Seasonal Scientia

McKendree University Science Newsletter
Issue 3: Summer 2010

Happy is he who gets to know the reasons for things.
~Virgil (70–19 BCE) Roman poet.

Featured in This Issue:

Student Research: Biology Students Receive Awards
Faculty Research: Dr. VanPutte’s Biofuel Research
Course Spotlight: Animal Behavior BIO 350

Seasonal Scientia is a seasonal newsletter for McKendree University Science Students, Faculty, Staff and anyone who is interested in the scientific undertakings at McKendree University. The purpose of this newsletter is to not only provide information regarding current research, events, and courses on campus, but also to tie together the scientific community at McKendree. Beyond the science on campus, we additionally incorporate worldwide headline news and calendar events both in and around the greater St. Louis area to encourage broader scientific engagement. While the content is always new, each ‘Scientia’ issue is comprised of 5 main sections:

- **Recent Happenings** – science events and news at McKendree
- **Sigma Zeta** – Science and Math Honor Society news
- **Research** – highlighted student and faculty research projects
- **Course Spotlight** – in-depth review of one of the science courses
- **Senior Thesis Research** – highlighted student project

Seasonal Scientia is written primarily by science faculty at McKendree, but we encourage student and staff contributions; if you have something you think would be interesting to feature in an upcoming issue, please contact Dr. Schutzenhofer.

**World Science Hot Topics – ENVIRONMENT**

- **Our Forests Are Disappearing!** - Satellite images have shown that about 3 percent of the world’s forests have disappeared from the year 2000 to 2005. More than 58 percent of forest losses worldwide occurred in Brazil, Canada, The Russian Federation and the United States. There are various reasons for forests to vanish, ranging from agriculture and logging to wildfires, storms and insect infestations. ([http://sciencenews.org/view/generic/id/58671/title/Forests_on_the_wane](http://sciencenews.org/view/generic/id/58671/title/Forests_on_the_wane))

- **Several New Species of Lizard Discovered!**

A new species of Monitor lizard, the Torch monitor (*Varanus obor*), was discovered last spring on the Moluccan islands east of Indonesia. A second new species, found in the Sierra Madres of the Phillipines, was named *Varanus bitatawa* and joins the other giant fruit-eating lizards in the region. Conservation efforts will move forward. (Science Daily; April 2010)
Recent Happenings

Star Gazing Returns to McKendree
University students, faculty, staff as well as citizens of the City of Lebanon joined together two clear nights in April for the McKendree Star Party Event hosted by Professor Stephanie Colby and members of the Saint Louis Astronomical Society (SLAS). The nights were beautifully clear with spectacular viewing of several planets, including: Venus, Mercury, Saturn and Mars. The Orion Nebula, galaxies and star clusters were also favorites. The university had its three telescopes set up and it was a real treat this year to have members of SLAS bring additional telescopes including two large Dobsonian's, which allow for easy scanning of the sky for even the most amateur astronomer. Some students even tried their skills at astrophotography, using their cell phone cameras! The image on the right below is the planet Saturn through a Meade 8-inch telescope taken by Astronomy student Devin Williams.

What's New

Biology Webpage Updated!
The biology department webpage has received a facelift. Students can now look up faculty office hours, check out current research opportunities, get updates on EZ activities, and even download the latest issue of the newsletter! Current students should use it to reference the biology handbook and find direct links to commonly needed resources. In addition, the pages are great for prospective students, highlighting what the McKendree biology program has to offer. Want to know more, check it out for yourself: http://www.mckendree.edu/academics/biology/index.aspx

New Endowed Professorship of Biology Bestowed on University
The new professorship comes from the generosity of two McKendree alumni, the late Harvey C. Pitt and Winifred “Mickey” Pitt. Presentation of the position occurred in February at a special ceremony during Founder's Day at the Hett. Mr. Pitt graduated from McKendree in 1950 with a biology degree and was a Sigma Zeta member during his time here. He went on become a prominent collector of duck decoys, amassing a collection that was recognized across the world. His love of nature and connection to McKendree led him to invest in the future of the University, its students, and the science program. Dr. VanPutte was honored as the first recipient of the professorship.

McKendree-Tyson Fellowship Awarded
Congratulations to Kaitlyn Kollman who received the 2010 summer fellowship. Kaitlyn will be working with Dr. Schutzenhofer investigating native diversity in prairie ecosystems this June!

Senior obtains Job before Graduation
Congratulations to Deb Geary who was hired as a production chemist at Sigma Aldrich in St. Louis. Deb will extracting and purifying biological chemicals such as proteins/enzymes & amino acids in her position.
Recent Happenings

Elluminate – Making Distance Education Closer to Home

McKendree University, like most major universities, has been expanding its educational avenues through the implementation of online courses. Online courses allow students to take classes from literally anywhere in the world, as well as allowing faculty to teach from afar. Online courses really seem to be the wave of the educational future, but no matter how you slice it, some of the attributes McKendree thrives on, including its personalized student and professor interactions with small class sizes and that one-on-one correspondence that is beginning to be non-existent at major universities, have been difficult to replicate in the online education system. Fortunately, new online software is allowing online course to bridge this gap between online education and in-person teaching. McKendree has recently implemented the program Elluminate-Live for a few online/distance education courses on campus. Elluminate allows for an interactive classroom where students and teachers can verbally communicate in real-time, see each other via web cams and allow for class participation in terms of hand raising and polling features.

The Division of Math and Science has incorporated Elluminate in two courses during the Spring 2010 semester; PHY 101 – Introduction to Astronomy with Laboratory and SCE 210 – Concepts in Science, both taught by Professor Stephanie Colby. Both students and professors who have participated in online classes before the use of Elluminate say it is almost incomparable. Elluminate essentially feels like a traditional in-person lecture, except that you are at your computer listening, seeing and interacting with your professor.

Here’s what students think:

“This is definitely more beneficial for a student than an online course because as a student we get to know who else is taking the class and we have the opportunity to compare notes and help each other out much like in a traditional class. Another difference between an online course and Elluminate, is the fact that we can actually hear and even see Mrs. Colby while she is teaching the lesson. Basically, it is as if Mrs. Colby were present standing right in front of the class. This is crucial from the student’s perspective because we don’t just have a power point full of lecture slides but we have a teacher explaining the slides and emphasizing certain things that we would not be able to appreciate had the class just been an online course. I feel Elluminate is a great way to use modern technology to incorporate an online course and a traditional course into one!” - Melinda Bayer, student in SCE210.

“I think Elluminate is very easy to use and might be the best program to do an online class. I've never participated in an online course before so I was kind of nervous about the whole idea. Elluminate ended up easing my anxiety in how fun it is to use. All the functions such as the display window and the classroom chat on top of the ability to use microphone/web cam are all very useful and make the course feel almost like being in a classroom. I enjoy having my own screen in front of me instead of struggling to see the screen/board from a weird classroom angle.” - Melissa Wilkinson, student in SCE210

*NEW* Environmental Studies Program at McKendree!!

Starting this fall, you can pursue Environmental Studies. The mission of the program is to provide students with an understanding of the relationship between human society and the environment. It is a highly interdisciplinary program, encompassing biology, chemistry, political science, sociology, ethics, and business, and is cited by the Chronicle of Higher Education as one of the top college majors on the rise. This degree is not only suited for biology interests, but a variety of career paths, including those that include marketing, policy, education, compliance, and much more. As the human population continues to increase, so do environmental issues, i.e. pollution. Consumers are becoming more aware and businesses are responding to demands, looking to hire those educated on environmental issues and sustainability.

Okay, it sounds great, but you’re a science major. That’s okay, there’s also a minor, which is a great complement to a science degree!

Minor requirements:
- Earth Science*
- Environmental Science
- Principles of Microeconomics*
- Environmental Economics
- Environmental Ethics
- Public Policy
- 2 electives*

*offered this fall!!
See Dr. Schutzenhofer for additional details.
Sigma Zeta - EZ

Sigma Zeta is a National Math and Science Honor Society. McKendree's Chapter is the Beta chapter and the oldest (1926) remaining national chapter. Currently, the chapter has 26 active members, with 14 new members having been inducted this past fall.

- **Science Education Day**
  - One of the larger events this semester! A local girl scout troop came and did activities relating to ecology, chemistry, and math. The goal was to get kids excited about these subjects at a young age.

- **National Convention:**
  - 5 students, along with Dr. Jennings and Dr. Schutzenhofer, attended the National Convention in March at Campbellsville University, Campbellsville, Kentucky.
    - Deb Geary and Amber Ramos presented their research.
    - Awesome field trip to Mammoth Cave!
    - Had fun and was a great way to meet people with common interests from schools around the country.
      - Check out pictures at: [http://www.sigmazeta.org/index.html](http://www.sigmazeta.org/index.html)
    - Next year convention is in San Antonio, TX
      - Fundraising has already started (see below!)

- **NEW EVENT: PIE YOUR PROFESSOR!!!**
  - Students voted for the professor they wanted to see pied with donations over the course of two weeks. Dr. Jennings was the winner with 27% of the votes! Pieing will take place Thursday, April 29th at noon in the quad between Piper and Voigt! Come and buy a chance to be the one to throw the pie!

- **Other Events:**
  - Display Cases
    - The display cases were emptied and painted
    - EZ Beta Chapter will be adding a great new display – stay tuned!
  - Plant Sale
    - Held during Earth Week, the plant sale featured plants grown by members in our very own greenhouse. Congratulations on all the hard work – most of the tomato plants were flowering and some were already fruiting!!! What a great deal.

- **Upcoming Events**
  - Annual Cookout at Horner Park! – Saturday, May 1st at noon
  - Food is provided, but people are welcome (and encouraged) to bring a side dish to share.
  - What a great way to cap off the semester right before finals with your classmates and professors. Eat, play games, and have some laughs...
  - Note: rain will move the event to the McK West Clubhouse!

**EZ Executive Board Officers**

**President:**
Carrie Schumacher

**Vice-President:**
Jordan Finch

**Secretary:**
Deb Geary

**Treasurer:**
Amber Ramos
Student Research

Students Receive Awards

Congratulations to Deb Geary, who was awarded the 2010 Biology Honor Award. One senior in biology each year is selected for this award based solely on faculty recommendation. Students receiving the award exemplify what it means to be a McKendree student. Dr. VanPutte presented this award to Deb during an Honor’s Day celebration at the Hett this April. Some of the things Dr. VanPutte highlighted about Deb included her work with Sigma Zeta, her dedication to finish whatever she starts, and her overall curiosity about the world. Deb exhibited a strong dedication to her senior research on mosquitos and water pollution, and gave a presentation at the Sigma Zeta national convention. Deb is a great communicator, always looking to help others, and perhaps most importantly, Deb “truly understands the importance of her education and the old addage you only get out of it what you put into it”.

Congratulations to Annie Weder, who recently presented a poster on the research she conducted while working with Dr. Schutzenhofer as the 2009 McKendree – Tyson Fellow. Her poster, entitled “Effects of community assemblage on native and invasive Lespedeza” won third place in the research category at the Undergraduate BEST (Bearcats Engaged in Scholarly Thinking) Poster Presentations.

Faculty Research

Dr. VanPutte continues sabbatical work with biofuel research

Bioenergy is renewable energy derived from biological sources, to be used for heat, electricity, or vehicle fuel (biofuel). Biofuel is derived from plant materials and is among the most rapidly growing renewable energy technologies according to the United States Department of Agriculture. This energy is renewable since photosynthetic organisms naturally produce all materials used as a source of energy. Dr. VanPutte’s research focuses on algae as a source of renewable energy, in particular for the production of biodiesel.

During his sabbatical, Dr. VanPutte worked in Dr. Devarenne’s laboratory at Texas A&M University to isolate, clone and sequence the squalene synthase gene from the algae *Tetraselmis suecica*. *Tetraselmis suecica* is a marine green microalga (Division Chlorophyta) that naturally produces oils enriched in many different types of fatty acids, especially polyunsaturated fatty acids (PUFA). The PUFA isolated from *T. suecica* and other species can be directly converted into biodiesel through a process known as methyl esterification.

Research Opportunities

Consider Independent Study

An Independent study course involves guided, one-on-one learning with a professor in a specific area or on a specific topic.

Be a Research Assistant

Dr. Schutzenhofer is looking for a student in the fall to continue work initiated over the summer on plant hybridization. Both field work, literature search, and molecular work needed.

Dr. VanPutte is looking for a student to assist him in molecular work surrounding his ongoing biofuel research (see feature on left).

Genius is one percent inspiration and ninety-nine percent perspiration.
*Thomas Alva Edison* (1847–1931)
*U. S. inventor.*
Course Spotlight

Animal Behavior (BIO 350)

Animal Behavior is an elective course that covers both the proximal (mechanistic) and ultimate (evolutionary) underpinnings of ‘why animals do what they do’. Sure, in-classroom discussions on sexual selection, mate choice, migration, and learning are par for the course. However, this class is also noted for its atypical experiences, including the antics and imitations performed by Dr. Schutzenhofer (bird mating dances included) and much more...

This year, students took a trip to the zoo and heard firsthand about gorilla and orangutan behavior in captivity from Stephanie Braccini, the Zoological Manager of the Great Apes. We even learned why the gorilla enclosure has that ‘special’ odor (ask a student to find out why!). They then conducted independent animal behavior observations, returning to McKendree to give presentations on their findings in the following week. These presentations were filled with excitement as students reflected on the animated primates they observed, and some even attempted to mimic primate ‘hoots’ and other noises – we all remember who!

Back on campus, students have ventured outside to mimic foraging birds in the front lawn to learn about how animals make decisions to maximize benefits, and they are currently working on their synthesis project where they will present on an excerpt from the book “Dr Tatiana’s Sex Advice to all Creation”. Students will explain the biology behind the sponge louse who has been ‘Hoodwinked in the Gulf of California’, the California mouse who is ‘So Bummed out in Berkeley’, and much more!

Behavior Thoughts...

This is a spider monkey.
And this is Bhushan.
And this is Carrie.

~Bhushan Shrestha
Senior Thesis Projects

A total of 7 students will give presentations of their research, a culmination of their three-semester research experience during Finals Week. All students are encouraged to attend!

When: Wednesday, May 5th, 1-3pm
Where: Voigt Science Hall 123

Jean Burns (Dr. Jennings)  
The Effects of Herbicides on Amphibian Development

Brandon Duncan (Dr. Jennings)  
The Developmental Differences of BMP-4 in Chicken and Duck Embryos

Lauren Eveland (Dr. Schutzenhofer)  
Native and Exotic Lespedeza and the Biotic Resistance Hypothesis

Deb Geary (Dr. Schutzenhofer)  
The Effects of Flumioxazin and Acetochlor on Mosquito Development and Reproduction

Maegan Hamilton (Dr. Jennings)  
Physiological and Psychological Effects of Guarana and Caffeine on the Human Body

Kristina Paisley (Dr. Schutzenhofer)  
Color and Sucrose Preferences of the Ruby Throated Hummingbird, Archilochus colubris

Beth Trame  
Pavlovian Learning in Mus musculus Given Time and Multiple Obstacles

Upcoming Classes – Fall 2009

Biological Science
- Genetics (BIO 211) - TBA
- General Ecology (BIO 303) – Dr. Schutzenhofer
- Microbiology (BIO 311) – Dr. VanPutte

Chemistry
- Biochemistry (BCH 305) – Dr. Ozturk
- Organic Chemistry (CHE 205) – Dr. Reese
- Physical Chemistry (CHE 303) – Dr. Ozturk

Physical Science
- Earth Science (ES 105) – Dr. Tournier
- General Physics I Mechanics (PHY 210) – Dr. Tournier
- Astronomy (PHY 101) – Dr. Tournier
- Earth and Astronomical Sciences (SCE 205) – Dr. Tournier

Calendar

MAY
1st – Division cookout at Horner
8th – Commencement
9th – Mother’s Day
13th -19th – Bike to Work Week
14th – New Moon
20th – Look for Woodchucks coming out of dens
22nd – Nature Hike at Cahokia Mounds in Collinsville, IL
23rd – Make Tracks for the Zoo 5K
24th – Fireflies Peak this week
27th – Full Moon

**Register for Fall Classes!!**

JUNE
2nd – National Trails Day
4th – Free Telescope Star Gazing at St. Louis Science Museum
11th -14th – IL Free Fishing Days
12th – New Moon
21st-27th – National Pollinator Week
21st – Summer Solstice
26th – Partial Lunar Eclipse

JULY
2th – Free Telescope Star Gazing at St. Louis Science Museum
5th – Winged Sumac Blooming
11th – New Moon
22nd – Blazing Star Blooming
26th – Full Moon
28th – Jammin at the Zoo Party

AUGUST
4th – Fence Lizards Hatch
6th – Free Telescope Star Gazing at St. Louis Science Museum
10th – New Moon
12th-13th – Perseids Meteor Shower
23rd – Classes BEGIN!!!
24th – Full Moon
25th – Jammin at the Zoo Party
Mathematics Activities

Presented!
Thomas Edwards presented his work at the Annual Meeting of the Illinois Section of the Mathematical Association of America in April 2009. Tom presented "Solution of the Field Equations of General Relativity for Spherically Symmetric Masses". Dr. Dennis Ryan served as his advisor.

Dr. J. Alan Alewine gave a presentation entitled "A Summer of Knots" on his experience working with students during the NREUP program here at McKendree during the joint meetings. The NREUP program is a Mathematical Association of America activity funded by National Security Agency (grant H98230-06-1-0156) and the National Science Foundation (grant DMS-0552763). For this program, Dr. Alewine and Dr. Dye were faculty mentors giving them the opportunity to work intensively with three students on a mathematical research project. One of the students, Irina Garduno published an article entitled "Virtual Mosaic Knots" in the Rose Hulman Undergraduate Mathematics Journal.

Adam Alls presented his research on signal analysis and percussion at the Honors Presentations.

Competed!
A team of Kumud Bhandari and Thomas Edwards placed fourth in the student mathematics contest held at the Annual Meeting of the Illinois Section of the Mathematical Association of America in April 2009. The McKendree MathCats team placed seventh. There were twelve teams entered in the competition.

Research!
Maggie Rahmoeller, Amber Ramos, and Stephanie Thomas went to the Joint Mathematics Meeting in San Francisco, CA during January 2010 to participate in The Undergraduate Poster Session. During the past summer, Maggie Rahmoeller participated in a Research Experience for Undergraduates (REU) at Miami University in Oxford, OH. Maggie studied the linear chromatic number of a graph and presented at poster on this topic at the meeting. Amber Ramos participated in a National Research Experience for Undergraduates Program (NREUP) at McKendree University during the past summer and she presented her research on Mosaic knots at the meeting. Stephanie Thomas participated in an REU at Clemson University last summer presented her research on graph theory and game theory at the meeting.

Danielle Belobraydich is working on research on the graph theory behind Sudoku under the guidance of Dr. Alewine.

Published!
Kumud Bhandari was published in the Rose Hulman Undergraduate Journal of Mathematics. His article “Computing the Arrow Polynomial” was published in Vol. 10 (1) 2009.


Attended!
The MathCats will attend the annual meeting of the Illinois section of the Mathematical Association of America on April 9-10, 2010 at Augustana College in Rock Island, IL.

Math Fun


Check out this digital gallery of art inspired by mathematics: [http://www.anneburns.net/jmm10/index.html]

Opportunities

Consider applying for a summer position in a REU: [http://www.ams.org/employment/reu.html]

Course Spotlight

Financial Mathematics
Mathematics 320

The mathematics department will be offering Financial Mathematics (MTH 320) in the fall semester. This course is only offered every two years and focuses on the mathematics of finance. This course is required for students on the actuarial track, but the mathematics department also recommends this course to business students and to mathematics majors on the general track. This course prepares you to use mathematics in a business setting and covers the material on the test “FM” offered by the society of actuaries.