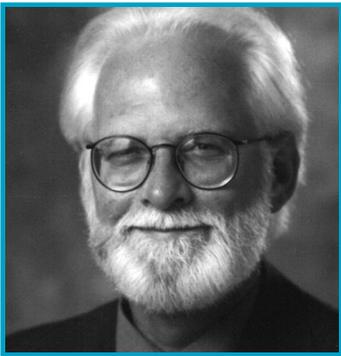




The LIFE Scientist

UMD Biology Department News
Winter 1999



Dr. Randall Hicks, Biology Department Head

From the Department Head

by Randall Hicks

We faced many challenges and have witnessed several changes during the past year. Most of the changes have been positive and many outstanding opportunities

await us in the next few years. I am optimistic that the future of the Department of Biology is bright as the University of Minnesota-Duluth moves towards a new millennium.
(Continued on page 2...)

Technology in the Biology Classroom, An Update for Alumni

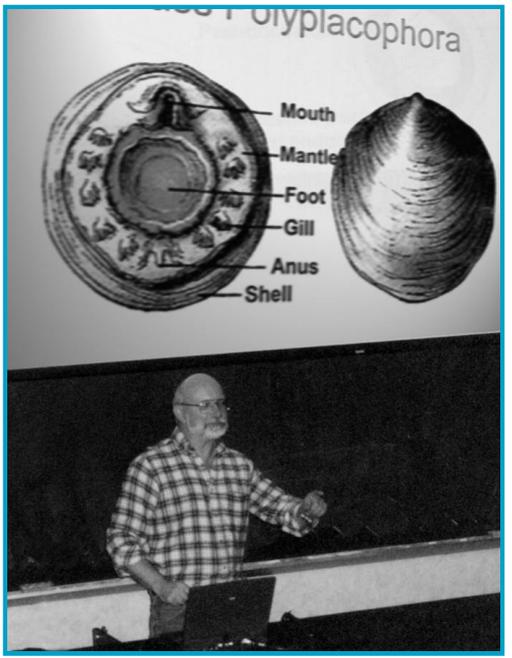
by Linda Holmstrand

With the current technology hype emphasized by the media in general, and the university in particular, former students and alumni may wonder how UMD Biology measures up. Or maybe you are thinking, "Biology is a science, and has always used technology". Consider the laboratories, where microscopes are used to observe, instruments to manipulate and measure, and in more recent years, computers to simulate, analyze and predict. Even though biology as a scientific discipline has always relied heavily on advances in technology and instrumentation, biology education has not kept pace through the years. Remember when your biology lectures were delivered with chalkboard sketches,

late some biological event. Here are some of the electronic "tools" that are giving biology education a new look and more effective delivery.

Email

At the beginning of a quarter, instructors may request that ITSS (Information Technology Systems and Sources) set up an "alias" or message center, for all the students registered in a class, and can then quickly communicate announcements, assignments, clarifications, reminders or current news items. Students can, likewise, contact the instructor with questions and comments. This is a rapid, but somewhat impersonal, way of communicating with students and is effective only if students regularly read their email. For smaller classes, where discussion of topics and ideas is part of the learning experience, "threaded discussions" between
(Continued on page 18...)



Lyle Shannon uses a laptop computer and PowerPoint to deliver General Biology lectures.

Unfortunately, we said farewell to Dr. Anne Hershey, who left UMD last August to become a Professor and Head of the Department of Biology at the University of North Carolina-Greensboro. Anne was a key member of our department for 13 years. Her research programs in Alaska and Minnesota brought prestige to the department and provided research opportunities for many undergraduate as well as graduate students. Anne leaves a legacy of many wonderfully trained students from her years at UMD. Our best wishes for her future success went with Anne as she left Minnesota.

The Department of Biology has moved ahead boldly with a unified sense of purpose despite Don Christian's departure a year ago and Anne's move this past year. We will conclude national searches this spring for two replacement faculty positions, a vertebrate physiologist and an insect ecologist. Dr. Gerald Niemi became interim department head for the '97 - '98 academic year. The faculty and staff owe an enormous debt to Jerry for stepping into this role at a time when the department was in need of leadership. His guidance saw us through this period of transition.

Last July, I became the Biology Department Head after serving for 12 years as a faculty member. My desire has been to see our department grow while remaining strong. This goal will be possible because of the groundwork laid by our most recent department heads. We continue to emphasize undergraduate education with a positive blend of high-quality undergraduate instruction, significant research programs, strong graduate training, and outreach of biological knowledge and understanding. Our departmental strength in research continues to provide a variety of undergraduate research opportunities. Many students have been involved in new research projects, either for university credit or supported by the UROP and NSF-REU programs or by faculty research grants.

Our developing strength in the area of cellular and molecular biology is paralleled by our existing strength in ecology, especially aquatic ecology. These focused strengths will provide many new opportunities in the near future for biology students, the largest group of undergraduate majors at UMD, as well as our graduate program. This year, Chancellor Martin announced two initiatives, one in freshwater science and another in cellular and molecular biology that will strongly impact our program. A new plankton ecologist will join our faculty as a direct outcome of the freshwater initiative. This position is the first new growth in our faculty numbers for many years. We are also excited by the prospect that another cell biologist may join the College of Science and Engineering and become affiliated with our department.

We are experiencing many positive changes that will help our faculty, staff, and students in the future; increased institutional support for our office, additional equipment for teaching, the start of freshman seminar courses, plans for constructing a laboratory sciences building, and a new departmental development program. I am glad to report that we have expanded our office complex this year and Betty Myshack, an Accounts Supervisor, will soon join our staff to help track our research and teaching expenditures. We also hope to hire a new receptionist to assist our Executive Secretary, Ruth Hemming. This summer, a second laboratory coordinator, Dr. Narayanan Rajendran, will augment Randy Hedin's hard work in preparing for laboratory courses. Further, we were pleased to obtain college funds to replace aging office equipment and purchase new teaching and research equipment.

Recently we received approval and support to develop three new seminars, exclusively for entering students, to be taught by senior faculty members. This is part of a strategic goal to make the freshman experience in biology the most fascinating time a student will spend at UMD. Another exciting project is the planning for new laboratory sciences building

which our department will share with the Department of Chemistry. Our faculty has worked diligently this year with the UMD Administration and architectural consultants to design a building that will address our current needs and provide for our future growth. We are pleased that Chancellor Martin has given this building project high priority. With support from the Minnesota legislature and our alumni, I hope that we can occupy new building space within four years. Last, but possibly most importantly, we have embarked on a development effort to provide increased recognition and special opportunities for students in the Department of Biology. Information about these new programs can be found in the article "Special Opportunities to Support UMD Biology Students" on page 17 of this newsletter.

Finally, I could not have made it through this year without the support and hard work of an excellent faculty and staff. Many individuals, who form the core of our department, took on even more responsibilities during this challenging year to ensure that our department stayed its course and met the challenges which faced us. Conrad Firling and Linda Holmstrand have continued to provide leadership in our department as Associate Heads. Their work on the impending conversion to semesters has been outstanding. We have used this conversion as an opportunity to re-evaluate and upgrade our curriculum and the faculty has invested tremendous effort to make this conversion work. David Schimpf continued as the Director of Graduate Studies for the Biology Graduate Program this year. His hard work directly contributed to two new graduate students being offered University of Minnesota Graduate Fellowships next year and a current graduate student, Kate Katich, receiving an Alexander P. and Lydia Anderson Research Grant from the University of Minnesota.

I have received sound advice from our faculty and staff in addition to our past Head, Dr. Gerald Niemi. I can honestly say that the challenges we faced this year have been met

through a renewed sense of teamwork, and I am exited about the directions our department is taking. I urge you to visit our web page (<http://www.d.umn.edu/biology>) or consider visiting us when you are in Duluth so that you can see the results of our collective efforts. Please accept our best wishes and thanks for your continuing support.

Faculty/Staff News Notes

After 14 years as a UMD Biology Department faculty member, **Anne Hershey** accepted a position as the first Julia Taylor Morton Distinguished Professor of Health and Life Sciences at the University of North Carolina – Greensboro, where she also serves as the department head. While at UMD, Anne established an active research program in aquatic ecology and was an effective, proactive leader in the department. Anne and her family left Minnesota last August. Faculty, staff and students wish her much success as she faces this new challenge.

Several visiting scientists and postdoctoral researchers have joined the plant physiology laboratory of Dr. Arun Goyal this past year. **Mamta Agarwal**, from Delhi University in India, was here for 8 months working on glycerol metabolism for improving stress tolerance in plants. **Dr. G. C.**

Srivastava, head of the Plant Physiology Division of the Indian Agricultural Research Institute, New Delhi, visited Dr. Goyal's lab for a month last summer. **Dr. Durba Ghosal** has a three year funded project from the USDA on the topic of carbon concentration mechanisms in plants and algae.

Dr. A.K. Rishi will be joining the group as a research associate this spring, starting polar transformation work for the new Forest Biotech Initiative, a joint endeavor between the UMD Biology Department and NRRI, focusing on the isolation of novel biomolecules from poplar trees.

Colleen Belk and **Virginia Borden** presented a seminar entitled "The Biology of Women and the Medicalization of Women's Biology" at the Women's Health Care Grand Rounds series at the Mayo Clinic in February.

Dr. Randall Hicks and graduate students **Brendan Keough** and **Ryan Maki** attended the American Society of Limnology and Oceanography 1999 Aquatic Sciences meeting in Santa Fe, New Mexico. See the "Graduate Student Profiles" section of this newsletter for titles of papers presented.

Gary Walton, Dr. David Schimpf and **Professor Emeritus Paul Monson** recently published an article entitled "Noteworthy Collections: Minnesota and Wisconsin" in Michigan Botanist. This paper describes first state records for seven species of flowering plants. Last June, the herbarium co-hosted a visit by Drs. Warren and Florence Wagner. This included the seminar "Moonwarts of the Great Lakes Area", an identification workshop on the genus *Botrychium* and several fieldtrips during their 4 day visit.

The May '99 issue of Lake Superior Magazine features an article "The Giving Tree" which cites the work of Dr. Pavel Krasutsky (NRRI), **Dr. Raj Karim**, Biology and Dr. Robert Carlson, Chemistry (UMD). The three researchers are testing derivatives of the compound betulin, derived from birch bark, for a variety of industrial and medicinal uses. Dr. Karim's research is centered on treatments for herpes.

In Memorium

The Biology Department sympathizes with the family and friends of Rosalie Calindo Naddy, who passed away last October after a long illness. Mrs. Naddy taught in the department in the late 1950's. She was a strong advocate of environmental education and talented in natural science illustration. Forced to retire by ill health, she was working on a book on the wildflowers of northeastern Minnesota at the time of her passing.

Visit With A Professor Emeritus...fifth in a series

by *Linda Holmstrand*

Although he officially retired in 1990, Dr. Paul Monson is still a familiar figure around the Biology Department. His life-long interest in the area of botany has kept him involved in the department, primarily the activities of the Olga Lakela Herbarium (see recent publication listed in the "News Notes" section). Dr. Monson came to UMD in 1958, with a background in plant taxonomy and systematic botany from Iowa State University at Ames, Iowa. He grew up in western Minnesota, Hawley to be exact, and still proclaims a great fondness for that prairie environment.

The Biology Department owes Dr. Monson a great deal for his many contributions, not only in teaching and service, but also for his role in building and sustaining collections of the UMD greenhouses and the Olga Lakela Herbarium. He served for many years as the Herbarium Director and continues in the role of Herbarium Curator. Dr. Monson contributed about 6000 specimens, roughly 10%, of the herbarium's collection, over a period of forty years. Many of them were classified as rare or endangered plants. A good share of the collection and identification of these specimens was funded by Voyageur's National Park and Grand Portage National Monument. Some of Dr. Monson's specimens have been annotated for the "Flora of North America Project", a multivolume set of reference books, of which three volumes have already been published. Most will be published in the next century. In addition to the collection and curation of botanical specimens, he also used his expertise in contributing to environmental impact assessments for a number of agencies, including the city of Duluth, U. S. Forest Service, Minnesota DNR and the Department of Transportation.

Paul Monson was one of the premier teachers in the Biology Department for many years. He shared his knowledge and keen interest in plants with generations of beginning students, *(Continued on page 4...)*

as well as those in upper division classes. I personally remember taking Plant Taxonomy from him. It was a difficult, yet rewarding, class, in which we were expected at all times to have a hand lens and a taxonomic key in possession. The final laboratory practical exam in that class was legendary. Everyone knew that Professor Monson would take off in his station wagon for several days on a collecting trip to southern Wisconsin, Minnesota and Iowa. Upon his return, we could expect to see a lot of new plants - for the very first time – on our final exam!

Dr. Monson had a special philosophy for teaching “hands-on” biology to beginning students, especially those that were “non-majors”. He was an active, long-time member, and board member, of a national organization called ABLE (Association for Biology Laboratory Education) and spent decades writing and refining laboratory exercises that guided students to think, and to discover for themselves, the wonders of biology. Many of the handouts he developed are still used in the department’s course offering for liberal education – Biology and Society – a course that he initiated and developed in the 1980’s.

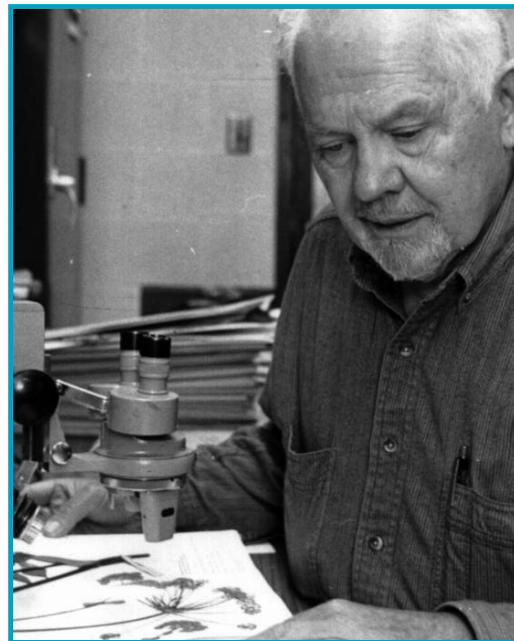
Paul’s repertoire of professional experiences has also included some unusual and creative teaching situations. Teamed with colleague Dr. Hollie Collins, Monson spent five summers “touring” Minnesota with 15 - 16 UMD biology students enrolled in a course entitled “Ecology of Minnesota”. The mobile classroom was a converted schoolbus named “Oikos” (Greek for ‘Ecology’) and housed bench space and field sampling equipment for the outdoor laboratories, in addition to two bunks for the instructors (students lived in tents). The class was exposed to the broad expertise of both professors, and they studied the geology of Minnesota, plus plant and animal communities ranging from the northern hardwoods and pine forests, to the western prairies, to the southeastern region of the state bordering the Mississippi River. I was told that there were some interesting and humorous “afterschool” activities also, not to mention the evenings at “Slippery’s” at

Wabasha (yes, the same setting that you saw in “Grumpy Old Men”). Paul has fond memories of those Oikos trips.

Paul and Betty Monson’s “retirement home” is the same one they have lived in for more than 40 years, while raising their three sons. Betty’s degree and background are in secondary and adult education, and she is now working for the Area Learning Center with special adult education. Their three sons are not far away. David and his wife are both chiropractors and have a practice in Brooklyn Park. David’s three daughters are adults and live in the west coast area.

Philip is an environmental education coordinator. He and his wife Teri, who is a biology teacher, have two children and live in the west end of Duluth. Mark, the youngest son, has an MS degree in Industrial Safety from UMD and lives in the twin cities with his wife and three children.

The Monsons both enjoy traveling – they most recently returned from a trip to Florida, and regularly drive to the twin cities to visit family. Summers are now devoted to a more leisurely life, including the care of a backyard garden with a plot of prairie vegetation. Paul is still able to spend some time in community service – Kiwanis Club, in particular – and does some volunteer work for his church. And he still stops to smell the roses! Former students and alumni who want to convey greetings can write to Dr. Monson at 223 West St. Marie Street, Duluth, MN 55803.



Professor Emeritus, Paul H Monson.

Biology Faculty Publications in the Last Year:

Arun Goyal

A. Goyal, J. Thielmann and N.E. Tolbert “Isolation of Ch1oroplast Envelopes from *Dunaliella tertiolecta*” Canadian Journal of Botany. Vol. 76, pp.1146-1152, 1998.

N. Mir, R. Beaudry, and A. Goyal, “Fruit Fungal Interactions: Prospects for a volatile communication system”. Crop Improvement through Gene Transfer, (Book, in press)

Randall Hicks

Hicks, R. E., and D. A. Pascoe. 1999. A comparison of cyanobacterial dominance within the picoplankton of the North American Great Lakes estimated by 6S rRNA-based hybridizations and direct cell counts, Exploring the Great Lakes of the World: Food-web dynamics, health, & integrity, (Munawar, M. and R. Hecky, Eds).

Raj Karim

In vitro Effects of Betulin and Betulinic Acid on HSV-1 and HSV-2 using Vero Cells. Kramer, M.L., M. Reza-ul (Raj) Karim, and R. M. Carlson. Proceedings - NCUR 1998: 1478-1482.

Andrew Klemer

Boyce, J.K., A. R. Klemer, P.H. Templet and C.E. 1999. Power distribution, the environment, and public health: A state-level analysis. *Ecological Economics* (in press).

Qin Qin Liu

Liu, Q., F. A. Oelke, R.A. Porter and B. Reuter. 1998. Formation of Panicles and Hermaphroditic Florets in Wild-Rice Populations. *International J. of Plant Sci.* 159(4): 550-558.

Liu, Q., R., Moretz, F. Mainolfi, R. Deleon, C. Myers, and T. K. Kishimoto. 1998. Dynamic expression of L-selectin in cell-to-cell interactions between neutrophils and endothelial cells in vitro. *J. of Experimental Cell Research.* 243: 87-93.

Gerald Niemi

Niemi, G.J., J.M. Hanowski, P.Helle, R.Howe, M. Monkkonen, L.Venier, and D.A.Welsh, Ecological sustainability of birds in boreal forests. *Conservation Ecology* 2 (2): 17, 1998.

Schulte L., and G.J. Niemi, Bird communities of early successional burned and logged forest, *J. Wildlife Management* 62:1418-1429, 1998.

Bradbury, S., J. Hermens, W. Karcher, G.Niemi, R. Purdy, and C. Richards, "Obtaining data for ecological risk assessment." pp 29-37 in K. Reinert, S. Bartell, and G. Biddinger (Eds.) *Ecological Risk Assessment Decision-Support System: a Conceptual Design*, Society of Environmental Toxicology and Chemistry Special Publication, 1998.

Christian, D.P., W. Hoffman, J. M. Hanowski, G.J. Niemi, and J. Beyea, Bird and mammal diversity on woody bio-

mass plantations in North America, *Biomass and Bioenergy* 14:395-402, 1998.

Basak, S.C., G.D. Grunwald, G.E.Host, G.J. Niemi, and S.P. Bradbury, A comparative study of molecular similarity, statistical, and neural methods for predicting toxic modes of action. *Environmental Toxicology and Chemistry* 17:1056-1064, 1998.

Monkkonen M., P. Helle, G. Niemi, and K. Montgomery, Heterospecific attraction affects community structure and migrant abundances in northern breeding bird communities. *Canadian Journal of Zoology*, 75: 2077-2083, 1998.

Hershey A.E., A.R. Lima, G.J. Niemi, and R.R. Regal, Effects of *Bacillus thuringiensis israelensis* (Bti) and methoprene on non-target macroinvertebrates in Minnesota wetlands." *Ecological Applications* 8: 41-60, 1998.

Froese K.L., D. A. Verbrugge, G.T.Ankley, G.J. Niemi, C.P. Larsen, and J.P. Giesy, Bioaccumulation of polychlorinated biphenyls from sediments to aquatic insects and tree swallow eggs and nestlings in Saginaw Bay, Michigan, USA. *Environmental Toxicology and Chemistry* 17: 484-492,1998.

Merry Jo Oursler

L. Pederson, M. Kremer, J. Judd, D. Pascoe, T.C. Spelsberg, B.L. Riggs, and M.J. Oursler, "Androgens Regulate Bone Resorption Activity of Isolated Osteoclasts in Vitro," *Proceedings of the National Academy of Sciences, USA*, vol.96, pp. 505-510 January, 1999.

John Pastor

Pastor, J., B. Dewey, R. Moen, M. White, D. Mladenoff, and Y. Cohen. 1998. Spatial patterns in the moose-forest-soil ecosystem on Isle Royale, Michigan, USA. *Ecological Applications* 8: 411-424.

Bridgman, S.D., K. Updegraff, and J. Pastor. 1998. Carbon, nitrogen, and phosphorus mineralization in northern wetlands. *Ecology* 79:1545-1561.

Jordan, P.A., J.L. Nelson, and J. Pastor. 1998. Progress towards the experimental reintroduction of woodland caribou to Minnesota and adjacent Ontario. *Rangifer Special Issue No.10*: 169-181.

Pastor, J. and D. Binkley. 1998. Nitrogen fixation and the mass balances of carbon and nitrogen in ecosystems. *Biogeochemistry* 43: 63-78.

Updegraff, K., S.D. Bridgman, J. Pastor, and P. Weishampel. 1998. Hysteresis in the temperature response of carbon dioxide and methane production in peat soils. *Biogeochemistry* 43: 253-272.

Hale, C.M. and J. Pastor. 1998. Nitrogen content, decay rates, and decompositional dynamics of hollow versus solid hardwood logs in old-growth and mature hardwood forests of Minnesota, U.S.A. *Canadian Journal of Forest Research* 28: 1276-1285.

Cohen, Y., J. Pastor, and R. Moen. Bite, chew, and swallow. *Ecological Modelling* (in press).

Pastor, J. and S.D. Bridgman. 1999. Nutrient efficiency along nutrient availability gradients. *Oecologia* 118: 50-58.

Pastor, J., S. Light, and L. Sovell (editors). 1998. *Sustainability and Resilience in Boreal Regions: Sources and Consequences of Variability*. *Conservation Ecology* 2 (Special Issue).

Moen, R., J. Pastor, and Y. Cohen. 1999. Antler growth and extinction of the Irish elk. *Evolutionary Ecology Research* 1: 235-249.

(Continued on page 6...)

David Schimpf

Walton, G. B., D.J. Schimpf, and P.H. Monson, Noteworthy collections: Minnesota and Wisconsin, Michigan Botanist, 35:105-110, 1998.

Lyle Shannon

Hershey, A.E., L. Shannon, G. Niemi, A. Lima, and R. Regal. Prairie wetlands of south central Minnesota: Effects of drought on invertebrate communities. In D. P. Batzer, Rader, B. and Wissinger, S. A., Eds: Invertebrates in Freshwater Wetlands of North America. John Wiley and Sons. 1999. pp.515-542

Niemi, G. J., A.E. Hershey, L.J. Shannon, J.M. Hanowski, A. Lima, R.P. Axler, and R. Regal. 1999. Ecological effects of mosquito control on zooplankton, insects and birds. Env. Tox. Chem. 18:3 pp.549-559.

Melbourne Whiteside

M. C. Whiteside "Quantitative sampling techniques for age-0 fish from diverse lake habitats". Arch Hydrobiol. Spec. Issues Advance. Limnol. 49:99-116.

CURRENT FACULTY RESEARCH GRANTS

A. Goyal (PI) Carbon Concentration Mechanisms in Plants and Algae, USDA, '98-'00, \$100,000.

A. Goyal (CO-PI), Randy Beaudry (P1), Identification of Natural Flavor Volatiles to Prevent Fungal infection in Apples : Pathogen-Host Communication. Center for Crop and Food Bioprocessing, Michigan State. '97-'98. \$21,000

A. Goyal (Co-PI), Randy Beaudry (P1), Pathogen-Host Volatile Communication. Biotechnology Research Center, Michigan State. '97-'98. \$15,000.

G. Sabel, J. Anderson, D. Gustafson, B. McCarthy, R. Axler, R. Hicks (Co-PI), J. Crosby, T. Bovee, WLSSD, and Minnesota OST Contractors Association. "On-Site Sewage Treatment Alternatives: Pathogen Removal Technology Transfer". Legislative Commission on Minnesota Resources; '97-'99; \$500,000.

R. P. Axler, R. E. Hicks (Co-PI), B. J. McCarthy, Pathogen and Nutrient Removal by Constructed Wetlands for Treatment of Single Home and Small Community Wastewater Flows". Competitive Grants Program, Minnesota Sea Grant '98-'00; \$80,400.

R. E. Hicks (P1), "Comparative Analysis of Archaeal Nucleic Acids in Picoplankton from Great Lakes"; University of Minnesota Graduate School; '97-'98; \$13,735.

Klemer, A.R. (CoPI), M. Mageau, M. Wackernagel, D. Yount, and J. Harvie, "Reducing Duluth's Ecological Footprint" State of Minnesota Environmental Assistance Grant, '98-'99, \$30,000.

Liu, Q. Identity variation in sex expression and control factors in wild rice flower development for seed production, Minnesota Cultivated Wild Rice Council, '98-'99, \$6,000.

Liu, Q (P1) Evaluation of sex expression in wild rice flowers for seed production using sex determination indexes, Minnesota Cultivated Wild Rice Council, '99-'00, \$4,000.

G.J. Niemi (co-PI) , Wildlife species: response to forest harvesting and management in riparian stands and landscapes, Minnesota Forest Resources Council, '96-'99, \$185,000.

G.J. Niemi (P1) Boulder Lake Management Area - Environmental Education and Research Program, (Partnership program between Center for Water and the Environment, NRRI, UM, Minnesota Power; Minnesota DNR and St. Louis County) '94 to present. \$59,500.

G.J. Niemi (P1) Forest bird biodiversity: indicators of environ-

mental condition and change in the Great Lakes watershed. Great Lakes Protection Fund. '96-'98. \$382,000.

G.J. Niemi (Co-PI) Monitoring bird populations in Minnesota's national forests. North Central Forest Experiment Station, Chippewa National Forest, Superior National Forest, USDA Forest Service and US Fish and Wildlife Service. '91 to present. \$198,360.

G.J. Niemi (P1) "Effects of changes in the forest ecosystem on the biodiversity of Minnesota's northern forest birds," Minnesota Legislative Commission on Minnesota Resources through Minnesota DNR. '91 to present. \$1,788,000.

M.J. Oursler (PI), "Identification of Estrogen-regulated Genes in Osteoclasts," Grant-in-Aid University of Minnesota, '97-'98, \$20,332.

M.J. Oursler (PI), "Breast Cancer Stimulation of Osteolysis," Department of the Army, '97-'00, \$286,509.

M.J. Oursler (PI), "The role of src in estrogen's protective effects on cardiovascular disease and osteoporosis," American Heart Association Beginning Grant-in-Aid, '98-'00, \$59,405.

M.J. Oursler (PI), "Nongenomic effects of estrogen on osteoclast-like cells," Minnesota Medical Foundation, '97-'98, \$9,000.

M.J. Oursler, (PI), The role of the estrogen receptor alpha in estrogen effects on osteoclasts in vitro," Duluth Clinic, '98-'99, \$9,800.

M.J. Oursler, (PI) "Estrogen action on osteoclasts in vitro," University of Minnesota Grant-in-Aid, 1/98-12/98, \$23,833.

J. Pastor (PI), Y. Cohen, "Moose foraging strategy, energetics, and ecosystem processes in boreal landscapes," NSF, '94-'99 \$765,000.

GRADUATE STUDENT PROFILES

J. Pastor (PI), Y. Cohen, and D. Mladenoff, "Long-term dynamics of moose populations, community structure, and ecosystem properties on Isle Royale," NSF, '93-'98 \$250,000.

J. Stanford (PI) and J. Pastor, A Grizzly bear digging in sub-alpine meadows: Influences on plant distributions and nitrogen availability, NSF, '95-'98, \$111,549.

C. Johnston (PI), J. Pastor, and H. Mooers, A Control of productivity and plant species segregation by nitrogen fluxes to wetland beaver meadows, NSF, '97-'00, \$600,000.

S. Bridgham (PI), J. Pastor, and J. Chen, Carbon and energy flow and plant community response to climate change in peatlands, NSF, '97-'01, \$1,380,889.

J. Pastor (PI), Y. Cohen, R. Moen, and B. Dewey. Moose population cycles, ecosystem properties, and landscape patterns on Isle Royale, NSF, '98-'03, \$300,000.

D.J. Schimpf (PI), "Computer database for the Olga Lakela Herbarium"; Biological Research Collections; National Science Foundation; '99 -'01; \$84,277.

L. J. Shannon (PI) 1998: Analysis of Bti and Methoprene application rates on Wright County, MN wetlands. Metropolitan Mosquito Control Commission. \$1600

Yin, Kewen, L. J. Shannon (Co PI), and C. Richards, '98-'00: Acoustical mapping of Lake Superior Zooplankton. Sea Grant. \$65,000.

Simge Akbulut is a graduate of the University of Marmara in Gaziantep, Turkey. This past year she has been a teaching assistant for General Biology and Plant Biology, in addition to initiating her research plans. Working under the direction of Dr. Ben Clarke, UMD School of Medicine, Simge's research is on the recycling of MCR-5 receptor structure in rat thymus tissue. Her long-range plans are to teach and do research in an academic setting, but this summer she will continue the research for her degree and visit her family in Turkey. Simge has found the faculty and graduate students here to be very helpful and supportive.

A native of Oak park, Illinois, **Gaea Crozier** holds a degree in Zoology and Biological Aspects of Conservation from the University of Wisconsin, Madison. She is interested in avian habitat relationships and has collected data from two field seasons in the Upper Peninsula of Michigan, under the supervision of Dr. Jerry Niemi. Her data will be analyzed using modeling techniques that utilize local and landscape factors to determine and predict associations between habitat type and predatory birds. Gaea has also been a teaching assistant for General Biology and Ornithology this past year, and attended the AOU conference in Memphis. Gaea says her summer plans are (like her avian research subjects) "up in the air".

Sandy Fritzl plans to complete her MS degree this summer and will defend her thesis "The Role of Nuclear Lamins in Chemotherapeutic Action". She received her bachelor's degree in Psychology from UMD and for the past two years has been working in medical research with Dr. Jon Holy of the UMD Medical School. In addition to the microscopy and lab work accomplished here, Sandy also regularly traveled to the Minneapolis campus to use laboratory facilities in the Cancer Center. Sandy had some great options for next fall - she will be attending Mayo Medical School starting in August, but was also accepted at both the UMD and UMM Schools of Medicine!

Mary Karst is completing her first year as a graduate student in the Biology department. Originally from Fergus Falls, MN, she graduated from UMD with a degree in Biology. Mary has some research in progress in the laboratory of Dr. Merry Jo Oursler, who is her faculty advisor, but has not decided on a thesis title. In addition to launching her research, Mary also was a teaching assistant, both fall and winter quarters, for the large course in General Biology. Her future plans are uncertain, but she may either apply to medical school or teach Biology at the junior college level.

Kate Katich graduated from UMD with degrees in Biology and Communications. During the past year, she has served as a teaching assistant for Plant Biology, focused her research goals in plant ecology and used her computer skills in part-time work for the department. Kate's research project, under the direction of Dr. David Schimpf, will investigate the role of soil conditions and climate in limiting the range of American beech in northern Michigan. This summer she will spend some time there collecting data, in addition to her job as an accountant for the Vista Fleet.

Brendan Keough is completing his second year of graduate research in microbial ecology with Dr. Randall Hicks. In February he presented a paper at the American Society of Limnology and Oceanography meetings in Sante Fe, NM. Brendan's thesis title "Distribution of Archaean Nucleic Acids in Great Lakes of the World" is based on the examination of archaea from picoplankton collected from lakes on three continents. He is a graduate of Marquette University and upon completion of his degree next fall, has hopes of continuing his career as a researcher.

Under the leadership of Dr. Anne Hershey, **Jenny Kysely** has nearly finished her graduate work in stream ecology. Her thesis, entitled "A ¹⁵N Tracer Addition Study on Organic Matter Dynamics in an Arctic Alaskan Stream" was the subject of a presentation last summer at the North American Benthological Society meetings, Prince Edward Island, Canada. *(Continued on page 8...)*

During her stay at UMD, Jenny has been a teaching assistant for General Biology, Animal Biology and Ecology, in addition to working on aquatic insect samples as a research assistant. She has a bachelor's degree from UW –Stevens Point, and after completing her MS here, plans to pursue a PhD and eventually have a secure research position.

Anne Lacy plans to graduate in May after two years as a graduate student here. Before coming to UMD, Anne took her undergraduate degrees in Psychology and Biology at UW-Eau Claire. She is under the tutelage of Dr. Jerry Niemi, and will use breeding bird survey data catalogued at NRRI, along with GIS information on landscape, climate and vegetation type, to predict the occurrence of rare avian species. Anne has been a teaching assistant in General Ecology, Animal Diversity and Plant Biology. She has her summer well planned and will be working as an RA at NRRI.

Ryan Maki will analyze his research data and complete his graduate work this summer, having completed his project on the survival and viability of a freshwater pathogen, *Salmonella typhimurium*. His experiments were conducted in rolling microcosms containing water and native microbes from the Duluth/Superior Harbor. In February, Ryan gave an oral presentation on his research at the American Society of Limnology and Oceanography meetings in New Mexico. He has been a research assistant, a lab preparator in general microbiology and also a graduate TA for General Biology and Biology and Society.

Jean Mengelkoch came to UMD from Hamel, MN by way of the College of St. Benedict, where she received her bachelor's degree in Biology. She has been a teaching assistant for the past two years in the Animal Biology and Human Anatomy courses. Jean's research has been directed by Dr. Jerry Niemi, and involves feeding in nestling tree swallows. She spent the summer of '98 at the Agassiz National Wildlife Refuge in northwestern Minnesota, collecting food samples from "collared" nestlings and using aerial nets to sample

insect abundance. She is currently identifying insects comprising the tree swallow nestling diet. Jean hopes to complete her graduate work here this summer. Her long-range plans are to conduct research in wildlife biology.

Kay Rezanka will fulfill requirements for her degree this summer, as she completes her thesis entitled "Examining Primary Producer-Consumer Interactions Using Exclusion and ¹⁵N Tracer Techniques in a Lake Superior Tributary". Amity Creek in Duluth was the site of Kay's research project. She introduced a stable nitrogen isotope into the stream as a tracer for examining producer/consumer compartments in the food web dynamics of the stream. Kay was selected as the outstanding graduate teaching assistant for the '97-'98 year. Additional information on her activities can be found in the "Graduate Teaching Assistant Award" article in this newsletter.

Carolyn Scholl, one of our "new" graduate students, currently lives in Iron River, WI and holds a Biology degree from UW-Oshkosh. Her interests are in aquatic biology, and with her advisor Dr. Andy Klemer, she has recently completed a study design for her thesis project. Carolyn eventually hopes to work in the private sector as a water resource manager. In support of that goal, her research will focus on shoreline and watershed development relative to water quality in selected lakes. She will spend the summer of '99 collecting field data for her thesis (and tending her flower and veggie garden). Carolyn has been a teaching assistant this past year in the Biology and Society class.

Aubie Shaw is a native of Eveleth, MN and a Biology graduate of UMD, where for the '97-'98 academic year she was a co-recipient of the T.O. Odlaug Award. Aubie's plans are to earn a PhD in Biochemistry and Molecular Biology and eventually to teach at a small university. She is currently working under the direction of Dr. Merry Jo Oursler, where she is investigating the growth factors released by breast cancer tumors, and their role in osteoclast activity leading to bone loss in breast cancer survivors. Aubie presented some

research results in a poster session last December at a joint meeting of the American Society for Bone and Mineral Research and the International Bone and Mineral Society. In addition to her research activities, Aubie has been a research assistant and a teaching assistant for General Biology and Biology and Society.

Another Biology graduate of UMD, **Matt Thompson's** interests are in the area of virology and immunology. He has done some preliminary studies on the *Herpes simplex* virus, which resides in the dorsal root ganglia of the nervous system. His research design will focus on the role of various hormones, such as epinephrine, in the reactivation of the virus from its dormant phase. Matt's faculty advisor is Dr. Raj Karim. Besides getting his research project off the ground, Matt has also enjoyed his experiences as a teaching assistant in Microbiology, General Biology and Animal Biology. He eventually hopes to attend medical school.

Andy Wold holds a bachelor's degree from Luther College in Iowa, an MS degree in Biology from UMD, and is currently enrolled in a PhD program in Water Resources Science. Working with Dr. Anne Hershey, UMD Biology, and Dr. Carl Richards of NRRI, Andy has been collecting and analyzing data for his doctoral thesis. He is interested in groundwater influences on hydrology, periphyton and macroinvertebrate communities in north shore streams. He is currently an RA and has presented papers at NABS conferences for the last several years. Andy and his wife, Amy Fisher Wold, who also has an MS degree from UMD Biology, have added a new son to their family, joining 2 year old Ellen. Congratulations, Wolds!

Other Biology Graduate Students include: **Chris Burdett**, **Mick Gillespie**, **Toni Lamkin**, **Jonathan Pundsack**, **Mark Pranckus**, **Heidi Rantala**, **Jay Sandal**, **Michael Scott**, and **Chris von Rabenau**.

Graduate Teaching Assistant Award

Kay Rezanka is pictured here with Dr. Sabra Anderson, Dean of the College of Science and Engineering, as she received her award as the Outstanding Teaching Assistant in the Biology Department for 1997-98. The faculties from each CSE department select their top teaching assistant each year. These graduate students are honored at a reception and receive an engraved plaque.

Kay has long range plans to become a science educator, where she would ultimately like to combine her skills in field work, research and technology. She holds bachelor's degrees in both Biology and Life Science Teaching from Gustavus Adolphus College and has nearly completed her master's degree here in aquatic ecology, under the direction of Dr. Anne Hershey. Kay attributes a great deal of her teaching success to her previous experiences as a fulltime laboratory coordinator and instructor at Gustavus. Here at UMD she has been a teaching assistant in General Biology, Animal Biology, Human Anatomy and Comparative Anatomy of Vertebrates. This past winter quarter, she also assumed the responsibility of lab coordinator for the General Biology (Biol 1111) labs, which included the organization and setup of laboratory exercises and the supervision of other graduate teaching assistants for the multiple sections of the course.

Responding to the department's initiative to incorporate modern technology into the curriculum, Kay spent last summer digitizing images on the computer for use in lectures and laboratories for the introductory courses. Besides being an exemplary teacher, a proficient technician and a competent researcher, Kay has also served the department as a writer for this publication, the Life Scientist. She authored the front-page article in the previous issue entitled "Biologists Explore Aquatic Ecology - North Shore to Alaska". Kay's talents, experience and work ethic will carry her far.



Kay Rezanka and Dr. Sabra Anderson, Dean of CSE

From the Other Side of the Desk... Thoughts about being a Teaching Assistant

by *Kate Katich and Aubie Shaw*

It's the first day of school and you've got the usual jitters: new classes, new people, new teachers...but this year there is something a little different to worry about. You are going to have to get up in front of a classroom of people and be their instructor. Mark Prancus, a first year graduate student at UMD, said "I thought I was all prepared for the first day. We didn't have lab the first week of the quarter, so I did have time to settle in and get used to UMD. I walked into the classroom on the first day of lab ready to go and then I realized all of the students were waiting for me to start." The first day seems to be unnerving for everyone. Kate Katich thought she had her nerves under control as she was going over the syllabus, until she realized she was using her notes to read her own name!

One of the most difficult things about teaching is learning the names of all of your students. Mary Karst had a useful approach. At the end of her first class, she tried to name everyone as they left the room. If she was unable to come up with someone's name, she asked him or her to tell her something about themselves that would help her to remember their name.

As the quarter goes on, you try various things to liven the class up. Aubie Shaw remembers telling a joke to her class

one morning and no one laughed. After mentioning it to a few other TA's, she found that no one ever laughs at their TA's jokes. There must be something about a TA that makes students unable to laugh at them. Jean Mengelkoch went a little further to get a laugh from her students. A veteran anatomy TA, she thought it would be fun to give her dissected cats a voice. Students were quite amused when the cat they were examining began to meow. Sometimes the students themselves are amusing. Every TA seems to remember the first time a student asked them, "Can I go to the bathroom?" This merits the ever-popular response, "I don't know. Can you?" Kate Katich recalls the first time a student called her Mrs. Katich, "I heard this person behind me say, 'Mrs. Katich', and it really threw me. When did I become Mrs. Katich?"

Being a TA isn't always fun and games. It is hard work to try to learn everything you are teaching so you can answer questions without running back to the text or answer book. Every once in a while a student will come through with something that makes all of the effort worthwhile. Each TA seems to recall a time when a student stopped by during office hours (usually a VERY quiet time) just because they wanted to talk. When a student comes to you looking for advice on classes, taking the GRE, or just about life in general you know that you have made yourself approachable for your students. All in all, the general buzz among the TAs - whether they are "well-seasoned" or have only one quarter of experience under their belt--is that they wouldn't trade their teaching experience for anything.

Commencement 1998

UMD hosted its largest-ever commencement ceremonies at the Duluth Entertainment and Convention Center on May 23, 1998. University of Minnesota President Mark Yudof was the featured speaker. Total number of graduates was 1503, including 115 receiving graduate degrees. Biology graduates are listed below.

Master of Science Degree (M.S.)

Charles W. Barnes
William P. Brown
Karen J. Ellingson
Mary R. Forman
James Lee
Seth A. Moore
Mark C. Nelson
David A. Pascoe
Scott Stai
John R. Terwillinger
Andrew P. Wold

Bachelor of Applied Science Degree (B.A.S.)

Garret C. Bitker
Anne Sigrid-Reagor Castle
Lisa M. Clausen
Sandra L. Davis
Theresa A. Fehlen
Cassandra Warner Gray
Jordan R. Moe
Jessica L. Moran
Kimberly R. Olson
Charles R. Rankin
Janet M. Stevens
Cynthia A. Ward



Biology Teaching Assistants are pictured above, top to bottom, L to R: Jean Mengelkoch, Aubie Shaw, Anne Lacy, Matt Thompson, Kate Katrich, Carolyn Scholl, Simge Akbulut, Sandy Fritzlzar, Gaea Crozier, Mary Karst, Chris Burdett, Mark Prancus, Kay Rezanka, Heidi Rantala
Not pictured: Brendan Keough, Jenny Kysely

Bachelor of Arts Degree (B.A.)

Keely M. Dietman
Beth E. Elness
Shannon L. Foley
Adam W. Herron
Kirk D. Thorsen
Stacy L. Wallgreen
Sandra K. Weller

Bachelor of Science Degree (B.S.)

G. Bradley Alsop
Joan M. Anderson
Kurt W. Anderson
Joshua N. Beilke
James R. Benzie
Jennifer L. Buchner
Aubie K. Bundy
Kristina L. Burdick
Dawn M. Calliguri
Corrine A. Centa
Dominic V. Chiapusio
Amanda B. Cornell
Carrie E. Crosby
Jason W. Dagit
Tracy D. Drechsel
Justin T. Dvorak
Erik R. Edwards
Christopher D. Emerson
Steven N. Fideldy
Martha A. Fish
Christine M. Fisher
Douglas J. Gathje
Chad J. Gruszka
Steven A. Hagen
Kathryn C. Henry
Catherine E. Honse
Jenny L. Hoven
Troy D. Humphreys
Carrie E. Johnson

Mathew B. Johnson
Trevor G. Johnson
Bryan D. Jones
John P. Judge
Myron J. Jurek
Katherine A. Katich
Todd C. Kavanagh
Aaron W. Keehr
Michele L. Kramer
Marc A. Krattenmaker
Andy A. Krubsack
Melissa K. Lawyer
Kia K. Lilly
Joseph B. Lind
Deanna M. Long
Mary M. Lunke
Jason M. Meyer
Jennifer D. Miller
Kimberly A. Miller
Samuel E. Miller
Jessica L. Moran
Patty J. Oman
Julia J. Opack
Heather J. Papenfuss
John L. Peschon
Jessica M. Pike
Kelly D. Runke
Joe E. Rybar
Christopher C. Schaefer
George M. Schiltz
Benjamin W. Siems
Megan A. Smeltzer
Angela R. Smith
Kristine N. Squillace
Staci Jo Stierien
Melissa N. Sulzbach
Tara L. Terho
Troy A. Trbojevich

Steven M. Vanderwerf
Tessa N. Velander
Julie L. Vorachek
Kenneth J. Waldvogel
Francis J. Walsh
Jennifer L. Whitney
Wendy J. Wohlwend
Joshua T. Ziebell

Biology Club News

by Angela Halgren

It was great to see new faces this year, many freshmen as well as old friends, at the first meeting of the year. We enjoyed pizza, discussed club plans and elected officers. Doug Mulley was elected President; Angie Halgren, Vice-President; Sarah Foldesi, Treasurer; and Marni Hogen, Secretary. Biology Club's great kick-off this year was a Vistacruise for faculty, staff and students on Lake Superior. Despite rough weather, it was a great opportunity for socializing. Thanks to Kate Katich for arranging the cruise at a minimal cost.

Early in the year, there was a leadership change as Angie Halgren assumed the role of President and Marni Hogen, Vice President. Dr. Arun Goyal is the faculty advisor. The club was active with many fundraisers during the winter. The sale of goldfish and betas was a huge success, and selling donuts and cider and taking orders for environmental T-shirts also raised money. Each week, the club members have baked cookies for the Friday departmental seminars.

Ideas and suggestions for activities are always welcome. The club would like to sponsor speakers and possibly a Biology Career Day next fall. There is also interest in taking a group trip to the Minnesota Zoo or the Science Museum in the twin cities. As usual, the Biology Club will sponsor the annual spring picnic for faculty, staff and students. Interested students are invited to join the club and to



Biology Club Officers are Sarah Foldesi, Angela Halgren, Marni Hogen, and Doug Mulley

participate in its many activities. For more information, check with one of the officers or inquire in the Biology Clubroom, room 235 of the Life Science Building.

Outstanding First Year Biology Student

by Megan Kingsley

This award, first presented in 1998, honors the student who demonstrates the best performance in the Biology 1111, 1112, and 1113 course sequence. The selection is made by the general biology instructors and teaching assistants. The very first award winner was Randy Olson from Nisswa, Minnesota. Randy obtained the highest overall point score in the introductory biology courses. Besides the commemorative plaque, he was also awarded a Duluth pack.

Randy is currently a sophomore taking classes in cell biology, quantitative chemistry, and physics for his cell biology major. His interest in the role of chondroitin sulfate in the programmed cell death of cartilage cells lead him to apply for

and receive a UROP grant for a research project. He is working in Dr. Conrad Firling's laboratory on the effects of chondroitin sulfate on cultured embryonic chick cartilage. Randy is also active in Intervarsity Christian Fellowship and is treasurer of the Scholar's Club. After finishing his undergraduate degree, Randy hopes to go on to medical school, possibly specializing in orthopedics or general surgery.

Students Organize New PreDent Club

by Erick Hallie and Vanessa Strom

Dentists....even the word makes some people queasy. The sounds of drills, staring at ceilings, and the dreaded removal of wisdom teeth brings back feelings that most people would like to forget. The above, however, is not true for a group of UMD students.



Randy Olson receives his award from Lyle Shannon.

At the beginning of the 1998-99 school year, a group of students aspiring to be "masters of the mouth" formed a Pre-dental Club. The group's first order of business was to form a committee that could lead the club to fulfill its purpose: "...to prepare students for dental school by increasing all participant's knowledge and interest in the field of dentistry". The club officers are: Vanessa Strom, Adam Huneke, and Melissa Sadlovsky with Linda Holmstrand as the advisor. As their first activity, club members attended a program "Discover Careers in Dentistry and Dental Hygiene," at the U of M Dental School in Minneapolis. They listened to comments by alumni and current students, then toured the school. The day ended with demonstrations on the latest technology and research in the field of dentistry. The organization next sponsored a visit from a local dentist, Dr. Timothy Langguth, a graduate of UMD and the U of M Dental School. He discussed his views on dentistry based on his practice and answered questions in an informal session. Future events are being
(Continued on page 12...)

planned, one of the next to be a tour of a local dentist's office. Also, a credit card fund-raiser is underway and a cooperative social venture with the Biology Club is being considered. The Pre-dental Club welcomes anyone interested in exploring the spine-tingling field of dentistry. If interested contact: Erick Hallie at: ehallie@d.umn.edu or Vanessa Strom at: vstrom@d.umn.edu.



PreDent Club members: (L. to R.) in Row 1— Vanessa Strom, Melissa Sadlovsky, Megan Rolseth, Cory Larson Row 2— Alisa Nord, Adam Huneke, Erick Hallie, Nathan Bourassa

PreVeterinary Medicine Club

By Barb Isaacson

The PreVet Club, although small, is a great club for interaction with peers of similar interest. Club members have a common goal of earning a degree that will allow them to work professionally with animals.

As a club, we try to gather new and old members who are interested in pursuing careers as veterinarians. The club provides useful information for students working toward their goals of meeting the prerequisites needed for acceptance to a school of veterinary medicine. Recently the group toured the College of Veterinary Medicine on the St. Paul campus. In addition, there have been some fun activities such as picnics, bowling, trips to the zoo and visits to the veterinary hospital.

This is a great club for meeting with those who share common interests, whether to have fun or to learn more about the profession. The faculty advisor is Dr. Raj Karim. Anyone interested in joining is welcome and can contact Barb Isaacson at bisaacso@d.umn.edu.



Officers for the PreVeterinary Medicine Club are: (L. to R.) Denise McNamara, Publicity; Matt Peterson, Treasurer; Chris Anderson, Vice President; Barb Issacson, President; Katie Carlson, Secretary

such an organization on the Duluth campus. The seniors all found it difficult, as underclassmen, to find information about optometry, so they started the club to make information about this rewarding career more accessible. The club advisor is Dr. Conrad Firling.

The goals of the club are to educate students about opportunities in the visual sciences, provide information useful in gaining admission to an optometry school and to form a network of support. Currently, the Optometry Club is organizing trips for student to visit schools, arranging appearances by guest speakers and gathering information for a new web page. They have also created a small library of optometry-related literature in the biology clubroom. More students will now have a chance to learn about this rewarding career and

Come and See What You've Been Missing!

by Jill Kirkeide

"Come and See What You've Been Missing!" This is what signs around campus have been boasting. Last fall, a new resource was made available to students – the UMD Optometry Club. Three seniors, Jill Kirkeide, Brady Town and Heather LeClaire

got advice from knowledgeable students and professionals in the community. Interested students can access the website from the Biology Department home page: <http://www.d.umn.edu/biology>



Jill Kirkeide, Heather LeClaire and Brady Town examine admission information for optometry schools.

Senior Spotlight

by Cory Sims

One of the first things one discovers when talking to members of the graduating class is that winter quarter is not the best time to be asking seniors about their plans for the future. From November to March is a tense time when most seniors are waiting to hear from graduate or professional school admissions committees or from potential future employers. During this period of limbo for students between knowing what they want to be doing after graduation and what they will be doing, time seems to slow down. Somehow, classes are tougher and even winter's crispness seems a little wearied.

Nevertheless, senior year also represents a very exciting time for students. In only a few short months they will witness both the integration and culmination of their undergraduate studies and the emergence of a new horizon and entirely dif-

ferent challenges. Amidst all of this, a few seniors did find a chance to pause and consider the future into which they are hurtling headlong and share their thoughts with us.

“Trials and Tribulations at UMD”

David Mach, a Biology major with minors in Chemistry and Coaching, says of his UMD experience that it “has taught me to be very independent and that if you want something you have to do it yourself”. In particular, David notes that his research on DHAP reductase in plants in Dr. Arun Goyal’s laboratory has been “some of the most exciting, yet difficult time” of his four years here. He says, “the best thing about doing research with Dr. Goyal is that when you enter the lab it is like becoming part of a new family. I admire Dr. Goyal because of his enthusiasm and work ethics, his devotion not only to the lab but also to his family.”

David has also been involved in other aspects of campus life, including serving as a student representative for the Biology department for two years. That role has been a practical learning experience different from anything in his classes. When asked what exactly it has taught him, he states simply, “Politics,” adding that he was able to observe “the ins-and-outs of the [Biology] department” which many students do not get to see firsthand. “Being a student representative has opened my eyes to the limitations the administration puts on the faculty.” He remarked. “ and I learned that professors are human, too.”

Perhaps another important lesson that David has learned at UMD is how to have fun outside of classes. He has been involved with the varsity tennis team since his freshman year and has also played a variety of intramural sports including hockey, volleyball, softball, soccer and basketball. As for the future, David is hoping to continue his research into the summer and possibly even publish some of his work in a paper. He will most likely continue to work as a certified tennis instructor in St. Cloud. In the fall he plans to attend dental school. He looks forward someday to

living in a smaller city near the water and notes that he would definitely consider settling in Duluth if his future work brings him back here.

“The Non-Traditional Route

On the other hand, not everyone takes the same path to graduation. Take, for example, **Craig Maly**, whose experiences at UMD have been shaped not only by his activities on-campus but by his concurrent full-time work at the Natural Resources Research Institute (NRRI). Craig has been taking classes toward his degree for eight and a half years, squeezing them in between the demands of his job and other interests. His persistence and patience will pay off in May, though, when he receives a bachelor’s degree in Biology.

Craig, who has an Associate of Arts degree in forestry from Itasca College, works for the Center for Applied Research and Technology Development at NRRI. He has worked on projects there ranging from composting studies and reforestation to (most recently) the regeneration and restoration of peat lands in Minnesota and Canada. Since he has managed to combine his schooling and his work (an achievement about which he is unduly modest.) he is fortunate not to have the typical senior-year angst about post-graduation plans. He enjoys his current job, but says he also hopes his degree will bring him more career options in the future.

Craig’s decision to pursue an additional degree demonstrates his self-motivation and his genuine interest in the field of conservation and land-use planning. His unconventional route to graduation also lends him a unique perspective on his experiences. “It could be a plus or a minus” he says of his drawn-out education. “When I get done I’ll be starting a new career in my thirties, while they [younger graduates] will be in their twenties.”

On the other hand, he feels there’s a definite positive side to taking classes at a slower pace. Not only has he had more time to consider his educational goals, he also feels he’s gained “a lot of real-world experience – what you learn

in the classroom isn’t always like the real world.” In fact, he would recommend to any student that they “experience what they think they’re interested in to see if it’s what they really want” before they commit to a course of study and, eventually, to a career.

“A Life-Changing Experience”

Certainly, a large part of everyone’s college experience is personal exploration and beginning to figure out what does and doesn’t interest us. Opportunities for involvement and discovery abound in college and sometimes the best way to settle on a plan for the future is to try out a variety of them. **Kate Belmont** has taken full advantage of those opportunities at UMD, participating in a surprising array of on-and-off-campus activities in addition to a rigorous course load.

A Psychology/Biology double major, Kate has been a member of Women in Engineering and Science (WES) since her freshman year, serving at times as the Secretary, Social Chair and even Vice President of that group. She worked for two years in the Department of Family Medicine in the medical school and, in addition, has participated in the Darland Intergenerational Peer Tutoring program helping to tutor local elementary and high-school students. She volunteers at St. Mary’s Duluth Clinic in the Coronary Intensive Care Unit and has somehow found time to play on intramural softball, basketball and volleyball teams as well.

Of her years at UMD Kate says that she feels lucky to have been able to attend college here, despite the fact that she had initially planned to go to the main university campus in Minneapolis. “If I had gone to the ‘U’ I would have been a whole different person” she comments. “I came here because of the size, it is not too big, not too small and there is a kind of camaraderie that you can’t get at a larger school.” With a grin she adds that, “there’s competition, too, but in a good way – it keeps people on their toes.” She also that she appreciates all of the relationships she has been able to form with faculty members from both of her majors at UMD.

(Continued on page 14...)

Kate emphasizes that one of the things that make UMD special is the city of Duluth itself. "I really like the city – there's so much outdoors stuff to do here. If you want to you can go down by the lake or out on the trails. There are also things like the Norshore [Theatre], too." Between her extra-curriculars and exploring the town, Kate has also kept herself busy on-campus, most recently working with Dr. Mustafa al'Absi in the medical school studying the effects of stress on physiological function. Dr. al'Absi has been very influential for her in terms of her decisions about post-graduate studies. "He provided me with such confidence and gave me so much support." She says, "This past year has been so critical in terms of what I'm going to do. He has really been such a huge factor in keeping my mind open to my options." Kate has recently been accepted into Palmer College's well-known Chiropractic program, which she'll attend in the fall.

In all, it was difficult to focus on only a few seniors in the Senior Spotlight this year, or even to take a representative sample. It is not difficult to think of any number of seniors whose academic and personal achievements at UMD are noteworthy, but of course it would be impossible to write about them all. As a whole, biology majors are a diverse, talented and active group of students, each of whom has a unique perspective and a unique set of experiences.

As for David, Craig and Kate, they were able to share some of the lessons they have learned at UMD from their different experiences. When asked what advice they would give to this year's freshman class about college life, they each had something different to say, and in a way, each of their comments reflected their own journey through UMD.

Kate would warn students to "be prepared for low grades and that you will have no sense of direction your first year." It is okay to feel a little lost at first. But she would also advise students to "get involved in anything they can – to get the social interaction." She commented that "If you don't get involved you aren't going to enjoy the [college] experi-

ence. Get to know your peers. It is so important that you find your passion."

"Don't be afraid to change your mind." Craig feels it is important for students to feel they have flexibility and that there aren't any limits on what they can or can't do, but they should try to get as much work experience as they can while they are in school.

Ultimately, Dave encourages, "don't underestimate yourself – keep reaching for the future and have fun along the way!"

Odlaug Award



Michelle Kramer is congratulated by Dr. Gerald Niemi, Biology Department Head, as she receives the T.O. Odlaug Award.

The 1998 recipient of the Odlaug Award was Michelle Kramer, pictured to the left receiving a plaque from Dr. Jerry Niemi. The award is given annually in honor of Dr. Theron O. Odlaug, Professor Emeritus of Biology, who retired in 1978 after serving as department head for 25 years. Criteria for selection include excellence in academic standing, participation in undergraduate research, strong leadership

qualities and service to the department. Michelle was selected by the biology faculty as the senior best portraying those high standards. She chose to receive a copy of the reference text "Gray's Anatomy" as part of the award.

Michelle is a 1998 graduate of UMD, with a major in Cell Biology. She has been accepted at the Medical College of Wisconsin in Milwaukee and will begin her medical studies next August. In the meantime, she has been doing contract work for OAO, a corporation contracted by the EPA laboratory to design and maintain scientific databases. Michelle will be leaving Duluth this June, and should also be congratulated, in advance, for her marriage, which will take place in October.

UROP Awards

by *Melissa Sadlovsky*

The Biology department represents the largest number of students involved in UMD's Undergraduate Research Opportunities Program. The organization provides financial support necessary for highly-motivated students to conduct their research projects. Participants work in collaboration with a faculty member. The interaction teaches undergraduates valuable research skills, unprecedented in the classroom setting. After students complete their projects, many go on to present their findings at regional scientific meetings or to publish their research. In 1997-1998, UROP provided over \$89,000 to CSE students. Listed below are the 1998 Biology award winners, along with the project title and faculty sponsor.

Todd Amunrud

"The Effects of Nicotine Deprivation on Cortisol Levels in Men"

sponsor: Dr. Mustafa al'Absi

David Mach

"Molecular Cloning of DHAP-Reductase"

sponsor: Dr. Arun Goyal

Douglas Mulley

“Effect of UV-B on Photosynthesis of Algae”

sponsor: Dr. Arun Goyal

Trevor Swoverland

“Induction of frog deformities by lake sediments”

Sponsor: Dr. Patrick Schoff

Joseph Trowbridge

“The effect of tumor cell hormone secretion IGF11 and GM-CSF on transcription of early response genes Jun-B and Jun-D in osteoclasts”

sponsor: Dr. Merry Jo Oursler

Amber Ulseth

“UV Effects on Arctic Stream Communities”

Sponsor: Dr. Anne Hershey

Katie Bellmont

“Hemodynamic, Cortisol, And Blood Pressure Responses to Acute Stressors between Healthy Men and Women”

sponsor: Dr. Mustafa al'Absi

Michael Bourdaghs

“Light Interception in Northern Beaver Meadow Canopies”

sponsor: Dr. Carol A. Johnston

Abram Burgher

“Nuclear Matrix Alterations in Two Breast Cancer Cell Lines”

sponsor: Dr. Jon Holy

Lina Maria Catilla Calle

“Isolation of Algal Mutants for Biodegradation of Organic Chemicals”

sponsor: Dr. Arun Goyal

Douglas Dylla

“Improving the Efficiency of Efficacy of MCR5 Transfections in HeLa Cells”

sponsor: Dr. Benjamin Clarke

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Mark Vonderharr

“Effects of Global Warming on Moss Diversity and Microtopography in Bogs and Fens.”

Sponsor: Dr. John Pastor

Jeremy Zellman

“Growth Differences in *Scendesmus bijugatus* on Nitrate vs. Ammonium based Media”

sponsor: Dr. Andrew Klemer

Congratulations!

The Biology Department faculty and staff offer best wishes for continued success to the following students who have, at the time of this publication, been accepted to graduate or professional schools for the fall of 1999.

Kyle Anderson – Northwestern School of Chiropractic, Bloomington, MN

Jennifer Baumgardt – Marquette University School of Dentistry, Milwaukee, WI

Kate Bellmont – Palmer College of Chiropractic, Davenport, IA

Jonathon Delf – University of Minnesota School of Dentistry, Minneapolis, MN

Sandy Fritzlar – Mayo Medical School, Rochester, MN.

Mike Hoffman – Drake University School of Pharmacy, Des Moines, IA

Michael Malloy – University of Minnesota School of Pharmacy, Minneapolis, MN

Frances Newton – M.S. Program in Biology, University of Minnesota, Duluth, MN

Cory Sims – University of Minnesota School of Veterinary Medicine, St. Paul, MN

Nicole Strand – UMD School of Medicine, Duluth, MN

Teresa Venditto – University of Minnesota School of Medicine, Duluth, MN

Alumni News

Rev. Daniel Belgum-Blad (B.S. '82) recently attended a conference entitled "Jubilee 2000/USA Campaign", in Washington, DC. The goal of the campaign is to cancel the debts of the highly indebted, poor countries, in hopes of benefiting the inhabitants, the environment and the world. He and his wife have an energetic three year old named Jacob.

Joe Nowak (B.S. '58) retired from teaching science at Cloquet Jr. High School. He is keeping busy with an annual ski trips to California in the winter and to Florida in April. He also competes in Duluth's Senior Olympic summer games and enjoys trout fishing in the Gun Flint area. Every year he is involved in stream improvement with fly fishers

Carrie A. Howard (B.S. '93) graduated in 1997 from Clark University in Worcester, MA with an MA in Geographic Information Systems and International Development. She is currently a research assistant at Yale University Department of Epidemiology and Public Health with a main focus in mapping the distribution of Lyme disease.

Cassandra (Knoblauch) Soukup (BS '98) and husband Steve added a daughter, Dana Allison, to their family, September 1997.

Todd Wellnitz (B.S. '86) received his Ph.D. this past year from the Swiss Federal Institute of Technology, Zurich. He is currently a post-doctoral fellow working in stream ecology at Colorado State University.

Mike and Susan (Van Schaick) Nordin (B.S. '89, B.S. '90) were married June 1992. Mike works for the Wisconsin DNR and Sue is a family practice physician in Antigo, WI. They have a 14 month old daughter, Anna.

Suzanne (Larson) Brusenhan (B.S. '89) received her Master of Industrial Safety from UMD in 1990, and is Health, Safety and Environmental Coordinator with Baker Hughes in

Houston Texas. She and her husband, John, became parents in August 1998, with the birth of their first child.

Jesse Schomberg (B.S. '94) and wife Cizzarie (Johnson) Schomberg have a new daughter, Eponine. He held an internship over the summer of '98 doing water quality GIS work for local governments, and graduated with a masters in Biology last fall.

Edward T. Bersu (B.A. '68) has been promoted to Professor of Anatomy at the University of Wisconsin-Madison Medical School.

Kitty Gronlund is currently teaching Anatomy and Physiology, General Biology, Cell Biology, Chemistry for non-majors, and Introduction to Genetics courses at New Mexico State University. She is also busy writing a lab manual for General Biology, developing new lab techniques, grant writing, and volunteering in the greenhouses at the Living Desert Zoo and Gardens at Carlsbad.

John Sandness (B.S. '60) taught Biology and science classes in Colville, Washington; Port Orford, Oregon; and Princeton, British Columbia, where he has retired with his wife Marci. He enjoys gardening, woodworking, photography, and learning to read, write, and speak Norwegian for use in his travels to Norway.

Gifts and Donations

The following alumni and friends made a donation to the UMD Biology Department in the past year. We sincerely appreciate their generosity. These contributions have helped us to fulfill our educational mission.

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Dr. Edward T. Bersu
Dr. Caroline Boehnke-Becker

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Dr. Daniel R. Sherry
Mr. Edgar L. Turcotte
Ms. Doris Ukura & Family
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Waste Management Foundation
Dr. Paul E. & Mrs. Janice L. Wicklund
Dr. Barbara J. Wilson

FIRST ENDOWED BIOLOGY SCHOLARSHIP AT UMD

Ed and Alma Turcotte Scholarship

by Randall E. Hicks

For the first time, UMD has a scholarship especially for biology students, thanks to the generosity of Dr. Edgar L. Turcotte of Phoenix, Arizona. Named in memory of his parents, Ed and Alma Turcotte, Dr. Turcotte has endowed a scholarship which will be given annually to a full-time undergraduate student pursuing a degree in biology at UMD.

Dr. Turcotte grew up in Carlton, Minnesota, with two brothers and two sisters, all of whom graduated from UMD. He earned a B.S. Biology degree in 1951, then studied plant genetics as a graduate student at the University of Minnesota. After receiving a Ph.D. in 1958, he worked as a plant geneticist for the U.S. Department of Agriculture in Arizona until his retirement in 1992. During his retirement, Dr. Turcotte has worked in the herbarium at the Desert Botanical Garden in Phoenix and he continues to collaborate with the USDA.

Dr. Turcotte said he remembers UMD as a student-friendly place and that several Biology faculty members had important influences on his life. He commented on how accessible his instructors were in the Biology Department. He took his first genetics class from Dr. Ted Odlaug, whom he called "an outstanding instructor". But it was Dr. Olga Lakela who may have had the biggest impact on him. When he wasn't sure about his plans after his senior year, Dr. Lakela insisted that he go to graduate school. Dr. Turcotte remembers her suggesting that she would "haunt him for the rest of his life" if he didn't go.

When asked why he chose UMD for this endowed scholarship, Dr. Turcotte said he had received scholarships when he was a student, and that he thought it was important to donate back to places that had helped him. Thanks to the generosity of Dr. Edgar Turcotte, many students completing biology degrees at UMD will be helped in the future.

SPECIAL OPPORTUNITIES TO SUPPORT UMD BIOLOGY STUDENTS

by Randall E. Hicks, Biology Department Head

When I became Department Head last July, one of my goals was to help our department identify specific development opportunities. While we have received significant university support in our efforts to develop new programmatic areas and improve our operations, institutional resources have not given us the opportunity to develop all the strengths that we desire or that our students deserve. The contributions of friends and alumni continue to be an important resource for us to grow and improve. This year, we are thankful to have received a number of significant new gifts (please see our list of donors). These gifts included the first permanent endowment for biology student scholarships at UMD, the Edgar and Alma Turcotte Scholarship Fund. We are extremely grateful for the continuing generosity of our alumni and friends.

The Biology Faculty decided that special, long-term attention needs to be directed towards three areas in our department: **student awards, student research opportunities, and student clubs.** We agreed to establish an endowed "Biology Student Award Fund" to develop new awards for our students, start fundraising efforts to endow a "Biology Student Research Stipend Fund" for undergraduate and graduate students, and initiate additional fundraising for our student clubs. As you can see, the Biology Faculty believes that fundraising for student causes should be high priority. I recently attended a luncheon with most of the emeritus faculty from our department. These eight persons comprise the largest group of emeritus faculty within a single department at UMD. Our emeritus faculty, your past professors, are very excited about the fundraising goals we have set for ourselves. Many corporations and organizations match individual donations to educational institutions, so I urge you



Dr. Edgar Turcotte receives a handshake from Chancellor Kathryn Martin as he receives his Founders Society plaque in appreciation for awarding the first annual \$1000 Turcotte Scholarship in Biology.

to inquire whether your employer will match a contribution you might make to the Department of Biology.

Our first goal is to raise \$10,000 by July, 2000 to endow a Biology Student Awards Fund. This endowment will provide enough annual support to develop several new awards for biology students at UMD. Obtaining funds from the university to develop student awards is nearly impossible after other needs within the university are met. Yet,

our faculty realizes the importance of recognizing students at all stages in their education and has already pledged more than \$2,000 so that we can reach this goal within a year. If you wish to contribute to this endowment, then please send your gift to Steve Johnston at the UMD University Relations and Development Office (315 Darland Administration Building, UMD, Duluth, MN 55812) and earmark it for the "UMD-Biology Student Awards Fund".

Our second goal is to raise a larger endowment over the next five years to support undergraduate and graduate research in the Department of Biology. Interest from this fund will be used for stipends and research supplies and will provide enough support to annually fund several additional student research opportunities. If you, your family, or your business would like *(Continued on page 18...)*

to help us reach this goal, then please contact either myself (218-726-7263; rhicks@d.umn.edu) or Steve Johnston (218-726-6995; sjohnst1@d.umn.edu) to discuss your gift further.

Our third goal is to raise enough funds over the next five years to endow annual support for the student clubs associated with the Department of Biology (i.e., Biology Club, Pre-VetMed Club, Pre-Dentistry Club, Optometry Club). We envision that these funds will be used for club activities that benefit all students in our department - like inviting special seminar speakers or visiting professionals who might develop a workshop for students during a short stay at UMD. If you have a special interest in these clubs, then contribute to the "UMD Biology Clubs Fund" or feel free to contact Steve Johnston or me to further discuss a gift to support our student clubs.

Technology in the classroom (continued from page 1)

students in the class can take place electronically, entirely outside the classroom.

Web Pages

A web page is an electronic document with a specific address, which is available on the internet and is created for an specific course. The simplest of web pages includes a syllabus and other pertinent information about the course and the instructor. Elaboration may include lecture note outlines, review questions for exams, or links to other sites for additional resources. Dr Arun Goyal is one of several Biology faculty members who has developed web sites for his classes. He reports that for his Biology 1113 (General Botany) class last spring, the site was visited 3721 times. The real benefit of a web page is that students can access the information

from outside the classroom at any time. The lecture outline is available before class, so that in class students can focus on listening and taking additional notes. Check out also the usefulness of web pages for Animal Biology and Animal Diversity designed by Lyle Shannon. They can be accessed from the Biology home page (<http://www.d.umn.edu/biology>).

Electronic Presentations

Some biology faculty deliver lectures using PowerPoint or other presentation software. This allows the major topics of the lecture, along with visuals (textbook illustrations, photos, or other images) to be shown on screen to the class. Video clips, animations or audio input can be included where appropriate, and if desired, the instructor can duplicate handouts of the materials for the class. Dr. Merry Jo Oursler is developing electronic presentations for Cell Biology, a core course taken by all biology majors. One of her guest lecturers in that class, Dr. Steve Downing (School of Medicine), makes excellent use of animation in his presentation on cell membranes. Moving molecules on screen show how ions and proteins move across the membrane (both active and passive transport) and how signal transduction mechanisms work.

Electronic "textbooks"

Colleen Belk has several years experience in using "HyperCELL", a CD ROM that her students may use to supplement, or replace, the textbook. They are able to scroll through the narrative (like reading the text) and in addition watch animations to see how viruses attack cells, how cells divide or how DNA is synthesized. Colleen feels that in the "little biology" (subcellular) courses, students need help in visualizing the abstract, and this is an effective solution. One of her concerns is that some students may not have computer access off campus. In the current textbook market, especially the area of introductory biology, many biology textbook purchases include a CD ROM, which students can use to

review and study for exams.

Software and Computer Applications for Specific Courses

Dr. Randall Hicks has incorporated some interactive computer exercises in his courses in Evolution and Microbial Ecology. The software GDE (Genetic Data Environment) is installed on the UMD mainframe computer, and along with large computerized databases of sequences of ribosomal RNA, is used by the students to complete class exercises. For example, students in the Evolution class are given a sequence of unknown origin and must determine which organism is represented by the sequence, then construct a phylogenetic tree of closely related organisms. Students in the Microbial Ecology class, use the same databases to design oligonucleotide probes to identify unknown microorganisms.

Students enrolled in Plant Autecology and Plant Population and Community Ecology, taught by Dr. David Schimpf, use computer software to analyze data that would require time-consuming, tedious calculations by hand. They also simulate plant growth in populations where both the demographic parameters and the geometry of the network can be changed. Web searching is an essential part of writing projects for both classes.

Technology Initiatives

For the past several years, the Biology Department has responded to initiatives to incorporate technology into teaching. The Instructional Development Service has offered a myriad of seminars and workshops, ranging from word processing and basic computer survival skills, to those on specific computer applications such as PhotoShop, PageMill, PowerPoint and others. All of these are designed to assist faculty in assessing and implementing, when and where appropriate, digital technology into the classroom.

Students in the Biology department's introductory courses are

already the beneficiaries of technological innovation in teaching. Last year, Chancellor Kathryn Martin awarded \$3,700 from a small grants program to members of the general biology teaching staff – Lyle Shannon, Arun Goyal, Merry Jo Oursler, Conrad Firling and Linda Holmstrand. The funds were used to purchase a digital camera, a CD ROM burner and other equipment. Under the direction of Lyle Shannon, a graduate student, Kay Rezanka, was hired to photograph animal dissections, digitize the microscope slide collection, and other available images, and to scan and store these images in computerized form. These images are currently being used in the introductory laboratories, where a class of students can view, for instance, a slide of connective tissue or a leaf cross-section on the screen, while the instructor reviews structural details. The intent of the project at completion is to design, for each of these laboratory courses, a CD ROM which contains images, with text, that students can use in conjunction with the microscopes in the laboratory or as a study/review resource outside the classroom. The stored images can also easily be made part of course materials in an electronic presentation or on a web page.

The Chancellor's Office also made available an opportunity – "Faculty Tech Camp" – for selected faculty applicants. This was held during the spring quarter break, and offered workshops and hand-on experiences in designing and teaching courses using technological tools. Linda Holmstrand was a participant and will be using the experiences and techniques learned to enhance the general biology program, where she has been teaching for more than 37 years. (Old dogs can learn new tricks!)

The Cost

Modern technology is expensive. . . . in terms of the time that faculty need to evaluate and redesign course content and to learn to use new tools, as well as the physical facilities required at the institutional level. Across campus,

classrooms are being renovated to accommodate new technologies in teaching. In the Life Science complex, lecture rooms 160 and 170 now have Ethernet connections; in addition, lecture halls 175 and 185 are now equipped with projection equipment which accommodates computerized presentations. Chemistry 200, the large auditorium used for introductory classes, besides the traditional equipment for overhead projection and video presentations, now has Ethernet connections, a PC computer, and connections for a laptop computer. As educators, we wonder how much, and how fast, the technology will change our classrooms and our lives. But, most importantly, we are concerned that student learning take place as effectively as possible. If you, as a student or alumnus, have ideas or comments about teaching and learning, or if you would like to share a learning experience from your past here, please feel free to contact me or another member of the department.

For more information on
the UMD Biology
Department,
visit our website at:

<http://www.d.umn.edu/biology>

The Life Scientist is also available on this website.

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