

The Ohio Journal of Science

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April Program Abstracts



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CONTENTS

101ST ANNUAL MEETING
The Ohio Academy of Science
Hosted by
The University of Akron
May 1-2-3, 1992

Registration	ii
Registration Form	Last Page
Parking	ii
Meals	ii
Housing	ii
Maps	Center Spread
General Schedule	iii
All-Academy Lecture	iii
President's Address	iv
Field Trips	v
Local Arrangements Committee	v
Academic Highlights of the Host	v
Abstracts	
Ohio Science Symposia	1
Technical Sections	9
Indices	
Ohio Science Symposia	61
Technical Sections	61
First Authors of Abstracts	62

April Program Abstracts Issue of *The Ohio Journal of Science*
edited by Lynn Edward Elfner.

Cover: Polymer Science Building at The University of Akron

Welcome

The University of Akron welcomes the 101st meeting of The Ohio Academy of Science. One hundred years ago, as Buchtel College, we also hosted the Academy at its first meeting away from Columbus. We invite you to explore our campus and to share in the excitement and challenge represented by the theme: **Science in Our Second Century.**

Registration

Registration is required for all meeting attendees. Although on-site registration will be available at a higher rate, meals cannot be guaranteed after April 22, 1992.

To assure reservations for banquets, registrations must be received by The University of Akron by April 22, 1992.

Use Registration Form on last page. Please send the completed form and fees (payable to The University of Akron) by April 22, 1992 to:

**OAS Annual Meeting Registration
Department of Special Projects
The University of Akron
Akron OH 44325-4714**

An acknowledgment will be sent to those whose registration and payment are received by April 22. Your packet, tickets, and name tag will be ready at the registration desk upon your arrival.

For further information, please call (216) 972-7872 or fax (216) 972-6634.

Friday, May 1st (Gardner Student Center)

Registration and symposia/workshops are located in the Gardner Student Center. On-site registration in the Hilltop Lobby is possible by check, VISA, or MasterCard.

8:00 am - 10:00 am for morning symposia
12:00 m - 2:00 pm for afternoon symposia

Saturday, May 2nd (College of Business Administration Building)

Registration and all technical and poster sessions will be in the College of Business Administration. On-site registration in the lobby is possible by check, VISA, or MasterCard.

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

Parking

Friday, May 1st

Visitor Lot A (south end of College Street, behind the library) is \$3.00 Per car all day (no in-and-out privileges). Parking regulations are strongly enforced until 1:00 pm on Friday, after which time any lot may be used. Closest handicapped parking is Lot 18 on Carroll Street near the intersection of Brown Street.

Saturday, May 2nd

The closest parking is free in the West Campus Parking Deck. Enter from South Broadway or from South High Street. An overhead walkway from the deck roof leads to the College of Business Administration Building. Free parking also available in Lots 33/34 off Wolf Ledges.

Smoking Policy

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

Meals

Friday, May 1st

A cafeteria and fast food restaurants are available for breakfast, lunch, and dinner on campus in the Gardner Student Center.

Nearby restaurants include Trecaso's (122 S. College-Italian); Chamberlain's (312 S. Main-novel); and five at Quaker Square (135 S. Broadway): Tavern in the Square, Depot Express, Schumacher's, Mill Street Deli, and Buck's Sports Bar.

6:00 pm OAS/OBS Dinner at the University Club
(Reservations required by April 22)

Saturday, May 2nd

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

7:00 pm OAS Annual Meeting Banquet in Gardner Student Center (Reservations required by April 22)

Housing

Please contact hotels and motels directly.

The Akron Hilton Inn at Quaker Square - unique and within walking distance - is offering a special rate of \$75 when you indicate you are attending the OAS meeting at The University of Akron when you register. (216) 253-5970

Holiday Inn Cascade (216) 762-0661

Midtown Motor Inn (216) 434-660

General Schedule

Friday, May 1st in the Gardner Student Center:

8:00 am - 10:00 am Registration - Theater Lobby

9:00 am Section S: Library and Information Sciences
(Chestnut B)

9:00 am - 12:00 m Symposia/Workshops

12:00 m - 1:30 pm Lunch on your own

12:00 m - 2:00 pm Registration - Theatre Lobby

1:30 pm - 4:00 pm Symposia

1:30 pm Section S: Library and Information Sciences
(Chestnut B)

2:00 pm - 4:00 pm OBS Executive Committee
(Chestnut A)

3:00 pm - 5:00 pm OAS Executive Committee
(Trustee's Room)

5:00 pm Hospitality Hour at the University Club

6:00 pm Joint OAS/OBS Dinner at the University Club
(Reservations required by April 22)

7:00 pm
Special Guest Presentation by

The Honorable Tom Sawyer
Congressman, 14th District, Ohio

Science and Math Education as We Begin the Next Century

Congressman Sawyer has risen steadily through the ranks of local, state and federal government to his current position as a third term U.S. Congressman representing the 14th Congressional District. After receiving B.S. and M.A. degrees from The University of Akron, Mr. Sawyer taught in the public schools and later worked as an administrator at a state school for delinquent boys. In 1976 he was elected to The Ohio House of Representatives. As Chairman of the House Education Committee, Representative Sawyer provided leadership in Ohio's educational policies and represented the House on The Ohio Board of Regents.

In 1983, Mr. Sawyer became the first Democrat in 20 years to be elected Mayor of Akron. As Mayor, he set a new course for Akron's economic growth. He restructured the City's fiscal reporting systems, increased the delivery of municipal services, increased police, fire and paramedic forces, and balanced the City's budget, all without raising taxes.

In 1987, Mayor Sawyer became Congressman Sawyer, succeeding The Honorable John Seiberling, in the historic 100th Congress. As a rapidly rising member of the

Committee on Education and Labor, Congressman Sawyer has played a key role in every education measure in the House since his election. He is an author of the Literacy for All Americans Act, the Eisenhower Mathematics and Science Improvement Act, and the National Literacy Act of 1991, the lead education bill in the 102nd Congress. In addition, he has been a co-sponsor of the Excellence and Equity in Education Act, Americans with Disabilities Act, and is currently working on the reauthorization of the Higher Education Act.

He has also worked closely with House leaders to pass legislation dealing with child care, environmental issues, civil rights, small business assistance, campaign reform, deficit reduction, and many other measures.

Born in 1945, Representative Sawyer is a lifelong resident of Akron where he lives with his wife Joyce, a teacher at Copley Middle School, and their daughter Amanda. Representative Sawyer and his wife are active in numerous community and professional organizations.

8:00 pm OBS Advisory Board and OAS Council Meetings
at the University Club

Saturday, May 2nd in the College of Business Administration Building:

7:30 am Breakfast for Past Presidents (University Club)

8:00 am - 3:00 pm Registration - Business Admin. Lobby

9:00 am - 3:30 pm Poster Session - Concourse

9:00 am - 11:00 am Morning Technical Section Paper
Presentations - see abstracts for rooms.

11:15 am - 12:00 m All Academy Lecture

Goodyear Auditorium in the
Polymer Science Building

Polymers: Problems and Potentials for Ohio

Dr. Frank N. Kelley
Dean, College of Polymer Science and Polymer
Engineering,
Professor of Polymer Science
The University of Akron

Frank N. Kelley was born in Akron, Ohio on January 19, 1935. He attended The University of Akron where he earned a B.S. in chemistry (1958), and an M.S. (1958), and a Ph.D. (1961) in polymer chemistry. While attending the University, he was employed by The Goodyear Tire & Rubber Company and later the Institute of Polymer Science. After graduating he was employed by the Union Carbide corporation until he entered active duty with the United States Air Force.

He was assigned to the Air Force Rocket Propulsion Laboratory, Edwards AFB, California, as an Air Force officer and at the completion of his military tour, in

July 1964, remained in a civilian status. He conducted research and managed technical programs associated with solid propellant mechanical properties. HE became chief of propellant development in 1966 and in 1970 was transferred to a staff assignment as chief of advanced plans. In 1971 he was named chief scientist.

In September 1973 Dr. Kelley transferred to the position of chief scientist of the Air Force Materials Laboratory at Wright-Patterson AFB, Ohio. In June 1977 he was named director of the laboratory. In September 1978 he returned to his alma mater to serve as director of the Institute of Polymer Science. He was appointed to his current position when the college formed in July 1988.

Dr. Kelley has received the Rubber Age Award, the AIAA Outstanding Technical Contribution Award, the Air Force Commendation Medal, the Civilian Meritorious Service Medal (in 1967 and 1978), and the Exceptional Civilian Service Award from the secretary of the Air Force. He is an active researcher, teacher, and consultant. His publications have focused on the relationship of molecular structure to mechanical properties of polymeric materials.

Dean Kelley has said, only half jokingly, that 90% of what there is to know about polymers can be learned in ten minutes - the other 10% takes a lifetime. His considerable skills in teaching that 90% have made him a popular and accessible speaker for audiences ranging from grade school children to corporate executives, and other polymer scientists the world over.

12:00 m Lunch on your own

12:00 m Open Invitation to those interested in Nutrition Science

Purchase lunch in the Gardner Student Center and take it to the Carnation Room.
Arranged by Dr. Kelly J. Kohls,
Miami University.

Nutrition Science Interest Group

Although Ohio contains a vast number of food industries, educational institutions and health care organizations, only a few people are aware of the extent and nature of the research being conducted. Participants in this informal luncheon will explore the ways and means of establishing within the Academy a forum for professionals in the area of nutrition. Brief presentations will be given by Dr. Kelly J. Kohls, Miami University and Dr. Mark Andron, Chief of the Mineral Nutrition Laboratory of the Procter & Gamble Company who will discuss *Food Industries: Challenges in the 90s*.

1:30 pm Section Business Meetings

2:00 pm - 5:00 pm Afternoon Technical Section Paper Presentations

3:00 pm - 5:00 pm Open House - University Research/Teaching Facilities (details will be included in your registration packet)

5:15 pm Annual Business Meeting (OAS members only) (CBA Room 137)

6:00 pm Hospitality Hour at the Gardner Student Center

7:00 pm Academy Banquet at the Gardner Student Center (Reservations required by April 22)

Awards & Recognition

President's Address:
Thinking and Brain Activity

Dr. John F. Schaff
The University of Toledo

John F. Schaff holds an Ed.D. in science education and biology from Florida State University, an M.S. in plant physiology and chemistry from Kansas State University, and a B.S. in biological and physical sciences from Illinois State University. Now Emeritus Professor of Curriculum and Educational Technology at The University of Toledo, Dr. Schaff has been involved extensively in the University's graduate and undergraduate programs and activities, having served as Associate Dean for Undergraduate Studies and for Special Services and Development, and as Graduate Studies Coordinator in the College of Education.

Since 1988 he has directed The Ohio Junior Science and Humanities Symposium; formerly he served as Director of the Northwest Ohio Science Day for The Ohio Junior Academy of Science.

He has taught at Florida State University, Syracuse University and The University of Toledo.

Having presented more than 20 papers and authored or co-authored nearly two dozen reports and papers, he has also been active nationally as chairperson of Section Q. Education for The American Association for the Advancement of Science. In 1974 he participated in a delegation from the National Science Foundation on a study of science education in France, Switzerland, Russia and England.

A Fellow of The Ohio Academy of Science, he has been a member since 1977 and received the Outstanding University Educator Award in 1989.

Dr. Schaff holds memberships in Sigma Xi, Phi Delta Kappa, The American Association for the Advancement of Science, Gamma Sigma Delta, National Science Teachers Association, National Association for Research in Science Teaching, American Chemical Society, Science

Education Council of Ohio, Toledo Technical Society and the School Science and Mathematics Association.

His current research interest is focused on brain mapping.

Sunday, May 3rd

8:00 am Geology Section Field Trip

The 1992 OAS geology field trip includes numerous stops along the Cuyahoga River that illustrate the river's geologic history, environmental problems and present significance as a water supply and treated wastewater conveyor. Glacial outwash, Kent end moraine, bedrock and channel characteristics of the upper Cuyahoga will be compared and contrasted with lacustrine deposits, bedrock and channel characteristics of the lower Cuyahoga. Trippers attention will be directed to several of the data collection stations mentioned in the May 1, 1992 Cuyahoga River Symposium. If time permits, a stop will be made at the Independence USGS stream gauging station and/or the navigation channel in "the Flats" of Cleveland.

Assemble, rain or shine, in the large student parking lot, Lot One, on the east side of campus. The lot is on the west side of Route 8, North Expressway between Buchtel Ave. and Carroll St. The Trip will begin promptly at 8:30 am. Coffee and donuts will be provided from 8:00 to 8:20 am. Participants must provide their own transportation and bring their own lunch. Soft drinks will be provided at lunch. A Field Trip Guide will be provided at no cost to trippers on May 3, 1992. For additional information contact Dr. Jim L. Jackson, The University of Akron, Department of Geology, Akron OH 44325-4101, Phone (216) 657-2815 or (216) 972-7991.

8:00 am-12:00 m Plant Sciences Section Field Trip

The Plant Sciences Section Field Trip will cover part of the Cuyahoga Valley National Recreation Area and an adjacent Nature Conservancy refuge for several uncommon native plant species. The area includes deciduous forests and marsh vegetation adjacent to the Cuyahoga River and remnants of the Ohio Canal including one lock. Participants should be prepared to walk on wet ground with some patches of standing water if spring rains prevail. The trip will be conducted regardless of the weather. Plants of the spring ephemeral flora should be in bloom. The trip will originate at the parking lot number 34 just west of the University of Akron Computer Center on Carroll St. Participants are encouraged to use private transportation, but a university van will be available for those who do not wish to drive.

The trip is restricted to 20 individuals on a first come first served basis.

To register for the trip and for further information, please contact Dr. Walt Macior, Department of Biology, University of Akron, Akron, OH 44325-3908. Phone (216) 972-7163 (office) or (216) 972-7155 (Dept.).

FAX (216) 972-6990.

Local Arrangements Committee

John F. Gwinn, Biology, Committee Chair

William H. Beyer, Associate Dean,
Buchtel College of Arts and Sciences
Roger B. Creel, Department Head, Physics
Robert Deitchman, Social Work
David J. Ewers, University Communications
John J. Houser, Chemistry
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Karla T. Mugler, Director, Special Projects
Gary Niehaus, Northeast Ohio Universities
College of Medicine
Allen G. Noble, Department Head, Geography
Rudolph J. Scavuzzo, Associate Dean,
Polymer Science and Polymer Engineering

Special appreciation is expressed to Karen M. Schulmeister, Derek Dauchy, and Glenda Seit.

Academic Highlights of The University of Akron

The University of Akron, Ohio's third largest university, is a vigorous participant in the life of Northeast Ohio and a recognized leader in such research areas as synthetic polymers and industrial/organizational psychology.

In 1892, the newly formed Ohio Academy of Science held its second meeting at Akron, because the executive committee believed "that this city and district can supply to all the members an opportunity of indulging their special tastes and of prosecuting their special studies." Some truths seem impervious to change.

Molecular Research at Akron

Scientific teaching and research first made history here in 1910 when chemist C. M. Knight offered the world's first formal class in rubber chemistry in the city that was to become the Rubber Capital of the World. Pioneering research in rubber, especially during World War II, led in turn to pioneering research in polymers. In 1988, the world's first college devoted to polymer science and polymer engineering was created here.

Known worldwide, Akron's College of Polymer Science and Polymer Engineering focuses on synthesizing and characterizing polymers, and on basic and applied research in polymer engineering. Akron, Case Western Reserve University, the State of Ohio's extensive polymer industries coordinate R&D through the Edison Polymer Innovation Corporation, part of the state's Thomas Edison Program.

Research in polymers and monomers is greatly enhanced by the chemistry department's Research Center for Nuclear Magnetic Resonance. The Center's three NMR's will soon be enhanced with a 600 MHz instrument, now the object of a fund-raising campaign kicked off last summer by \$500,000 grant from the Kresge Foundation.

Excited state dynamics and energetic, electronic and vibrational relations, and molecular electronic spectroscopy are the focus of research by Dr. Edward Lim, holder of the Goodyear Tire and Rubber Company Chair in Chemistry.

In the Mathematics Scientific Computation Laboratory, Presidential Young Scholar Gerald Young is modeling the silicon crystallization process in search of the perfect microchip.

Significant strides in surface science are being made in the physics labs of Drs. Peter Henriksen, Robert Mallik, and Harry Chu.

Medical Research

Research in medicine and medical technology enhance UA's relationship with the Northeast Ohio Universities College of Medicine in nearby Rootstown.

In the biology department, Dr. Daniel Ely is stretching the length of time that a human heart can be transported from donor to recipient from the current three hours to 24 hours. And Drs. Ely, Monte Turner, and Mark Johnson are searching for the genetic key to male hypertension.

In the College of Engineering, the Institute for Biomedical Engineering Research serving local hospitals, industry, and private and public agencies. In the Human Motion Analysis Lab, improving the comfort level at the interface of prosthesis and human tissue is the aim of Dr. Mary Verstraete's work. And Dr. Stanley Rittgers is working in the Vascular Dynamics Lab to reduce the incidence of arterial blockage in bypass patients.

The College of Nursing's Center for Nursing provides students and faculty with practical research experience as well as the campus and community with free health care programs. The college's pre-nursing program for talented fifth and sixth graders encourage minority students to consider nursing as a career and to enhance their study skills.

The Environment

Among the geology department's programs is the Oak Hill Center for Environmental Studies, managed by Dr. Jim Jackson and located in the Cuyahoga Valley National Recreation Area.

The Training Center for Fire and Hazardous Materials Brings together academia, government, and industry into a comprehensive regional center to integrate educational programs, fire and hazardous materials training, and other applications of fire and safety technology.

Nearby in the Auburn Science and Engineering Building, the College of Engineering's Process Research Center, under the direction of Dr. Sunggyu Lee, focuses on fundamental and applied research involving new chemical processes and novel materials. Clean coal technology, synthetic fuels, and sludge/hazardous waste treatment are among key projects

The Liberal Arts

In the social sciences, Akron offers "the single best American department in industrial and organizational psychology," according to the North Central Association of Colleges and Schools, the accrediting agency.

In economics, the Emile Grunberg Lecture Series, named after the prominent economist and head of Akron's department, annually draws speakers of the caliber of Nobel Laureate Franco Modigliani.

The College of Fine and Applied Arts offers one of the nation's few minors in computer art with an emphasis on computer animation and three-dimensional design. And the commercial arts program in the University's broad-based Community and Technical College is moving toward computerized graphic design.

Based here is the highly respected Ohio Ballet, whose members often teach and share expertise with UA students.

Law, Business, and Education

Students in the Center for Taxation Studies, a joint venture between the College of Business Administration and the School of Law, have testified before Congress and consulted with the IRS on revising tax forms. The Center focuses on studies in tax policy directed toward legislative changes at the local, state, and federal levels. The law school is also delving into space law, and last fall worked with visiting professor Vladen Vereshchetin, an expert in space law from the former Soviet Union.

College of Business Administration seniors working under faculty direction offer management assistance counseling to area organizations through the Small Business Institute, in 1972 the first such institute created in Ohio.

The College of Education's Center for Economic Education seeks to improve economic literacy and the college's Clinic for Child Study and Family Therapy trains students through intensively supervised community counseling services. This fall, the college will unveil an ambitious curriculum reform package that includes some of the newest, most innovative teaching strategies in the country.

Innovation in computer testing was recognized this year as the biology department's Dr. John Gwinn's computer testing program received the regional Phoenix Best Award (the PHOEBE). Gwinn pioneered computer testing in his self-paced audio-tutorial anatomy, and physiology course. Last fall, over 5000 students on campus used on-line computer testing in a variety of courses.