From the Chair:

We are well into the Spring session; the pace of teaching has slowed, giving faculty and students more time to do research. It has given me the opportunity to reflect on the many changes that have occurred this past academic year. From the outset I should tell you that Dr. Leonard Ginsberg is now an Associate Dean in the College of Arts and Sciences. I assumed the role of Department Chairman last July. Many of you will remember me as the professor who led you through human physiology, a role I continue to enjoy. During this past year I have found the new responsibilities of chairman both challenging the rewarding.

The faculty are the leaders and workhorses of this department. They bring fresh approaches and ideas that are vital for both teaching and research in biology. You may remember that four new faculty, Drs. Bejcek, Byrd, Karowe, and Spitsbergen, were hired last Fall; they are now teaching and have functional labs or field research sites. The previous year we added Drs. Jellies and Rossbach to our faculty. Several of our new faculty have obtained grants to support their research activities. This improves both the significance of departmental research and opportunities for students. We are fortunate to have added these very qualified and highly motivated individuals to our faculty.

Not all of the faculty changes have gone our way. Dr. Cindy Hoorn decided to take a job opportunity with Pharmacia and Upjohn in April of this year. We will greatly miss her excellent teaching of the nonmajors physiology and the toxicology courses, as well as her great sense of humor. We wish Dr. Hoorn all of the best in her new career.

The large number of faculty losses in recent years, curriculum changes, and the need for research-intensive faculty have caused some reduction in the breadth of our course offerings. We hope to gain approval to search for several new faculty in the next academic year to remedy this change. We approach the addition of new faculty with great caution, for the faculty shape the direction of departmental functions. We want to grow in a manner consistent with our departmental goals and objectives.

The timing of these changes should work well with construction of the Wood Hall retrofit and the new research-oriented Science Pavilion. We move into our new
Wood Hall offices in the Spring of ‘98; classes start there the following Fall. Our research laboratories will be available one year later. Please try to visit to see how the old ‘stomping grounds have changed. You can also get a feel for how we’ve grown and changed by checking out our website at http://www.wmich.edu/bios. There is a pleasant sense of change, freshness, cooperation and opportunity here. We hope you feel it as well and are proud.

Leonard Beuving, Professor and Chair
NEW SCIENCE BUILDING

As of June 1, 1997, construction on the Wood Hall retrofit and the new research building (The Science Pavilion) is on schedule making the work site seem different each day. Wood Hall was gutted leaving cement floors, outer walls, and support beams. Workers are now putting in partitions for offices, teaching labs and lecture rooms. Each teaching room is being equipped for “state of the art” multimedia communication capability.

The Biological Sciences and Chemistry Department offices will be on the east/south sides of the third floor. The northern entrance will be a real eye catcher; you will walk into a large lobby with a two story glass wall that looks out into a beautifully landscaped courtyard. That space can be used for student gatherings and even outdoor classes. We will move in April of 1998 with classes starting in the Fall of that year.

The Science Pavilion joins the west side of Wood Hall through a third floor crosswalk. It consists of two four story rectangular structures connected by central enclosed walkways on the above ground floors. This building will close off the western edge of campus by extending north to Everett Tower. It will contain the labs of faculty from Biological Sciences and selected investigators from Psychology, Geology and Chemistry. It will also house a consolidated animal care facility, the Imaging Center, and a P3 micro-organism handling lab. At this time, the cement floors and support piers are in place. Occupancy is planned for the Spring of 1999. These facilities will greatly enhance research productivity.

If you would like an architectural rendering of the new science complex, please send a self-addressed envelope to: Dr. Leonard Beuving
Dept. Of Biological Sciences, W.M.U.,
Kalamazoo, MI 49008

NEW FACULTY INFORMATION

Our four new faculty members spent the year adjusting to the department and continuing their research. We are pleased to have them with us and thought that a little more information about each of them would be helpful:

Dr. Bruce Bejcek, Ph.D.
Assistant Professor
Dr. Bejcek has been working in the field of Cancer Biology for the past several years and has been continuing this work since he joined the faculty in the Fall of 1996. His main focus has been to investigate how hormones that make cells grow are also able to cause tumors when produced in an unregulated manner. Recently his laboratory has identified a protein inside of cells that may be integral in controlling the process of tumor formation without having a known role in growth of cells. Currently he is trying to identify what this protein is doing and how it may serve as a target for anti-cancer agents. In 1996 he received a $500,000 grant from the National Cancer Institute to continue these studies.
Dr. Christine A. Byrd, Ph.D.
Assistant Professor

“The research in my laboratory is in the areas of cell biology, neuroanatomy, and developmental biology. The major focus of my research is the development of the nervous system, using the olfactory system as a model. I am interested in addressing some of the fundamental questions in developmental biology such as how cellular interactions control the induction of tissue differentiation and the maintenance of cellular phenotype. The olfactory system is ideal for these studies because it is continually developing. In fact, it is one of the few places in the nervous system where new neurons are born and new connections are made throughout life. I am examining these questions in the zebrafish, a popular developmental model animal. The rapid development in this fish and the fact that it is being studied intensely from a molecular aspect make the zebrafish a good model for my studies.

Much of my research involves the use of cellular biological and anatomical techniques. These include light microscopy (general histology, immunohistochemistry, and quantitative methods), electron microscopy (quantitative and qualitative methods), and experimental manipulations (transplantations and ablations).

My primary teaching responsibility is Human Anatomy (BIOS 211), which I teach both Fall and Winter semesters. In addition, I will be offering a senior seminar course every other year (usually in Winter) in Developmental Neurobiology.”

Dr. John Spitsbergen, Ph.D.
Assistant Professor

“My research examines trophic interactions between neurons of the peripheral nervous system and target tissues which they innervate. One of the projects presently under way in my laboratory studies the effects of nerve growth factor (NGF) on sympathetic and sensory neurons which innervate blood vessels and the potential involvement of NGF in the development of high blood pressure. A second project examines neurotrophic interactions between motor neurons and skeletal muscle following exposure to a chemical which causes neuromuscular weakness.

My teaching interests are in the areas of Pharmacology, Biology of Aging, Biology of Drugs and Addiction, and Comparative Animal Physiology.”

Dr. David Karowe
Associate Professor

“The carbon dioxide content of our atmosphere is expected to double by the end of the next century. My graduate students and I are currently investigating several potential ecological consequences of this global atmospheric change. Growth under elevated carbon dioxide typically results in increased plant growth, decreased leaf nitrogen and water contents, and increased leaf carbon:nitrogen ratios. Presumably to compensate for decreased leaf nitrogen content, insect herbivores increase consumption rates but nevertheless usually display reduced survivorship and/or growth. Thus, it is becoming clear that elevated carbon dioxide is likely to exert substantial direct effects on plants, and may therefore profoundly influence
natural ecosystems.

Our current research compares these direct effects of elevated carbon dioxide between two contrasting multiple trophic level systems: one based on crucifer host plants and the other based on legume host plants. Since a major direct effect of elevated carbon dioxide is dilution of plant nitrogen, the hypothesis underlying this study is that association of host plants with nitrogen-fixing symbionts (legumes) will buffer all trophic levels against the direct effects of elevated carbon dioxide.

Host plants are grown at ambient and elevated carbon dioxide at the University of Michigan Biological Station. We then analyze leaf nutritional quality (nitrogen and water contents and C: N ratio) and secondary chemistry (glucosinolate and alkaloid content) at each carbon dioxide level. Consequence of elevated carbon dioxide for insect herbivores are identified by measuring larval survivorship, growth, efficiency of food utilization, and oviposition preference among host plants grown under each carbon dioxide level. We also determine effects on parasitoid and hyperparasitoid survivorship and growth by rearing wasps in caterpillars fed host plants grown under each carbon dioxide level.

The ultimate goals of this research are to expand our understanding of the direct ecological consequences of elevated carbon dioxide to include the third and fourth trophic levels, and to begin to assess mechanisms responsible for variability among different multiple trophic level systems in their susceptibility to the direct effects of elevated carbon dioxide. This work is currently supported by grants from the National Science Foundation and the United States Department of Agriculture.

Teaching Interests:
Over the next few years, I expect to teach undergraduate courses in Introductory Biology, Ecology, Evolution, and Global Environmental Issues, as well as graduate courses in Population Ecology, Evolution, and Plant-Animal Interactions.”

College of Arts and Sciences Undergraduate Research and Creative Activities Award

Dr. Elise Jorgens, our new Dean of Arts and Sciences, put in place a plan to involve more undergraduate students in research activities with professors. In this plan, up to 25 Arts and Sciences students receive $500 each following application with a research plan and a sponsoring faculty member. Below is a list of the BIOS students receiving grants.

--Lynn Shooks - Ortonville, MI
“Determination of Secondary Signaling Mechanisms Used by Somatostatin Receptor Subtypes”
Bruce Bejcek, Ph.D.

--Christy E. Hoadley - Portage, MI
“Genetic Transformation of Tomato to Induce Constitutive Systematic Acquired Resistance Against Alternaria Solani”
Alex Enyedi, Ph.D.
--Thandiwe V. Nyirenda - Kalamazoo, MI
"Detection of Chromosome Aberrations in F.I.S.H."
Gyula Ficsor, Ph.D.

--Jennifer Chenelle - Plainwell, MI
"The Spontaneously Hypertensive Rat: A Model of Neurogenic Bowel Dysfunction"
John Spitsbergen, Ph.D.

--Cassandra Lynn Anderson - Paw Paw, MI
"Investigation of Nitric Oxide Synthase Distribution in the Leech"
John Jellies, Ph.D.

--Jason L. Leduc - Kalamazoo, MI
"Localization of Cadmium-Responsive Elements in the Rat G6PDH Promotor"
Susan Stapleton, Ph.D.

--Victoria R. Sutton - Bridgman, MI
"The Effects of DNA Methylation on TGF-Alpha Promotor Activity"
Susan Stapleton, Ph.D.

--Briana Jackson - Waterford, MI
"Characterization of Microorganisms Associated With Wetland Plans and Evaluation of Their Potential in Bioremediation"
Silvia Rossbach, Ph.D.

--Steven Ray - Kalamazoo, MI
"Addition of New Cells to the Adult Zebrafish Brain"
Christine Byrd, Ph.D.

--Margaret Lincoln - Mason, MI
"Inhibition of DNA Repair By Cadmium"
Gyula Ficsor, Ph.D.

--Tracey Barnhart - Seneca, NY
"Regulation of Glial-Derived Neurotrophic Factor (GDNF) Expression in Skeletal Muscle"
John Spitsbergen, Ph.D.

--Marie E. Gilbert - Kalamazoo, MI
"Construction of a Binary Vector For Plant Genome Transformation Which Contains the bgIA Gene encoding β-Glucosidase"
Alex Enyedi, Ph.D.

The Recipients of the Lee Honors College Undergraduate Research and Creative Activities Awards were:

--Rachel Williams - Big Rapids, MI
"How Does Development of Hypertension Affect Nerve Growth Factor Expression by Vascular Smooth Muscle"
John Spitsbergen, Ph.D.

--Kathryn Stafinski - Vicksburg, MI
"Cell Migration In the Adult Zebrafish Brain"
Christine Byrd, Ph.D.
Undergrad Presentations:  
Research performed by our undergraduate students was high caliber as indicated by acceptance of their work in major scientific meetings.

At The Seventh Annual Argonne Symposium for Undergraduates; November 1-2, 1996

Christopher Deppmann  
Sponsored by: Leonard Ginsberg, Ph.D.

Julie Durr and Lynn Shooks  
Sponsored by: Bruce Bejcek, Ph.D.

Marsha Kukuk  
Sponsored by: Silvia Rossbach, Ph.D.

Bonnie Parets  
Sponsored by: Leonard Ginsberg, Ph.D.

At The National Conference for Undergraduate Research; April 24-25, 1997  
(University of Texas in Austin, Texas)

Marsha Kukuk  
Sponsored by: Silvia Rossbach, Ph.D.  
“Matter Regulated Gene Expression in Pseudomonas Fluorescens”

Lynn M. Shooks and Julie Dürr  
Sponsored by: Bruce Bejcek, Ph.D.  

Chris Deppmann  
Sponsored by: Leonard Ginsberg Ph.D.  
“Differential Display of Total RNA from Pulmonary Endothelial Cells Treated with Mitomycin C”

Matt Brown  
Sponsored by: Leonard Beuving, Ph.D.  
Robert Eversole, Ph.D.  
“ALPHA-4 BETA-1 Integrin Adhesion Molecule Expression on Uterine Eosinophil in Diethylstilbestrol Treated Rats”

Graduate Student Awards and Presentations

These two graduate students were nominated by the department for the 1997 Graduate Research and Creative Scholar Award. The nominees are selected annually by the Graduate College, the Graduate Studies Council of the Faculty Senate and the Graduate Student Advisor Committee to recognize graduate student achievements in research and creative activities.  
April 16, 1997

--Bina Garimella
--Mark Galbraith
The Awards and Fellowships Committee selected the proposals of these four students for support from the Graduate Student Travel Fund.

--Mark Galbraith
--Sung Hoon Lee
--Sara Sutton
--Mark Hammond

GRANT RECIPIENTS
(GRADUATE STUDENT RESEARCH FUND)

This fund is provided by The Graduate College. While the money goes to the student, it is generally spent on research supplies. The award usually can be renewed one time which greatly reduces departmental costs for supporting graduate student research.

Francisco Berguido--$600
Susan Stapleton, Ph.D.
Stephanie Blazina--$600
Gyula Ficsor, Ph.D.
Bina Garimella--$600
Kalpana Merchant, Ph.D.
Sanjay Jivraj--$600
Susan Stapleton, Ph.D.
Santiago Navarro--$600
Steven Malcolm, Ph.D.
Phill Peters--$516
Alex Enyedi, Ph.D.

FACULTY GRANTS

Within the past year, these six faculty members have received grants for their research:
Dr. Bruce Bejcek--February 1996
Dr. Christine Byrd--April 1997
Dr. Alex Enyedi--May 1996

Dr. William Jackson--June 1996
Dr. John Jellies--June 1996
Mark Gurney (adjunct)--June 1996

BIOCYLOGICAL IMAGING CENTER

The Biological Imaging Center (BIC) has grown in the last 10 years to become a comprehensive core imaging facility combining macroscopic through ultrastructural data acquisition with digital, as well as, analog output capabilities. The facility is under the direction of Professor Leonard Beuving with daily operations managed by Rob Eversole, Ph.D. The mission of the BIC is to provide University faculty with access to research grade electron microscopic and optical imaging instruments and technical services, maintain an active research program, and provide training of undergraduates and graduate students in the use of the instrumentation. This mission is funded, in part, by monies obtained by the BIC for services to clinical and industrial customers. The bulk of these contracts involve ultrastructural analysis of tissues from animal studies conducted to answer questions regarding toxicology and/or drug safety. Additionally, the BIC provides ultrastructural screening of human kidney biopsies for local hospitals. This service allows resident pathologists direct viewing of individual cases on our transmission electron microscope for rapid diagnosis and intervention. In all, the BIC offers a unique blend of service and research to the entire community.

Over the last few years, the research efforts of Drs. Beuving and Eversole along with the students of the BIC have been committed to several aspects of
eosinophil biology. This work has been done in collaboration with Professor Charles Mackenzie of Michigan State University’s Department of Pathology. The physical heterogeneity of eosinophils has been described in the literature. However, these changes have not been linked to specific eosinophil functions. We have now linked specific granule changes that occur following in vitro exposure to a calcium ionophore as well as to extracts of the parasitic nematode *Nippostrongylus brasiliensis*. These observations were recorded using electron microscopy and several forms of light microscopy. The results were correlated with in vivo demonstration of changes in eosinophil distribution and morphology in the small intestine of *Nippostrongylus brasiliensis* infected August rats. To facilitate this work and future work in human tissues, we have developed a new method of detection of eosinophil-specific granules by fluorescence microscopy. We presented this work in April at the Experimental Biology meeting in New Orleans.

Another important area of our research entails in vivo aspects of adhesion and migration of eosinophils out of the blood vessels. The literature has described the transmembrane protein, VLA-4, as an important mediator for eosinophil-specific migration into inflamed sites in asthmatic lungs and skin. We looked at both the parasite model described previously and at an estrogen-induced eosinophilia in the rat uterus to assess the involvement of VLA-4. Utilizing *in situ* immunocytochemistry, John Phipps, one of our former students, found that indeed this was the case; VLA-4 was expressed in *Nippostrongylus*-exposed eosinophils. John won an award for best Graduate Student paper at the winter meeting of the Michigan Microscopy and Microanalysis Society for this work. Recently, Matt Brown produced preliminary evidence that estrogen-induced migration of eosinophils into the rat uterus is not mediated by expression of VLA-4. This study may indicate a possible unique mechanism, for eosinophil migration. Matt presented his work at the National Conference of Undergraduate Research in Austin, Texas this year.

**MLK Day**

On Monday January 20, 1997 approximately eighty students and faculty participated in the science keynote speech, panel and open house activities in the memory of Dr. Martin Luther King. The event was jointly sponsored by the Association of Minorities in Biological Sciences, the Department of Biological Sciences, the Chemistry Club and the Chemistry Department.

Dr. Ficsor introduced the keynote speaker, Ms. Mozell Long, an African American educator from the Michigan Department of Education. The title of her speech was: *Enhancing Minority Success in the Sciences*. Ms. Mozell reviewed the result of research about the special challenges African American students encounter in their education paths.

After Ms. Mozell’s excellent presentation, Dr. Don Schreiber of the Chemistry Department introduced the all African-American panel of Drs. Mike McLeod from KCMS, Robert Sutton from KVCC, Leon Clark and Joe Davis from
Pharmacia & Upjohn. The panelists supported Ms. Mozell's statements, often by examples from their own lives. These highly accomplished African-American professionals imparted valuable advice and served as role models to our students. We are deeply indebted for their participation.

Following the keynote speech, panel discussion and many questions from the floor, participants were invited to visit 14 Chemistry and Biological Sciences research laboratories. Special thanks to Drs. Eversole, Dziwiatkieski, Bertman, Miller, Reinhold, Stapleton, Essani, Hoorn, Jellies, Rossbach, Enyedi, Schreiber, Ficsor and Ginsberg for making their laboratories available for the open house.

This exciting and memorable event was closed with an informal mixer where the panelists and the speaker met with the students for informal conversation.

THE GREENHOUSE

As part of the construction of the Wood Hall Retrofit, a new, enlarged greenhouse facility will be constructed by Rough Bros. Inc. There will be two interconnected 3000 sq. ft. modules that will be divided into conservatory, teaching and research compartments. The greenhouse will be computer-controlled with state-of-the art shading and venting systems that will enable 5 distinct environmental zones to be maintained.

A corridor will connect the structure to Wood Hall and will serve as a head house and potting room. The southern portion of Wood Hall will contain the teaching and research rooms where plants will be used. This area is also where 4 modern walk-in environmental chambers will be installed. These were obtained by an NSF grant prepared by Drs. Enyedi and Rossbach.

Demolition of the old greenhouse, you remember, occurred in the second week of May after greenhouse manager, Chris Jackson, had repotted and moved all of the plants to a local commercial greenhouse. A small plastic sheeting enclosure that protects some plants being used in research projects is still at the on campus site. The new greenhouse facility should be ready for use in October of 1997.
FINAL COMMENTS FROM THE CHAIRMAN:

I hope in reading this newsletter you see that the Biological Sciences Department is becoming more research oriented. In addition we are seeking out and rewarding undergraduates who participate in faculty research. These experiences can be critical shaping events for them. Students who are unable to gain laboratory or field research experience are required to take a “capstone” course in their senior year. These courses integrate a variety of biological concepts so that students see the relation of course material to pertinent situations. Having a background in this knowledge is critical to dealing with today’s problems and questions. Two examples from the 1997 Fall Schedule are “Origins and Implications of Evolutionary Thought” and “Environmental Health Interactions”.

A quality education requires talented and dedicated people. It also requires top notch facilities and equipment. Due to the new construction, there is a relatively small amount of the State and corporate funds available to buy or replace equipment. Consequently, a publicly based fund raising effort will be launched soon. You will be encouraged to donate to this W.M.U. Foundation fund drive. Please remember that you can earmark your donation for a Biological Sciences equipment fund. That way, you will be directly helping us to continue improving our teaching and research. Thank you.

Leonard Beuving, Ph.D.