

BioLogue

Wright State University

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Chair: David Goldstein

Note from the Chair

Pandemic Novel H1N1: Not just for pre-meds!

By now, you have no doubt heard about “H1N1.” News of H1N1 infections in schools and universities arrives daily. As biology majors, you may find that others turn to you for information about this “entity.” Are you prepared to answer these questions? Investigating the topic a bit can serve a variety of functions: it can help to protect you from disease; it can make you a resource for your acquaintances; and it can even stimulate some thinking about basic issues in biology! In the process, you might notice that you could contribute to the H1N1 problem from many perspectives, ranging from molecular to population biology, and from the pursuit of medicine to the study of evolution. So here are a few issues to think about:

What does H1N1 refer to?

H1N1 is a form of the influenza (flu) virus, specifically a form of the genus of flu virus known as Influenza A. Influenza A contains a core of “negative-sense” RNA (it must be transcribed into mRNA before it can be translated) surrounded by a lipid envelope. Influenza A viruses can be categorized into “strains” based on the structure of two proteins found in the virus envelope. The H1N1 strain of flu expresses type 1 of the hemagglutinin protein (H1) and type 1 of the neuraminidase protein (N1). (Remember bird flu a couple of years ago? That was H5N1.) The H1N1 strain is one of the main causes of symptomatic seasonal flu infection in humans.

Why is a new vaccination required against flu each year?

The interaction between pathogenic parasites (like viruses) and their hosts is an evolutionary arms game. Parasites need to replicate and disperse, hosts must resist or tolerate infection

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Dr. Goldstein with 3 recent graduates, Lindsey Hogle, Sarah Frey, and Khadijeh Alnajjar.

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To stay up-to-date with the most recent WSU Dept of Biological Sciences news, courses, faculty, seminars, events, etc., please visit www.wright.edu/biology

Do you have feedback on The BioLogue? If so, feel free to email evelyn.lauterbach@wright.edu

Your comments and suggestions are appreciated!

Student spends summer with BIG cats!

WSU Bio Sci student Anna Holtvoigt spent the summer with some pretty large feline friends! She took part in an internship under the supervision of Dr. Jeff Peters. See page 3 of this newsletter for pictures and more details regarding her experience at a sanctuary in Indiana with tigers and other large carnivores.



Note from the Chair continued...

long enough to do their own replication. Thus, over time the parasite and host continually change characteristics (evolve). One weapon in the viral arsenal is the ability to change the structure of the surface proteins (H and N) that elicit the host immune response. This occurs in Influenza A both by mutation of the genes encoding the H and N proteins and by the exchange of genetic material between viral variants (which can happen when two viral strains infect the same cell). This evolution of viral proteins accounts for the need for annual vaccination against flu, as the human immune system may not recognize the changing protein variants expressed from year to year.

Why is H1N1 also called “swine flu?”

Influenza infection is common in pigs, but swine influenza usually cannot infect and cause disease symptoms in humans. However, certain variants can cross-infect between people, birds, and swine, and the exchange of genetic material between viral strains is thought to be particularly common in agricultural settings where birds and pigs are closely quartered. The current H1N1--“pandemic novel H1N1”--has a genetic makeup that represents a re-assortment of genes from human and swine influenza viruses (some of which also carry elements of avian flu). It is thought to have originated in swine and to have crossed to humans about a year ago. Hence, “pandemic novel H1N1” is commonly referred to as “swine flu.”

Why is flu infection (usually) seasonal?

Interestingly, although the seasonality of flu outbreaks is one of their most obvious characteristics (winter is “flu season” in Ohio), the reasons for this seasonality remain poorly understood. Possible explanations include changing human habits (more congregation in close quarters, indoors, in the winter), changes in human physiology (e.g., less watery mucus in drier cold air, reducing the ability to remove flu viruses from the respiratory system), and changes in virus characteristics (such as longer persistence of virus particles at colder temperatures). One interesting hypothesis is that Vitamin D deficiency, caused by reduced exposure to sun at some times of year, reduces resistance to infection. The current outbreak of H1N1 is unusual because it has become established during the warm, sunny months, raising fears that the outbreak will worsen during winter; epidemiologists are constructing mathematical models predicting the potential spread during the upcoming colder months.

What makes some strains of flu more dangerous than others?

Flu strains vary tremendously in virulence (the severity of illness they cause). Each typical year, something like 250,000 – 500,000 people worldwide die from flu. However, the famous 1918 Spanish flu pandemic is estimated to have killed up to 50 - 100,000,000 people. And we still don't know why. In 2005, researchers reconstructed that 1918 variant (helped in part by the discovery in Alaska of a frozen corpse of a person who had died of that flu) in hopes of learning the keys to disease-causing mechanisms and virulence. No definitive answer has yet arisen from that research. In recent studies, several strains of mice were equally dosed with flu virus, and some mouse strains became much sicker than others—suggesting that virulence reflects a complex interaction between virus and host, with the host immune reaction contributing to severity of disease. The bottom line is that, as yet, we cannot accurately predict the severity of infection resulting from any particular flu strain.

How do you diagnose H1N1 infection?

Infection with flu virus is typically diagnosed by symptoms: fever, cough, sore throat, runny nose, etc. However, specific diagnosis of “novel H1N1” infection requires molecular evaluation. The diagnostic test recommended by the Centers for Disease Control to confirm novel H1N1 influenza A virus is real-time reverse transcriptase PCR. In this test, a patient swab is collected, and specific sequences of nucleotides (primers) are used as starting points to amplify (polymerase chain reaction, PCR) and then quantify the viral genetic material if it is present.

Conclusions:

You could ask any number of questions that about the ongoing flu episode; I have briefly addressed just a few of them. As biology majors, you are positioned to explore these questions, and potentially to direct your studies and your professional careers to providing answers. Like any problem in biology, the progression of the H1N1 pandemic is complex and integrates issues from many areas of science. **Consider that answers to the questions above derive from the fields of molecular biology, clinical laboratory science, evolution, public health, mathematical modeling, population genetics, virology, behavior, immunology, and more.** Hopefully, this pandemic will provide you with stimulation to follow your academic and professional interests in some of these directions—without also providing you with days home sick in bed!

For further information on how to avoid, recognize, or respond to possible H1N1 infection:

<http://www.wright.edu/admin/bpra/em/swineflu.html>

<http://www.cdc.gov/h1n1flu/groups.htm>

Student spends summer with big cats

Biological Sciences student Anna Holtvoigt spent her summer at a rescue sanctuary for big cats and large carnivores called The Great Cats of Indiana. Great Cats takes in animals that are treated inhumanely, were purchased without a license, or could no longer be cared for by their owner. This was the first year that Great Cats had interns in to educate the public and give tours. Anna had three duties during her two month stay at the sanctuary: cleaning cages and preparing food, building enclosures for the animals, and giving tours to the public. When asked about her favorite part of the experience Anna said "I received the greatest satisfaction from my work when I watched Pandy, a female siberian tiger, enter an enclosure the other interns and I had constructed so she could feel the rain and sun. The bonds that were made between myself and the large cats (especially Raja, an older cougar) were of the rare bonds not shared by others." Anna's friend and fellow Biological Sciences student Allison Manning also held a similar internship position in Texas at Tiger Creek. Anna is looking forward to going back to the Great Cats of Indiana Sanctuary to help out on weekends.



Did you have an interesting or noteworthy internship experience? E-mail the Biologue staff at bowers.43@wright.edu and tell us about your experience! We would love to feature you!

Biological Sciences student Anna Holtvoigt observes one of the tigers at The Great Cats of Indiana.

3rd Annual Department Golf Scramble held Aug. 31



Matthew Diggs, honorary chairman and one member of the winning foursome, poses proudly next to his winning score.

On August 31 the Biological Sciences department hosted their third annual golf scramble to benefit undergraduate and graduate research. Dayton businessman and Wright State University benefactor Matthew O. Diggs Jr. was the very first Honorary Chairman of the event as a thank you to him and his wife Nancy for their contributions to the Matthew O. Diggs III Laboratory for Life Science Research, a tribute to their son. Forty-four golfers attended the scramble held at the Dayton Country Club. After an afternoon of golf, the participants dined and took part in the silent auction where items such as themed gift baskets and gift certificates were auctioned off. The winning foursome of the outing was Robert Sweeney, Jimmy Henderson, Matthew Diggs, and Dave Gasper.

"Achievement seems to be connected with action. Successful men and women keep moving. They make mistakes, but they don't quit."

-Conrad Hilton

Honors & Awards



Holding the book donated to the library in her honor is Lauren Ford. She was named the Top Scholar for College of Science and Mathematics.

Lauren Ford

Lauren Ford (CoSM Biological Sciences graduate) was named this year's CoSM Top Scholar by the Libraries. That award is given once a year to one student graduating from each college with a 4.0 GPA. Lauren also won a \$100 scholarship from University Honors colloquium for her outstanding work of her presentation her work "*Examining Association Between Btf and Emerin*", an Honors thesis, in the Bubulya lab. Lauren is now a medical student at WSU's Medical School.

Khadijeh Alnajjar

Khadijeh Alnajjar, a Chemistry major and Biology minor, was one of 30 students across the US selected for an American Physiological Society Student Research Fellowship. The fellowship supported research in Dr. Goldstein's laboratory, where she studied patterns of glycosylation of proteins involved in water and solute transport in a freeze-tolerant amphibian, and also supported Khadijeh's travel to the Experimental Biology meeting in New Orleans, where she presented a poster of her results. Khadijeh is now enrolled in WSU's Biomedical Sciences Ph.D. program.



WSU grad student Khadijeh Alnajjar poses in front of the statue outside of Diggs Laboratory. Khadijeh was one of few students selected for a highly competitive research fellowship.

Spring/Summer Graduates

Sarah Abdallah	Sarah Frey	Brett Lorenzo	Erik Snell
Hilary Allen	Abkush Goel	Jaclyn McCabe	Hanna Sonek
Micah Belew	Travis Hammond	Adrienne Narrowe	Sarah Sparks
Anita Boadi	Jennifer Harrod	Mohammed Odeh	Whitney Steiner
Lindsey Bowen	Brian Heinbaugh	Kristen Olson	Larissa Tangeman
Becky Brown	Daniel Hellmund	Kathleen Oxner	Demetria Thomas
Iris Castilio	Brittany Henry	Nisha Panday	Brandon Tingley
Justin Collins	Lindsey Hogle	Brandon Parks	Sukhjit Uppal
Michael Conley	Chase Hurst	Karen Pedersen	Shawna Webster
Jeremiah Cooper	Wakhas Idrees	Jesse Pohly	Christopher Bigley
Dillion Cupp	Kathryn Irwin	Matthew Ralidak	Jena English
Samantha Decatur	Leah Kershner	Ashley Sawyer	Juliane Hallon
Harley Dixon	Kali Koch	Laura Schuerman	Heather Sever
Lauren Ford	Mark Labig	Anthony Shumacher	Kimberlee Thompson
Brittney Franks	Brittany Lane	Siddharth Shirvastava	

Welcome New Staff and Faculty

Jenny Papadakis

Jenny is the new administrative specialist in the office of Biological Sciences. She completed her undergraduate degree in English at WSU. While working in the office, she is in charge of event planning, answers general questions about the department, assists with organizing seminars, and helps with the prehealth and biology advising. In addition, she teaches a freshman seminar learning community class and is currently pursuing her graduate degree in English. Jenny resides in Beaver Creek with her husband Art and their dog Prime. We're glad to have you, Jenny!



Amy Wissman

Amy graduated from IU in 1994 with a B.S. in Medical Technology. She then worked in a physician's office lab and hospital lab as a bench technologist. In 2000 she received her M.S. in Biological Sciences from WSU. Amy previously taught at Edison Community College for several years and began their Medical Assisting Program. Last year she taught Bio 105 and Bio 107 here at Wright State. She is beginning her full-time Instructor position this Fall, teaching M&I 220. Amy and her husband Ted have three children ages 12, 8, and 7 who keep them busy at their home in Minster. They enjoy walking, hiking, biking, camping, water sports, and playing family games. Amy looks forward to working with everyone in the Biology department and an exciting new year of teaching!

Faculty & Staff Achievements

President's Award for Excellence: Leadership

Director of Advising for Biology and Pre-Health Jacqui Neal was awarded one of the President's Awards for Excellence for "Excellence in Leadership". Jacqui developed BIO 194, a class that introduces students to the Biology major, possible career opportunities with a Biology degree, and involvement opportunities such as student organizations and research opportunities. One indicator of Jacqui's success in this realm is that approximately half of biology majors now graduate with some laboratory research experience during their undergraduate years. In addition, Jacqui also developed the "Path to Health Professions" program which is offered on President's Day every year for hundreds of students and their parents. She is the driving force in educating and encouraging students in the field of pre-health programs and is dedicated to the success of the student. Congratulations, Jacqui!



Faculty Awards for Excellence: Early Career Achievement

Dr. Lisa Kenyon was awarded the President's Award for Early Career Achievement. Dr. Kenyon holds a dual appointment with the Department of Biological Sciences (CoSM) and the Department of Teacher Education (CEHS). She teaches BIO 345 and ED311 to pre-service students, and has been teaching for 15 years (5 of which have been with WSU). Her research focuses on engaging students and teachers in scientific practices such as explanation, argumentation and scientific modeling-- specifically, examining how students use their epistemologies of science to support these practices. Her current focus on scientific modeling includes two main areas: (1) developing a learning progression for upper elementary and middle school students, and (2) supporting pre-service teacher pedagogical content knowledge for scientific modeling. Other research interests include curriculum design, project-based inquiry, and teacher professional development. Nice job, Dr. Kenyon!

Research Paper Cited by Justice Alito

One of Dr. Dan Krane's papers (a 2003 article from The Champion, publication of the National Association of Criminal Defense Lawyers) was cited by Justice Samuel Alito in a Supreme Court ruling. The paper describes the sensitivity of modern forensic DNA techniques, and Justice Alito cites that as a cautionary note "Indeed, modern DNA testing technology is so powerful that it actually increases the risks associated with mishandling evidence." Very impressive, Dr. Krane!



Get Involved!

2009-2010 BIO Club Officers

President: *Clay Hoerig*

Vice President: *Steve Young*

Secretary: *Chelsea Housh*

Treasurer: *Elizabeth Swartzwelder*

Activities Coordinator: *Michael Wourms*

Last year the BIO Club was involved in many events such as cleaning up the WSU woods, taking a behind the scene tour of the Newport Aquarium and the Columbus Zoo, and the Relay for Life. If you are interested in getting involved with the BIO Club contact Clay at hoerig.4@wright.edu, and/or plan on attending their "Welcome Back" social on September 24th at 4:00pm.

Biological Sciences Departmental Seminars

September 14:	Dr. Ellen Currano	"Some Liked It Hot": a paleontological perspective of plan-insect herbivore interactions during global warming
September 21:	Dr. Brian Maurer	Estimating the dimension of ecological systems in space and time
September 28:	Dr. Vaishali Katju	Determinants of Gene Duplicate in Evolution in Two Eukaryotes
October 5:	Dr. John Pearce	Combining banding, telemetry and genetic data to infer ecological, evolutionary, and disease-related patterns of migratory birds
October 12:	Dr. Jeff Coller	Lost in translation: mRNA decay, P-bodies, and polysomes
October 19:	Dr. Stephen Matthews	Potential impacts of climate change on bird and tree habitats across the eastern US
October 26:	Dr. Colin Orians	How plants resist herbivores: Advantages of a whole plant perspective
November 2:	Dr. Alejandro Royo	Evidence for the ghost of herbivory past
November 10:	Dr. Ben Salisbury	Distinguishing lethal mutations from benign variants: The genetics of Long QT Syndrome

All seminars are on Mondays at 1:30pm in room 135 of Oelman Hall.

Everyone is welcome!

New Classes and Application Deadlines

NEW CLASSES WINTER 2009

BIO 305 Animal Physiology:
BIO 460 Population Genetics:
BIO 402 Special Topics "Gene Therapy"
BIO 476/477 Parasitology
BIO 446 Advanced Cell Biology
BIO 442 Advanced Molecular Biology

Clinical Lab Sciences

Applications for the CLS program are now available in the Bio Sci office (235 BH) or online at

<http://www.wright.edu/biology/program/cls>

DEADLINE: November 1, 2009

Interviews with program officials and hospital affiliates will be in December and class will begin June 14, 2010. For more information see Beverly Schieltz (advisor, 129C Allyn) or Cheryl Conley (director, 129D Allyn)

Attention Juniors!

Do you have a strong interest in science and are maintaining at least a 3.4 GPA? If so, then you should strongly consider pursuing departmental honors! Don't miss this opportunity to be a part of cutting-edge research and to learn from professors who are among the best in their fields.

Visit the advising office, BH 235, to pick up a packet of information.

EXB 466 Internship Application Deadlines

Fall Internship: Deadline for applying is August 15

Winter Internship: Deadline for applying is November 15

Spring Internship: Deadline for applying is March 15

Summer Internship: Deadline for applying is May 30

Wright State University

Need Advising?

If you need to schedule an appointment with an advisor, please call 937-775-4226 or e-mail bioadvising@wright.edu. Make sure to include the name of the advisor you would like to meet with, along with your availability.

- Undergraduate Degrees:
Jacqui Neal
Lindy Lauterbach
Meredith Rodgers
- Graduate Degrees:
Laura Buerschen
- Clinical Lab Sciences:
Bev Schieltz

The BioLogue is a quarterly newsletter that contains valuable information for faculty, staff, and students in the Department of Biological Sciences.

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