case made of an electroformed nickel shell, steel frame, and ceramic backing with cast-in copper heating lines. (The ceramic is Comtek 66 tooling compound from Cemcom Corp., Baltimore.) Approximate cost of the tool and complete molding cell was

FIG. 2—SMC ROLL-FORMING MACHINE



Another novel way of molding SMC without the high cost of a press is continuous roll forming from Intec-Hirai, Ltd. of Kyoto, Japan. This method produces continuous profiles such as the channel shown here.

COMPOSITES

about $50,000. (CIRCLE 139)

Premix does not intend to sell equipment. Rather, it hopes to sell more LPMC materials if molders adopt the low-cost self-clamping mold concept. Premix has two families of LMPC materials—one based on technology from Takeda Chemical Industries of Japan and one of Premix's own invention. (CIRCLE 140)

New patent-pending resin technology developed by Ashland Chemical Co., Columbus, Ohio, is said to produce "true Class-A" automotive-grade LPMC that can be molded at less than 500 psi. What's more, Ashland's "SMC Lite" has 15% lower density (1.6 g/cc) than standard SMC. Ashland says it uses special resin chemistry and unique thickening technology to achieve easily handled, tack-free sheet with reduced viscosity (20 million cp) for low-pressure molding. Because this LPMC technology is not based on a crystalline polyester resin, SMC Lite reportedly can be made on a standard SMC impregnating machine. It can also be stored at room temperature. A special filler contributes to both low viscosity and low density without use of hollow microspheres. (CIRCLE 141)

Pressures as low as 300 psi reportedly can be used to mold Class A automotive SMC made from new Ultryl one-pack, low-profile polyester resin from Alpha/Owens-Corning, Collierville, Tenn. The resin uses normal thickeners and can be processed on normal SMC impregnating equipment to make either low-pressure or standard formulations. GenCorp reportedly has used Ultryl-based LPMC to mold several large truck parts weighing up to 135 lb. Good glass carry, bondability, and paintability reportedly have been demonstrated. (CIRCLE 142)

New proprietary additives for making LPMC will be introduced by Union Carbide Corp., Danbury, Conn. Neulon LoBar thickening agent 101 and Neulon LoBar thickening modifier 101 are used with conventional polyester resins and polyvinyl acetate low-profile additives. No compounding process modifications are said to be necessary. The thickening system is said to provide consistent control of chemical thickening, as well as a large degree of latitude in thickener concentration, thus allowing a large processing window. A low thickened viscosity (10-20 million cp) permits molding at 100-500 psi. The resulting compound is dry and easy to handle, with no resin separation. Class-A, zero-shrink, and low-shrink pigmentable LPMC can be formulated with this system. Good glass carry in molding is also claimed. (CIRCLE 143)

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TECHNOLOGY NEWS

COMPOSITES

MORE SMC NEWS

Pre-dispersing pigments such as carbon black, titanium dioxide, and zinc sulfide in a standard polyvinyl acetate (PVAc) low-profile agent is said to improve pigmentation of SMC and BMC by minimizing hazing and mottling. Union Carbide first came out with black Neulon Pigmented 2066 and a styrenated version, Neulon Pigmented 2000. Now the firm has developed PVAc products containing 30-70% zinc sulfide and 30% titanium dioxide. Carbide researchers say these products can provide uniformly pigmented black, white, and gray compounds, allowing substitution for non-mottling PS low-shrink agents. Substituting pigmented PVAc for PS reportedly yields higher gloss and better glass hiding without higher cost. In addition, a new "Anti-Yellowing Additive" reportedly increases yellowing resistance of white-pigmented PVAc formulations. (CIRCLE 144)

A material and part design for BMC "marble" sinks that resist thermal shock has been developed by Reichhold Chemicals Inc., Research Triangle Park, N.C. The optimized formulation was developed from tests of temperature distribution and material strains during thermal-shock testing of cultured-marble and onyx sinks. Optimized parts can be molded in 7 min at 0.30-in. thickness with high gloss and good stain resistance. The sink design is thicker at the drain to increase thermal shock resistance. (CIRCLE 145)

NEWS FOR PULTRUDERS

A method of using a dry particulate filler (foamed clay) as the core of pultruded profiles will be presented by Pultrex Ltd. and Caledonia Composites of the U.K. The patented Pulrite process uses continuously folded glass cloth to give longitudinal and transverse reinforcement, as well as providing a hollow envelope into which the core material is blown (Fig. 3). The envelope is drawn through a dry tapered die where it is compressed. The packed envelope enters a resin injection chamber and then a heated die for curing. The process can be achieved on conventional pultrusion machines with bolted-on additions upstream to fold the cloth and feed the core filler. Significant cost savings can be achieved by using 60-70% volume fraction of filler, the authors say. (CIRCLE 146)

An in-line powder-coating system for pultruded window lineals has been developed by Owens-Corning Fiberglas Corp., Toledo, Ohio. The existing off-line electrostatic spray-painting process used at the company's window division in Hazleton, Pa., accounts for a third to half the cost of manufacturing window lineals. It also imposes a number of restrictions, including fixed part length, heavy maintenance, pollution-control costs, high labor cost, and paint defects.

The in-line system (which has not yet been put into production) uses a conductive polyester veil to facilitate electrostatic powder coating, as well as a paintable mold release to ensure adhesion of the coating to the lineal. The powder-coating operation occurs between the exit of the pultrusion die and the puller. After the lineal exits the die, it is reheated so that the coating powder flows properly when it is applied in the paint booth immediately downstream. Next, an infrared oven further ensures proper coating flow, after which a conventional oven cures the coating. (The thermosetting acrylic-modified urethane powder requires an extended cure.) Finally, the coated lineals are cooled by a water spray and then blown dry before reaching the puller and cutoff saw. The line is designed to coat at 7 ft/min.

Total equipment costs for the powder-coating line is approx. $155,000. Direct painting cost/ft of casement sash is 16¢ for powder coating versus 46¢ for one-pass off-line painting. For the in-line process, paint, not labor, becomes the dominant cost.

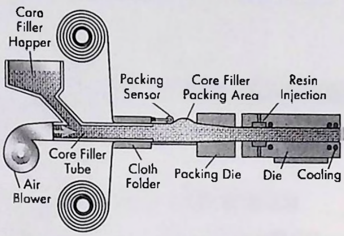
A "lean and smart" pultrusion die that's said to require significantly reduced power for heating has been developed by Teck Awa, a consultant in Loveland, Ohio, and researchers at the Mechanical & Materials Engineering Dept. of Wilkes University in Wilkes-Barre, Pa. This die has low thermal mass and reportedly requires a third to half as much power as usual. The die itself is not heated. Rather, the die halves are mounted on heated platens that have transversely mounted electric cartridge or strip heaters to provide zone heating. Control thermocouples are attached midway between the heaters. Thick layers of thermal insulation are mounted on the outer surfaces of the heating platens and on both vertical sides of the die as well.

Joseph Sumerak, founder of Pultrusion Dynamics Inc., Oakwood Village, Ohio, will discuss his firm's new "TOPDie" (Thermally Optimized Pultrusion Die) service that uses finite-element thermal analysis to help maximize the productivity and quality potential of new and existing tooling. Three-dimensional computer modeling of the pultrusion die, heating environment, and polymer reaction produces a thermal "map" of the die, identifying heat-distribution imbalances and energy deficiencies with respect to die cross-section and axial profile. The company claims to have improved outputs by up to 50% in some cases. (CIRCLE 147)

The economic and performance benefits of using engineered fiberglass fabrics in place of traditional mats will be discussed in the context of phenolic pultrusion by PPG Industries, Inc., Pittsburgh. PPG reports that triaxially stitched fabrics with a phenolic-specific finish can be cost competitive with less expensive phenolic-compatible mat because the fabrics provide higher transverse

COMPOSITES

FIG.3—PULTRUSION WITH FILLED CORE



The Pulrite process from Pultrex Ltd. of the U.K. uses a filled core to reduce the cost of pultrusions. Foamed clay filler is blown into a wrapper of continuously folded glass cloth.

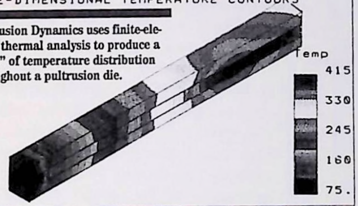
strengths, allowing use of thinner, lighter laminates. What's more, the fabrics can be pulled at much higher rates than mat without suffering blisters or delamination, PPG reports. (CIRCLE 148)

Pultruders will also have the opportunity to hear first-hand from Stoughton Composites Inc., Brodhead, Wis., about its in-house process developments for making structural panels for large freight containers. The company learned to pultrude complex wall thicknesses up to 48 in. wide and from 0.065 to 0.5 in. thick at rates up to 48 in./min. Stoughton combines stitched and braided glass fabrics, carbon-fiber tows, and fiberglass rovings into laminates with fiber contents of 60-68% and a high percentage of off-axis fibers. Stoughton will also tell how it captures styrene emissions from pultrusion machines and keeps emissions to 11 ppm, well below the OSHA limit of 100 ppm.

Processors should be interested in Reichhold's experiments on corrosion resistance of different resins in pultruded rebar for concrete reinforcement. Some 6 billion lb/yr of steel rebar and cable are used in this application, and only 3-4 million lb/yr are currently FRP, the company estimates. Reichhold—working with the Constructed Facilities Center of West Virginia University, Morgantown—exposed pultrusions to freeze-thaw cycles, salt solution, and alkaline environments (concrete is itself alkaline). In these accelerated tests, a severely alkaline (pH 13-14) solution was found to be the most damaging to the laminates. Out of seven resins, the best overall performers were a urethane-modified vinyl ester (Reichhold's Dion 31038-00) and a medium-reactivity isophthalic polyester (Dion 31022-00). (CIRCLE 149) □□

—John De Gaspari

THREE-DIMENSIONAL TEMPERATURE CONTOURS



Pultrusion Dynamics uses finite-element thermal analysis to produce a "map" of temperature distribution throughout a pultrusion die.

Study Quantifies Styrene Emissions from Hand Lay-Up

The first results of an open-mold styrene-emissions study, conducted by the Composites Fabricators Association, Arlington, Va., and Dow Plastics, Midland, Mich., were released in October at the CFA '95 show in Anaheim, Calif. The study was designed to determine baseline emissions from the hand lay-up process using typical industry techniques while making no attempt to reduce emissions. Tests were run on four experimental variables: laminate thickness, resin styrene content, gel time, and air flow over the mold surface.

►*Laminate thickness*: Overall, this was the biggest contributor, responsible for 69% of styrene emissions. The thicker the laminate, the lower the emissions per pound of resin used. In two samples using the same weight of low-styrene (35%) resin, two plies of 1.5-oz chopped-strand mat produced 4.2-5.3% lower emissions by weight and 30-33.5% lower emissions per unit of surface area than one ply of mat. Using high-styrene (42%) resin, two plies of mat produced 5.9-6.7% lower emissions by weight and 35-35.6% lower emissions per unit of area than did one ply of mat.

►*Gel time*: This factor was responsible for 17% of styrene emissions. Faster gel times produced lower emissions. A decrease in gel time from 30 to 15 min yielded an average decrease in emissions of 18.3% by weight and 12.4% per unit of surface area.

►*Styrene content*: This accounted for 11% of styrene emissions. Higher styrene content produced more emissions. Emissions ranged from 9.8% to 17.7% of available styrene for hand lay-up of low-styrene (35%) resin and from 11.7% to 21% of available styrene for high-styrene (42%) resin. A decrease in styrene content from 42% to 35% yielded a 16% average decrease in emissions.

►*Air flow*: This factor contributed only 1% of overall emissions.

This year, the second phase of the project will look at work practices and emissions-reduction techniques.

MUTUAL
PRESS CLIPPING SERVICE

OCT 26, 1994

MOUNTAINTOP EAGLE
MOUNTAINTOP, PA

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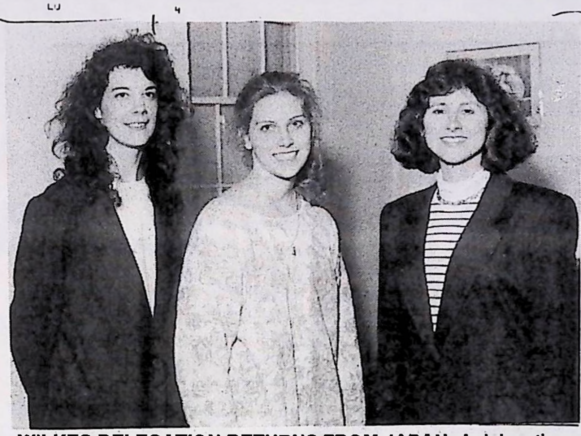

WILKES DELEGATION RETURNS FROM JAPAN- A delegation of students and faculty from Wilkes University recently returned from a 10-day trip to Tamagawa University, Machida, Japan. The trip was part of Wilkes's continuing exchange program with Tamagawa University, which beings educators together to study educational systems of different cultures. delegates, shown from left, are Darlene Jones, '95; Nancy Bingham, '96, of Mountaintop; and Diane Polachek, associate professor of education. 225FF

Vahey Awarded Fellowship

Wilkes University senior Stephen C. Vahey, of Mountaintop, is currently in Richland, Wash., on a research fellowship at Battelle Pacific Northwest National Laboratories.

A materials engineering major, Vahey was awarded the fellowship through the United States Department of Energy's Science and Engineering Research Semester program. He will be there until mid-December.

Vahey's research will focus on ceramic fuel cells, which are devices that combine hydrogen and oxygen in a way so that they produce electricity and not an explosive, chemical reaction. Ceramic fuel cells, which are nonpolluting because their byproduct is water, are being tested for use in electric cars.

"Stephen has received a very recognized and prestigious fellowship, and many students compete for this award," says Dr. John L. Orehotsky, chairperson of the mechanical & materials engineering department, and Vahey's academic advisor.

While on the fellowship, Vahey is taking two evening classes at Washington State University. A Presidential Scholar, he will graduate from Wilkes in May of 1995.

Vahey is the son of Richard and Christel Vahey of Mountaintop. He is a 1991 graduate of Bishop Hoban High School, Wilkes-Barre.

Stephen Vahey awarded DOE research fellowship

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CN 12/30/94

Wilkes University News

Christine Liberaski
Communications Assistant
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Wilkes Student Awarded Fellowship in Washington

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-MORE-

1ST ADD - WILKES STUDENT AWARDED FELLOWSHIP

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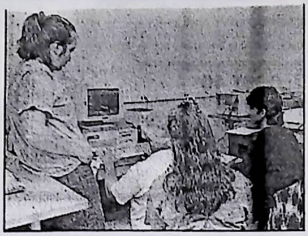


TIMES LEADER/CARA MENICHELLI

Dr. Roger Maxwell of Wilkes University teaches area high school students how to measure radon levels with the aid of a computer.

Wilkes lab lets potential students dabble in science

By ANTHONY COLAROSSI
Times Leader Staff Writer

WILKES-BARRE — What were those high school students doing early Saturday morning in a dark laboratory room at Wilkes University? They were creating holograms, that's what.

Working carefully on and around a $10,000 vibration proof-table, the students developed images of small porcelain figures on a clear film and then held them in front of a laser, creating a three-dimensional reproduction of the scene.

Scott Jones, one of 14 local high school seniors and juniors attending a free series of physics workshops at Wilkes, learned holograms can be used to spot malfunctions in engines, errors the unaided eye could never spot, Jones said.

"You can see the errors on the hologram," said Jones, 17, of Wyoming Area High School. "You actually see how it works and how it operates."

"A hologram always fascinates," said Wilkes University professor Dr. Yu Bibby. "They cannot do this in high school. They don't have the facilities."

Other physics students spent their morning designing three-dimensional images on computers, measuring radon levels and building electromagnetic radiation detectors.

"Our aim is to let them see what Wilkes has to offer," said Dr. Roger Maxwell, the physics department chair. "We would like them to consider Wilkes."

Maxwell taught students to measure radon test levels with the help of a computer. Radon gas is the nation's second leading cause of lung cancer. The gas leaks into homes from adjacent soil through unsealed cracks and other openings.

"We're going to test our homes for radon," said Dave Dudzinski, 17, of Pittston Area High School. On his way out of the lab, Dudzinski was packing a charcoal canister detector. He plans to place the detector in his home and then bring it back during the week to be analyzed.

Dudzinski was impressed with the workshop and said he will be applying to Wilkes next year.

In the Solid State Physics and Materials Engineering Laboratory other students learned how to measure electromagnetic radiation from a model power line.

"These two students are trying to find out how this phenomena (electromagnetic fields) works," said Dr. John Orehotsky.

The professor watched the students chart the decrease of the electromagnetic field, as they moved their measuring device farther away from a model power line.

"You didn't think I was going to make you work, did you?" Orehotsky joked.

Michelle Girvan said she chose the workshops because she plans to major in physics in college. Although she is not planning to attend Wilkes, Girvan, 17, said the program is helping her decide on which area of physics to concentrate her studies.

"I'm here because I know what I want to do," the Wyoming Valley West High School senior said. "After sampling, that could help me narrow things down."

TL 9/18/94

Department Engineering
Appointed Sept. 1971

FACULTY PERSONNEL DATA

NAME [illegible] Date of Birth 7-24-34

1. RECORD AT WILKES:

	Date of appointment or promotion	Date of Severance
Instructor		
Assistant Professor	9-1-71	
Associate Professor	June 1976	
Professor	June 1982	
Other		

Other activities and responsibilities while at Wilkes;

II. EDUCATION:

	Degree	Institution	Year
Bachelor's Degree	B.S.	Massach. Inst. of Tech.	1956
Master's Degree	M.S.	Polytech. Inst. of Brooklyn	1961
Doctor's Degree	Ph.D.	Syracuse Univ.	1967
Other Degrees			

III. STUDIES AND PUBLICATIONS:

Title	Publisher or Publication	Date
High Temp. Heat Exchange Calorimeter	Jour. Phys. E	1971
Zener Relaxation	Acta Met.	1968
Analytic Representation [illegible]	Philos. Mag.	1964
Brittle-Ductile Transit. in Tungsten	Trans. AIME	1961
Fourier Analysis of [illegible]	Jour. Appl. Phys.	1966
[illegible]	Bull. Am. Phys. Soc.	1967
Zone Melting of Tungsten	Proc. of 1st Elect. Beam Sym.	1960
Magnetism on FeGd Alloys	(Submitted Jour. App. Phys.)	
Magnetic [illegible]	(Submitted [illegible] in Phys.)	

Name ____________________

IV. EXPERIENCE Before Coming to Wilkes:

Teaching: - School or College	Position Held	Date

Business:		
International Business Machines	Staff Engineer	to 1971
Sylvania Electric Company	Junior Engineer	to 1961

Military: - Service	Rank	Year

V. PROFESSIONAL AFFILIATIONS (Indicate offices held):

American Society for Metals - President Syracuse Univ. Student Chapter

American Institute of Metallurgical Engineers

American Physical Society

Sigma Xi

American Scientific Affiliation

VI. NON-PROFESSIONAL AFFILIATIONS:

John Lewis Orehotsky
79 Grandview Avenue
Dallas, Pennsylvania 18612

Born - July 24, 1934; Hartford, Conn.; Married - three children
Height - 6 ft.; Weight - 165 lbs.

Education

Ph.D.; Solid State Science; Syracuse University; Feb. 1971; Dissertation - Speci
Heat Anomaly at the Curie Temperature of FeNi, FeCo, FeCr, and FeV Alloys.
M.S.; Metallurgical Engineering; Polytechnic Institute of Brooklyn; June 1961;
Thesis - The Brittle Ductile Transition in Tungsten.
B.S.; Physical Metallurgy; Massachusetts Institute of Technology; June 1956;
Thesis - X-Ray Absorption Edge Analysis of CuZn Alloys.

Employment

1971 to Present
Wilkes College
Wilkes-Barre, Pennsylvania
Associate Professor; Dept. of Materials and Electrical Engineering
Teaching Responsibilities (Text - Author - Publisher)

1. Intro. to Metallurgical Thermodynamics - Gaskell - McGraw Hill
2. Elements of X-Ray Crystallography - Azaroff - McGraw Hill
3. Elements of Materials Science - VanVlack - Addison Wesley
4. Solid State Physical Electronics - van der Ziel - Prentice Hall
5. Transistor Engineering - Phillips - McGraw Hill
6. Mechanical Metallurgy - Dieter - McGraw Hill
7. Modern Electrochemistry - Bockris and Reddy - Plenum
8. Intro. to Ceramics - Kingery - Wiley
9. Heat Transfer - Chapman - MacMillan

1961 to 1968
T. J. Watson Research Lab
International Business Machines
Yorktown Heights, New York
Research Responsibilities

1. Magnetic Thin Film Amorphous Alloys
2. Vacancy Studies in AgZn Alloys
3. Anelastic Prezoresistance Effects
4. Bipolar and Field Effect Transistors

1956 to 1961
Sylvania Electric Products Research Lab.
Bayside, New York
Research Responsibilities

1. Secondary Recrystallization in Tungsten
2. X-Ray Work in Single Crystals, Preferred Orientation, and Fourier Anal
of Diffraction Profiles

Professional Affiliations

American Institute of Metallurgical Engineers

Description of Current and Previous Research

1. Magnetic properties of amorphously structured $(Fe_{1-x}Ni_x)_{80}(B_{1-x}P_x)_{20}$ and Fe-Gd alloy thin films.
2. Crystallization Kinetics of amorphous $(Fe_{1-x}Ni_x)_{80}(B_{1-x}P_x)_{20}$ alloy thin films.
3. Magnetic properties of the stoichiometic Sm_2Co_{17} and Sm_1Co_5 type rare earth transition metal alloys.
4. Magnetic properties, crystal structure determination, and catalytic characterist of spinel and perovskite structured ceramic compounds.
5. Phase transitions in magnetic materials and in atomic order-disorder alloys from specific heat and electrical resistivity measurements.
6. Gas-solid reaction kinetics - The hydrogen reduction of MoO_2 and MoO_3.
7. Photovoltaics - Energy conversion characteristics of p-n junction Si solar cells as a function of the size and position of the space charge region.
8. Photon assisted electrolysis of aqueous solutions using a photo-illuminated $Ba_{.6}Sr_{.4}Ti_1O_3$ anode.
9. Electrochemistry of oxygen evaluation from various alloy and ceramic anodes in aqueous solutions.
10. Vacancy controlled atomic mobility in Ag-Zn alloys.
11. Anelastic piezoresistance effect in selected solid solution and interstitual alloy systems.
12. Secondary recrystallization in tungsten.
13. Electron beam zone refining of tungsten.
14. Fourier analysis of X-ray diffraction profiles in cold worked tungsten wire.
15. Development of preferred orientation in cold worked tungsten wire.

Publications

1. A. Opinsky and J. Orehotsky, "Orientations of Large Grains in Tungsten," Trans. AIME 221, 1083 (1961).
2. A. Opinsky, J. Orehotsky, and C. Hoffman, "Fourier Analysis of Crystallite Size and Lattice Strain in Tungsten Wire," J. Appl. Phys. 33, 708 (1962).
3. J. Orehotsky and T. Stienitz, "Effect of Purification on the Transition Temperature of Tungsten," Trans. AIME 224, 556 (1962).
4. B. Berry and J. Orehotsky, "Anelastic Piezoresistance Effect in Alloys," Phil. Mag. 9, 467 (1964).
5. B. Berry and J. Orehotsky, "The Zener Relaxation and Vacancy - Controlled Atomic Mobility in AgZn Solid Solutions - 11 The Kinetics of Vacancy Annealing," Acta Met. 66, 697 (1968).
6. B. Berry and J. Orehotsky, "The Zener Relaxation and Vacancy - Controlled Atomic Mobility in AgZn Solid Solutions - 1 Vacancy Formation and Migration Energies," Acta Met. 66, 683 (1968).
7. J. Orehotsky and K. Schroder, "Simple High Temperature Heat Exchange Calorimeter," J. Phys. E. 2, 889 (1970).
8. J. Orehotsky and K. Schroder, "High Temperature Specific Heats of Cr-Fe and Ti-Fe-Co Compounds Between 400^o and 1000^{o}C," Bull. Amer. Phys. Soc., Ser. 11, No. 1, 16, 82 (1971).
9. J. Orehotsky and K. Schroder, "Magnetic Properties of Amorphous Fe_xGd_{1-x} Alloy Thin Films," Journal Appl. Phys. 43, 2413 (1973).
10. J. Orehotsky, W. Kwaitkowski and K. Moser, "A Magnetically Driven Flexure Fatigue Apparatus," Metallurgical Transactions, 4, 2849 (1973).
11. J. Orehotsky and K. Schroder, "Magnetic Specific Heat of Iron Rich Iron-Chromium and Iron-Vanadium Alloys Between 600^o and 1500^{o}K," Phys. Status Solidi, 19, 93 (1973).
12. J. Orehotsky and K. Schroder, "Magnetic Specific Heat of Nickel-Iron and Nickel-Cobalt Alloys Between 600^o and 1500^{o}K," Phys. Kondens Mat. 17, 37 (1973).
13. J. Orehotsky and K. Schroder, "Order-Disorder Critical Phenomena in FeCo," J. Phys. F, 4, 196 (1974).
14. S. Washko, J. Gerboc and J. Orehotsky, "Magnetic and Crystallographic Properties of SmCo Base Ternary Alloys," IEEE Transactions MAG-12, No. 6, 974 (1976).
15. J. Orehotsky, S. Washko, J. Gerboc and T. Wahl, "Electron Transfer in Magnetic SmHfCo Alloys," J. Appl. Phys. 48, 823 (1977).

16. J. Orehotsky and T. Wahl, "Electron Transfer in Hf_1Co_6," J. Appl. Phys. 48, 2626 (1977).

17. J. Orehotsky, H. Huang, C. R. Davidson, and S. Srinivasan, "The Dependence of Oxygen Evolution Kinetics on the Magnetic State of NiCu Anodes," J. Electronal., Chem. 95, 229, (1979).

18. J. Orehotsky, H. Huang, C. R. Davidson, and S. Srinivasan, "Oxygen Evolution on $Ni_xFe_{3-x}O_4$ Electrodes," J. Electroanal. Chem. 95, 233, (1979).

19. J. Orehotsky, and C. R. Davidson, "Magnetic Properties of Fine Particle Nickel Ferrites, "Magnetism Letters, 1, 117, (1979).

20. J. Orehotsky and Marie Kaczenski, "The Hydrogen Reduction Kinetics of MoO_2 Powder," Mat. Sci and Engineering, 40, 245, (1979).

21. J. Orehotsky, Linda Jamiolkowski and J. Gerboc, "Hydrogen Reduction of MoO_3 to MoO_2, " Materials Science and Engineering, 41, 237, (1979).

22. J. Orehotsky, "Crystallization of Amorphous $Fe_{80}(B_{1-x}P_x)_{20}$ Alloys," J. Appl. Physics, 50, 7612, (1979).

23. J. Orehotsky, "Composition Dependency of Crystallization in $Fe_{80}(B_{1-x}P_x)_{20}$ Amorphous Alloys, "Met. Transactions 11A, 1761 (1980).

24. J. Orehotsky, "Energy Conversion Characteristic of a Silicon Solar Cell," Proceedings of 1981 Porto Energy Conference, Porto, Portugal.

25. J. Orehotsky, "The Hydrogen Fuel-Solar Energy Alternative; Photoelectrolysis Characteristics Employing a $Ba_{0.6}Sr_{0.4}Ti_1O_3$ Anode," Proceedings of 1981 Porto Energy Conference, Porto, Portugal.

26. R. S. Yeo, J. Orehotsky, W. Visscher, and S. Srinivasan, "Ruthenium-Based Mixed Oxides as Electrocatalysts for Oxygen Evolution in Acid Electrolytes," Journal of Electrochemistry, 128, 1900, (1981).

Awards

Summer Research Fellowship
National Research Council of Canada
Atlantic Research Institute
Nova Scotia Technical College
Halifax, Nova Scotia, Canada
June - August 1974

Visiting Research Scientist
Electrochemistry Department
Brookhaven National Laboratories
Upton, New York
June - August 1977
June - August 1978
July - August 1979

Fulbright-Hays Fellowship
Department of Physics
University of Oporto
Oporto, Portugal
January - July 1981

NASA Faculty Fellowship
Jet Propulsion Laboratories
California Institute of Technology
Pasedena, CA
June- - A ugust 1982

WILKES COLLEGE OFFICE OF PUBLIC RELATIONS

FACULTY-STAFF INFORMATION SHEET

1980-81

NAME JOHN ORεHOTSKY POSITION ASSOC PROF

Date of Birth JULY 24, 1934 Place of Birth HARTFORD, CONN.

Address 79 GRANDVIEW AVE DALLAS PA 18612 Home Phone 675-4345

Marital Status M To Whom RUTH ANN LARSEN When MARCH 29, 1958

Children and Dates of Birth LARSEN JULY 24, 1959, DAVID FEBRUARY 2, 1962, JENNIFER MARCH 8, 1965

Date Joined Wilkes 1971 Other Positions Held at Wilkes(Include Dates)

Previous Employment (Institutions, Titles & Dates) SYRACUSE UNIV 1969-1971

IBM RESEARCH SCIENTIST 1961-1968

SYLVANIA ELECTRIC RESEARCH SCIENTIST 1956-1951

COLLEGE INFORMATION

Colleges Attended	Dates	Degree	Major
SYRACUSE UNIV	1969-1971	Ph.D.	SOLID STATE SCIENCE
BROOKLYN POLYTECHNIC INST.	1959-1961	M.S.	MET. ENGIN.
MASS. INST TECH	1952-1956	B.S.	METALLURGY

High School Attended WINDHAM HGH

Location WILLIMANTIC CONN Years 1948-1952

FACULTY-STAFF INFORMATION SHEET
(Page 2)

Military Information (Optional)

Dates of Service ______________________ Branch ______________

Rank on Discharge ______________________

List all Honors, Decorations, etc. ______________________

Please list extra-curricular activities; professional memberships; honors or awards received; varsity athletics; business and social fraternities; scholastic Honors; etc. (Use reverse side if necessary.)

AMER. INST. OF MET. ENGINEERS, NATIONAL RESEARCH COUNCIL OF CANADA AWARD 1974, BROOKHAVEN NATIONAL LABORATORIES VISITING SCIENTIST AWARD 1977, 1978, & 1979. FULLBRIGHT-HAYS FELLOWSHIP 1980

Please list research and teaching interests. (Use reverse side if necessary.)

MAGNETISM, GAS METAL REACTIONS, SOLID STATE PHYSICS, THERMODYNAMICS

Hometown Newspaper or Professional Publications to which you would like releases sent:

SUBURBAN NEWS ~~PHEEL~~ SWEET VALLEY

Please add any additional information about yourself that would help us in keeping our files up-to-date.

Please Return To:

PUBLIC RELATIONS OFFICE
WECKESSER HALL

Faculty Resume Information Sheet

Full Name Orehotsky John L.
Last First M.I.

School or College and Department Engineering

Age as of September 1, 1988, Date of Birth 54, 7/24/34

Academic Rank Professor

Full-Time [X] Part-Time [ ]

Non-Wilkes College Teaching, If Part-Time Penn State W-B campus

Earned Degrees	Name of Institution	Location	Area, Field or Major	Degree Received	Date Conferred
	Syracuse University	Syracuse, NY	Solid State	Ph.D.	1971
	Brooklyn Poly. Tech.	Brooklyn, NY	Engineering	M.S.	1961
	Mass. Inst. of Tech.	Boston, MA	Metallurgy	B.S.	1956

Teaching Experience Incl. Wilkes	Name of Institution	Location	Subjects/ Fields Taught	Full or Part-Time Rank	Dates of Service From – To
	Wilkes College	W-B, PA	Phy./Egr	Full	1971-89
	Penn State	W-B, PA	Engineering	Part	1988

Non-Teaching Experience

	Firm or Organization or Self-Employed	Duties	Title	Dates of Service From – To
Full-Time	IBM	Research	Scientist	1961-1971
	Sylvania Electric	Research	Scientist	1956-61
Part-Time				

List Major Consulting Activities

Brookhaven National Labs

RCA

Bibliographic Citation of Principal Publications – Last Five Years

J. Appl. Physics 61,1210 (1987)

J. Appl. Physics 61, 4240, (1987)

(OVER)

Memberships in Professional and Scientific Societies

Organization Name	Scope: Local, State, Regional, National	Offices Held
American Phys. Society	National	

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	Thermodynamics	3			3/10	
Total of	Advanced Lab			6		1/6
Students	Physics Lab			6	1/15	1/10
Taught	Solid State Phys	3			2/1	
41						
Spring '89 Anticipated						
Total of	Physics III	3			3/45	
Students	Physics II Lab			3	11/15	
Projected	Intro to Ma.E	3			2/45	
115	Electrochem	3			2/10	

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

Duty/Activity	Hours per Week
Advising	2
Research/Scholarship	15
Committee Work	2
Department Chairperson	

# of Advisees: 10

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

Duty/Activity	Hours per Week

esc

9-26-88

7

John Lewis Orehotsky
R.D.#1, Box 9
Grandview Avenue
Dallas, Pennsylvania 18612

PERSONAL INFORMATION

Born - July 24, 1934; Hartford, Connecticut
Married - three children; ages 14, 11 and 8
Weight - 170 lbs.
Height - 6 feet
Brown hair and eyes

PROFESSIONAL AFFILIATIONS

1. American Society of Metals
   President - Syracuse University Student Chapter - 1970-1971
   Secretary - Northeast Pennsylvania Chapter - 1973-1974
   Chairman of Education and Student Affairs Committee
   Northeast Pennsylvania Chapter - 1972-1973
   Faculty Advisor - Wilkes College Student Chapter - 1972-1973

2. American Physical Society

3. American Institute of Metallurgical Engineers

EXPERIENCE

1. Wilkes College
   South River Street
   Wilkes-Barre, Pennsylvania
   1971 to present - Assistant Professor, Department of Materials and Electrical Engineering.
   A. Teaching Assignments:
      a) Physical Metallurgy
      b) X-ray Diffraction and Laboratory
      c) Thermodynamics
      d) Materials Science
      e) Magnetism
      f) Ceramics

g) Semiconductor Physics (Solid State Physical Electronics)
h) Crystallography
i) Instrumentation Laboratory

B. Research Projects:
a) Diffusion in multicomponent systems
b) Thermodynamic properties of alloys
c) Gas-metal reaction kinectics
d) High energy batteries

2. Syracuse University
409 Link Hall
Syracuse, New York 13210
1969 to 1971 - NSF Research Assistant, Physical Metallurgy
Section of the Metallurgical Engineering Department.
A. Research Involved:
a) Design and construction of a rapid measurement calorimeter
b) Second order magnetic phase transformations in iron and nickel base alloy systems
c) Order-disorder phase transformation
d) Density of electron states in transition metal alloys

3. Thomas J. Watson Research Laboratories
International Business Machines
Yorktown Heights, New York
1961 to 1968 - Research Scientist, Solid State Physics Group.
A. Work Assignments Included:
a) Magnetism in amorphous iron gadolinium alloys
b) Formation and motion energies of vacancies in solid solution alloys
c) Vacancy annealing kinetics in solid solution alloys
d) The anelastic piezoresistance dffect
e) High vacuum technology (designed and built an ultrahigh vacuum evaporator)
f) Mass spectrograph residual gas evaluations in ultrahigh vacuum
g) Thin films
h) Field effect transistors and pnp semiconductor devices (at IBM, Fishkill, N.Y.)

4. Sylvania Electric Research Laboratories
Bayside, New York
1956 to 1961 - Member of Tungsten Research Section.

A. Activities Involved:

a) X-ray diffraction; Fourier analysis of line shapes for lattice strain and crystallite size in tungsten
b) Secondary recrystallization and grain growth in tungsten
c) X-ray single crystal work
d) X-ray evaluations of preferred orientation in deformed tungsten
e) The zone purification mechanism in tungsten
f) The brittle-to-ductile transition temperature of tungsten
g) Design and construction of one of the first electron bombardment apparatus for floating zone melting of metal rods

AWARDS

Canadian National Research Council Fellowship 1974

PUBLICATIONS

1. Magnetic Phase Transformations in fcc Alloys - "Specific Heat of Nickel-Iron and Nickel-Cobalt Alloys Between 600° and 1500° K;" J. Orehotsky and K. Schroder; Phys. Kondens Mat. 17, 37, (1973).

2. Magnetic Phase Transformations in bcc Alloys - "Specific Heat of Iron Rich Iron-Chromium and Iron-Vanadium Alloys Between 600° and 1500° K ;" J. Orehotsky and K. Schroder; Phys. Status Solidi, 19, 93, (1973).

3. Fatigue - "A Magnetically Driven Flexure Fatigue Apparatus;" J. Orehotsky, W. Kwaitkowski and K. Moser; Metallurgical Transactions, 4, 2849, (1973).

4. Amorphous Thin Film Alloys - "Magnetic Properties of Amorphous $Fe_x Gd_{1-x}$ Alloy Thin Films;" J. Orehotsky and K. Schroder; Journal Appl. Phys., 43, 2413, (May 1973).

5. Density of Electron States - "High Temperature Specific Heats of Cr-Fe and Ti-Fe-Co Compounds Between 400° and 1000° C;" J. Orehotsky and K. Schroder, Bull. Amer. Phys. Soc., Ser. 11, No. 1, 16, 82, (1971).

6. Calorimetry - "Simple High Temperature Heat Exchange Calorimeter;" J. Orehotsky and K. Schroder; J. Phys. E. 2, 889, (1970).

7. Point Defects - "The Zener Relaxation and Vacancy – Controlled Atomic Mobility in AgZn Solid Solutions - I Vacancy Formation and Migration Energies;" B. Berry and J. Orehotsky; Acta Met. 66, 683, (1968).

8. Vacancy Annealing Kinetics - "The Zener Relaxation and Vacancy - Controlled Atomic Mobility in AgZn Solid Solutions - II The Kinetics of Vacancy Annealing;" B. Berry and J. Orehotsky; Acta Met. 66, 697, ((1968)

9. Piezoresistance - "Anelastic Piezoresistance Effect in Alloys;" B. Berry and J. Orehotsky; Phil. Mag. 9, 467, (1964).

10. Brittle-Ductile Transition - "Effect of Purification on the Transition Temperature of Tungsten;" J. Orehotsky and T. Stienitz. Trans. AIME 224, 556, (1962).

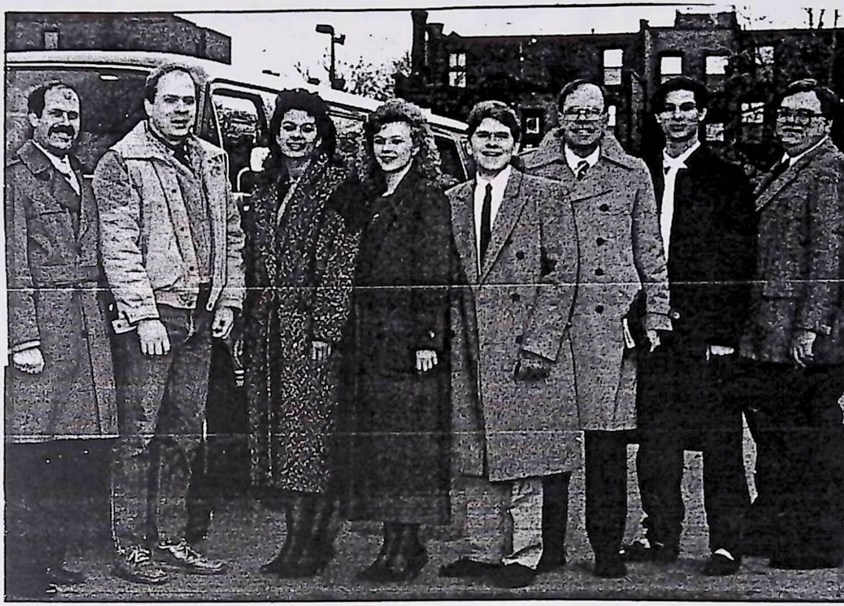
11. X-ray Diffraction - "Fourier Analysis of Crystallite Size and Lattice Strain in Tungsten Wire;" A. Opinsky, J. Orehotsky

and C. Hoffman; J. Appl. Phys. 33, 708, (1962).

12. Secondary Recrystallization - "Orientations of Large Grains in Tungsten;" A. Opinsky and J. Orehotsky; Trans. AIME 221, 1083, (1961).

13. Zone Purification - "Electron Bombardment Apparatus for the Molten Zone Melting of Tungsten;" J. Orehotsky and A. Opinsky, Proc. of First Sym. on Electron Beam Melting; Alloyed Research Corp. Watertown, Massachusetts.

14. Order-Disorder Phase Transformation - "Order-Disorder Critical Phenomena in FeCo;" J. Orehotsky and K. Schroder (Accepted for publication - J. Phys. A.).



C.V. May 9, 1989

Wilkes College faculty presents research papers

Several Wilkes College faculty members presented research papers in various fields at the Pennsylvania Academy of Science's recent 65th annual meeting held at Mount Airy Lodge in the Poconos.

Among Wilkes personnel at the session were members of the biology faculty and students, from left: Dr. Kenneth Klemow, Dr. David Long; students, Marie Glowaski, Renee Strucke, David Garber; Dr. Wilbur Hayes, student Joseph Eby, and Dr. Lester J. Turoczi. The Biology Department, represented by nearly the entire faculty, presented a diversity of research ranging from lead content in the bottom sediment of Lake Nuangola, and 12 other bodies of water in Luzerne County.

Others in attendance included Dr. Charles Reif, Dr. Micahel Case, Dr. Charles Charnetski, Dr. Robert Ogren, Dr. Clyde Houseknecht, John Rinehart, and Professor John Orehotsky, as well as students, George C. Strand Jr., Albert Timko and Michelle Olexa; Wilkes alumnus John V. Jankowski, Leigh University; Mary F. Kokoski, Bureau of Labor Statistics, and Edwin B. Forsythe, National Wildlife Refuge located in Atlantic County, NJ.