SUMMATION

The newsletter of the Division of Natural Science and Mathematics at Morningside College, Sioux City, Iowa

FALL 1998

Exciting New Changes In Curriculum Piloted This Fall

The ever-changing, fast paced world of science and technology puts unique pressure on academic programs to respond with innovative curricula. Several departments in Math and Science have recently modified their programs of study.

The biology department has created two new tracks of study for biology majors. In addition to the classic graduate/ professional school track and the environmental sciences program that currently exist, students may choose from a multipurpose track or a conservation track in biology.

The rapidly expanding industry of biotechnology has created a demand for workers conversant in science but also trained in a second area such as business or journalism. The multipurpose track will enable Morningside students who are not considering graduate or professional school to develop an expertise in biology and in another area outside of biology and chemistry such as business administration, public policy, journalism, or graphic design.

Students choosing this option might pursue careers in science writing, business, or medical illustration. The conservation track is designed for students desiring an entry level position in conservation or wildlife management.

The Computer Science major at Morningside has also gotten a face lift. Two new courses have been added to the major including "software development clinic" and "foundations of

MATH AND PHYSICS OBTAIN GRANT FOR NEW COURSE

he new core curriculum at Morningside contains an innovative course for teaching college math—Math in the Physical World. This course, which will be taken by all Morningside students, takes an application based approach to teaching math. The course combines math theory with physical reality and uses many state of the art teaching tools and computer software. Dr. David Groh (physics), Dr. Sue McDonald (physics), Dr. Steve Nimmo (math) and Robbie Rohlena (math) teamed up and wrote a successful grant application to the American Council of Learned Societies to support purchase of new computers and other equipment for the labbased math course. The grant award of \$15,000 was received last spring, and new computers were available in the lab for students this Fall. Dr. Groh spent much of his free time this summer doing behind-the-scenes preparation designing equipment and gathering materials needed to teach the new course.



Jacob Bossman Whitney Poston Craig Muston

computer organization". The software development clinic provides students with the opportunity to integrate and apply information and skills gained in the other computer science courses.

Each semester the students work on a software design project aimed at solving a campus or community generated software need, gaining essential experience as a software design team working on a real problem.

The clinic will also give students intensive discipline-specific training in writing. The clinic is taught by Randy Campbell in the Math and Computer Science department. This type of experience benefits students whether they continue in their education in a graduate program or if they enter an industrial setting after Morningside. (continued page 5)

> SUMMATION is a semi-annual publication of science and math news at Morningside.

......

Please direct submissions to: Michele Arduengo-Editor Biology Department Morningside College Sioux City, IA 51106 or pma001@morningside.edu 712-274-5304

1998

DAVID FISHER- Major: Biology is a first year student in the D.O. program at the University of Osteopathic Medicine and Health Sciences in Des Moines, IA.

JAMES NICOLAISEN- Major: Physics is in graduate school at Iowa State University studying electrical engineering.

ANGELA MOREHEAD- Major: Medical Technology is working as a medical technologist in the labs at Marian Health Center in Sioux City.

MARY KAY SCHULTES- Major: Biology/ Chemistry Education is teaching high school in the Dakota Dunes school district.

DENISE SIDELINKER- Major: Biology is currently employed in the quality assessment laboratory at Kind and Knox Gelatin.

LAURIE WALSH- Major: Biology is employed as a chemist at IBP.

MIKE MOLLET- Major: Biology is working as a supervisor in the plant at Kind and Knox in Sioux City.

1997

ATHENA ANDERSON- Major: Medical Technology is working as a medical technologist in Omaha, NE.

DANIELLE ANDERSON- Major:, Biology is in graduate school at the University of British Columbia.

ERIC JOHNSON- Major: Biology is in graduate school in the Sports Administration program at Mankato State University.

JASON LAURITSEN- Major: Biology is working in sales at A B Dick products of Siouxland in order to obtain one year sales experience before pursuing a career in pharmaceutical sales.

BRIAN LENDERTS- Major: Biology is a laboratory technician with ConAgra in South Sioux City, NE.

SHELLY VAN MEETEREN- Major: Biology is attending Northwestern School of Chiropractic in Minneapolis, MN.

AMY PEASE- Major: Biology is a development assistant at Midstep Services in Sioux City.

ALUMNI PROFILE: THE DOCTORS ROBERTS

Morningside legacies revisit their experience

r. Terry Roberts (1960) graduated from Morningside with a degree in biology. Currently he is a veterinary practice consultant in California, assisting practicing veterinarians with hospital management and planning. On the research end of veterinary science, he has participated in work on the feline immunodeficiency virus (FIV), commonly tagged as feline AIDS, and "Morningside is supporting research to work on drug therapies that boost the natural immune responses for more effective defense against viruses. Dr. Terry Roberts sees his greatest contribution to Morningside in his efforts to recruit his nephew, Cory Roberts, to the college.

Dr. Cory Roberts is currently in his fifth year of residency as a pathologist with the University of Nebraska Medical Center. His professional accomplishments include four pathology research publica-

tions since 1996. A 1990 graduate of Morningside with a major in biology, Cory distinguished himself while on campus as an excellent student, superb student leader, student ambassador, and dorm head resident.

Both of these individuals cite their experiences at Morningside as critical to their successes. "Morningside gave me the confidence to really feel that I could do whatever I wanted to do," says Cory Roberts, "I mean that beyond just my chosen career in medicine. Morningside introduced me to so many experiences beyond the classroom that it became quite natural for me to continue similar activities in medical school and even now. I was as well prepared for medical school as one probably can be." Dr. Terry Roberts gives much credit to the faculty at Morningside during his college career. Bob Malloy and Dr. Bill Yockey were professors he describes as "top instructors who had high expectations—nurturing yet structured." Because students were held accountable for their own education, they not only

learned, but they learned how to learn.

Even 25 years later, when Cory came to Morningside, he had similar experiences with the

faculty. He was positively influenced by a great number of people. The science faculty "were all tremendous," according to his reminisces. However, if forced to choose one person as particularly influential, Cory is quick to name Dr. Ed Shane in chemistry. "His teaching style and enthusiasm really fostered an interest in chemistry where I had none before. I learned a great deal from him and enjoyed it. I actually considered a career as a college

professor largely due to him."

Both of the Drs. Roberts have many fond memories of their experiences at Morningside. Cory tells of a May interim trip to the desert southwest that was a highlight of his college days. "Of course, we were late leaving because we had to wait on my good pal and now physician, Scott Holtz (1990), who was sleeping soundly although we could hear his alarm clearly from the front yard of his house. Our freshman year, my roommate and I posed as pizza delivery guys and went to women's rooms and acted like they had ordered pizza. From there our tremendous charm took over."

What do these successful alumni have to say to current Morningside students?

(continued page 5)

introduced me to so many experiences similar e

beyond the classroom that it became quite natural for me to continue similar activities in medical school and even now. I was as well prepared for medical school as one probably can be."

TEACHING & RESEARCH UPDATE

SEURP POSTERS LINE JONES HALL

ones Hall is lined with posters that feature the outcomes of biology and chemistry research projects conducted this summer by five student/faculty teams. The Science Education and Undergraduate Research Program (SEURP) funded since 1986 by Siouxland's regional utility company, MidAmerican Energy, has provided summer research experience for more than 120 Morningside college students. This summer 5 separate research projects were conducted by Morningside students and faculty.

Historical Vegetation Patterns and Woody Plant Dynamics in the Loess Hills of Woodbury County.

L had Scherbring and Dr. Jim Stroh documented the vegetation changes in prairies at two sites using onsite transects and comparing aerial photographs from 5 dates, 1938 - 1994. They report that woody plant species are encroaching on the lower slopes of both prairie sites, in the Sioux City Prairie and Stone State Park, and contributing to the decline in prairie vegetation.

Nematocidal Activity of alpha-terthienyl in the Nematode, Caenorhabditis elegans.

K im Counce, Vince Dvorak and Dr. Michele Arduengo studied the effects of a toxin derived from roots of the marigold on the nematode *C. elegans*. The research group found that alpha-terthienyl causes paralysis and uterine contraction before killing the worms. The next step will be the isolation of mutant worms that are resistant to the marigold toxin.

Monitoring Piping Plovers and Least Terns at Port Neal North and Developing a Protocol for Monitoring the Plains Spadefoot Toad.

Kristi Brouwer, Janet Dubois, Ellen Harbaugh, Rose Schultes, Amy Stiles, Dr. Eugenia Farrar and Dr. Jane Hey began monitoring two threatened and endangered birds that nest on the fly ash ponds at Port Neal North. SEURP students also installed autocallers and data loggers at two ephemeral wetland sites to monitor the plains spadefoot toad. By correlating recordings of spadefoot calling events with temperature and rainfall recorded by data loggers they were able to recommend optimum times for monitoring spadefoot breeding activity.

Detection of Hydrocarbons in Contaminated Soils.

David Chapman and Dr. Larry Martin tested two methods for identifying and determining the percentage of coal tar found in contaminated soils. They report that NMR spectroscopy is a reliable method for identification of coal tar contaminants following soil extraction.

The Association of Polycyclic Aromatic Hydrocarbons (PAH) with Humic Acids.

onya Hanson and Dr. Ed Shane studied the binding of PAHs to humic acid by measuring PAH fluorescence in the presence of varying amounts of humic acids.

Through attending a science writing session, giving project reports, preparing poster papers and numerous revisions of their final report, SEURP students improve their ability to evaluate data and write clearly. The summer research experience continues to have a strong impact on Morningside's science students and some of its outcomes are immediately apparent. One student declared that she now knew that she was more comfortable with laboratory research than field research. Another confided that her summer chemistry research had been valuable and immediately signed up for an internship in a chemistry r & d lab of a Siouxland industry.

CREATING A RESEARCH RICH

tudents in the pilot course biochemistry and molecular biology research lab will be gaining original research experience at the Siouxland Health Department this year.

The students, under the direction of Dr. Michele Arduengo in the biology department, will be asking two basic questions about the tanning industry:

(1) How sanitary are tanning beds? and

(2) Are mutation rates significantly increased after an organism is exposed to tanning bed UV?

To answer the first question, the students will be traveling with health department inspectors to ten tanning bed sites and sampling for bacterial and fungal microorganisms. They will keep detailed records of the sanitation procedures followed at each collection site, and they will identify any microorganisms cultured from the sites.

To answer the second question, the students will look at reversion of mutations in yeast after exposure to tanning bed UV light and compare that to exposure to fluorescent and sun light.

An added bonus for these students is the opportunity to assist CDC epidemiologists who are coming to Sioux City for a research project on vancomycin resistant enterococcus (VRE). The students will help the CDC scientists analyze over 4,000 stool samples for these antibiotic resistant bacteria.

Students in the Molecular and Cellular Biology class also have their work cut out for them. These students will be analyzing and interpreting data gathered by the professionals at the Siouxland Regional Cancer Center for a study analyzing the effectiveness of treatment for radiation burns in cancer patients. The students will make a formal presentation of their analyses for the cancer center staff at the end of the semester.

TEACHING & RESEARCH UPDATE

FACULTY PROFESSIONAL ACTIVITIES



DR. MICHELE ARDUENGO in the biology department attended the Project Kaleidoscope Leadership Institute at the Baca Campus of the Colorado College in June 98. The Leadership Institute is designed to train young science and math faculty for leadership in reforming science and math education and teaching at the college level. This year Michele coordinated the PKAL national task force on "Developing as a Civic Scientist," and she has also been selected to serve as Faculty 21 observer on a Keck Foundation Consultant team at St. Olaf College in Minnesota.

DR. RICH MAY in the biology department is initiating a follow-up study of low birth weight infants in Sioux City in collaboration with the Siouxland District Health Department. In March, Rich also participated i paleontological filed work in northwest Pakistan. The joint project between Harvard University and the Geological Survey of Pakistan is investigating mammalian evolution.



98-99 SAC- SCIENCE ACROSS THE COMMUNITY SEMINAR SCHEDULE

SEPTEMBER 14

Dr.Jim Sroh & students present "Desert Impressions"- a discussion of the 1998 May Interim Trip to the desert Southwest.

OCTOBER 12

Dr. Michele Arduengo brings us up to date on the most recent advances in Alzheimer's Disease Genetics

NOVEMBER 9

Natural history students present their collections. DECEMBER 7

Tim Orwig: Rare Siouxland Butterflies

JANUARY 22- Joint meeting w/ Sierra Club

Dr. Rich May talks about his recent trip to a dig in Pakistan. FEBRUARY 8

Dr. Mary Leida leads a discussion on Emerging Infectious Disease. MARCH 8

Dr. Aline Bobys leads a workshop, "Hands On, Minds On-Science" for parents and teachers of children ages 5-11. APRIL 12

Tanning Beds, Bugs & Mutations: Sweet Dreams or Nightmares?

*All Seminars are held at Jones Hall-room 123 on the campus of Morningside College unless otherwise specified. Seminars are free and open to the entire community. Hope to see you there!

PUBLICATIONS

Arduengo, P. M., Appleberry, O. K., Chaung, P., and L'Hernault, S. W. 1998. The presenilin protein family member SPE-4 localizes to an ER/Golgi derived organelle and is required for proper cytoplasmic partitioning during *C. elegans* spermatogenesis. *Journal of Cell Science* (in press)

Farrar, Eugenia and J. D. Hey. 1998. Status of the Plains Spadefoot Toad, *Spea bombifrons*, in Western Iowa. *In The status and conservation of midwestern amphibians*. Michael J. Lannoo, ed. (University of Iowa Press, Iowa City, IA) (in press)

Sherwood, Richard J., Haynes B. Robinson, Richard S. Meindl, and Richard L. May. 1997. Pattern and Process of Growth of the Abnormal Human Fetus. *Human Biology* 69:6 pp. 849-871.

Swan, Doug. 1998. A precalculus writing and modeling project: Exponential Growth or Not?" Proceedings of the Symposium on Mathematical Modeling.



DR. SUE MCDONALD

spent six weeks teaching field geology for Indiana University in southwestern Montana. Indiana University runs one of the oldest and most prestigious geology field programs in the nation. Close to 100 students attend the

field program each summer from around the nation. Sue has been teaching in this program for the past seven summers. Sue's expertise lies in the areas of the structural geology of the northern Rocky Mountains.

DR. ED SHANE in chemistry attended the lowa Academy of Sciences and presented a paper with Miranda Price (1998) and Brianna Macfarlane (North High School) entitled Pyrene Binding to Natural Humic



Acids. Ed also presented a paper at the Biennial Conference on Chemical Education in Waterloo, Ontario, "Fluorescence Experiment to Measure the Binding of PAHs to Humic Acid." This paper was an outgrowth of summer research projects (SEURP) that he directed over the last 3 years. This year also finds Ed serving the Morningside community as president of the faculty Senate.



DR. JIM STROH in the biology department presented a paper at the 14th North American Prairie Conference in Kearney, Nebraska, this summer. The paper entitled "Vegetation Patterns and Dynamics of Two

Savannah Parkland Sites in Southern Texas" was well received by conference attendees. He has set up a research collaboration with Steve Archer at Texas A&M University to continue research begun this summer.on woodland expansion in the Loess Hills. Jim also consulted for Camp Dodge near Johnson, Iowa where he worked with Don Farrar from Iowa State University to set up a global positioning system (GPS) to map and inventory plant community data.

Curriculum Changes continued...

The foundations of computer organization course will provide additional exposure to assembly language programming and its associated arithmetic theory and technique.

Another change to the curriculum is the addition of a senior project in computer science required of all majors. This change is based on recommendations by the Association for Computing Machinery (ACM) for computer science programs at liberal arts colleges. This change will bring Morningside's program into compliance with the ACM recommended curriculum.

NEW FACULTY IN SCIENCE & MATH

Randy Blessing, who previously served as an adjunct instructor, will teach full time in intro-ductory chemistry and physics. A 1992 graduate of Morningside, Randy holds a MS in physics from Creighton University.

His teaching experience includes service on the faculty of Western Iowa Technical Community College in Sioux City as an instructor in physics. His research experience includes helping to build a superconductor detector at Creighton and work with computer testing of monte-carlo methods for diagonalizing huge matrices.

Eric Canning joins the faculty in the math department this year. Eric will receive his Ph.D. in mathematics from Kansas State University. Mr. Canning has taught various levels of undergraduate math courses at Kansas State, and has taught full-time in math at Arvin High School and Compton Junior High School in California. His dissertation research concerns the smoothness properties of wavelet paraproducts.

Mark Winegar, a doctoral student at the University of South Dakota, earned his undergraduate degree and MS in computer science from Michigan State University. He has taught at Kalamazoo Valley Community College and Lake Michigan College.

Prior to coming to Morningside, Mark was employed at Competitive Solutions in Grand Rapids, Gateway in Sioux City, and Zenith Data Systems as a senior staff engineer. Mr. Winegar will teach intermediate and advanced computer science courses as a sabbatical replacement for Bill Steinman this year.

Science Students Excel Around Campus

The opportunity for students to gain experience in a wide variety of activities outside their major field of study is one of the advantages of a liberal arts education. Science and Math majors are some of the most involved students on Morningside's Campus, and the science and math faculty are pleased to encourage (and brag about) the extracurricular activities of our majors.

Biology major Kim Counce placed first in the women's 100 meter dash at the Jim Duncan Invitational track meet in Des Moines this past Spring. Counce also placed 6th in the long jump competition. Jennifer Haage (biology), distinguished herself with a 4th place finish in the shot put. Kelly Bass and Rachel Bunt (biology), placed eighth in the 200 meter and the 3,000 meter respectively. Ryan Smith (biology), took second place in the 400 meter hurdles at this same event. Kudos to these young scientists who do a great job of juggling class work and athletics.

Jim Cady (biology), has made a mark at Morningside not only as a scientist but also as a musician. Jim performed in the annual Morningside Opera Theater production on April 17, 1998, distinguishing himself as Don Andres in several scenes from Offenbach's *La Perichole*. Jim was also recognized at the Honors Convocation on April 22, 1998 as the 2nd place winner of the Elizabeth Sounds vocal competition in the music department. He was joined by Mary Curry (math major) who took 1st place in the Elizabeth Sounds plano competition.

Tonya Hanson and Brooke Stansberry received 2nd prize in the Writing Across the Curriculum contest for their paper entitled "Environmental Regulation: Too Strict or Too Lenient?" This is the second year running that science students have taken prizes in the writing competition.

Paul Niles (biology) was one of four students recognized as an Outstanding Senior by the Alumni Association of Morningside College.

DUBOIS & SMITH WIN IOWA METHODIST 'SCHOLARSHIP

ach year the Iowa United Methodist Foundation awards two scholarships to science students attending Iowa United Methodist Colleges. This year Morningside students received both scholarships.

Biology majors Janet Dubois and Ryan Smith were each awarded the Mary and Orlin Trapp Science Scholarship. Kudos to these two students for their acheivement.

Alumni Profile continued...

Terry Roberts strongly believes that the spiritual side of the college is extremely important and he urges students not to ignore that part of their life. "If you miss the spiritual foundation of life, you've missed it all."

Cory tells students to take advantage of their opportunities at Morningside. "Discuss things with professors. Don't just expect to be filled with information. You never know where you will end up and what will be important in the future, so don't miss out now."

Mofningsiglei Seudents Enter the Professional World

Students in the Division of Natural Science and Mathematics have taken advantage of some outstanding opportunities to ply their trade in the professional setting through student internships. Recent internships include:

BIOLOGY, CHEMISTRY AND ENGINEERING PHYSICS:

Paul Niles, Chris Davis and Tonya Hansen-Research and Development: Kind and Knox Gelatin

Stephonie Hoock- Dr. Don Parsons, DVM in South Sioux City.

Phil Thomos- Woodbury County Conservation Board.

Kim Counce-Physical therapy intern at Marian Health Center in Sioux City.

Matt Curry-MidAmerican Energy

Sherri Moss and Mollie Neal- Optometry internships through the office of Dr. Steven Marsh in Sioux City.

MATH AND COMPUTER SCIENCE:

Heidi Struve- Marian Health Center

Don Togstrom-Terra Chemical

Bryce Goehring- Gateway, Inc.

Kirk Monsfield- Great West Casualty

Lori Gibson- Gateway, Inc.

Eddie Vonnohme- Great West Casualty

At the Honors Convocation on April 22, 1998, the Division of Natural Science and Mathematics recognized many of our outstanding and involved scholars.

CHAD SCHERBRING (biology) and KATHLEEN MCCANN (chemistry) were awarded Farnsworth Scholarships for the 98-99 school year.

MARY CURRY received the Elsie C. Mullet Scholarship for the outstanding mathematics major, and RYAN UHL received the Terra Chemicals International, Inc.Scholarship for the outstanding Computer Science major.

JEIFEBRY RIESSELMAN was awarded the Robert Wood Green scholarship in physics and engineering.

The Division selected ANDREA MADSEN, a biology/chemistry secondary education major, as the divisional outstanding senior for 1998.