Piecing together the puzzle of global change
Contents

1 From the Chair

2 Piecing together the puzzle of global change

3 Salamanders are shrinking due to climate change

4 Global change, physiology, and behavior

5 Non-profit born from EEB field trip to Costa Rica

6 Invasive species, maize adaptations, and nutrient networks all part of global change

7 Below the surface: One lab’s research digs into the dirt of global change

8 EEB students head west with EEOB faculty-led field trips

9 Fellowship provides unique summer experience

10 From the field

11 Department news

12 Where are they now?

From the Chair

Greetings former Students, Friends, and Alumni! It is a pleasure to write to you again and provide you with a snapshot of our many ongoing activities.

As the summer comes to a close, I wonder if you’ve thought about some of the seemingly extreme weather events that we have experienced here in Iowa over the past several years, or that may have made the news where you reside. While our state is famous for its extreme temperature fluctuations from one day to the next, it seems this phenomenon is occurring across the country. In addition, coastal flooding has surged across the eastern seaboard, while western states are hoping for some relief from persistent droughts.

If you’ve found a nice weekend weather-wise, you may have headed to a local state park and found signs regarding the emerald ash borer invasion. You may have also seen news clips on the amphibian population decline or concerns about bee health.

All of these are signs of a rapidly changing world, and scientists are scrambling to find answers to the complicated questions surrounding global change. Here in EEOB, and as highlighted in this issue of Biospheres, we are taking to the lab and field to study questions about invasive species, unpredictable precipitation, nitrogen deposition, environmental adaptation, and much more. I hope you enjoy these snapshots, and find that they convey a sense of our commitment to meeting the needs of all our students and stakeholders.

I’m also excited to announce a new feature, “Where Are They Now?”. With each issue, and soon to appear on our website, we will highlight our amazing alumni. I hope you enjoy learning about what happened to your fellow EEOB graduate students after they left Bessey Hall, and that you might thereby be inspired to share with us your own story.

Of course, climate is not the only thing that has been changing in our lives. Iowa State University has also experienced dramatic transformation over the last several years. From massive enrollment increases to constant improvements in and modifications of technology, the university, and EEOB, continue to adapt to meet the needs of all our students and stakeholders.

It is a privilege to be a part of this community. Yet we can use your support! There are many ways in which you can help us succeed, and toward that end, we have included for your use a form on the last page of this issue of Biospheres. I thank you in advance for your commitment to the future of the department. I hope you enjoy this issue of Biospheres. Until next issue, please stay in touch!

Jonathan F. Wendel, Professor and Chair
Department of Ecology, Evolution, and Organismal Biology
Iowa State University, Ames, IA 50011
Phone: 515-294-7172; Fax: 515-294-1337;
Email: jfw@iastate.edu
www.eeob.iastate.edu
By Fred Love

A shift in climate can devastate a population of animals or force them to leave for a more suitable habitat. But certain species of salamanders in the eastern United States appear to be responding to climate change in an altogether different fashion.

Dean Adams, an Iowa State professor of ecology, evolution and organismal biology, said certain Appalachian salamander species are shrinking, losing an average of 7 percent of their body size in recent decades. During that same time, the climate the salamanders call home has gotten hotter and drier.

“There’s a growing body of evidence to suggest that changes in body size are a widespread response to climate change,” Adams said.

Adams co-authored a recent study in the journal Global Change Biology that found that six of the 15 salamander species involved in the study showed significant reduction in body size over the last 55 years. The salamanders have a lifespan of about 15 years, meaning the size reduction has taken place over 13-15 breeding generations, a change that Adams called “very fast.”

“It works out to a reduction of about 2 percent per generation,” he said.

Salamanders are particularly susceptible to changes in their environment due to their permeable skin, he said. As the climate in the Appalachian regions studied in the paper becomes drier and warmer, the salamanders have access to less moisture. Their metabolism speeds up, which results in less energy for growth.

How did the researchers know how big salamanders were 55 years ago? That’s where Adams came in.

By Jacki Hayes

In the last twenty years, scientific research on climate change has expanded to include an increasing breadth of disciplines. This expansion has led to an increasing understanding of the vast complexity of the issues facing the world’s biota and human society.

While the average global citizen is aware of the term climate change, meaning changes in average weather conditions that persist over multiple decades or longer, researchers often focus on the larger concept of global change.

According to the U.S. Global Change Research Program, global change focuses on the Earth’s ability to sustain life in the face of global environmental changes.

EEOB faculty member, Dr. Kirk Moloney said, “In the ecological community, we talk about global change through a bunch of different elements. So it’s global warming, which most people think about, but there are other things like nitrogen deposition and invasive species.”

Within the Department of Ecology, Evolution, and Organismal Biology, numerous faculty, staff, and students endeavor to understand complex systems.

“That’s the part of climate change that I struggle with, because there are all these different components. We study them individually, but we have to put them all together.” Dr. Brian Wilsey said.

In this issue of Biospheres, we introduce you to the work EEOB is doing in piecing together the puzzle that is global change.

Piecing together the puzzle of global change

By Fred Love

A shift in climate can devastate a population of animals or force them to leave for a more suitable habitat. But certain species of salamanders in the eastern United States appear to be responding to climate change in an altogether different fashion.

Dean Adams, an Iowa State professor of ecology, evolution and organismal biology, said certain Appalachian salamander species are shrinking, losing an average of 7 percent of their body size in recent decades. During that same time, the climate the salamanders call home has gotten hotter and drier.

“There’s a growing body of evidence to suggest that changes in body size are a widespread response to climate change,” Adams said.

Adams co-authored a recent study in the journal Global Change Biology that found that six of the 15 salamander species involved in the study showed significant reduction in body size over the last 55 years. The salamanders have a lifespan of about 15 years, meaning the size reduction has taken place over 13-15 breeding generations, a change that Adams called “very fast.”

“It works out to a reduction of about 2 percent per generation,” he said.

Salamanders are particularly susceptible to changes in their environment due to their permeable skin, he said. As the climate in the Appalachian regions studied in the paper becomes drier and warmer, the salamanders have access to less moisture. Their metabolism speeds up, which results in less energy for growth.

How did the researchers know how big salamanders were 55 years ago? That’s where Adams came in.

By Jacki Hayes

In the last twenty years, scientific research on climate change has expanded to include an increasing breadth of disciplines. This expansion has led to an increasing understanding of the vast complexity of the issues facing the world’s biota and human society.

While the average global citizen is aware of the term climate change, meaning changes in average weather conditions that persist over multiple decades or longer, researchers often focus on the larger concept of global change.

According to the U.S. Global Change Research Program, global change focuses on the Earth’s ability to sustain life in the face of global environmental changes.

EEOB faculty member, Dr. Kirk Moloney said, “In the ecological community, we talk about global change through a bunch of different elements. So it’s global warming, which most people think about, but there are other things like nitrogen deposition and invasive species.”

Within the Department of Ecology, Evolution, and Organismal Biology, numerous faculty, staff, and students endeavor to understand complex systems.

“That’s the part of climate change that I struggle with, because there are all these different components. We study them individually, but we have to put them all together.” Dr. Brian Wilsey said.

In this issue of Biospheres, we introduce you to the work EEOB is doing in piecing together the puzzle that is global change.
Global change, physiology, and behavior: EEOB student studies the connections

By Andrew Kraemer

The world is changing around us. Temperatures are increasing and weather has become increasingly irregular. For many creatures, these changes are having a strong impact on daily life. The question is no longer if, but rather, how?

Eric Gangloff, an EEOB graduate student in the Anne Bronikowski lab, is determined to find out. Gangloff said, “I’m interested in the role of behavior and physiology in determining where organisms can or cannot live and then predicting how that might change in the future.”

Like many herpetologists (biologists who study reptiles and amphibians), Gangloff grew up reading about dinosaurs and catching snakes. After teaching high school for a number of years he heard the call of basic research and decided to go back to school to pursue his PhD. “I think this vocation is one that chooses you, not the other way around.”

These days, Gangloff studies two species of garter snake in California and Iowa. Through this work, he has found remarkable differences in physiology and behavior between populations of the snakes.

Surprisingly, some snakes in Iowa are far more easily stressed than other snakes, and Gangloff may soon know why. “My guess is that this is because one population has become acclimated to stress by being exposed to lots of people and other predators.”

This summer, he is testing this hypothesis by directly measuring predation in the field. In California, he and other biologists from the department are measuring how snakes respond to heat stress.

(continued on page 13)

Non-profit born from Costa Rica field trip

By Andrew Kraemer

Of the seven Central American countries, none is as accessible to American biologists or have as much biological diversity as Costa Rica. In 2012, Jill Pruetz and colleague Thomas LaDuke led a team of graduate students down to Costa Rica through the EEB Field Trip program. The students explored and conducted research at the El Zota Field Station, located in the northeastern corner of Costa Rica.

While there, the team observed several species of monkey, dozens of species of amphibians, a dazzling diversity of insects, as well as a multitude of snakes, toucans, and macaws. It is, perhaps not surprising that at the conclusion of the two-week trip students Kelly Boyer, Robert Literman, and Phil McGuire didn’t want their experience in Costa Rica to end.

During their time at the field station, the trio realized there was a unique opportunity for research in Costa Rica. While biological research at other field stations in the country tends to focus on biodiversity surveys and observational studies of pristine habitats, less attention has been given to the impact of active habitat management on biodiversity and ecosystem processes.

Furthermore, Costa Rica is developing into a country that attempts to protect its biological resources not only in national parks, but also in lands heavily impacted by human activities. Research on managed lands may thus shed light on the impact of management on biological resources. How could they contribute to this research in a country outside of their own?

The idea of Siempre Selvas was born. Siempre Selvas, or Always Rainforests, is a non-profit organization formed through a partnership between Boyer, Literman, McGuire, and El Zota. It took two years for Siempre Selvas to progress from idea to a formal non-profit, and now researchers affiliated with the group have permission to conduct observational research at El Zota.

In fact, Peter Eyheralde (another graduate student affiliated with the EEB program) has set up camera traps throughout El Zota to record the mammal species living at the station. Much more research is planned.

Siempre Selvas welcomes all biologists interested in conducting research at El Zota. The non-profit envisions funding for such projects could take the form of traditional grant proposals or by means of crowdsourcing methods like Indiegogo or Kickstarter.

Siempre Selvas co-founder, Phil McGuire holds one of the many snakes found at El Zota. photo credit: Andrew Kraemer

For those interested in Siempre Selvas, feel free to contact Kelly Boyer (kmboyer@iastate.edu), Robert Literman (literman@iastate.edu), or Phil McGuire (pmcguire@iastate.edu).
Invasive species, maize adaptations, and nutrient networks all part of global change

By Jacki Hayes

Our natural resources are a critical component to understanding and mitigating the impact of global change. In particular, vegetative systems can provide buffers between storm surges and our built environments. Prairie restorations can reduce topsoil loss during storms, and the proper maintenance of vegetation can reduce wildfire risks.

Numerous EEOB faculty members are busy examining key factors of global change and their relationships to plant life. From experiments that examine native and non-native species to a search for maize genetic adaptations, these faculty members are piecing together the global change puzzle.

Dr. Lori Biederman, is currently working with the Minnesota DNR, investigating periodic life cycle events of Platanthera praeclara, the Western Prairie Fringe Orchid.

“The coolest thing that we are finding is that the plants are emerging earlier and earlier every year. We think it is a couple of different factors playing out depending on the year, but it seems to be triggered to flower with the solstice. After the days begin to get shorter, then it flowers, which is a problem because the earlier it emerges then the longer it is out of the ground and vulnerable to herbivory, burning, and any number of things before it has a chance to pollinate,” said Biederman.

Listed as a threatened species, Platanthera praeclara could be decimated by global change. Biederman and the Minnesota DNR hope to tease out climate cues that would allow them to create mitigation strategies.

In addition to her work with the Minnesota DNR, Biederman is working with a global network of scientists examining the impact of fertilizer on grasslands around the world.

“We are part of a global network that is applying the same amount of fertilizer to grasslands around the world. So we are comparing apples to apples. We are looking at how nitrogen levels and grazing regimes affect plant diversity,” Biederman said.

In addition to carbon-induced climate change, Biederman points out that humans are also changing the environment through the application of fertilizers. While they may not be explicitly fertilizing prairies, the excess nitrogen from fertilizers is now in the precipitation.

Polluted water is not the only source of concern when it comes to precipitation and global change. Dr. Brian Wilsey is currently studying the impact of altered precipitation on native and invasive species in central Texas. He hopes to gain a better understanding of how very wet and very dry years affect prairie communities.

“Precipitation, I think, is really important. In some areas, they are predicting an increase in precipitation and in some areas they are predicting a reduction. And they are predicting everywhere will be more variable,” Wilsey said.

Wilsey attributes the success of the native species to the diversity found in native prairie communities. With variety comes a higher likelihood that at least some plant species will be capable of adapting to a particular environmental change.

His work illustrates one particular point in the pursuit of habitat restoration. “In restoration, we are used to looking back. If you look back and we want it to look like it used to be, our climate is changing. I think what we need to do is restore diversity, and I think to restore diversity, we need natives. We’ve found that with non-natives, (continued on page 13)
EEB students head west with EEOB faculty-led field trips

by Kim Szcodronski

EEB graduate students had two recent opportunities to travel westward alongside EEOB professors who specialize in two unique ecosystems—the Greater Yellowstone Ecosystem and the Arizona desert.

In 2013, EEOB’s Dr. Diane Debinski, along with Dr. Robert Klaver and Dr. Julie Blanchong of NREM, led a group of 9 EEB graduate students on a 10-day trip to Grand Teton National Park and Yellowstone National Park.

The students gained research experience by collecting presence-absence data on amphibians at Rockefeller Memorial Parkway and measuring plant growth responses at Dr. Debinski’s climate change simulation plots in Grand Teton National Park.

Student Brent Mortensen summed up the experience. “The Tetons are quite possibly the most beautiful place on earth. Combine that with their inclusion in one of the largest disturbed ecosystems in the lower 48, and all of this makes for a spectacular place to study ecology.”

Dr. Fred Janzen and post-doc, Dr. Timothy Mitchell, led 10 EEB students on the 2014 EEB Field Trip to the desert of Arizona. They took in the Desert Botanical Gardens in Phoenix, toured the Madera Canyon of the Santa Rita Mountain Range, and visited the Sonora Desert Museum in Tucson.

The group then traveled to Organ Pipe Cactus National Monument where they spent the remainder of their trip. At Organ Pipe, they witnessed fascinating wasp-mimicking flies, went on black-lighting searches for scorpions, and assisted in Dr. Janzen’s 30-year experiment on saguaro cactus growth that he remarkably started as an undergraduate.

Alex Walton, an Arizona native, said, “I’ve lived in the Sonoran Desert my whole life and I thought I knew all there was to know about its biology and natural history. However, I learned so much more during this trip than I ever imagined I would and I’m very glad for it.”

Fellowship provides unique summer experience

by Alvin Alejandro

For most graduate students, summer is a time to get a lot of research done. Many head out to field sites with data collection instruments in tow, others crank out genetic sequences, and a few monopolize computer servers to analyze data. For one select individual, summer is a time to step into the role of lecturer for the first time.

The George Knaphus College Teaching Fellowship provides an opportunity for graduate students to teach Introductory Biology (BIOL 101) for non-majors. For about two hours a day, every weekday for a month, the fellow lectures, administers activities, and conducts learning assessments. All the materials are of the fellow’s own design and provide 20-30 undergraduates with a general understanding of biology.

The students that take the course range from incoming freshmen to graduating seniors majoring in diverse fields such as business, engineering, exercise science, or performing arts. Thus, the experience can be quite a challenge for the fellows. However, the fellow is not alone on this venture.

Since 2001, Dr. Jim Colbert has mentored 12 Knaphus fellows. Prior to the beginning of the course, Dr. Colbert meets with the fellow once a week to discuss aspects of pedagogy, such as lecture planning and instructor and student responsibilities.

The mentoring Dr. Colbert provides is what makes the Knaphus Fellowship unique and noteworthy. While graduate students have many opportunities for teaching, very few garner this level of feedback on the effectiveness of their teaching efforts.

This year’s Knaphus Fellow is Ali Berens. As an undergraduate, Berens was a mathematics major. Thus, she feels that she can relate to students with limited knowledge in biology.

She decided to begin the course with biodiversity, which she feels is a good way to get non-majors interested in biology, as it is a topic that is familiar to most students. While Berens is looking forward to the challenge, she said it was “quite a shock how much effort goes into a single lecture.” Indeed, the biggest challenge for fellows is realizing the work involved, according to Dr. Colbert.

Dr. Colbert created the Knaphus Fellowship as a way to prepare graduate students to the teaching responsibilities of a college professor. Dr. Colbert named the fellowship in honor of his friend and colleague Dr. George Knaphus who passed away in 2000. Dr. Knaphus was involved in the Educator Preparation Program. Dr. Colbert wanted to recognize Dr. Knaphus’ contributions by similarly helping graduate students become better prepared for professorship.

Dr. Colbert expects to continue mentoring graduate students for a few more years. The diverse perspectives each fellow brings amaze him, so much that he steals some of their ideas for his own lectures.

If you would like more information on the Knaphus Fellowship, please contact Dr. Jim Colbert at jtcolbert@iastate.edu.

Berens and Colbert review lesson plans. photo credit: Jackie Hayes

for more information on the Knaphus Fellowship, please contact Dr. Jim Colbert at jtcolber@iastate.edu.
Hello, my name is Rebecca Polich and I am a member of the Janzen Lab at Iowa State. Every summer, the Janzen lab, or the Janzone, as we refer to ourselves, embarks on an exodus to Thomson Causeway in Illinois. There, we stay at a campsite for roughly six weeks and collect long-term data on the nesting ecology of painted turtles, as well as complete our own individual research projects.

It is our love for turtles that brings the Janzone to Thomson Causeway year after year for the roughly six weeks of field work and camping that we affectionately call “Turtle Camp.” The work that we do at Turtle Camp involves collecting data on nesting mother turtles via hourly checks starting at 5am and ending at 9pm, trapping aquatic turtles, mapping nest locations, determining the amount of solar radiation nests are exposed to, and somehow jamming our own research projects into this hectic mix.

The mountains are calling Kim Szcodronski

The pristine, large-scale protected ecosystem of Grand Teton National Park, Wyoming contains a unique heterogeneous distribution of habitat types, stunning mountain peaks, abundant alpine wildflowers, and a wide variety of wildlife from the Cutthroat Trout to the Gray Wolf.

Grand Teton National Park is a truly inspiring research study site and I’m grateful to have had the opportunity to conduct my thesis research in the park for the last two summers. With my thesis defense date approaching in August, this is the start of my third and final summer in the Tetons where I’ll be finishing up thesis writing and continuing data collection at Dr. Diane Debinski’s long-term study site.

I, along with my field tech extraordinaire, will be collecting data on three studies this summer, including butterfly mark-recapture surveys, experimental simulation of climate change, and analyzing nectar production in the experimental climate plots to investigate how climate change may be affecting nectar resources of pollinators.

Rebecca Polich reports from Turtle Camp

Lifetime Achievement Award presented to Clark

On the occasion of his retirement, Professor Emeritus, Bill Clark was presented a Lifetime Achievement Award by the Iowa Department of Natural Resources “in recognition of exceptional professional commitment to academic excellence and scientific contribution to Iowa’s wildlife resources.”

Clark’s research over the years has included single species populations, landscape ecology, and statistical ecology. His most recent work focused on bobcat colonization of the Midwest.

At Iowa State he taught wildlife and vertebrate biology courses, with a special focus on population principles (in Population Ecology and Population Analysis), to two generations of undergraduate and graduate students.

Earlier in the year he was presented a Hall of Fame Award by Pheasants Forever, a national conservation organization.

Hofmockel honored with Early Achievement Award

Presented to faculty members who have demonstrated outstanding accomplishments in research and/or creative activity unusually early in his or her professional career, the ISU Award for Early Achievement in Research was presented to Dr. Kirsten Hofmockel in 2014.

Hofmockel is a respected scientist known for her research in soil microbial ecology. She has been awarded more than $6 million dollars in research funds since arriving at Iowa State, participates in four interdepartmental graduate programs, and has authored 18 scientific articles and two book chapters.

Hofmockel collaborates closely with other research scientists at ISU and across the nation; serves on multiple journal editorial boards; is regularly invited to speak at other institutions; has served on NSF, DOE and USDA proposal review panels; and still finds quality time for graduate students.
Where are they now?

EEOB grad finds success in evolutionary genetics

by Rebecca Polich

Dr. Chris Chandler came to Iowa State University from Cornell University, where he received a Bachelors of Science in 2004. At Iowa State, he became a valued member of the Janzen Laboratory, choosing to investigate the developmental biology and molecular evolution of sex-determining mechanisms in the model nematode Caenorhabditis elegans.

After the conclusion of his PhD. work, Dr. Chandler completed a postdoc with Dr. Ian Dworkin at Michigan State University. Within this setting, Dr. Chandler investigated the importance of standing genetic variation and how it affects opportunities for mate choice in Drosophila species undergoing compensatory evolution.

Since August 2012, Dr. Chandler has been an Assistant Professor of Biology at SUNY-Oswego. His laboratory primarily focuses on the evolutionary genetics of sex determination mechanisms and sexual differentiation. However, he is also more broadly interested in understanding how genes and the environment interact to influence organismal phenotypes.

Invasive species, maize adaptations, and nutrient networks (continued)

(continued from page 7)

Dr. Kirk Moloney is also interested in native and invasive species, in particular, how invasive plants operate in novel environments.

Looking at invasive annuals in the desert southwest, areas that are not historically fire-prone, Moloney and his team have found that these non-native species are providing a fuel-base that could spread wildfires.

“In years of high rain, you have vegetation filling in spaces that normally have been barren. Then the vegetation dries out after the rains and creates fuel for fires to spread,” Moloney said.

These invasive species can have a tremendous impact on cropping and natural systems. According to Moloney, the movement of invasive species is happening at a greater rate than in years past. “Invasive species have always been around and there are historical instances, like the land-bridge, so this isn’t unique. It’s just the pace at which it is happening how. A lot of invasive plants have been introduced on purpose because they are ornamental.”

Like Wilsey, Moloney warns that restoration is not going to be as simple as restoring native plant species. When comes to restoring natural environments, Moloney says, “Climate change throws a monkey wrench into a lot of things, and we don’t really understand all the nuances or how big of an issue it is really going to be.”

Global change, physiology, and behavior (continued)

(continued from page 4)

“I’m hoping that this will provide a clear understanding of the mechanisms that set thermal tolerance limits on snakes. As the Earth keeps warming up, understanding exactly why organisms can or cannot tolerate high temperatures becomes all the more important.”

The limits set by temperature are not always obvious. Temperatures higher than 107° Fahrenheit can quickly kill a snake, but snakes may encounter equally important challenges long before that point.

“Snakes, and other organisms, may survive as individuals at high temperatures, but might not be able to allocate the necessary energy or perform the necessary behaviors for reproduction,” Gangloff said. In short, populations may quickly decline and go extinct not because adults are dying, but because it is too hot to produce new young.

Gangloff’s research is a typical example of the broad collaborations established by EEOB biologists. So far, Gangloff has collaborated with several current and former Bronikowski Lab members, individuals from the Janzen Lab, Amanda Sparkman in California, and researchers in Colorado. This collaborative atmosphere works well for Gangloff. “It has been a real treat to have so many excellent scientists ready to share ideas and work together here at Iowa State,” he said. “In my opinion, it’s the greatest strength of our department and program. I couldn’t be happier than where I am now.”

Restoring the Equilibrium

by Alvin Alejandrino

From nutrient enrichment, to land alteration, and introduction of invasive species, humans continue to destabilize ecosystem functioning and dynamics. Each of these activities affects ecosystems on many different levels. Investigating these dynamics is the over-arching goal of Dr. Forest Isbell.

Dr. Isbell graduated from EEOB with a doctoral degree in 2010. During his tenure at Iowa State University, he worked with Dr. Brian Wilsey. Since then, he has kept busy with postdoctoral positions at McGill University in Montréal and at the University of Minnesota Twin Cities, before landing an assistant professor position in the Department of Plant Biology at the University of Georgia.

Dr. Kirk Moloney of SUNY-Oswego in the field.
Making a Difference

The Department of Ecology, Evolution, and Organismal Biology at Iowa State University is committed to providing outstanding opportunities for the university community. In order to have the resources necessary to take these programs into the future, support for the department is essential. Funding is required to aid the program in developing new opportunities in technology, continuing and advancing outreach activities, and maintaining and expanding current performance and educational opportunities, and supporting students and faculty. These services are crucial as the Department of Ecology, Evolution, and Organismal Biology strives to keep up with student demand for these experiences. To help make a difference, simply fill out the form, drop it in the mail (ISU Foundation, 2505 University Blvd, Ames, Iowa 50010-8644), and check your next newsletter.

I wish to support programs in EEOB at ISU. Enclosed is my gift of:

______ $1000
______ $250
______ $100
______ $50
Other $ ______

Please specify the fund that should receive your gift:

______ Student Support
______ General Development
______ I will request that my employer match my gift

My employer is ____________________________

Please charge my credit card.

______ Visa  Card# ________________
______ Mastercard  Exp. _________
______ Discover

Signature __________________Date _________

Phone # and email ____________________________