

# 102nd Annual Meeting The Ohio Academy of Science Hosted by Youngstown State University April 30-May 1-2, 1993

## WELCOME

Youngstown State University welcomes the 102nd annual meeting of The Ohio Academy of Science. Founded in 1908, YSU celebrates its 25th year as one of Ohio's state universities in 1992-1993. We invite you to explore our campus and to share in the excitement and challenge represented in this program.

## REGISTRATION

**REGISTRATION IS REQUIRED FOR ALL MEETING PRESENTERS AND ATTENDEES.** On-site registration will be available at a higher rate. Meals cannot be guaranteed after April 22, 1993.

To assure reservations for banquets, registrations must be received by Youngstown State University by April 16, 1993.

Use Registration Form on last page. Please send the completed form and fees (payable to Youngstown State University) by April 16, 1993 to:

Youngstown State University  
Office of University Outreach  
Continuing Education Registration  
Youngstown, Ohio 44555-3358

Registration by credit card or purchase order only will be accepted by FAX at (216) 742-1419. An acknowledgment will be sent to those preregistered and paid by April 16. Your packets, tickets, and name tag will be ready at the meeting registration desk upon your arrival.

For further information, please call (216) 742-3358 or FAX (216) 742-1419.

### Friday, April 30 (Wick-Pollock Inn)

Registration and the symposia for Friday will be held at the Wick Pollock Inn. On-site registration is possible by check, VISA, Mastercard, or Discover Card.

12:00 pm - 2:00 pm for afternoon symposia

### Saturday, May 1 (Cushwa Hall-YSU Campus)

Registration and all technical and poster sessions will be in Cushwa Hall on the YSU campus. On-site registration at the meeting registration desk in the ground floor lobby of Cushwa Hall is possible by check, VISA, Mastercard, or Discover Card.

8:00 am - 3:00 pm for technical and poster sessions

## PARKING

### Friday, April 30

The symposia, workshop, reception and dinner will take place at the Wick-Pollock Inn on Friday. The Wick-Pollock Inn is located on Wick Avenue across from the YSU campus. It provides guest parking for those staying at the Inn and for those attending the Friday events.

If the Wick-Pollock Inn lots are filled, OAS meeting attendees should park in YSU's visitors lot (M-8) located on Spring Street, one block from the Wick-Pollock Inn.

### Saturday, May 1

Guest parking for those attending the Saturday sessions will be in the Lincoln Avenue parking deck (M-2). Access to the parking deck is from Arlington Street off Fifth Avenue. Inform the parking attendant that you are attending the OAS meeting.

## SMOKING POLICY

Smoking in buildings is permitted only where there are "designated smoking area" signs.

## MEALS

### Friday, April 30

A cafeteria and fast food restaurants are available for breakfast and lunch on campus in Kilcawley Center or at the Crystal Room of the Wick-Pollock Inn.

On campus in Kilcawley Center:

Arby's  
Terrace Room  
Wicker Basket

Nearby restaurants include Lincoln Avenue: (1 block from campus)

Little Jimmy's Pizza  
Burger King  
Inner Circle  
Fred's New Life Restaurant  
Subway

Fifth Avenue: (1 block from campus)

McDonald's

Belmont Avenue: (5 miles from campus)

Captain's Table  
Station Square  
Choice's - Holiday Inn Metroplex  
Golden Hunan - Chinese  
Boat Yard Ltd  
Bob Evans  
Western Sizzlin Steak House  
Empress - Chinese  
Armando's

6:00 pm OAS/OBS Dinner at The Wick Pollock Inn (Reservations required by April 16)

## Saturday, May 1

Breakfast and lunch are available on campus in the Kilcawley Center. (Also see the above list of nearby restaurants.)

### *Tips for Success in Graduate School*

Graduate Student Luncheon and Discussion at 12:30 P.M. in the Kilcawley Center, Buckeye Suites 1-2.

Arranged by DR. TOD F. STUESSY  
The Ohio State University

Join Dr. Stuessy for an informal discussion on such issues as joining professional societies, presenting papers, preparing your curriculum vitae, interacting with peers and others in your field around the world, and preparing for employment interviews.

BIONET Meeting at 12:30 P.M. in the Kilcawley Center, Room 2068  
Arranged by DR. JOHN OLIVE,  
The University of Akron

OAS Annual Meeting Banquet at 7:00 P.M. in Kilcawley Center  
(Reservations required by April 16)

## Sunday, May 2

Field trips are planned between 8:00 a.m. and 12 noon.

Geology field trip to the BFI carbon limestone landfill.

Ecology field trip to Mill Creek Park.

Registrations required by April 16. Use the check-off provided on the registration form.

## HOUSING

Please contact hotels and motels directly. Listed below are area motels and their rates.

Days Inn (216) 759-3410 (5 miles from campus)

RATES: \$37 - \$42 per night for 1-2 persons

Ramada Inn (216) 759-7850 (5 miles from campus)

RATES: \$45 - Single; \$50 - Double; \$55 - Triple; \$60 - Quad

Comfort Inn (216) 759-3180 (5 miles from campus)

RATES: \$45 - Single; \$60 - Double Includes continental breakfast

Knights Inn (216) 793-9305 (14 miles from campus)

RATES: \$32.95 - Single; \$40.95 - Double

Holiday Inn - Metroplex (216) 759-0606 (5 miles from campus)

RATES: \$64 - Single; \$79 - Double

Holiday Inn - Boardman (216) 726-1611 (12 miles from campus)

RATES: \$69 - Single; \$79 - Double

Wick Pollock Inn (216) 746-1200 (on YSU campus)

RATES: \$54 - 1 - 4 people.

Prices quoted above do not include tax. The above discounted rates are valid only through April 16, 1993. After April 16, the current motel rate will be charged. When making reservations, please state that you will be attending The Ohio Academy of Science Annual Meeting.

## GENERAL SCHEDULE

### Thursday, April 29, 1993

6:00 - 9:00 p.m. and

### Friday, April 30, 1993

8:30 a.m. - 4:00 p.m

Animals in the Classroom Workshop

Cushwa Hall B 079

### Friday, April 30th in the Wick-Pollock Inn:

12:00 Noon - 1:30 p.m. Lunch on your own

12:00 Noon - 2:00 p.m. Registration - Terrace

1:30 p.m. - 4:00 p.m. Symposia/Workshops (see abstracts for rooms)

1:30 p.m. Section S: Library and Information Sciences Maag Library, 5th floor Conference Room

2:00 p.m. - 4:00 p.m. OBS Executive Committee - Board Room

3:00 p.m. - 5:00 p.m. OAS Executive Committee - Board Room

5:00 p.m. Hospitality Hour - Terrace

6:00 p.m. Joint OAS/OBS Dinner - Ballrooms, Wick Pollock Inn  
(Reservations required by April 16)

7:00 p.m. **Industrial and Post-Industrial Mahoning River**

DR. LAUREN A. SCHROEDER  
Department of Biological Sciences  
Youngstown State University

Lauren Schroeder was born in Minnesota, February 24, 1937. He received his B.S. degree in science from Saint Cloud State College (1959), a M.A. (1964) and Ph.D. (1968) in zoology from the University of South Dakota. His academic/research experiences include a fellowship to study molecular biology (University of California, Berkeley, 1962), a research fellowship to study plant-insect interactions (Iowa State University, 1963), and research assistantship to participate in the study of Antarctica ponds (1968).

Schroeder has been on the faculty at Youngstown State University since 1968. His teaching activities include ecology and aquatic ecology. A particularly rewarding course for both Lauren and his students is field ecology, taught in the Arctic tundra at the Northern Studies Center, Churchill, Manitoba.

His life-long research activities focus on plant-insect interactions, aquatic ecology and water pollution. The contrast between the relatively unpolluted rural Midwest and the intensely industrialized and polluted Youngstown area motivated Lauren into increasingly direct his research, teaching and service activities to environmental issues.

8:00 p.m.

OBS Advisory Board - Scarlet Room, Kilcawley Center,  
Youngstown State University

OAS Council - Carnation Room, Kilcawley Center, Young-  
stown State University

**Saturday, May 1st in Cushwa Hall:**

7:30 a.m. Breakfast for Past Presidents - Board Room, Wick Pollock Inn

8:00 a.m. - 3:00 p.m. Registration - Ground Floor Lobby, Cushwa Hall

9:00 a.m. - 3:30 p.m. Poster Session - Atrium, Cushwa Hall

9:00 a.m. - 11:00 a.m. Morning Technical Session Paper Presentations  
(See abstracts for rooms)

11:15 a.m. - 12:00 Noon

**All Academy Lecture Room B024 Cushwa Hall****Ice Age Hunters in the Central Russian Plain**

DR. JAMES ADOVASIO

John E. Boyle Professor of Anthropology and Archaeology Professor of Geology; Director, Anthropology and Archaeology Department; Director, Geology Department, Mercyhurst College, Erie, Pennsylvania; Executive Director, Archaeology Research Program, Southern Methodist University

Jim Adovasio was born in Youngstown, Ohio in February 1944. He attended the University of Arizona where he graduated *magna cum laude* with a B.A. in anthropology in 1965. He received his Ph.D. in anthropology from the University of Utah in 1970. A Phi Beta Kappa scholar, he was a Rhodes scholar finalist from the state of Arizona.

Dr. Adovasio taught at Youngstown State University until 1971 when he became a post-doctoral research associate at the Smithsonian Institution. In 1972 he began a twenty-year sojourn at the University of Pittsburgh. While at Pitt, he went from assistant professor in 1972 to full professor and chairman of the Department of Anthropology by 1980. In 1985 he added Professor of Geology and Planetary Sciences to his list of academic accomplishments.

His groundbreaking archaeological work at Meadowcroft Rockshelter in southwestern Pennsylvania changed the way we think of early humans in the New World. Considered by many to represent state-of-the-art methodological technique, the Meadowcroft excavations have been featured in national and international scholarly journals as well as in television specials by National Geographic, Discovery, and Nova. Dr. Adovasio received research grants in excess of \$371,000 for his work at Meadowcroft and other archaeological sites.

While at the University of Pittsburgh, Dr. Adovasio instituted the Cultural Resource Management Program and served as its director and principal researcher from 1976 to 1989. During his tenure as director of this archaeological contract program at the University of Pittsburgh, he managed more than 140 major archaeological projects and brought the university contract benefits amounting to almost 10.5 million dollars.

His research interests lie in all matters anthropological. To this end he has published more than 170 scholarly articles and books on subjects ranging from prehistoric textiles and basketry to paleoenvironment, including geographic areas from the southern United States to the Central Russian Plains.

His colleagues say that, "Adovasio always has at least three research articles going at one time." If you know him, you know it's probably true. His answer to the cautionary note, "Jim, you'll work yourself into an early grave," is standard: "You're probably right, but not before I've worked out the stratigraphy."

12:00 Noon Lunch on your own

1:30 p.m. - 5:00 p.m. Afternoon Technical Session Paper Presentations  
(See abstracts for rooms)3:00 p.m. - 5:00 p.m. Planetarium Show, "The Milky Way," in Ward  
Beecher Science Hall5:15 p.m. Annual Business Meeting (Academy Members Only)  
Kilcawley Center Carnation and Scarlet Rooms6:00 p.m. Hospitality Hour, Special Lectures Lounge Kilcawley  
Center7:00 p.m. Academy Banquet at the Ohio Room Kilcawley Center  
(Reservations required by April 16)

Awards and Recognition

President's Address: *Technology: Tomorrow's Determinate*

DR. RICHARD W. JANSON  
The Janson Industries  
Canton, Ohio

Since 1986 when the Ph.D. degree in Geography was conferred by Kent State University, the focus of Dr. Richard W. Janson's post doctoral research has been on mathematical modeling of large, complex production systems, including: (1) methods for simultaneous solution of all sector, all-region trade; (2) methods for evaluation of differential regional effects, including feedback effects; and (3) policy formulation for the Ohio economic-spatial system. His formal academic work included undergraduate work in physics at Denison University, the study of geography at Kent State University, and economics at The University of Chicago and Duke University.

Dr. Janson has written over 50 papers, most of which have been on topics related to economic development. They include papers on defense industry, small business high technology industry, historical development of regions, Markovian analysis, development policy for Ohio, input-output modeling, inter-regional trade, and the comparative advantage of regions. All of the papers have been presented at meetings or sessions of professional groups or were presented to boards or committees to assist policy evaluation or were published in regarded journals including *The Ohio Journal of Science*.

Dr. Janson is a charter member of the Industrial Technology and Development Enterprise Advisory Board (The Edison Board) and has served continuously for both Governors Richard F. Celeste and George V. Voinovich, since the legislature of Ohio created the Board. This Board has been charged with guiding the State of Ohio in the establishment of policies for successful transition of the industries of Ohio into the next century: that is, into the global economy of the developed world. The Edison Board has established high technology research centers. Three centers have core technologies that cross all manufacturing industries — welding, polymers, and advanced materials; three centers are regionally based and specialize in advanced manufacturing technologies; and two are focused on biotechnologies — medical applications and directed genetic research. In addition, related centers for artificial intelligence, sensor technology, technology transfer, technology development, and a training center have been funded and supported through the Edison initiatives. All of the Edison Centers are based on the comparative advantage of the regional industries and the regional universities. The Board has also funded high technology research by seed development grants and several small business, start-up centers (incubators). Dr. Janson serves as the Chairman of the Edison Board.

Dr. Janson and his brother, Ray, have owned and operated The Janson Industries for almost 35 years. During this time they have performed several thousand stage equipment and stage lighting contracts throughout Ohio, the nation and overseas. They have also been the dominant source for planetariums and driver trainer simulators in schools and universities throughout the United States. The Janson Industries constructed, and operated a commercial UHF television station, WJAN TV, in Canton for ten years.

Dr. Janson served as a trustee of The Wilderness Center in Stark County, Ohio during its formative period. The Center is a

research and educational institution that serves the people of northern Ohio, especially school children and consists of a primitive area and farm that comprise about 1000 acres with some primeval forest, and an interpretive building.

Dr. Janson also serves as a member of the Governing Board of the American Geographical Society and as an adjunct Professor of Geography at Kent State University.

## Sunday, May 2nd

8:00 A.M. - 11:00 **Geology Field Trip** (Also see abstract on p. 43.)

Tour of the Browning-Ferris Industries Carbon Limestone Sanitary Landfill, Poland Township, Ohio. Transportation will be provided from YSU to the site and back. The trip will take about three hours.

The geology field trip will examine a state-of-the-art sanitary landfill located in an abandoned limestone quarry. Limestone strip mining began in the eastern portion of Poland Township, Mahoning County, Ohio, prior to 1900. With an average thickness of 20 feet, the Vanport limestone was removed after 10 to 170 feet of overlying soil was stripped.

The Carbon Limestone Sanitary Landfill, named after the original quarry operator, began landfilling operations in 1963 as part of a reclamation project in one of these Poland Township strip mines. In May 1992, the facility received a permit from the Ohio Environmental Protection Agency to install best available technology as defined by the latest solid waste regulations. To install the environmental controls required, construction costs of over \$200,000 per lined acre were expended. With approximately 430 lined acres permitted, the Carbon Limestone Sanitary Landfill in one of the largest municipal solid waste landfills in the United States.

The site is an example of sequential land use. Essroc Materials, Inc. continues to mine limestone north and south of the BFI landfilling operations. The area is converted to grassland as quarry and landfilling operations are completed. A highwall surrounds the landfill site on three sides, providing an excellent opportunity to view a cross section of Pennsylvanian rocks consisting of coal, sandstone, shale and limestone. With the construction of two culverts, the highwall area will be converted into a passive drainage system. This gravity system will control groundwater elevations at the landfill site.

To register for the trip check the space on the registration form. For further information please contact Dr. Ikram Khawaja, professor and chair, Department of Geology, Youngstown State University, Youngstown, Ohio, 44555, (216)742-3583.

8:00 A.M. - 12:00 noon **Ecology Field Trip**

Tour of Mill Creek Park including the Ford Nature Museum, Lanterman's Mill, and Fellow's Riverside Gardens. Transportation will be provided by WRTA. Trolleys will leave the front of the Wick Pollock Inn at 8:00 a.m.

Mill Creek Park was established as a Township Park in 1891 by an act of the state Legislature and a favorable vote of the people of Youngstown Township. The total park area covers 2,467 acres, including 21 miles of drives and 15 miles of foot trails. Mill Creek Park is the site of the International Peace Race, which each fall attracts

runners from all over the world. The creation of Mill Creek Park is the result of the foresight and untiring efforts of Volney Rogers, a Youngstown attorney who foresaw the value of the area. On his monument at the memorial entrance to the park is the inscription, "Conceived in his heart and realized through his devotion." No phrase could better describe Rogers' contribution.

Pioneer industries of the Western Reserve were established along Mill Creek and some relics still remain as evidence of these enterprises. Lanterman's Mill was the third flouring mill on the same site. Pioneer Pavilion was originally a woolen mill. The remains of the foundation of the last charcoal blast furnace built in the Mahoning Valley may be seen at the base of the hill just north of Pioneer Pavilion and drill marks in the sandstone ledges show where stone was quarried. Evidence of other early activity is visible to the alert park visitor. There were several homes on property that is now within the boundaries of the Park. The Log Cabin, built about 1816, is perhaps the oldest of these residences.

The north part of the park includes the Mill Creek Gorge and parts of the lateral ravines which enter it. This narrow valley extends from the confluence of Mill Creek with the Mahoning River at the extreme north end of the park to the Lake Newport Dam at its south end. Through this section of the park, the hillsides are steep and beautifully covered with deciduous and evergreen trees. There are bold outcroppings of sandstone rock and numerous grass-covered meadows. A fine variety of shrubs, vines, ferns, and wild flowers are native to the gorge section of the Park.

Above the gorge the land is rolling and partly wooded, but much of it was formerly good farmland. Lake Newport covers the bottom land in this part of the Park. The extreme south end of the Park is quite flat and includes both dense woods and extensive swamps. The finest stands of wildflowers in the county are to be found in this section. Small game and birds are plentiful and, after years of absence, deer and even colonies of beaver have returned to Mill Creek Park. Three pleasure lakes were created in the Park by blocking the gorge at different points with dams of sandstone construction. Lake Newport is the largest, having a surface area of 100 acres. Lake Glacier has a surface area of 44 acres and Lake Cohasset a surface area of 28 acres.

To register for the trip, check the space on the registration form. For further information, please contact Dr. Dale W. Fishbeck, professor, Department of Biological Sciences, Youngstown State University, Youngstown, Ohio 44555, 216-742-3601.

## LOCAL ARRANGEMENTS COMMITTEE

DR. DAVID B. MACLEAN, PROFESSOR, BIOLOGY, COMMITTEE CHAIR  
MR. MIKE HEHER, DIVISIONAL MANAGER AND VICE PRESIDENT,  
BROWNING-FERRIS INDUSTRIES

DR. WILLIAM BARSCH, PROFESSOR & CHAIR, ENGINEERING TECHNOLOGY  
DR. DALE W. FISHBECK, PROFESSOR, BIOLOGY  
MR. TODD FLECKENSTEIN, MAHONING VALLEY TECHNICAL SOCIETIES COUNCIL  
DR. JOHN R. LOCH, DIRECTOR, UNIVERSITY OUTREACH  
DR. JAMES H. MIKE, ASSISTANT PROFESSOR, CHEMISTRY  
DR. DARYL W. MINCEY, PROFESSOR, CHEMISTRY  
DR. CHARLES R. SINGLER, PROFESSOR, GEOLOGY  
DR. GEORGE E. SUTTON, DEAN, WILLIAM RAYEN SCHOOL OF ENGINEERING  
DR. JOHN R. WHITE, PROFESSOR, SOCIOLOGY, ANTHROPOLOGY & SOCIAL WORK  
DR. WARREN YOUNG, PROFESSOR & CHAIR, PHYSICS & ASTRONOMY

*Special appreciation is expressed to the Office of University Outreach and to DR. JOHN R. LOCH, Director of University Outreach, for his help in arranging for the meeting.*

## LOCAL HOSTS

Youngstown State University Centurians — New Student Honor Society

# ACADEMIC HIGHLIGHTS OF YOUNGSTOWN STATE UNIVERSITY

From a law school under the guidance of the Young Men's Christian Association in 1908 to a full-scale urban university with close to 15,000 students, Youngstown State University has evolved into a small city within a city during its 85-year history.

The University was originally established as the School of Law of the Youngstown Association School, later became the Youngstown Institute of Technology in 1921, Youngstown College in 1928, and in 1955 became Youngstown University. The University joined the Ohio system of higher education in 1967 and changed its name to Youngstown State University.

The University has six colleges granting undergraduate degrees at the associate and baccalaureate levels and a School of Graduate Studies granting the Master of Arts, Master of Science, Master of Business Administration, Master of Music, Master of Science in Engineering and Master of Science in Education and the Ed.D. in Educational Leadership.

## COLLEGE OF ARTS AND SCIENCES

Within Youngstown State University, the College of Arts and Sciences strives to prepare students for full and productive lives by helping them develop the skills to observe, analyze and make rational judgements. The College further attempts to familiarize students with the ways in which these skills have contributed and continue to contribute to knowledge and progress in a civilized society. To these ends, students are introduced to a reasonably wide range of studies, and in addition, given intensive training in particular areas. Students are thus offered not only a basis for competence in a career, but also the ability to function well in a world that requires an understanding in areas beyond their specialty.

The College involves its students in a variety of scientific research and field studies, including studies of plant and animal life in the Arctic circle and the geography of San Salvador Island in the Bahamas. Studies are currently being conducted by Dr. Daryl Mincey, chemistry, on exposure to neurotoxins among underserved populations in the Youngstown, Ohio, area. Recent bioanalytical chemistry research projects include development of analyses for human bile and studies of formaldehyde in dialysis patients.

In the field of quantum chemistry, Dr. Janet DeBene is conducting research investigating the structures and binding energies of hydrogen-bonded complexes, and the assignment of the vibrational spectra of hydrogen-bonded complexes, and proton affinities of first- and second-row bases, the stabilities of hydrocarbons and carbocarbons,

and the ground-state structures of molecules that have low-frequency vibrational modes.

Neuroscientist Dr. Frederick Prete and his undergraduate assistants are exploring the anatomical and neurophysiological underpinnings of vision through research on praying mantises. They hope to develop artificial seeing systems for visually impaired people. Research and other scholarly activity abounds in other University departments as well, including spectroscopic investigation of Rydberg states of molecules in physics and astronomy, study of parallel algorithms in the Mathematics and Computer Science Department, market forecasting in economics and intensive training in technical writing and editing through the English Department.

## **BS/MD PROGRAM**

Also housed within the College of Arts and Sciences is the NEOUCOM program. The Northeastern Ohio Universities College of Medicine is a publicly chartered institution consisting of the Basic Medical Sciences Campus in Rootstown, The University of Akron, Kent State University, Youngstown State University, and 18 community hospitals. As the only medical school in the State of Ohio offering the benefits of a consortium, the College combines these organizations to create a progressive and challenging medical student education. One measure of the success of the program is that over fifty percent of the graduates become chief residents. NEOUCOM was founded in 1973 to promote the education of physicians oriented to the practice of medicine at the community level. Students may enter the College of Medicine through the unique six-year combined B.S./M.D. (Bachelor of Science/Medical Doctor) degree program, the traditional four-year M.D. program or through Clinical Advanced Standing (transfer).

## **IN QUEST OF SCHOLARSHIP AND RESEARCH**

QUEST is an annual two-day program that celebrates the research and scholarship of University faculty, staff and students from the current academic year. A significant number of students are involved in independent research or research sponsored by faculty, and they are especially encouraged to participate. Brief, non-technical presentations are given. They need not be limited to formal papers but may include demonstrations of experiments, artistic displays, live performances, and any other media featuring scholarly activities. Proceedings are open to the University community as well as the general public.

## **WILLIAM RAYEN COLLEGE OF ENGINEERING AND TECHNOLOGY**

Faculty and staff work as individual professionals for local industries, as individuals as well as under the YSU Technology Development Corporation. Internally, the Center for Engineering Services contracts with regional industries for technical assistance, so long as the service does not compete unfairly with local consultants. Faculty and staff, using WRSE equipment and facilities, provide the service.

Currently, an Edison Grant is underway to assist a local firm in trying to develop an inorganic binder to replace an organic binder for a fiber ceramic material used in handling molten metals. The firm uses microwave energy in curing the ceramic products, a consideration in the use of new materials.

Contract projects include evaluation of gaskets for tunnel sections for underwater installation, development of guard rail sections for highways, evaluation of plastic units to facilitate construction of rail crossings and development of means of attaching steel rail to concrete foundations.

## **WILLIAMSON COLLEGE OF BUSINESS ADMINISTRATION**

Undergraduate students of the Williamson College working under the direction of the faculty offer management assistance counseling to over twenty area organizations per year through the Small Business Institute, which has been on campus since the mid-1970s.

The Office of Professional Practice supervises over 70 undergraduate business majors per quarter working as interns or in cooperative experiences throughout northeast Ohio.

Each spring the Department of Accounting and Finance sponsors a Tax Institute which brings to campus nearly three hundred practitioners, and once a year the Department of Management cosponsors an Operations Research Conference for scholars and practitioners in Ohio, Pennsylvania and Michigan.

## **SERVICE TO STUDENTS AND PERSPECTIVE STUDENTS**

The Williamson College of Business Administration instituted an Executive MBA sequence in its graduate program to better service qualified practitioners who, for whatever reasons, cannot participate in the MBA. To date, one class has completed the Executive MBA and the Williamson School is in the process of putting together the second EMBA class.

In an effort to reach more constituents, the Williamson College has started Sunrise College, an experiment with early morning classes, i.e., 6 a.m. to 8 a.m. So far, the student response to this initiative has been positive and the College is exploring the possibilities of offering a degree-granting program in the early morning hours.

Finally, in an effort to improve the critical thinking and communications skills of all undergraduate and graduate students, the College implemented a "Writing Across the Business Curriculum" in the fall of 1992.

## **THE COLLEGE OF EDUCATION**

The College of Education has entered the age of technology in several areas. The Center for Distance Learning utilizes advanced satellite transmission and production facilities. A national demonstration project for NASA using distance learning has been recently completed.

Electronic-assisted learning strategies will be a focus of the College of Education's future curricular planning and its new building to be completed in 1996.

Youngstown State's College of Health and Human Services focuses on programs which allow for the application of the social and health sciences, as well as technological disciplines. These disciplines represent the fastest-growing and largest industries in the United States. As a result, there is a great need for well-trained personnel in these areas.

It is the aim of the College to prepare professionals for careers in the health and human services occupations to serve the community, region and nation. Most programs are nationally accredited.

Faculty research and service enhance YSU's training of students as well as the important relationship with the health care, human services and technological communities.

## COLLEGE OF FINE AND PERFORMING ARTS

The YSU College of Fine and Performing Arts encompasses three departments: the Department of Art, the Dana School of Music and the Department of Speech Communication and Theatre. Annual departmental offerings include a dozen art exhibits, five major theatrical productions and more than one hundred musical presentations. Academic programs combine the theoretical and practical, offering students the opportunity to augment traditional classroom activities with internships and laboratory experiences.

A 1991 addition to the Art Department is the McDonough Museum of Art, designed by world-famous New York architect Charles Gwathmey. The 18,000 square-foot facility has traditional and experimental galleries as well as an outdoor sculptural terrace to display work. The museum is used to exhibit artwork of students, faculty, YSU alumni and the community. It is also used to install contemporary visual work of artistic, cultural and educational significance for the region.

Also enhancing academic offerings, opportunities are offered in the areas of art and theatre through the Interface Program. The program is provided by a grant through the Youngstown Foundation with the purpose of mutually benefiting the University and the community. One such opportunity, the Interface Symposia on American Art, is a lecture series held in the Butler Institute of American Art which features prominent artists, critics and specialists addressing important issues in American Art. Past Interface speakers have included John Perreault, Peter Plagens and Carter Radcliff as part of a week-long symposium on art criticism, made possible through the program.

In theatre, the Interface Program provides professionals-in-residence of national repute to work with students to enrich their experience.

The Dana School of Music began in 1869 as Dana's Musical Institute in Warren, Ohio. It continues to be one of the most well-known and respected music schools in the country. The Dana Concert Series features the prominent members of the faculty and students in over 100 free concerts each year.

The major objective of the College of Fine and Performing Arts is to continue to provide instruction of the highest quality in art, music, speech communication and theatre in addition to providing students and the public the maximum exposure to fine arts, either in the form of direct experience associated with instructional programs, or as members of viewing and listening audiences.

## SCHOOL OF GRADUATE STUDIES

The School of Graduate Studies offers programs in economics, English and history leading to the Master of Arts degree; programs

in biology, chemistry, criminal justice and mathematics leading to the Master of Science degree; programs in general business, finance, management and marketing leading to the Master of Business Administration degree; programs in music education, performance, music theory and composition, and music history and literature leading to the Master of Music degree; programs in civil, electrical, and mechanical engineering and materials science leading to the Master of Science in Engineering degree; and master teacher (elementary or secondary), educational administration and supervision, counseling and special education programs leading to the Master of Science in Education degree. At the doctoral level, YSU offers an Ed.D. in Educational Leadership.

## WILLIAM F. MAAG, JR. LIBRARY

The University's six-story William F. Maag, Jr. Library, completed in 1976, provides an attractive and comfortable environment for study and research. A member of the Online Computer Library Center, Maag Library provides reference, governmental documents, inter-library loan, database searching and other services necessary to the needs of the University community. In addition, the library has an online public access catalog (the Virginia Tech Library System) with over 20 terminals in the Maag Library, remote access from several buildings on campus, from a personal computer via a phone modem, and through the microcomputer center network. Several CD-ROM data bases as well as an Internet terminal providing direct access to online catalogs at other libraries throughout Ohio (including Ohio Link), the U.S. and certain foreign countries are available in the reference area.

The library includes instructional and research materials in books, periodicals, and microforms. These holdings number 602,959 volumes, 976,294 microforms, and 181,765 government documents.

## OFFICE OF UNIVERSITY OUTREACH

The Office of University Outreach develops and administers courses and programs outside the traditional degree programs through Continuing Education, Education Outreach, Edutavel, College for the Over Sixty and the Center for Quality and Productivity. Through both credit and noncredit course offerings at a variety of convenient times and locations, it makes academic programs, along with administrative and support services, available to nontraditional students.

Through the Office of University Outreach, YSU attempts to make the lifelong process of education possible for the adult with family and work obligations.

Youngstown State University offers degree and nondegree programs - courses, workshops, and seminars, all specifically designed and planned to meet the varied needs of adults. The University has the flexibility to build a schedule that is both comfortable and convenient for adults.