1999-03

Back Matter

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How to get to Cleveland State University

Directions to Campus

From the south: Follow I-71 north to the East 22nd Street exit (#172C). Turn left onto East 22nd Street; drive several blocks to Euclid Avenue.*

From the south: Follow I-77 north to the East 22nd/East 14th Street exit (#162B). Turn left onto East 22nd Street, drive several blocks to Euclid Avenue.*

From the east: Follow I-90 west to the Chester Avenue/CSU exit (#173B). Turn left onto East 24th Street and left at the light onto Chester. Take Chester to East 30th Street, turn right. After one block, turn right onto Euclid Avenue and proceed west across the bridge.*

From the west: Follow I-90 east to the East 22nd Street exit (#172C). Turn left onto East 22nd Street, drive several blocks to Euclid Avenue.*

From the west: Follow the Shoreway (Route 2) east to I-77/I-71 South. Exit at the Chester Avenue/CSU exit (#173B). Turn left onto East 24th Street and left at the light onto Chester. Take Chester to East 30th Street, turn right. After one block, turn right onto Euclid Avenue, and proceed west across the bridge.*

From the airport: Rapid transit trains leave from Hopkins International Airport to Public Square, where several bus routes regularly serve the campus.

*Parking for visitors is available in Lot A off Euclid Avenue east of the Bookstore and in Lot UC, under University Center off East 22nd Street.

Cleveland State University

campus core represented by grey areas

Parking in SuperLot #3

Registration in University Center 8
RECOGNITION OF ACADEMY FELLOWS

Forty eight outstanding scientists, engineers and educators will be honored this year at the Academy’s Annual Meeting. The recognition ceremony will take place immediately following the All-Academy Lecture in the auditorium of Main Classroom on Saturday, April 24, 1999.

Fellows are members who have rendered some special service to The Ohio Academy of Science or have made extensive, productive scientific, technological or educational contributions to society. The distinction of Fellow — an honorary position — carries with it certain responsibilities for scholarship, leadership, service, and support. Fellows are expected to continue to strive for academic excellence, volunteer for leadership and service to the Academy, and continue to support The Ohio Academy of Science through membership and gifts. By their examples they demonstrate to others the importance of the Academy to education, science, engineering, and technology. Fellows also provide a deep and rich pool of talent from which to draw ideas for strong programs, to help improve science education, and to advise state and local governments on science and engineering-based policy issues.

About The Ohio Academy of Science

The Ohio Academy of Science strives to be the leading organization in Ohio to foster curiosity, discovery, and innovation and to unite all who value education, science, engineering, technology, or their applications, for the benefit of society. The Academy welcomes all interested in science—a researcher, a teacher, a corporate executive, an elected public official, an engineer, a student, a parent, or any citizen—to consider The Ohio Academy of Science as their organization. Members and volunteers are the principal source of inspiration, intellectual capital, volunteer and financial support. Website URL http://www.ohiosci.org. Email oas@iwaynet.net.

The Ohio Academy of Science
Roster of Newly Elected Fellows
November 18, 1998

<table>
<thead>
<tr>
<th>Name</th>
<th>City</th>
<th>Employer</th>
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</thead>
<tbody>
<tr>
<td>Dr. Judy L. Adams</td>
<td>Bowling Green</td>
<td>Bowling Green State University</td>
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<tr>
<td>Dr. James E. Evans</td>
<td>Bowling Green</td>
<td>Bowling Green State University</td>
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<tr>
<td>Dr. Nara Gavini</td>
<td>Bowling Green</td>
<td>Bowling Green State University</td>
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<tr>
<td>Dr. Lakshmi Pulakat</td>
<td>Bowling Green</td>
<td>Bowling Green State University</td>
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<tr>
<td>Mr. Stephen Mencer</td>
<td>Cambridge</td>
<td>Meadowbrook MS</td>
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<tr>
<td>Dr. George E. Klee</td>
<td>Canton</td>
<td>Kent State University</td>
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<tr>
<td>Mr. William R. Burk</td>
<td>Chapel Hill, NC</td>
<td>University of North Carolina</td>
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<tr>
<td>Mr. Ronald L. Huston</td>
<td>Cincinnati</td>
<td>University of Cincinnati</td>
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<tr>
<td>Mr. M. A. Keyes</td>
<td>Clayton, MO</td>
<td>Rosemount Analytical Inc.</td>
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<tr>
<td>Dr. Shyamala D. Chitaley</td>
<td>Cleveland</td>
<td>Cleveland Museum of Nat. History</td>
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<tr>
<td>Prof. Christopher A. Callis</td>
<td>Cleveland</td>
<td>Case Western Reserve University</td>
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<tr>
<td>Dr. Samuel M. Savin</td>
<td>Cleveland</td>
<td>Case Western Reserve University</td>
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<tr>
<td>Dr. William R. Adrion</td>
<td>Columbus</td>
<td>Franklin Cnty Coroner's Office</td>
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<td>Mr. Truman W. Bennett</td>
<td>Columbus</td>
<td>Bennett &amp; Williams Envir. Cons.</td>
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<tr>
<td>Mr. C. Scott Brockman</td>
<td>Columbus</td>
<td>Ohio Geological Survey</td>
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<tr>
<td>Dr. John M. Cassady</td>
<td>Columbus</td>
<td>Ohio State University</td>
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<tr>
<td>Dr. Ann D. Christy</td>
<td>Columbus</td>
<td>Ohio State University</td>
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<tr>
<td>Dr. Norman R. Fausey</td>
<td>Columbus</td>
<td>U.S. Dept. of Agriculture</td>
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<tr>
<td>Mr. George F. Hall</td>
<td>Columbus</td>
<td>Retired - Ohio State University</td>
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<tr>
<td>Mr. Richard D. Benz</td>
<td>Concord</td>
<td>Wickliffe HS</td>
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<tr>
<td>Dr. Michael G. Grote</td>
<td>Delaware</td>
<td>Ohio Wesleyan University</td>
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<tr>
<td>Dr. John D. Sedlacek</td>
<td>Frankfort, KY</td>
<td>Kentucky State University</td>
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<tr>
<td>Dr. Juliana C. Mulroy</td>
<td>Granville</td>
<td>Denison University</td>
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<tr>
<td>Dr. Fred J. Brenner</td>
<td>Grove City, PA</td>
<td>Grove City College</td>
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<td>Dr. Shirley Graham</td>
<td>Kent</td>
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<td>Dr. Robert T. Heath</td>
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<td>Kent State University</td>
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<tr>
<td>Mr. Frederick John Kluth</td>
<td>Kent</td>
<td>COMSYS</td>
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<td>Mrs. Diane Gabriel</td>
<td>Lancaster</td>
<td>Bloom Carroll HS</td>
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<tr>
<td>Dr. Helen R. Churella</td>
<td>Lewis Center</td>
<td>Retired - Ross Labs</td>
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<tr>
<td>Dr. Alan B. Cady</td>
<td>Middletown</td>
<td>Miami University</td>
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<tr>
<td>Mr. James B. Short</td>
<td>Montpelier</td>
<td>Gorham Fayette HS</td>
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<tr>
<td>Prof. Dennis N. Luck</td>
<td>Oberlin</td>
<td>Oberlin College</td>
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<tr>
<td>Dr. Richard E. Lee</td>
<td>Oxford</td>
<td>Miami University</td>
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<tr>
<td>Dr. Diana M. Spillman</td>
<td>Oxford</td>
<td>Miami University</td>
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<tr>
<td>Dr. Gene E. Willeke</td>
<td>Oxford</td>
<td>Miami University</td>
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<tr>
<td>Mrs. Relda E. Niederhofer</td>
<td>Sandusky</td>
<td>(Ret.) Fredlands College (BGSU)</td>
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<tr>
<td>Dr. Horton H. Hobbis</td>
<td>Springfield</td>
<td>Wittenberg University</td>
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<tr>
<td>Mr. Larry A. Tornes</td>
<td>Sunbury</td>
<td>Ohio Dept. of Natural Resources</td>
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<tr>
<td>Dr. Susan Carty</td>
<td>Tiffin</td>
<td>Heidelberg College</td>
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<tr>
<td>Mr. Michael Woods</td>
<td>Washington, DC</td>
<td>Toledo Blade/Pittsburgh Post</td>
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<tr>
<td>Dr. Michael A. Hoggarth</td>
<td>Westerville</td>
<td>Otterbrin College</td>
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<tr>
<td>Mr. David M. Weaner</td>
<td>Westerville</td>
<td>Westerville North HS</td>
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<tr>
<td>Dr. Willie W. Houston</td>
<td>Wilberforce</td>
<td>Central State University</td>
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<tr>
<td>Dr. Roger N. Williams</td>
<td>Wooster</td>
<td>Ohio Agr. Res &amp; Dev. Center</td>
</tr>
<tr>
<td>Dr. Robert L. Vertrees</td>
<td>Worthington</td>
<td>Ohio State University</td>
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<tr>
<td>Dr. Henning E. Von Gierke</td>
<td>Yellow Springs</td>
<td>Wright Patterson Air Force Base</td>
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PRELIMINARY

CALL FOR PAPERS

for presentation at the

109th Annual Meeting of

The Ohio Academy

of Science

To be hosted by

Ohio Northern University

Ada

March 31; April 1-2, 2000

ABSTRACT DEADLINE:
Postmarked by Monday, November 1, 1999

For abstract forms or further information contact:

The Ohio Academy of Science
P.O. Box 12519
Columbus, OH 43212-0519

Phone or FAX (614) 488-2228

Email: oas@iwaynet.net • Website http://www.OHIOSCI.org
# Registration Form

## 108th Annual Meeting

April 23-24-25, 1999

Hosted by Cleveland State University

Advance registration must be received by April 9, 1999

**ALL authors, presenters and other attendees must register.**

### ALL MEETING ATTENDEES: Access to sessions by name tag only.
Name tag, information packet and receipt will be available at the meeting. Please return the completed registration form along with the appropriate fees to the address printed below.

**Students, Spouses, or Relatives:** To promote and encourage participation of undergraduates, pre-college students, spouses, and relatives, a special discount schedule has been approved. All students, spouses, and relatives must register using a separate form. This registration does not include membership or meals which must be paid separately.

### After April 9th

<table>
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<tr>
<th>Spouse or relative of first author</th>
<th>$15</th>
<th>$20</th>
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</table>

*Discounted Rates for students who are not first author: (Does not include membership)*

| 1-4 from same institution | $15 | $20 |
| 5-10 from same institution | $10 | $20 |
| 11 or more from same institution | $8 | $20 |

Please use a SEPARATE REGISTRATION FORM for each person.

### Registration Fees

Please check appropriate categories. One fee covers ALL THREE DAYS. Payment must be received by April 9, 1999 to avoid higher rates. On-site registration will be accepted at the higher rate by credit card or check only. First authors have pre-paid registration when submitting their abstracts and DO NOT NEED to return this form unless they need meals. First authors are already registered for the meeting.

### Current Member Registration Rate

- Professional: $55
- Retired: $30
- Student: $15

### Non-Member Professional and Retired Registration Rate

Includes membership

- Professional: $120
- Retired with Journal: $60
- Retired without Journal: $45

### Non-Member Pre-college and College Student Rate

Includes membership

| College Student with Journal | $45 | $50 |
| Student (17 & under) with Journal | $45 | $50 |
| Student (17 & under) w/o Journal | $30 | $35 |

### Does Not include membership

| Pre-college student | $15 | $20 |
| College student | $15 | $20 |
| 5-10 students each | $10 | $20 |
| 11 or more students each | $8 | $20 |

*See table at left for more information.

### Spouse or Relative of a First Author

- Spouse or relative: $15
- $20

Please use a separate form for each.

### Meals (ONLY by preregistration)

- **Friday Dinner:** $25 N.A.
- **Saturday Box Lunch:** $7.50 N.A.

### Sunday Geology Field Trip

- $5 N.A.

### Membership Renewal

- Family: $70
- Regular Member: $60
- Retired Member w/OJS: $30
- College Student: $30
- Student (Age 17 & under) w/OJS: $30
- Retired Member w/o OJS: $15
- Student (Age 17 & under) w/o OJS: $15

### Total Enclosed

$____

### Method of Payment

**NO REFUNDS AFTER April 9, 1999.** Return checks subject to a $15.00 return fee. Only registrations paid by Purchase Order, VISA, or MasterCard will be accepted by FAX at 614/488-2228.

- Confirms a FAXed registration
- Check enclosed payable to The Ohio Academy of Science
- Purchase order enclosed (A $2.00 processing fee will be added)
- Charge my credit card (A $2.00 processing fee will be added)

## Please Print or Type

**Circle:** Ms. Mrs. Mr. Dr.

**Name**

**First**

**Middle**

**Last**

**Job Title**

**School, Organization, Agency, Institution, or Employer**

**Is the following a home address? **

- **Yes**
- **No**

**Students MUST use home, dorm or apartment address.**

**Address**

**City**

**State**

**Zip**

**County**

**Work Phone**

**Home Phone**

**FAX**

**Email**

## Mail Form with Payment To:

The Ohio Academy of Science

PO Box 12519

Columbus OH 43212-0519

FAX 614/488-2228

**Pre-registration Deadline:** April 9, 1999
Registration Policies

108th Annual Meeting

April 23-24-25, 1999
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STUDENTS, SPOUSES, OR RELATIVES: To promote and encourage participation of undergraduates, pre-college students, spouses, and relatives, a special discount schedule has been approved. All students, spouses, and relatives must register using a separate form. This registration does not include membership or meals which must be paid separately.
The Ohio Journal of Science
Author's Instructions for Preparation of Manuscripts

The Ohio Journal of Science considers for publication solicited Book Reviews and Research Reviews, and unsolicited Brief Notes and Research Reports. Solicited submissions will be requested by the editor or member of the editorial board. Book reviews will be requested of experts in the subject matter of the book to be reviewed. Research Reviews will be requested to serve as extensive surveys of the literature of an area of science in which Academy members have an interest.

Unsolicited submissions, in the form of presentations of quantitative or qualitative data pertinent to any of the sections of the Academy listed inside the front cover, will be considered for peer review. Brief notes are manuscripts that are less than 2 printed pages (approximately 6 typed pages) and contain no more than one table, figure or other type of illustration. The editor will identify papers which meet these criteria as Brief Notes if not already categorized as such by the author. Research Reports are those papers which are longer than 2 pages or contain more than one illustration.

All manuscripts will be organized as follows:
Page 1 - Title, Author(s), Running Head, Abstract
Page 2 and remainder - Introduction, Materials and Methods, Results, Discussion, Acknowledgments, Literature Cited, Tables, Figure Legends, Figures.

STYLE. The CBE Manual for Authors, Editors, and Publishers, 6th ed. is used for editorial decisions with regard to style. Manuscripts should be typewritten using 1 inch margins on 8.5 x 11 inch paper. Text should be left justified. Three copies should be submitted. Manuscript should be double-spaced throughout, including the title and abstract. Arabic numerals should be used in preference to words when the number designates anything that can be counted or measured (7 samples, 43 species). One exception to this use is that numerals are not used to begin a sentence (Twenty-one species were found in . . .). The 2nd exception is when 2 numeric expressions are adjacent in a sentence. The number easiest to express in words should be spelled out and the other left in numeric form (The sections were divided into eight 4-acre plots.).

TITLE, AUTHOR(S), AFFILIATION(S). The first page of the manuscript should contain the title, author(s) name(s), the affiliation of the author(s) at the time the research was done or to indicate the author to whom inquiries should be directed. The address (department, institution, city, state, postal code, country if not USA) should appear below the name of the author(s). If more than one institution is to be credited, they should appear in the order of the author(s) affiliation. A running head of not more than 60 letters and spaces should be typed in capital letters between the address and the abstract.

ABSTRACT. The abstract should be a concise statement of the main conclusions and any new methods or procedures critical to the results of the study. It should be 250 words or less.

INTRODUCTION. The introduction should describe the knowledge that gave rise to the question examined by, or the hypothesis posed for the research.

MATERIALS AND METHODS. This section should describe the research design, the methods and materials used in the research (subjects, their selection, equipment, laboratory or field procedures), and how the findings were analyzed.

RESULTS. The text of the results should be a descriptive narrative of the main findings of the reported study. This section should not list tabulated data in text form. Reference to tables and figures included in this section should be made parenthetically in the text.

DISCUSSION. This section should compare and contrast the data collected in the presented study with that previously reported in the literature. Unless there are specific reasons to combine the two, as explained by the author in the letter of transmittal, Results and Discussion should be two separate sections.

ACKNOWLEDGMENTS. Colleagues and/or sources of financial support to whom thanks are due for assistance rendered in completion of the research or preparation of the manuscript should be recognized in this section rather than in the body of the text.

LITERATURE CITED. References to scientific literature should be arranged alphabetically by first author's last name using the Name/Year (N-Y) method as described in the CBE Manual.

Journals
Author(s). Year. Article title. Journal title volume number (issue number) inclusive pages.


Form of citation (Thomison 1988)

Books
Author(s). Year. Title. Place of publication: publisher name. Number of pages.


Form of citation (Voet and Voet 1990)

Multiple author citation: (Steiner and others 1992)

TABLES. Tables must be typed double-spaced, one table to a page numbered consecutively, and placed in the manuscript after Literature Cited. Since tables must be individually typeset, consolidation of data into the smallest number of tables is encouraged. A horizontal double underline should be made beneath the title of the table, and single underlines should be made on the width of the table below the column headings and at the bottom of the table. Do not use vertical lines, and do not place horizontal lines in the interior of the table. Footnotes must be used to clarify possible questions within the table, and should be noted by asterisks, daggers, or other symbols to avoid confusion with numerical data.

FIGURES. All illustrations are referred to as "Figures" and must be numbered consecutively. Figures may be photographs, hand-drawn or computer generated drawings in black ink. Each figure should be identified along the top edge with the name of the author(s) and figure number, and on the back with name of author(s) and manuscript title. Illustrations other than those generated by the author(s) must bear permission for use and credit to the originator. ORIGINAL ARTWORK WILL NOT BE RETURNED UNLESS SPECIFICALLY REQUESTED AT TIME OF SUBMISSION. Each figure must have a complete legend. The legend should not be placed on the figure, but should be typed in order, double-spaced, on a separate sheet which precedes the figures in the manuscript. Figures should be referred to parenthetically in the text, for example (Fig. 1). The size and proportion of each illustration should be suitable for reduction. Excessive white space should be avoided. Illustrations will be reduced to one column width (3 and 3/8 inches) or two column width (7 inches) at the discretion of the editor. Lettering should be done of a size to ensure that it can be read after reduction. On maps and other illustrations where original size is a concern, a graphic scale should be incorporated into the figure.

FOOTNOTES. Text footnotes should not be used with the following exceptions. A footnote to the title will be added editorially to state the dates of manuscript submission and revision. A footnote to name(s) of author(s) may be used to indicate present address different from that at which the research was done, or to indicate the author to whom inquiries should be directed. All other material or comments must be incorporated into the text. Literature Cited should not be inserted as footnotes. Footnotes to tables are permissible, and are encouraged to promote clarity.

Attention to the above instructions will minimize the need for revision and editorial correction, and will shorten the time from submission to publication. Any questions which are not answered by these instructions, or by consulting the CBE Manual for Authors, Editors, and Publishers, 6th Edition, should be addressed to the editor.
The Ohio State University's F. T. Stone Laboratory, located on the 6.5-acre Gibraltar Island in Put-in-Bay harbor, is the Lake Erie research and teaching laboratory for the Ohio Sea Grant College Program, and is the oldest freshwater biological field station and research laboratory in the United States. Since its establishment in 1895, significant research has been conducted by both student and professional biologists on the ecology of Lake Erie and the Great Lakes region.

JOIN US AT STONE LABORATORY TO PREPARE FOR YOUR FUTURE.

• Earn college credit while still in high school.
• Enhance teaching skills in environmental sciences.
• Live, study, and work on an island for 1 to 11 weeks.
• Examine the ecosystem around Stone Laboratory with leaders in science who bring classroom concepts to life.
• Improve research skills with hands-on experience in a living laboratory.
• Get to know your professors personally with 12 to 20 people in your classes.
• Attend Stone Laboratory to prepare for college, graduate school, your career, and your life.

SUMMER COURSES

Through classroom, laboratory, and field studies, students gain a comprehensive background in freshwater systems and the unique environmental attributes of Lake Erie. Students enrolled at Ohio state-assisted universities may enroll in Stone Laboratory courses through their home institutions. Scholarship and employment opportunities are available.

Upper-level courses are designed for undergraduate and graduate students in biological sciences, education, and natural resources; professional biologists and ecologists; and biology and general science teachers. Term courses meet three days a week for approximately five weeks; courses for educators meet daily for one week.

Introductory courses are available to college and select high school students who have completed a high school biology course. High school students must be at least 15 years old and should have completed their sophomore year before coming to Stone Laboratory. These courses meet daily for one week.

OTHER USES OF STONE LABORATORY

Custom-designed aquatic science workshops/field trips are offered from mid-April through October. Science teachers who teach 4th grade classes and higher are encouraged to bring their students to Stone Laboratory for one to two days of field study. Stone Laboratory can provide laboratories, research boats, field equipment, and experienced field ecologists for such groups.

Conference and retreat facilities are available from mid-April through October. The isolated, informal atmosphere on the island makes it ideal for these programs.

Research facilities at Stone Laboratory are available year round.