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Department of Biological Sciences

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College of Arts & Sciences

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From the Communications Committee

As 2014 draws to a close, we look back at the Fall semester that's given us plenty to talk about. Faculty with a cover on *Science*, a new book on Zebrafish, graduate students winning awards at national meetings, new staff joining the department as other staff members move on to new challenges. The BioGSA starts a new organization, Graduate Women in Science (GWIS), and the Chair was spotted driving a tractor at the Fall picnic held at the Meeman Biological Station. To top off the semester, the Memphis Tiger Football team has its best season in many a year! Remember, you can let us know what you're doing by emailing your news to us at bi-onews@memphis.edu and can keep up with the Department by following us on [Facebook](#) and the [Department web site](#)



FACULTY NEWS: *Retirements, Tenure and Promotion, Appointments, Grants, Awards, Presentations*

Retirements

We would like to recognize our two new Professors Emeriti who have moved on to the next phases of their lives.



Dr. Charles J. Biggers graduated from Wake Forest University, received his Master's degree from Appalachian State University, and his Ph.D. from the University of South Carolina. Before coming to the University of Memphis in February of 1969, Dr. Biggers taught Biology at Orlando Junior College. At the UoM he has instructed various courses in General Biology and Genetics as well as Human Anatomy and Physiology 1 and 2. Through the years he has directed a number of Master's and Doctoral students as well as numerous undergraduate research students. Dr. Biggers is the recipient of two distinguished teaching awards, and the award for advising excellence as well as the Briggs Excellence in Teaching Award. He was selected as commencement speaker in the summer of 1985.



Dr. Stanley "Ed" Stevens received his BA and MA in Microbiology and a Ph.D. in Botany from the University of Texas-Austin. Dr. Stevens was a visiting scientist at Los Alamos National Laboratory and a faculty member and Associate Director of the Biotechnology Institute at The Pennsylvania State University. In 1988, he was appointed to the Chair of Excellence in Molecular Biology at Memphis State University and has also served as Director of The Edward J. Meeman Biological Station. Dr. Stevens has chaired two departments, has served as President of the University of Memphis Faculty Senate and as a member of The Tennessee Board of Regents. He was the Faculty Athletic Representative to the Athletic Department and served as the President's representative to the Athletics Department, the Conference, and the NCAA.



FACULTY NEWS: *Tenure and Promotion, Appointments, Grants, Awards, Presentations*

Tenure and Promotion

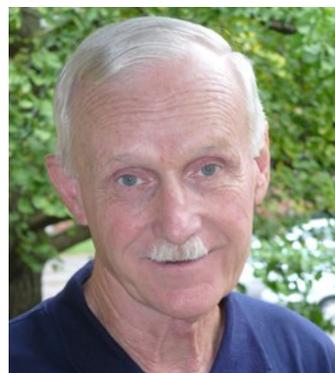


Dr. Andrew Liu was promoted to Associate Professor with Tenure in the Fall of 2014. Dr. Liu studies the cellular and molecular basis of circadian rhythms in mammals, using mice and rats as well as cultured cells as models. Circadian rhythms are driven by a circadian clock which regulates many aspects of the 24 hour rhythms in physiology and behavior. Dr. Liu employs a number of novel approaches to study circadian clocks. One of these approaches was published in *PLoS Genetics* and highlighted on the [Science Daily](#) website, where Dr. Liu's work was described as "the engineering of liver and adipose tissues to flash light with a daily rhythm much like an alarm clock." Dr. Liu's study showed that changing clock gene function in these cells is similar to what happens in mice lacking clock genes." To read more about Dr. Liu's work, visit his [webpage](#)

Dr. Ramin Homayouni, Director of the [Bioinformatics program](#), was promoted to full Professor the Fall of 2014. In addition to directing the Bioinformatics Program, Dr. Homayouni's lab investigates the molecular and cellular mechanisms of neuronal migration and dendrite maturation during mammalian brain development, the physiological and pathophysiological role of amyloid precursor protein in Alzheimer's Disease, and develops text-mining approaches to extract gene function information from the biomedical literature. At the request of the Bill and Melinda Gates Foundation, Dr. Homayouni, along with Behrouz Madahia and Dr. Lisa Klesges, Dean of the School of Public Health and a team of researchers from the Bioinformatics Program and the University of Memphis School of Public Health are applying their System Dynamics model used to predict weight gain in 8-10 year old African-American children, to a population of malnourished children. To read more about Dr. Homayouni's work, visit his [website](#)



Appointments



Dr. Michael Kennedy, co-Director of the Ecological Research Center, was named Director of the [The Edward J. Meeman Biological Field Station](#). The Meeman Biological Field Station consists of 623 acres of forests, ponds, and meadows that encompass upland areas of the Chickasaw bluffs as well as bottomland habitats near the Mississippi River. The research mission of the Meeman Biological Field Station (MBFS) is to examine the effects of spatial scale, spatial and temporal heterogeneity and periodicity on ecosystem functions. Its educational mission is to teach ecology and evolution using hands-on inquiry based learning. The faculty, staff and students using the field station are studying river, floodplain and wetland ecology, evolutionary ecology of hybridization, wildlife ecology, genetics, conservation biology and the evolution of mammalian behavior systems



Grants

Dr. Omar Skalli is a co-PI with Dr. Chysanthe Preza (PI, Electrical Engineering) on an Instrument Development for Biological Research grant from the NSF entitled *Improving 3D resolution and reducing sensitivity to spherical aberration in live, thick sample cellular imaging using novel methods in optical sectioning microscopy*.

Dr. Stephan Schoech received an NSF grant, an American Ornithologists' Union grant and a Cooper Ornithological Society grant to support travel to the 26th International Ornithological Congress (IOC), in Tokyo, Japan, August 2014. These grants supported travel for students, post docs, junior faculty, and those from developing countries. Forty seven people received support that ranged from \$1,000 - \$5000. Twenty-two of those supported were women, 17 were students, 8 were post docs, 9 were junior faculty, 1 was mid-level faculty, 5 were senior faculty, and 7 were in non-academic positions. The majority of the latter two categories were from developing countries.

Invited Talks and Presentations

In June, **Dr. Omar Skalli** was an invited speaker at a Special Interest Meeting: Molecular Insight into Muscle Function and Protein Aggregate Myopathies, in Potsdam, Germany. The title of his talk was *The Role of Synemin in Normal and Diseased Muscle*. Also in June, Dr. Skalli traveled to West Dover, VT where he attended a Gordon Conference on *Intermediate Filaments at the Crossroads between Health and Disease*. Dr. Skalli and his graduate student Madhumita Paul presented a poster entitled *Molecular Analysis of Synemin Partnerships, With an Emphasis on Synemin Interactions with PP2A and α -Actinin*. He was on the road again in October to attend the joint conference of the Southeastern Association of Shared Resources (2nd

Annual Meeting) and the Midwest and Southeast Association of Core Directors (5th Annual Meeting) in Nashville, TN.

Dr. Stephan Schoech attended the 26th International Ornithological Congress (IOC), in Tokyo, Japan, August 2014. Dr. Schoech presented "The physiological phenotype: Hypothalamo-pituitary-adrenal axis responsiveness and the timid-to-bold continuum in Florida scrub-jays at the Symposium on *Developmental Stress Beyond Bird Song: Can Early Life Stressors Engineer Physiology and Behavior for Harsh Environments?* He was also elected Treasurer of the International Ornithologists' Union at that meeting. In addition, a recent paper from Dr. Schoech's lab describing the impact nighttime light on reproduction was featured by [National Geographic News](#) and the [Environmental Health News](#).



In October 2014, **Dr. Ramin Homayouni** spoke at the annual *Bill & Melinda Gates Grand Challenges* meeting in Seattle on "A Systems Approach to Brain Growth and Development". This collaborative research endeavor involves investigators at the Gates Foundation, the University of Memphis Bioinformatics Program, and the University of Memphis School of Public Health.



Invited Talks and Presentations, cont...

Dr. Thomas Sutter gave an invited talk to the Department of Chemical Biology, at Rutgers University, The State University of New Jersey entitled “Integrated Omic and Chemical Biology Approaches towards Understanding the Etiology, Treatment and Prevention of Cancer,” on April 30, 2014. He also traveled to Michigan State University to present “Integrated Omic Approaches Identify the Mechanism by which Dioxin Accelerates Keratinocyte Differentiation,” on October 23 and “Elaborating the Mode-of-Action for Chloracne,” to the Dow Chemical Company on October 24th, 2014.

In November, **Dr. Duane McKenna** attended the 62nd Annual Meeting of the Entomological Society of America in Portland, OR where he presented “Patterns of

cryptic speciation, endemism, and host plant specialization in Mesoamerican ‘hispiine’ beetles *Chrysomelidae: Cassidinae*” in the Member Symposium *Biogeography and Evolution of Mesoamerican Arthropods*. He also presented “The 1000 curculionidae phylogeny and evolution project (1K Weevils): Phylogenomic and morphological data converge to reveal the evolutionary history of a superradiation” in the Coleoptera Systematics session. Dr. McKenna and his collaborators’ work on insect physiology was also featured on the cover of *Science* (see Selected Publications).

On November 23rd, **Dr. Randall Bayer** presented “Growth Chambers: How to construct one and succeed in the cultivation of cooler growing orchids” to the Memphis Orchid Society, Memphis, Tennessee.

GRADUATE STUDENT NEWS: Degrees and Defenses, Grants, Fellowships, Awards, and Presentations



Pictured from Left to right: Ms. Deepthi Raghu, Mr. Ramhari Thapa, Dr. Bridget Fisher, and Mr. Jeremy Dennison

Defenses and Degrees

On June 24th, 2014, **Deepthi Raghu** successfully defended her Master’s Thesis entitled *Innate Immune Response and Early Innate Immune Proteins of Channel Catfish (*Ictalurus punctatus*)*. Ms. Raghu performed her graduate work in the laboratory of **Dr. Donald Ourth**.

Ramhari Thapa successfully defended his Master’s Thesis entitled *Genetic Variability and Fruit Morphological Diversity in the Tomato Germplasm* on July 3rd, 2014. Mr. Thapa performed his Masters work with **Dr. Randall Bayer**.

Bridget Fisher successfully defended her doctoral dissertation entitled *Modeling Giardia-Host Interactions: Mechanisms of Barrier Dysfunction and Immune Sup-*

pression on July 10th, 2014. Dr. Fisher performed her dissertation work in the laboratories of **Drs. Carlos Estrano** and **Judy Cole**.

On December 2nd, 2014, **Jeremy Dennison** successfully defended his Master’s thesis entitled *Biodiversity measures of Bats in Western Tennessee*. Mr. Dennison’s thesis work was performed under the direction of **Dr. Michael Kennedy**.

Lauren Collins received her Master’s degree on December 14th, 2014. Ms. Collin performed her graduate work under the direction of **Dr. Melvin Beck**.

Jacob Reed received his Master’s degree on December 14th, 2014. Mr. Reed performed his graduate work under the direction of **Dr. Charles Lessman**.

Grants and Awards

Bailey Patillo received a grant from the Society for the Study of Amphibians and Reptiles for her research. SSAR is one of the major international herpetological research societies, and publishes *The Journal of Herpetology* and *The Herpetological Review*.



Pictured: Bailey Patillo and friend

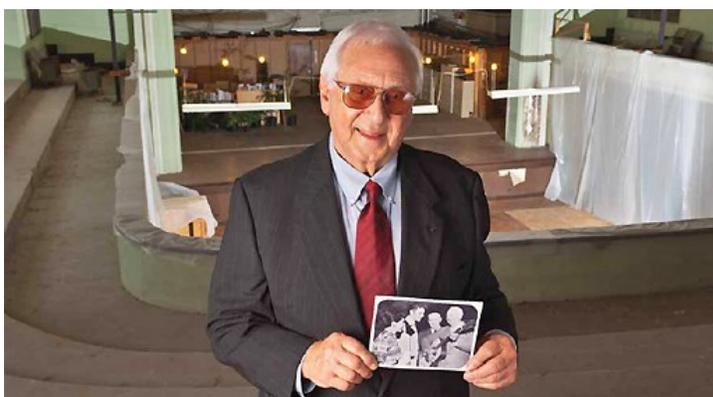
Alex Aitken, Cristian Beza-Beza, and Stephanie Haddad (students in Dr. Duane McKenna's lab) all received Student Graduate Association funds to present at the 62nd Annual Meeting of the Entomological Society of America, Portland, OR, November 2014. Alex and Stephanie also received Departmental Funds.



Pictured clockwise from upper left: Alex Aitken, the McKenna Lab (Alex, Cristian Beza-Beza, Stephanie Haddad, and Dr. Duane McKenna) and Stephanie Haddad at the Entomological Society Meeting. Pictures courtesy of Alex Aitken.

Stephanie Haddad won 1st place in the graduate student poster presentation competition for the President's Prize (Systematics, Evolution, and Biodiversity Section) at the 62nd Annual Meeting of the Entomological Society of America in Portland, OR, November 2014.

The Dr. Victor Feisel Scholarship in Biology, endowed by Dr. Victor Feisel, retired Professor and former Vice President of the U of M, were presented to **Emily Elderbrock** (junior award, two years or less in the graduate program) and **Blake Jones** (senior award, more than two years in the program). Emily and Blake are both Ph.D. candidates in Dr. **Stephan Schoech's** lab.



Pictured: Dr. Victor Feisel

Presentations

Ferguson SM, Jones BC, and Schoech SJ. *Equality of the sexes: Territory defense in the Florida scrub-jay.* *Animal Behavior Society*, Princeton, NJ, August 2014.

Ferguson SM, Jones BC, Schoech SJ. *Equality of the sexes: territory defense in the Florida scrub-jay.* *Animal Behavior Society Annual Meeting*, Princeton, NJ. Aug 2014

Beza-Beza CF and McKenna D *Phylogenetics and biogeography of the tribe Proculini Kaup 1868 (Coleoptera: Passalidae): A test of Halffter's Mesamerican highland pattern of distribution.* Student Competition, RELAS, Reunion latinoamericana de escarabajoecologia, Villa de Leyva, Colombia, September 2. 2nd place

Ferguson SM, Jones BC, Schoech SJ. *It's not what you say, it's when you say it: the role of context in songbird aggression.* *Tennessee Ornithological Society Meeting*, Manchester, TN. Oct 2014.



Pictured: S Ferguson, B Jones, S Bebus, and nestling Idris at the TN Ornithological Society. Picture courtesy of B Jones

Jones BC, Bebus SE, Ferguson SM. Exploring links between stress hormones and behavior in the Florida scrub-jay (*Aphelocoma coerulescens*). Joint presentation to Memphis Tennessee Ornithological Society, Nov 2014.

Aitken A and **McKenna D.** *Phylogenomic data help resolve the phylogeny of Curculionoidea and yield insights into the evolution of weevils*, 62nd Annual Meeting of the Entomological Society of America, Portland, OR, November 2014.

Beza-Beza, C and **McKenna, DD.** *Evolution and Island biogeography in the continental tropics: Reconstructing timing and patterns of diversification in endemic Neotropical cloud forest bess beetles (Passalidae: Proculini)*. 62nd Annual Meeting of the Entomological Society of America, Portland, OR, No-

vember 2014.

Beza-Beza, C. *Phylogenetics and biogeography of the tribe Proculini (Coleoptera: Passalidae) in the Mesoafrican highland*. 62nd Annual Meeting of the Entomological Society of America, Portland, OR, November 2014.

Haddad S, Lemmon A, and **McKenna DD.** *Partial genome capture helps resolve the long-enigmatic higher phylogeny of longhorned beetles (Coleoptera: Cerambycidae)*. 62nd Annual Meeting of the Entomological Society of America, Portland, OR, November 2014.

BioGSA NEWS: Fall trips, mixers, and the Graduate Women in Science

The BioGSA is pleased to announce that the graduate students in the Department of Biological Sciences have registered a Graduate Women in Science (GWIS) organization on campus. The purpose of this organization is to create a community of graduate students and faculty who are interested in fostering the development of women in science. The goals of the organization are to discuss and highlight challenges that women face in the scientific community, facilitate outreach and mentoring initiatives in our local community, and foster professional and social development. More generally, the organization aims to facilitate involvement among young professionals of all race, religion, national origin, gender, sexual orientation, and ability. GWIS aims to organize events that allow young professionals to cultivate their career goals via exposure to the academic/career-related life choices and experiences of accomplished colleagues in the scientific community.



As part of this initiative, GWIS instituted a "Meet the Professor" series in the department whereby faculty members are invited to give informal talks regarding their academic/career-related life choices (not about their research) so the graduate students may benefit from their faculty's experience and decision-making. Follow the GWIS on [Facebook](#) to see when new events are scheduled.

[Dr. Danielle N. Lee](#), a 2000 graduate of [Dr. Michael Ferkin](#), closed out the Fall GWIS seminar series on December 5th. Dr. Lee studies animal behavior, mam-

malogy, and ecology and uses social media, informal experiential science experiences, and draws from hip hop culture to share science with general audiences, particularly under-served groups. She was recently named one of Ebony's Power 100, and recognized by the White House as a Champion of Change.

If you are interested in sponsoring a speaker in this series, contact Stephanie Haddad shaddad@memphis.edu. These funds will provide refreshments at the event, and the donor will be recognized at the talk they sponsored. Any donation will go a long way in making these significant events happen in our department.



Grad students enjoy a night off at the Halloween Haunted Maze. Picture courtesy of S. Haddad

The BioGSA also sponsored

- Fall Mixer at R.P. Tracks
- Dept. of Biological Sciences Annual Picnic Game Organization
- Haunted Maze Event
- Memphis Zoo (Tour of Research Facilities/ Collaboration Opportunities)
- 'Topics in Statistics' course surveying
- Graduate Recruitment Fair
- Graduate student-chosen speaker survey
- Bake Sale

You can keep track of BioGSA events on [Facebook](#).

STAFF NEWS: Leaving and arriving

Leaving

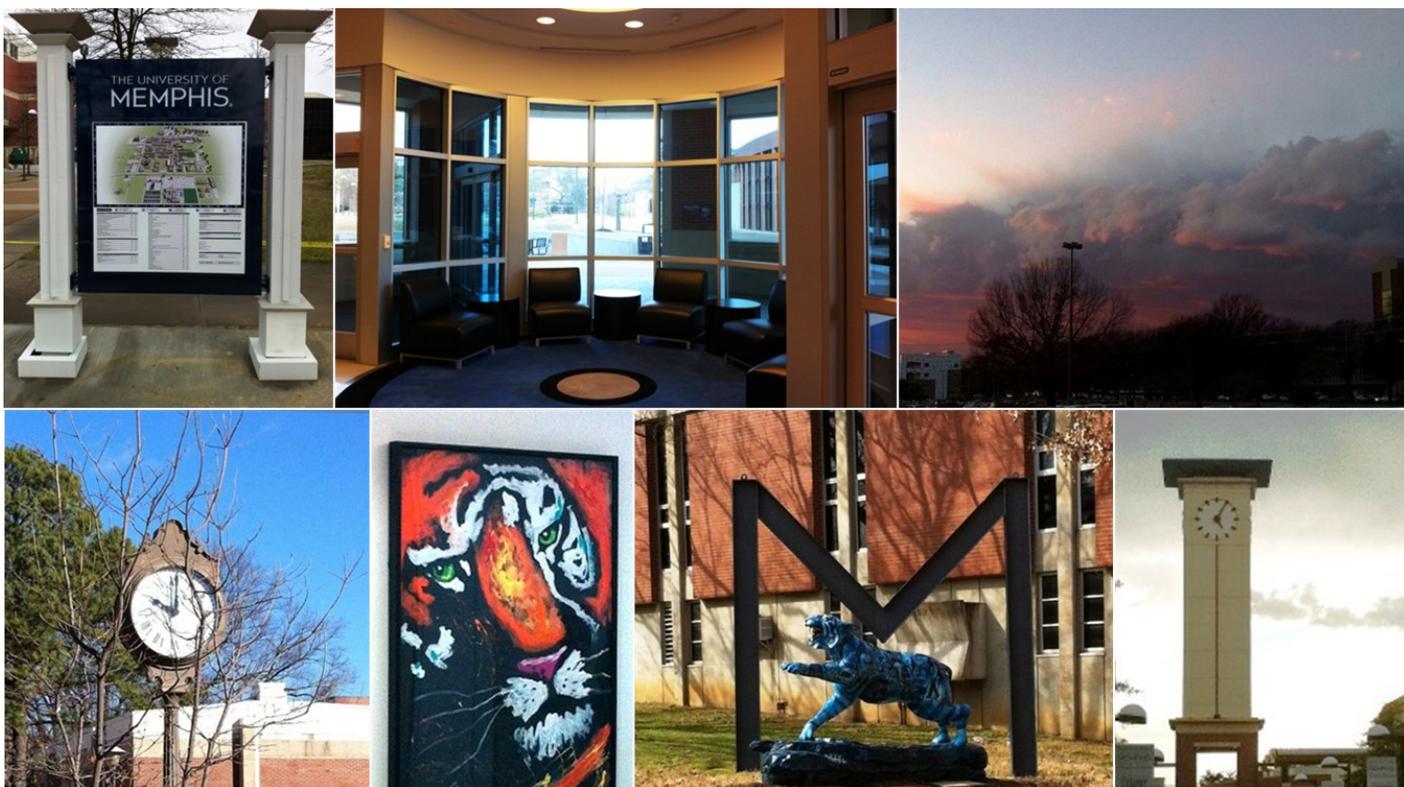
This semester we said good-bye to a member of the Feinstone Center and two staff members and we welcome two new ones. Dr. Shirlean Goodwin, who received her Ph.D. from Alabama A&M University, joined the Feinstone soon after it opened. Dr. Goodwin was the resident real time PCR and NexGen sequencing expert and her expertise will be difficult to replace. We also say goodbye to Steve Kynerd, who served as the Department's laboratory assistant and Ellington Hall Building Manager. Steve decided to retire and begin his second career as an artist and fisherman. Wendelyn Williams, who was the laboratory coordinator for Anatomy and Physiology, recently completed her B.S. in Nursing and will be working at St. Jude Children's Research Hospital in the New Year.



Pictured (left to right): Dr. Shirlean Goodwin, Mr. Steve Kynerd, Ms. Wendelyn Williams (picture courtesy of C. Powless), Mr. Jon Hart and Mr. Joseph Barnes (both pictures courtesy of J. Hart)

Arriving

As people move on, new staff members join our ranks. We welcome Jon Hart, who takes over for Steve Kynerd as the Department's Laboratory Assistant and the Ellington Hall Building Manager. Joseph Barnes joins the department as the laboratory coordinator for the Microbiology laboratories. Welcome to both Jon and Joe, who we hope are with us for a long time to come.



BIOLOGISTS@LARGE



Dr. Randall Bayer, Professor and Chair of the Department of Biological Sciences won two red ribbons, two blue ribbons, a ribbon for best of class (Best *Masdevallia* species in the show) and an American Orchid Society Certificate of Horticultural Merit for his orchid specimen of *Masdevallia superbians* "Forest Envy" (pictured above and right). Dr. Bayer picked the clonal name "Forest Envy" for this plant because it would be the envy of the forest where it grows in the Andes of Ecuador. The Memphis Orchid club also won a trophy for best display at the show.

The Fall Picnic at the Meeman Biological Station

The Annual Fall Picnic was once again held at (1) The Edward J. Meeman Biological Stations. Dean Neenan, Drs. Bayer, Wong and Simco arrived to get the party started. (3) Others had to use GPS to get the (4) Blue Line on course, but all arrived safe and sound. (5) Dr. Bayer channeled his inner farmer and toiled around the driveway on the Station's tractor while (6) the graduate students congregated on the backside of the conference center. Are (5) and (6) related? Perhaps... Perhaps. (7) The Abell lab seemed to be in a particularly festive mood. After a light repast, (8) the graduate students gathered for a volleyball match. Clearly it was too hot for the faculty to get involved. Yes indeed, it seemed as though a good time was had by all.

(Pictures courtesy of C. Powless and J Cole)



SELECTED PUBLICATIONS

Journal articles

Bateman PW, Fleming PA, **Jones BC**, Rothermel B. 2014. Defensive responses of gopher tortoises (*Gopherus polyphemus*) are influenced by risk assessment and level of habituation to humans. *Behaviour* 151:1267-1280

Galbany M, Unwin M, Garcia-Jacas N, Smissen R, Susanna A and **Bayer RJ**. Phylogenetic relationships in *Helichrysum* (Compositae: Gnaphalieae) and related genera: Incongruence between nuclear and plastid phylogenies, biogeographic and morphological patterns, and implications for generic delimitation. *Taxon* 63(3): 608-624, 2014.

Herr MJ, Longhurst CM, Baker B, **Homayouni R**, Speich HE, Kotha J, Jennings LK. Tetraspanin CD9 modulates human lymphoma cellular proliferation via histone deacetylase activity. *Biochem Biophys Res Commun.* 447(4):616-20, 2014.

Mandel JR, McAssey EV, Nambeesan S, Garcia-Navarro E, Burke JM. Molecular evolution of candidate genes for crop-related traits in sunflower (*Helianthus annuus* L.). *PLoS ONE* 9(6): e99620, 2014.

McKimm E, Corkill B, Goldowitz D, Albritton LM, **Homayouni R**, Blaha CD, Mittleman G. Glutamate dysfunction associated with developmental cerebellar damage: relevance to autism spectrum disorders. *Cerebellum.* 13(3):346-53, 2014.

Misof B, Shanlin L,...**McKenna DD**,...Kjer KM, Zhou X. Phylogenomics resolves the timing and pattern of insect evolution. *Science* 346: 763-767, 2014.

Niedermeyer SE, Penfound TA, Hohn C, Li Y, **Homayouni R**, Zhao J, Dale JB. Group A streptococcus expresses a trio of surface proteins containing protective epitopes. *Clin Vaccine Immunol.* 21(10):1421-1425, 2014.

Oguin TH 3rd, Sharma S, Stuart AD, Duan S, Scott SA, Jones CK, Daniels JS, Lindsley CW, Thomas PG, Brown HA. Phospholipase D facilitates efficient entry of influenza virus, allowing escape from innate immune inhibition. *J. Biol. Chem.* 289(37):25405-417, 2014.

Pandey AK, Lu L, Wang X, **Homayouni R**, Williams RW. Functionally enigmatic genes: a case study of the brain ignomere. *PLoS One.* 2014 Feb 11;9(2):e88889.

Saunders LE and **Pezeshki R**. Sublethal effects of environmentally relevant run-off concentrations of glyphosate in the root zone of *Ludwigia peploides* (creeping water primrose) and *Polygonum hydropiperoides* (smartweed). *Weed Biol Manage* 14:242-250, 2014.

Books

Lessman CA and Carver EA (editors) *Zebrafish: Topics in Reproduction, Toxicology and Development*. Nova Science Publishers, Inc., New York, 2014.

Book Chapters

Jones KD and **Lessman CA** *Age determination of gonad maturation and puberty onset in the transparent casper zebrafish juvenile*. In: *Zebrafish: Topics in Reproduction, Toxicology and Development*. Eds: Lessman, C. A. and Carver, E. A. Nova Science Publishers, Inc., N.Y. Chapter 1, p. 3-13, 2014.

Kaushik G and **Lessman CA**. *Ovarian follicle dynamics assessed in vivo by intraperitoneal (i.p.) trypan blue uptake during vitellogenin endocytosis in adult female zebrafish*. In: *Zebrafish: Topics in Reproduction, Toxicology and Development*. Eds: Lessman, C. A. and Carver, E. A. Nova Science Publishers, Inc., N.Y. Chapter 2, p. 15-37, 2014.

Lessman CA. *The protein phosphatase inhibitor, okadaic acid, elicits several components of zebrafish (*Danio rerio*) oocyte maturation in vitro*. In: *Zebrafish: Topics in Reproduction, Toxicology and Development*. Eds: Lessman, C. A. and Carver, E. A. Nova Science Publishers, Inc., N.Y. Chapter 3, p. 39-63, 2014.



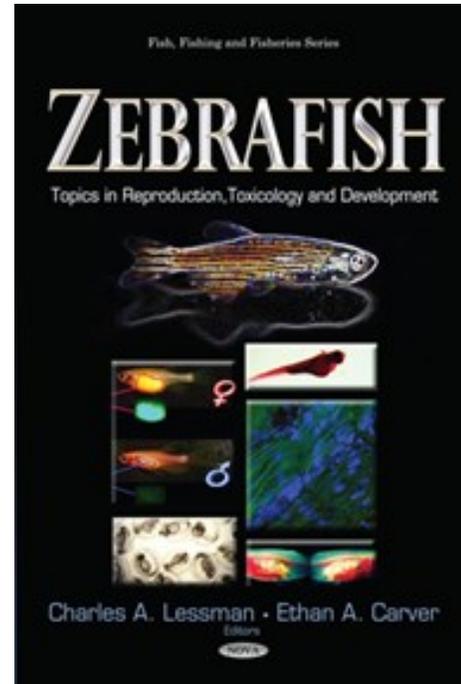
From the cover of *Science* 346:763-767, 2014

SELECTED PUBLICATIONS

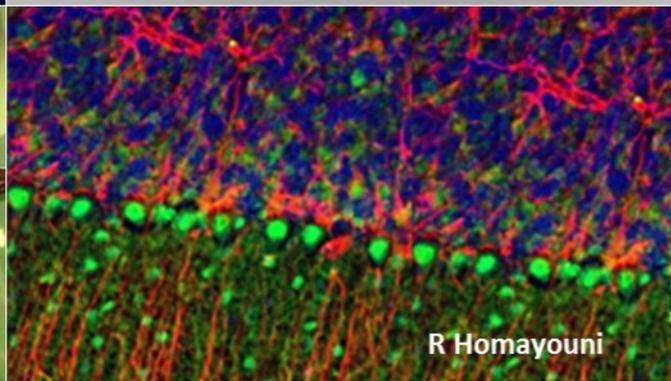
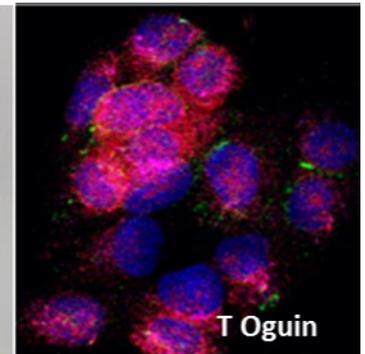
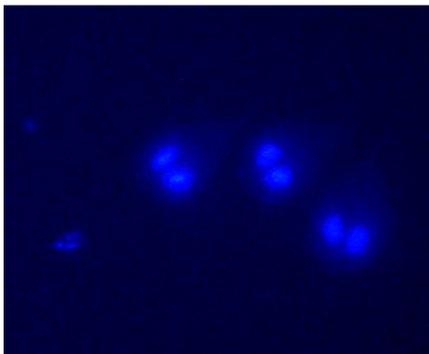
Lessman CA. *Fecundity and spawning frequency in wild-type zebrafish mated pairs: A long-term, longitudinal study.* In: Zebrafish: Topics in Reproduction, Toxicology and Development. Eds: Lessman, C. A. and Carver, E. A. Nova Science Publishers, Inc., N.Y. Chapter 6, p. 123-131, 2014.

Carver EA, Taylor MR, Sircy L, and **Lessman CA.** *Localization of the sodium-potassium-chloride cotransporter gene (slc12a2) protein products during zebrafish embryogenesis and myogenesis and a screen for additional antibodies to study zebrafish myogenesis.* In: Zebrafish: Topics in Reproduction, Toxicology and Development. Eds.: Lessman, C. A. and Carver, E. A. Nova Science Publishers, Inc., N.Y. Chapter 7, p. 135-154, 2014.

Carver EA, Taylor MR, Milleville L, and **Lessman CA.** *The zebrafish dead elvis (DEL) mutant encodes titinA."* In: Zebrafish: Topics in Reproduction, Toxicology and Development. Eds: Lessman, C. A. and Carver, E. A. Nova Science Publishers, Inc., N.Y. Chapter 8, p. 155-177, 2104.



[from the cover](#)



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Except where noted, photos were taken by JA Cole

