

UNDERGRADUATE RESEARCH Highlights

Lucas JR, Courtney S, Hassfurder M, Dhingra S, Bryant A, Shaw SL. Microtubule-Associated Proteins MAP65-1 and MAP65-2 positively regulate axial cell growth in etiolated *Arabidopsis* hypocotyls. *The Plant Cell*. 2011;23:1889-1903. (Indiana University, Bloomington)

This study examined the role of two microtubule associated proteins in plant growth. We found that these two proteins drastically affect axial cell elongation without dramatically disrupting the microtubule cytoskeleton. Jessica Lucas is currently a postdoctoral researcher at Indiana University in the Biology department in the laboratory of Assistant Professor Sidney Shaw. Stephanie Courtney was a sophomore biology major at the time of this study. Stephanie is in the process of applying for graduate schools. Sonia Dhingra, a pre-dental student, was a sophomore when she completed the research presented in this paper. Sonia will attend dental school after graduation. Adam Bryant was a senior when he worked on this project and he is currently enrolled in Medical School at the University of Illinois. Funding for this work was provided by a National Science Foundation award to Sidney Shaw.

Galperin BL, Robbins, DL. Constructive deviance: striving toward organizational change in healthcare. *J Mixed Met. Res.* 2010;5:1-11. (University of Tampa)

Constructive deviance is becoming increasingly important in businesses today because constructive deviants can bring about positive changes. Unlike much of the literature on workplace deviance which focuses on dysfunctional behavior such as antisocial behavior and workplace aggression, constructive deviants are employees who break the rules and norms but intend to benefit the organization. These individuals can play a key role in creating an organizational change and serve as future change agents. Given the increasing discussion on health care reforms, our paper explores the factors that relate to constructive deviance among physicians. Finally, practical implications and future research directions are discussed. Bella L. Galperin is an Associate Professor of Management and Associate Director of the TECO Energy Center for Leadership at the University

of Tampa. Dana L. Robbins completed the paper during her senior year for one of her honor's tutorial. Dana is currently studying law at Stetson University. She presented the paper at the Academic and Business Research Institute Conference, which was funded by the John H. Sykes College of Business at the University of Tampa.

George D, Hunt S, Gallagher A. How the muses got into music: The historical perspective of the Greek concept of inspiration on music creation and performance. Music performance, lecture recital, dance. May 5, 2011; Potsdam, NY. 2011 (The Crane School of Music, SUNY Potsdam)

In ancient Greece, it was thought that nine goddesses presided over and inspired the arts and sciences. This Kilmer Award project researched how this concept of the muses could be applied to song literature through the centuries. This collaborative project also included the 18 students of the voice studio of Donald George and explored how this idea of 'muse' has continued and changed over the past 3000 years. Songs were selected to be performed by members of the studio, which reflect the different characteristics of the muses from different eras and cultures, and the project culminated in a lecture-recital by the studio presenting these songs. Donald George is an Associate Professor of Music. Stephanie Hunt, Senior was a Kilmer Undergraduate Research Apprentice and has graduated. Ashley Gallagher, Sophomore was a Kilmer Undergraduate Research Apprentice and is currently a sophomore. The Kilmer Research Award is part of SUNY Potsdam and also supported by the Title III Strengthening Institutions Grant.

Weidenhamer JD, Miller J, Guinn D, Pearson J. Bioavailability of cadmium in inexpensive jewelry. *Environ. Health Perspect.* 2011;119:1029-1033. (Ashland University)

Cadmium bioaccumulates in the body and chronic exposure causes kidney damage and weakens bones. This study characterized the extent of cadmium contamination of inexpensive jewelry and determined its bioavailability

through leaching tests. It was found that young children who mouth or swallow jewelry containing cadmium may be exposed to as much as 100 times the recommended maximum exposure limit for cadmium. It was also found that damaged pieces of jewelry in some cases leached up to 30 times more cadmium than undamaged pieces. Jeff Weidenhamer is a professor of chemistry. Jennifer Miller, a senior geology and integrated science education major, participated in this research as a summer project. Daphne Guinn and Janna Pearson, both toxicology majors, participated in this research as an independent student project during their junior (Daphne) and senior (Janna) years. Jennifer is currently in a master's program in geology at Miami University (Ohio). Daphne is currently in a doctoral program in biomedical sciences at Ohio State University. Janna is employed and in the process of applying to schools to train as a physician assistant. The research was supported in part by a grant from the Dr. Scholl Foundation, and the National Science Foundation provided financial support for acquisition of the Varian 220 AA spectrometer.

Yakovenko V, Speidel ER, Chapman CD, Dess NK. Food dependence in rats selectively bred for low versus high saccharin intake: Implications for "food addiction." *Appetite*. 2011;57:2:397-400. (Occidental College)

Three experiments concerned the construct of "food addiction." This concept implies that proneness to drug dependence and to food dependence should covary. The latter was studied in low- (LoS) and high- (HiS) saccharin-consuming rats, who differ in drug self-administration (HiS>LoS) and withdrawal (LoS>HiS). Sugary food intake in the first 1-2 hr was higher in HiS than LoS rats. Sugar intake predicted startle during abstinence only among LoS rats. These results may suggest bingeing-proneness in HiS rats and withdrawal-proneness among LoS rats. However, intake escalation and somatic withdrawal did not differ between lines. Further study with selectively bred rats, with attention to definitions and measures, is warranted. Clinton Chapman and Nancy Dess are both faculty in the Department of Psychology at Occidental. Veronica Yakovenko conducted two of the studies as a Fletcher-Jones Science

Scholar. Elizabeth Speidel conducted the third study. They have been, respectively, teaching abroad and doing research since graduating with Honors in Psychology in 2010, and both plan to apply for doctoral programs in psychology. The research was supported by the Fletcher-Jones Science Scholar program at Occidental College and by the Dennis A. VanderWeele Student Research Fund.

D 'Souza MJ, Shuman KE, Omondi AO, Kevill DN. Detailed analysis for the solvolysis of isopropenyl chloroformate. *Eur. J. Chem.* 2011;2:130-135. (Wesley College)

Since World War I, there has been significant interest in isopropenyl chloroformate due to its ability to cause sharp pain in the eyes upon exposure to the evaporating gas. This undergraduate research project proposes a mechanism of reaction for this war gas in a variety of pure and aqueous binary organic mixtures. Malcolm J. D. 'Souza is professor of chemistry at Wesley College. Dennis N. Kevill is emeritus professor of chemistry & biochemistry at Northern Illinois University. Kevin Shuman is currently in a doctoral program at the University of Delaware. Arnold Omondi is employed at a hospital in DC. Support is from Grant Number 2 P20 RR016472 under the INBRE Program of the National Center for Research Resources (NCRR), a component of the National Institutes of Health (NIH).

Coles JB, Zhuang J. Decisions in disaster recovery operations: A game theoretic perspective on organization cooperation. *Journal of Homeland Security and Emergency Management*. 2011;8:1:1-14. (University at Buffalo, SUNY)

In this paper we proposed an approach to support and guide decision makers in emergency environments on how to select and develop relationships to improve resource utilization and project outcomes in the wake of a disaster. Using game theory, we provide an initial approach for the development of a decision support framework for emergency managers entering a disaster environment. Jun Zhuang is an assistant professor in the Department of Industrial and System Engineering at the University at Buffalo, SUNY. John B. Coles was a senior at the University at Buffalo in the

Spring of 2009 when the research was performed through an undergraduate research seminar (IE 499) taught by Dr. Zhuang. John was a School of Engineering and Applied Sciences (SEAS) Senior Scholar, a program which provided funding to help develop the work now published. Mr. Coles is now working on his PhD at the University at Buffalo in Industrial and Systems Engineering with Dr. Zhuang as his advisor. John is also a current National Science Foundation Graduate Fellow. The work was performed by John using a small Scholarship which he was awarded through the SEAS Senior Scholar Program.

Sua YM, Scanlon E, Beaulieu T, Bollen V, Lee KF. Intrinsic quantum correlations of weak coherent states for quantum communication. *Phys. Rev. A Rapid Communications*. 2011;83:030302(R). (Michigan Technological University)

The research work is about performing a new protocol of quantum communication by using intrinsic quantum correlations of weak coherent states. We make use of nonlinear post measurement method to obtain coherent state bi-partite correlation through balanced homodyne detection. The experiment demonstrated key (bit) correlations between Alice and Bob separated by 10 km of optical fiber. Kim Fook Lee is an assistant professor of physics. Yong Meng Sua is currently a third year graduate student in physics. Erin Scanlon is currently in a doctoral program in Georgia Tech. Travis Beaulieu is currently a 5th year undergraduate Physics student at Michigan Tech. Viktor Bollen is currently in a doctoral program in physics at the Washington State University. The research was supported by Michigan Tech's Start-up fund and Summer Undergraduate Research Fellowship (SURF) at Michigan Tech, which was awarded to Erin in 2010.

Doze VA, Papay RS, Goldenstein BL, Gupta MK, Collette KM, Nelson BW, Lyons MJ, Davis BA, Luger EJ, Wood SG, Haselton JR, Simpson PC, Perez DM. Chronic alpha-1A adrenergic receptor stimulation improves synaptic plasticity, cognitive function, mood, and longevity. *Mol Pharmacol*. 2011;81:. (University of North Dakota)

The role of alpha-1 adrenergic receptors in cognition and mood is unclear. We studied the effects of chronic alpha-1A adrenergic receptor stimulation and found that it improves synaptic plasticity, cognitive function, mood, and longevity. This may afford a therapeutic target for counteracting the decline in cognitive function and mood associated with aging and neurological disorders. Van Doze is an Associate Professor and James Haselton an Assistant Professor in Pharmacology, Physiology & Therapeutics at the University of North Dakota. Paul Simpson is a Professor at the University of California San Francisco. Robert Papay is a Laborat Brianna Goldenstein, Katie Collette and Brian Nelson are currently graduate students in Pharmacology, Physiology & Therapeutics at the University of North Dakota. Mariaha Lyons recently started medical school at the University of Minnesota. Bethany Davis is a senior undergraduate student at the University of North Dakota. Elizabeth Luger is employed while finishing a PREP program at the Mayo Clinic and in the process of applying to graduate programs. Sarah Wood is currently in a PREP program at Wright State University. This research was supported by NSF Faculty Early Career Development Award, NSF REU Site Award, NSF Graduate Research Fellowship Program Awards, NIH NCRR INBRE P2ORR016471, and the NHLB Institute.

Uphouse L, Heckard D, Hiegel C, Guptarak J, Maswood S. Tropisetron increases the inhibitory effect of mild restraint on lordosis behavior of hormonally primed, ovariectomized rats. *Behav Br Res.* 2011;219:2:221-226. (Texas Woman's University)

Ovariectomized, hormonally primed Fischer rats were treated intraperitoneally or intracranially with the 5-HT₃ receptor, antagonist, 3-tropanylindole-3-carboxylate hydrochloride (tropisetron), prior to a 5 min restraint stress. Intracranial (but not intraperitoneal) treatment amplified the effect of the stress on female rat sexual behavior. These findings are consistent with a role for the serotonergic system in both female rat sexual behavior and in the response to mild stress. Dr. Lynda Uphouse is a professor in the Department of Biology. Danyeal Heckard is a graduate student at Meharry Medical College. This research was supported by NIH HD28419, NIH GM55380, and by TWU institutional research support grant.

Sloop JC, Boyle PD, Fountain AW, Pearman WF, Swann JA. Electron deficient aryl β -diketones: synthesis and novel tautomeric preferences. *Eur J Org Chem.* 2011;27:936-941. (United States Military Academy and Georgia Gwinnett College)

The present study examines the synthesis and properties of fluorinated aryl 1,3-diketones. The significant finding that neat liquid spectroscopic measurements as well as single crystal x-ray crystallographic results for selected electron deficient aryl β -diketones suggest a single, chelated cis-enol isomer that is conjugated with the aryl ring has not been previously reported. Joseph Sloop is an associate professor of chemistry at Georgia Gwinnett College. Paul Boyle is the director of the North Carolina State University X-Ray facility. Augustus Fountain is chief chemist at the Edgewood Chemical Biological Center. William Pearman Jacob is currently a physician serving with the US Army. This research was supported by the GGC and USMA Faculty Research Funds, the USMA Photonics Research Center for Raman support and the NCSU X-ray facility for crystallographic support.