

# The Ohio Journal of Science

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## The Ohio Journal of Science

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## The Ohio Academy of Science

445 King Avenue  
Columbus, OH 43201  
614/424-6045

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98th Annual Meeting  
The Ohio Academy of Science  
Hosted by  
the Western Campus of  
Cuyahoga Community College, Parma  
April 28–30, 1989

## Toward the Next Millennium: Advances in Science & Technology for the 21st Century

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Cover photograph – Galleria of Western  
Campus of Cuyahoga Community College  
Parma. Photograph by Lynn Edward Elfner.

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## Registration

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Registration Required. Access to sessions by name tag only. Name tags issued at Registration Desk on day of meeting.

Use Registration Form at end of this program.

On-site Registration in Theater Lobby from 8:00 a.m. - 3:00 p.m. on Friday, April 28, and Saturday, April 29, 1989.

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## Parking

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Park in designated lots. Exact change of \$.50 (two quarters) per vehicle payable upon exit.

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## Meals

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Advanced reservations required for meals. Reservations with payment must be postmarked by Tuesday, April 18, 1989.

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## Housing

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See map for location of nearby motels at the intersection of I- 71 and Bagley Road. Exit 235.

Holiday Inn  
7230 Engle Road  
Phone (216) 243-4040

Envoy Inn  
7219 Engle Road  
Phone (216) 234-0990

Red Roof Inn  
17555 East Bagley Road  
Phone (216) 243-2441

Cross Country Inn  
7233 Engle Road  
Phone (216) 243-2277

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## General Schedule for Friday, April 28, 1989

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9:00 a.m. - noon

Introduction to Computer-Assisted Experimentation in the Chemistry Lab Workshop in B217  
Sr. Jean Marie DeChant, Presiding

This will be a hands-on introduction to the use of computer interfaces in the chemistry lab which will use the Apple IIe for gathering and analyzing data. Teachers will use temperature probes, pH electrodes and a simple spectrophotometric cell. Activities include (1) determination of the heat of neutralization using strong acid-strong and weak acid-strong base, (2) thermometric titration of strong acids-strong base, (3) pH titration of monoprotic acid and diprotic with strong base, and (4) determination of calibration curve and concentration of unknown solution spectrophotometrically.

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9:00 a.m. - noon

Insect Physiology Workshop in A228  
Dr. George Shambaugh, Presiding

This workshop is intended to give junior and senior high school teachers hands-on instruction in several aspects of the physiology of insects -- the most abundant animals on the earth. Three hours will be devoted to learning how to handle and to observe insects, aspects of their sensory physiology, external and internal anatomy, and a exercise in biochemistry. There will be opportunities to learn practical lab exercises that can be adapted to the appropriate level of instruction. There will be adequate opportunity for questions. An outline of the workshop with list of important sources of supplies and information will be provided to the participants.

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9:00 a.m. - noon

Workshop on Basic Radiation Protection in B206  
Richard Bowers, Presiding

This workshop introduces non-nuclear scientists to the basics of radiation protection including the concepts of radiation, contamination, and airborne activity. Radiation effects on people and the concept of risk will be discussed. Also included will be an explanation of protection from radiation, contamination and airborne activity. There will be a demonstration of radiation detection instruments and experiments to show the effects of distance and shielding will be included. Participants will receive various handouts of the workshop material.

NOTE: A related activity -- a bus trip to the Perry Nuclear Power Plant -- is planned for Sunday, April 30, 1989. Limited seating requires preregistration. See registration form.

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10:00 a.m. - 12:00 noon  
Academy Executive Committee Meeting in G04A&B  
Dr. Donald Wise, OAS President, Presiding

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12:00 noon  
Lunch in Upper Cafeteria  
Advance reservation required.  
See registration form at end of program.

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2:00 - 4:00 p.m.  
Elementary Science Teachers Workshop in B208 on  
Rock and Mineral Identification Verne Friberg,  
Presiding

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This is an opportunity for elementary school teachers to learn some simple methods to identify common rocks and minerals. The methods you will learn involve tests that you can easily carry out in the classroom. If you have a puzzling specimens sitting around, bring them in for identification. In this way you can assemble a classroom reference collection for future use.

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2:00 p.m. - 3:00 p.m.  
Goals and Plans of The National Science Foundation  
in A231 Dr. Larry Badar, NSF, Presiding

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The overall goals and plans of the National Science Foundation for funding scientific research and education will be discussed by Dr. Badar. Time will be available for Dr. Badar to respond and follow up on specific inquiries from Ohio researchers and educators.

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2:00 p.m. - 5:00 p.m.  
Lake Erie Resources Workshop in A230  
Dr. Victor Mayer, Presiding

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This is a workshop for middle school and high school science teachers on the biological and physical environments of Lake Erie. Participants will be able to choose between biological and earth science activities. Topics will include (1) changing lake levels, storm surges and their effects, coastal erosion, wetlands as nutrient filters, and feeding adaptations of Great Lakes birds. Teaching resources including people, books and periodicals will be discussed. All participants will receive a copy of the 150 page book entitled, *The Great Lake Erie*. Additional take home materials

provided. Additional Fee \$10. Advanced registration required. Instructors: Rosanne W. Fortner and Victor J. Mayer, The Ohio State University.

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2:00 p.m.  
Workshop on Radon Basics in B217  
Lanier Schlegel, Presiding

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This workshop will explore the many facets of radon and radon protection. Topics include radiation, protection factors, detection methods and units, health effects, risk evaluation, radon entry routes and remediation.

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2:30 p.m. - 4:30 p.m.  
Ohio Biological Survey Executive Committee in G206  
Dr. Charles C. King, Presiding

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3:00 p.m. - 5:00 p.m.  
Women in Science Program Replication Workshop in  
G04A Dr. Lois A. Cook, Presiding

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With grants totaling nearly \$110,000, The Ohio Academy of Science has developed WISEMCO - the Women in Science, Engineering and Mathematics Consortium of Ohio. Dozens of regional career development workshops, hosted by colleges and universities, have attracted thousands of students. The publication, *EXEMPLARS*, features women in science roles models. This workshop will review program evaluation and set goals, objectives and strategies for the following years. Funds for WISEMCO have been provided by the Ohio Board of Regents from Section 207(c) of the Education for Economic Security Act of 1984.

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5:30 p.m. - 7:00 p.m.  
Joint OAS/OBS Dinner in G229B  
Dr. Donald Wise, Presiding  
Advanced registration required.

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7:00 p.m. - 8:00 p.m.  
The Ohio Academy of Science Annual Council  
Meeting in G04A&B Dr. Donald Wise, Presiding

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7:00 p.m. - 8:00 p.m.  
Ohio Biological Survey Advisory Board in G5E  
Dr. Charles C. King, Presiding

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8:00 p.m. - 9:30 p.m.

## TOWARD THE NEXT MILLENNIUM

Advances in Science & Technology  
for the 21st Century

### PANEL ON THE FUTURE

in B Atrium

Dr. J. Stuart Fordyce, NASA, Presiding

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Join leading Cleveland area scientists and engineers as they explore and predict developments in their fields for the next millennium. Audience participation will be encouraged. Panelist include:

- Dr. J. Stuart Fordyce  
Director of Aerospace Technology  
NASA Lewis Research Center
- Mr. Henry A. Putre  
Senior Design Engineer  
Mechanical Engineering Section  
Centerior Energy
- Dr. Joseph E. Metcalfe, III  
Research Program Manager  
BP America Research & Development

This session is open to the public without charge.

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## General Schedule for Saturday, April 29, 1989

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See page ii for information on registration, parking, meals and housing.

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9:00 a.m., 10:00 a.m. and 2:00 p.m.

General Poster Sessions in Theater Lobby near Registration. See abstracts in specific technical sections for exact times of presentations.

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9:00 a.m. - 11:00 a.m.

Technical Section Meetings  
for paper presentations  
See abstracts on pages 1-45.

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11:15 a.m.

### All Academy Lecture in Theater

Dr. Donald Wise, OAS President, Presiding  
Featured Speaker: Dr. Ellis D. Miner  
Deputy Flight Science Officer  
Voyager Project  
Jet Propulsion Laboratory

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#### *NEPTUNE: THE CLIMAX OF A GRAND TOUR!*

The Voyager 2 spacecraft will complete its tour of the gas giant planets of our solar system with an encounter of the planet Neptune on August 25, 1989. The encounter observation period extends from June 5, 1989, through October 2, 1989. Dr. Miner will outline the major science objectives of the Neptune encounter and describe the most important observations designed to address these objectives. Our present understanding of the planet, its magnetic and radiation fields, its partial rings, and its satellites will also be discussed. A question and answer period will follow the lecture.

This lecture is open to the public without charge.

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12:15 p.m. Lunch in Upper Cafeteria  
Advance reservations required.

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1:30 p.m.

Section Business Meetings  
See Section Abstracts for rooms.

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2:00 p.m. - 5:00 p.m.

Afternoon Technical Section meetings for paper presentations. See abstracts page 1-45.

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5:00 p.m.

Annual Academy Business Meeting for Members only in G04A&B Dr. Donald Wise, OAS President, Presiding

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5:30 p.m. - 6:30 p.m.

Hospitality Hour in South Galleria

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6:30 p.m.

Banquet and Awards Ceremony in North Galleria  
Advance registration required.

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8:00 p.m.

President's Address  
*The Many Roles of Calcium*  
Dr. Donald Wise, OAS President, Presiding

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# General Schedule for Sunday, April 30, 1989

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Field Trip to Perry Nuclear Plant  
Access to plant by bus only.  
Bus leaves from CCC parking lot  
at 9:00 a.m.

**Pre-registration required.** Limited to first 80  
persons. No charge for bus to meeting registrants.

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Field Trip to Presque Isle State Park  
Dr. John Furlow, Presiding

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Nearly 90 miles east of Cleveland is one of  
Lake Erie's most interesting natural features. Presque  
Isle, a six mile long peninsula, is formed of sand that  
waves have washed from the bluffs to the west and  
have built into what is called a compound recurved  
sandspit. The peninsula's natural value was  
recognized early and Presque Isle State Park was  
created in 1921. Its spectacular scenery harbors  
unique natural habitats -- open beaches, beach dunes,  
palustrine sand flats, lagoons, interior ponds and sedge  
meadows, dry ridges, lake and bay shores. The park  
is used extensively for recreation, education and  
research. The Cleveland Museum of Natural History  
completed the fourth year of its survey of the flora in  
1988.

**NOTE:** Meet at Lakeland Inn parking lot, southeast  
corner of I-90 and Ohio Rt. 306 interchange at 8 a.m.  
for the 1.75 hour drive. Van transportation will be  
available for those who make reservations in advance.  
Bring a brown bag lunch. For further information and  
**reservations** (mark REGISTRATION FORM also)  
contact: James K. Bissell, Curator of Botany, The  
Cleveland Museum of Natural History, Wade Oval,  
University Circle, Cleveland, OH 44106. Phone (216)  
231-4600, Ext. 219.

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9:00 a.m.

Plant Sciences Section Field Trip:  
Fens and Bogs of Northeastern Ohio  
Dr. Barbara K. Andreas and  
Mr. Jeffrey D. Knoop, Presiding

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This field trip will visit relict plant communities  
including Herrick Fen, Triangle Lake Bog and Jackson  
Fen which contain a variety of rare and endangered  
plants. These sites reflect a wetland gradient of  
mineral input and pH. For more information contact  
the field trip leaders, Dr. Barbara K. Andreas at (216)  
987-2389 or Mr. Jeffrey D. Knoop of The Nature  
Conservancy at (614) 486-4194.

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9:30 a.m.

Geology Section Field Trip:  
Downtown Cleveland Rocks: A look at rock types  
used for buildings and monuments in downtown  
Cleveland.  
Dr. Joseph Hannibal, Presiding

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The many types of stone used for the exterior  
and interior of buildings build over a more than a  
century in downtown Cleveland will be discussed on  
this trip. This is a walking trip. It will begin at 9:30  
a.m. sharp in front of the Terminal Tower in  
downtown Cleveland. Lunch will be on your own at  
various fast food outlets in Cleveland's new Galleria.  
The trip will end at about 2:30 p.m. There will be a  
\$2.00 fee for a guidebook, payable to the field trip  
leader. Further information can be obtained from Dr.  
Joseph Hannibal, Cleveland Museum of Natural  
History, Wade Oval, University Circle, Cleveland, OH  
44106. Phone (216) 231-4600.

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## Our Host

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Cuyahoga Community College (CCC) is Ohio's  
fourth largest college and the largest in the Cleveland  
area, serving nearly 25,000 students each quarter and  
more than 45,000 students each year. Its three modern  
campuses are located in downtown Cleveland,  
Warrensville Township and in Parma, which is the site  
of the Western Campus -- the host of this year's  
Annual Meeting of The Ohio Academy of Science.

CCC's students come from the city and from the  
suburbs, from all age, ethnic, and economic groups.  
They are attracted to CCC by the opportunity for  
quality education that is accessible, affordable, and  
designed to prepare them for the real world of today  
and tomorrow. Students can enroll in more than 40  
career programs in engineering technologies, allied  
health, business technologies, and such public service  
technologies as law enforcement, early childhood  
education, and mental health.

Other students take the first two years of college  
education at more affordable tuition and then transfer  
to a four year university. Still others return to take a  
course or two to help keep them current in their field  
of knowledge or gain new job skills to move up the  
career ladder.

With an average age of 29, CCC's students  
range from the traditional recent high school graduate  
to the displaced homemaker, the laid-off factory  
worker, and the business manager learning new skills.  
Special programs serve those from high school youths  
to senior citizens. During its 25 year history, CCC has  
enrolled over 450,000 citizens of Cuyahoga County --  
nearly one in four residents. Eighty percent of its  
students remain in Cuyahoga County, adding to the  
area's economic growth and vitality.

From its beginnings, CCC has built linkages with the community. The \$12 million, state funded Unified Technologies Center was dedicated in October, 1986. This advanced manufacturing training and demonstration facility will train students through contractual agreements and customized training programs with business, industry and government. It will showcase the most up-to-date technological equipment available to business and industry.

Through the Unified Technologies Center, the college continues to work closely with business, industry, labor, government and other educational institutions at all levels in an effort to introduce new technology to market place.

CCC is an ever-changing, responsive institution which contributes significantly to Ohio's economic development. Supported by state allocations, county tax levies and student fees, CCC has become an institution with a proven record of success in Ohio.

Exit 235 (east) from I-71 on Bagley Road. Bagley Road turns into Pleasant Valley Road. The Western Campus of Cuyahoga Community College is located at 11000 Pleasant Valley Road at the northwest corner of the intersection of Pleasant Valley Road and York Road. See W on map below. Phone (216) 987-5363.

