

In This Issue

DEPARTMENT OF CHEMISTRY

NEWSLETTER

Founder of the Green Chemistry movement, John Warner, was brought to EMU by a grant to present a keynote address and interact with EMU faculty and students. EMU Chemistry department members Ray Hough and Don Schoolmaster retire, EMU biochem faculty initiate a new neuroscience research project, and alumnus Jerry Artman remembers his days as a chemistry student at EMU.

Dreyfus grant brings renowned "Green Chemist" to speak at EMU's Summer Science Research Initiative

Our key note speaker of this year's EMU Summer Science Research Initiative (SSRI) was Dr. John C. Warner, Chief Technology Officer and Chairman of the Board of the Warner Babcock Institute for Green Chemistry. We invited Dr. Warner because of his commitment to green chemistry, a topic of interest to our faculty and students. Dr. Warner presented two lectures.



The first lecture, titled 'Green Chemistry: The Missing Element', was geared toward a general audience and discussed the importance of green chemistry to society at large. Dr. Warner also talked about the current status of green chemistry efforts in the U.S. today. The EMU community was invited to this lecture.

The 70 attendees in the audience included a member of the Board of Regents, the Deans of the Colleges of Arts & Sciences and Technology, the Heads of the Chemistry and Biology Departments, and several faculty members and students from STEM departments.

The second lecture was titled 'Entropic Control in Materials Design' and was presented to faculty and students in the Chemistry Department. Here Dr. Warner discussed the principles of green chemistry and gave several examples of green design.



Undergraduate chemistry major Christopher Friebe consults with Dr. John Warner in the organic chemistry research suite in the Science Complex.

Green chemistry, also called sustainable chemistry, is a philosophy of chemical research and engineering that encourages the design of products and processes that eliminate or minimize the use and generation of hazardous substances. Through green chemistry, environmentally benign alternatives to current materials and technologies can be systematically introduced across all types of manufacturing to promote a more environmentally and economically sustainable future.

Warner received his bachelor of science from the University of Massachusetts, in Boston and his Ph.D., in chemistry from Princeton University. In 2007, he founded the Warner Babcock Institute for Green Chemistry, LLC, a research organization that

develops green chemistry technologies. He also founded Beyond Benign, a non-profit organization dedicated to sustainability and green chemistry education.

He has published over 200 patents, papers and books and his recent work in the fields of semiconductor design, biodegradable plastics, personal care products, solar energy and polymeric photo-resistors are examples of how green chemistry principles can be immediately incorporated into commercially relevant applications.

Support for Dr. Warner's visit was obtained from the Jean Dreyfus Boissevain Lecture series, which was made possible by an \$18,500 grant from The Camille and Henry Dreyfus Foundation. The foundation was established in 1946 by chemist, inventor and businessman Camille Dreyfus as a memorial to his brother Henry, to advance the science of chemistry, chemical engineering and related sciences as a means of improving human relations and circumstances.

The grant, secured by Maria Milletti and Harriet Lindsay, professors in the chemistry department at Eastern, provides funding to bring a leading researcher or scientist to campus to give a series of lectures in the chemical sciences and to support two undergraduates in summer research.

The Jean Dreyfus Boissevain Lectures are the cornerstone event for the Summer Science Research Initiative, a series of supplemental activities for science and technology students who are on campus working on research projects with their faculty mentors during the summer months.



Harriet Lindsay, John Warner, Maria Milletti and EMU regent Beth Fitzsimmons (left to right) at SSRI poster presentation.

Ray Hough Retires as Full-Time Lecturer

For more than 20 years, Ray Hough has taught chemistry at EMU to future elementary school teachers and other non-majors. Here are some of Ray's parting thoughts. "I've done a few

interesting things in my life – interesting to me, that is. I've been married for 48 years, to the same person! I adopted three children from another country and somehow forged a family from the



hodge-podge. I can sing and play guitar. I've outlived numerous cats and dogs . . . and cars.

I've been to Scotland and England, France and Spain, Bermuda and Hawaii, Ontario and Quebec, Colombia and the Carribean. I've seen the rising sun in Japan. I even spent a year in a war zone (in a pretty safe place; the Viet Cong only attacked once, and they missed me). I've lived in Cincinnati, Denver, Seattle, Pittsburgh, Toledo, Darien CT, Farmington and Green Lake MI, Detroit, Dothan AL, Petersburg VA, Detroit again, and Ann Arbor.

I was a paper boy. I worked in several libraries, a mail room, and a factory cleaning company. I guarded a tank farm at night with an M-14 and three bullets. I've taught in a middle school and an Army training base. I've done research in chemistry in pursuit of advanced degrees (one degree, one ABD). I've been a teaching assistant in chemistry at two universities, and a lecturer at two.

I've told you all this to make the following point. Among the most interesting and fulfilling of all my experiences was the last 23 years, as a lecturer at this university. My thanks to the people in the Chemistry Department, for trust expressed as academic freedom, for occasional camaraderie, for easy relationships across lines of authority, and most of all for the opportunity to reach across generation gaps and connect with younger generations. Best wishes to all of you, and fare well." ***Farewell, Ray!! You will be missed.***

From Student to Manager of Chem. Department Services: Don Schoolmaster retires

Don Schoolmaster earned his bachelors degree at EMU in 1976 and was employed as Lab Services Specialist in the Chemistry Department until 1980. He left EMU to work for Airco Industrial Gases as an analytical chemist for four year, but returned to EMU where he completed a Masters degree in Chemistry. He was briefly employed as a lecturer and Lab Manager in EMU Chemistry. Don was hired as a Manager of Chemistry Department Services at EMU in January 1988 and retired in June 2013. Here is what he has to say about his time at EMU.



Working as a medic in the military I had decided to pursue a career as a med-tech. This involved, of course, some classes in biology and chemistry. My first chemistry class was with Clark Spike. I can still remember the way he taught with such enthusiasm, truly caring that you really understood and appreciated what he was talking about. It was obvious that he loved the field of chemistry and wanted everyone else to as well. By the end of my second class, taught by Ted Compere, I was hooked and changed my major to chemistry. I was in a real hurry to get done because I had a family to feed. So, I piled on the classes, with full loads and more, even in the Spring and Summer terms. With the encouragement of faculty like Ron Scott and Bruce West, I began taking graduate classes as a Junior and Senior. It was the enthusiasm and love of the field these people had that sent me down a path I had never, to this point in my life, considered possible for myself. I remember many nights in the Advanced Enzymology Lab with Ron Scott. Isolating enzymes and talking about chemistry and life over a 2L Erlenmeyer flask of Earl Grey Tea (there was no Health and Safety

Department back then). At the end of my last semester as an undergraduate, just before graduation, I was hired as the Laboratory Services Specialist for the Department of Chemistry at EMU.

Working in this capacity for about 4 years I got to know and appreciate the amazing group of people that made the department such a warm and inviting place. The next 4 years I spent in industry as an analytical chemist with Airco Specialty Gases. Many factors came into play as I made the decision to return to school in pursuit of a master's degree. I was able to set the academic part of the plan in motion with the help of Ken Hicks and Ron Collins. It was John Sullivan who assisted me financially by finding me a part-time job with the school his kids were attending. I spent the next two years under the direction of Nina Contis completing a graduate degree in chemistry education. At this time, Bert Ramsay and Judy Levy were working on a new position for the department: The "Manager of Chemistry Services". Again, still trying to keep my family fed, I applied for and was chosen to take on these new responsibilities for the department. Now, after 26 years in this position, I find myself at the end of this path and the beginning of a new one. I retired from EMU on July 1, 2013. Now, six months later, I wake up every morning in thought about the walk I took to work each day. Although I now have much more time for family and travel, I miss the everyday interactions with the great group of people I have come to know so well.



EMU and the Department of Chemistry have afforded me and my family a very good life. For that, I will always be grateful. I do hope that I can, even in some small way, continue to contribute to the department and EMU." ***Don is looking forward to travel in his retirement. Don, you are irreplaceable. Happy trails!!***

New Directions in Chemistry Faculty Research

Peptide disruption of protein interactions as drug therapy

The department's biochemists, Debbie Heyl-Clegg and Hedeel Evans, are collaborating on several research projects and even "sharing" and co-mentoring research students. These new, mostly neuroscience-based, projects involve using peptides to explore protein-protein interactions that are implicated in depression, Alzheimer's disease, infection, and cancer *in vitro* and in mammalian cells. In each case, the peptides are designed to mimic the sequence of a protein at the interface where it associates with another protein, whether it is a signaling protein, enzyme, or receptor. The effects of the peptides are then assayed by using several techniques to determine whether they compete with the protein, disrupting the interactions of the proteins. Structure-activity studies also can be performed by modifying the sequences to enhance the contacts between the peptides and the protein. Jeff Guthrie, our bio-analytical chemist, also has gotten involved by doing some tissue culture for the project. Current targets include ATCase and DHOase in pyrimidine biosynthesis (cancer and antibacterial therapy), humanin and IGFBP3 (Alzheimer's therapy), and the D1 and D2 dopamine receptors (treatment of depression). So far, the collaboration has resulted in a joint Faculty Research Fellowship, a publication in *Peptide Science*, and several presentations at the Undergraduate Symposium and the upcoming ACS National Meeting, with more in the works.



Debbie Heyl-Clegg (in red) and Hedeel Evans (in white) with undergraduate and graduate members of their research groups.

Chemistry Alum Perspective

A Career in Chemistry built on an EMU Foundation -- Dr. Gerald Artman

This past January I had the pleasure of speaking at Eastern about my experiences as a chemist outside of academia. As I began working on my slides, I realized that it had been 15 years since I ran a reaction in the basement of Mark Jefferson. I was startled. 15 years? Has it been that long? Am I that old? After the shock wore off, I reflected on my time at EMU and how it has impacted my development as a chemist. When I graduated high school in 1996, a career in Chemistry was not on the radar. I wanted to be a History teacher. I know . . . History and Chemistry are like water and hexane -- polar opposites. I had planned on minoring in Chemistry or Math since I had 12 credits from AP courses, but History was the focus. Unfortunately, when my schedule was drawn up prior to my first semester at EMU, I did not have any room for a History class. My advisor told me not to worry because I could make it up in the Spring. If only they had known the exciting ride I have been on since then.



Jerry Artman in 1999 shown with other student awardees at the Annual Chemistry Awards and Alumni Banquet.

Fortunately, I did have room for Honors Quantitative Analysis that first semester. After a few weeks, I was hooked. I found Chemistry to be the outlet I needed to apply the abstract math I had stored in my head. X and Y now became rate constants and pKa's. Furthermore, I spent time in an actual lab and did more than make up 1N HCl solutions for simple titrations. I learned to interpret order out of the chaos of data generated from various instruments. Chemistry had so many different applications and possibilities I never again considered being a History major.

For three years, the chemistry faculty fueled my desire to learn with challenging course work and lab assignments. However, it was the Winter '98 when organic chemistry became my passion. Professor Arthur Howard's Organic II course exposed me to SN2 reactions, interpreting 3D structures drawn in two dimensions and experiments trying to generate white crystals. Organic chemistry was challenging, frustrating and rewarding all at the same time. My success in Prof. Howard's class provided an invitation to take a graduate course in heterocyclic chemistry and the six-hour final exam the following semester. Furthermore, I actively participated in independent research with Prof. Howard my final year at EMU studying the effects of microwaves in organic synthesis. Both experiences exposed me to the bigger world of organic synthesis.

It was during this time I realized that stopping at a B.Sc. would not be satisfying. There was still chemistry to learn. My hard work at EMU provided me with an opportunity to study at Penn State University with Prof. Steven Weinreb. This move from EMU to Penn State was met with some

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- Jerry Artman

apprehension. After all, who was I to study under such a well known professor? Would I be able to reach my goal of Ph.D.? These concerns were quickly suppressed when I realized my experiences at EMU provided me with a solid foundation for my career as a chemist. My Eastern education had taught me how to run reactions, write mechanisms and use instrumentation. Furthermore, the EMU

faculty challenged me to think about projects from every angle and to scour the literature for novel solutions to problems. My EMU experience gave me a head start in graduate school allowing me to quickly impact projects and publish new methodologies for organic synthesis where I was recognized as the lead investigator.

Upon completing my Ph.D., I was awarded a NIH postdoc, where I continued to grow and develop as an independent scientist. In 2007, I accepted my first industrial position as a medicinal chemistry focusing on eye-related diseases at Novartis in Cambridge, MA. I learned many new skills required for drug development. In 2010, I returned to Michigan where I accepted a position at Kalexsyn in Kalamazoo. At my current employer, I am challenged daily with organic synthesis projects that have no easy solution and need to be completed on time and under budget. I continue to grow my skill set in organic synthesis, but am also learning new skills in business and law.

I continue to be amazed each day at how many different industries chemistry impacts. From Ypsilanti to State College to Boston to Kalamazoo, I continue to trace my success back to EMU. The dedicated professors, the intimate exposure to independent research and the challenging course work provided me with the solid foundation needed to be a chemist in these exciting times. I know that I will continue to build on this foundation no matter where my career as a chemist takes me. I am proud to be an EMU Chemistry alumni and support the great instruction this department provides for future chemistry students.



Jerry Artman today at work in drug development at Kalexsyn



STUDENT AWARDS, 2013



Hector E. Figueroa, The Peet-Mayor Endowed Chemistry Award

Elizabeth P. Miguet, ACS Huron Valley Section Undergraduate Award

Daniel Van Strien, American Institute of Chemists Award

Jason Miller, Grace Simmons Gregory Scholarship

Calvin J. Day, Maurice Decoster Endowed Chemistry Scholarship

Amanda L. Dewyer, Briana S. Moe, Collins' Endowed Scholarships in Chemistry

Antonios M. Chionis, Sandra J. Lobbestael Chemistry Endowed Scholarship

Christian V. Chirosca, Elva Mae Nicholson Organic Chemistry Endowed Scholarship

Brianna S. Moe, John Sullivan Endowed Scholarship

Christian V. Chirosca, John R. Hopkins, James G. and LeAnn K. Emal Scholarship in Chemistry

Martin D. Solano, CRC Press Chemistry Achievement Award

Amanda L. Dewyer, Hypercube Scholar Award

Elyssa M. Rautiola, Biochemistry Achievement Award

Joshua C. Hunt, ACS Division of Analytical Chemistry Award

Erika Van Goethem, ACS Inorganic Chemistry Award

Blaire S. Backstrom, Christopher L. Friebe, Julia L. Lombardi, and Jamie M. Reder, Perry S. Brundage Scholarships

Aimee M. Conat, Donald B. Phillips Memorial Endowed Scholarship

Joshua C. Hunt, 25th Anniversary Undergraduate Symposium Endowed Scholarship

Christian V. Chirosca, Barry A. Fish Undergraduate Symposium Endowed Scholarship

Christopher L. Friebe, Mordechai Sadowsky, Symposium Undergraduate Research Fellow

Hector E. Figueroa, Mary Beth Kalvaitis, Elizabeth P. Miguet, Elyssa M. Rautiola, and Erika Van Goethem, University Honors Program Graduates

Hector E. Figueroa, Elizabeth P. Miguet, Elyssa M. Rautiola, Erika Van Goethem, University Honors Senior Thesis Awards

Antonios M. Chionis, Amanda L. Dewyer, Hector E. Figueroa, Sherif Hassanien, Joshua C. Hunt, Mary Beth Kalvaitis, Elizabeth P. Miguet, Brianna S. Moe, Michael C. Priestley, Elyssa M. Rautiola, Mordechai Sadowsky, and Erika Van Goethem, Honors Undergraduate Fellowships

Sarah J. Burke, Hector E. Figueroa, John R. Hopkins, Erika Van Goethem, Lois C. Vasquez, and Alyssa E. Winkler, Undergraduate Research Stimulus Awards

Danielle St. Germaine, David A. Berry Excellence in Organic Chemistry/Biochemistry Endowed Scholarship

Philip R. Stratton, Martin and Antoinette Gorski Endowed Scholarship in Radio and Nuclear Chemistry

Olutawatobi, O. Odeleye, EMU Chemistry Department Teaching Assistant Award

Mayank Srivastava, EMU Chemistry Department Research Award

Naga Sandhya Guntaka, ACS Huron Valley Section EMU Outstanding Graduate Student Award

Darshani Weerakoon, Evert Njomen, Ronald M. Scott Memorial Endowed Scholarship

GRADUATE RESEARCH FAIR, March 2013



Himabindu Anumala – Professor Cory Emal, sponsor. “Novel Small Molecules for the Enhanced Inhibition of Plasminogen Activator Inhibitor-1”

Naga Sandhya Guntaka – Professor Cory Emal, sponsor. “Design and Synthesis of Novel Inhibitors of Plasminogen Activator Inhibitor-1”

Jacinda M. Lisi, Megan Connolly – Professors Ellene Tratras Contis/Jose Vites, sponsors. “The CSIE Program at EMU: Recruitment and Retention of STEM Students at Eastern Michigan University”

Hareesh Mukkisa – Professor Deborah Heyl-Clegg, sponsor. “Fighting Bacterial Resistance: Modifying the Antimicrobial Peptide Tachyplesin”

Alekhya Nimmagadda – Professor Gregg M. Wilmes, sponsor. “Synthesis of Amphiphilic Blocks Copolymers by Raft Polymerization and the Investigation of Their Self Assembly In Solution By NMR”

Evert Njomen – Professor Hedeel Evans, sponsor. “Characterization of FAM129B, a Protein Involved in Cell Invasion”

Oluwatobi O. Odeleye – Professor Amy Flanagan Johnson, sponsor. “The Relationship Between Students’ Definition of Chemistry and Their Attitude Towards the Discipline”

Mayank Srivastava – Professors Deborah Heyl-Clegg/ Jamie Scaglione, sponsors. “Chemoenzymatic Synthesis of an Analogue of the Potent Antifungal Mycosubtilin”

Phillip Stratton – Professor Gavin Edwards, sponsor. “Mathematical Modeling of Chemically Reactive Pollutants in Outdoor and Indoor Environments”

Christina A. Varney – Professor Ruth Ann Armitage, sponsor. “Characterizing Organic Colorants in a 15th Century Iranian Timurid Qur’an by Direct Analysis in Real Time Time-of-Flight Mass Spectrometry”

UNDERGRADUATE SYMPOSIUM, March 2013



Mary Beth Kalvaitis – Professor Heather Holmes, sponsor. “Synthesis of 1-Pyrenyldiazomethane”

Daniel H. Lee – Professor Larry Kolopajlo, sponsor. “A New Physical Chemistry Experiment on Sucrose Inversion”

Elizabeth Miguet – Professor Harriet Lindsay, sponsor. “A Concise Method for the Production of Lentiginosine”

Joshua John Perrin – Professor Amy Flanagan Johnson, sponsor. “Investigating the Next Generation Science Standards for Classroom Implementation”

Brittany Michelle Berger – Professor Hedeel Evans, sponsor. “Expression and Purification of a Cell Invasion Protein, FAM129B, in *E.coli*”

Antonios Marios Nickolaos Chionis – Professor Maria Milletti, sponsor. “The Effect of a Methyl Substituent on Product Stereoselectivity in an aza-Cope – Mannich Reaction”

Cristian Chiroasca and Antonios Marios Nickolaos Chionis – Professor Harriet Lindsay, sponsor. “Overcoming Challenges in the Synthesis of Small Molecules with a Specific 3D Arrangement of Atoms”

Katelyn Ann Cichon and Sarah Dolan – Professor, Gavin Edwards, sponsor. “Air Quality on Campus During the Heatwave of 2012”

Calvin John Day – Professor Ruth Ann Armitage, sponsor. “Developing DART-MS Methods for Identification of Organic Dyes in Historic Textiles”

Amanda Dewyer – Professor Timothy Freibe, sponsor. “Synthesis of 1,2,4,5-Tetraaminocyclohexanes and Their Potential Use as Ligands for Platinum”

Amanda Dewyer – Professor Maria Milletti, sponsor. “Evaluating the Effect of a Chiral Catalyst on Stereoselectivity in an aza-Cope – Mannich Reaction”

Hector Figueroa – Professor Deborah Heyl-Clegg, sponsor. “Running Interference on Protein Aggregation: Non-Specific Peptide Inhibitors of Amylin Aggregation”

Christopher L. Friebe – Professor Harriet Lindsay, sponsor. “Development and Analysis of a Method to Synthesize Potential Building Blocks for Pharmaceuticals”

Bryan Harless – Professors Hedeel Evans and Deborah Heyl-Clegg, sponsors. “Kinetic Analysis of the Effect of a Peptide on the DHO-ATC Oligomeric Complex from *Aquifex aeolicus*”

Sherif Hassanien – Professor Harriet Lindsay, sponsor. “The Production of New Precursors of Medically Relevant Acyl Pyrrolidines”

John Hopkins – Professor Ruth Ann Armitage, sponsor. “Evaluation of DART-MS for Detection and Quantification of Lipid Residues on Ceramics”

Joshua Hunt – Professor Jeff Guthrie, sponsor. “Selection of Molecular Probes for Streptavidin Using Capillary Electrophoresis”

Brittany Marie Jewell – Professor Maria Milletti, sponsor. “Choosing a Valid Molecular Mechanics Method to Model the PAI-1 Protein”

Jenny McGuckin, Josepha Eassa, Jeffrey Adam Loos and Taurean Marquise Bradley – Professor Jose Vites, sponsor. “Investigation of Water Quality Along the Huron River and Its Watershed”

Elizabeth Miguët and Michael Priestley – Professor Jamie Scaglione, sponsor. “fnq8: An Aminotransferase in the Furanonaphthoquinone Pathway”

Briana Moe – Professor Jamie Scaglione, sponsor. “Lipid-Tail Modified Mycosubtilin Analogues”

Michael Priestley – Professor Harriet Lindsay, sponsor. “Variations on a Theme: Four-Step Synthesis of Analogues of a Potential Chemotherapy Drug”

Mordechai Sadowsky – Professor Maria Milletti, sponsor. “Computational Study of PAI-1 and Its Inhibitors”

Erika Van Goethem – Professor Vance Kennedy, sponsor. “Characterization of Silicon Phthalocyanine Oligomers by DART-MS and ESI-MS”

Alyssa Winkler – Professor Professor Maria Milletti, sponsor. “Energy Profile of an aza-Cope–Mannich Reaction Leading to a Substituted Acylpyrrolidine”

Chelsea Wisnewski and Eric Brooks, Professor Jeff Guthrie, sponsor. “Detection of Cellular DNA Damage from Radiation and Benzo[a]pyrene Using Capillary Electrophoresis”

CHEMISTRY FACULTY ACTIVITIES



Grants, Awards, Invited Talks

Ruth Ann Armitage: Invited talk at Anachem Symposium, Livonia, MI (Nov. 2012) -- “*Applications of Direct Analysis in Real Time – Time of Flight Mass Spectrometry to Cultural Heritage Materials*” Anachem; Invited talks at ACS Central Arizona Local Section, Phoenix, AZ (May 2013), ACS Upper Ohio Valley Local Section, Marietta, OH (Dec. 2012), and ACS East Texas Local Section, East Texas Baptist College, Marshall, TX (Nov. 2012) -- “*Archaeological Chemistry of Rock Paintings: Radiocarbon Dating and Chemical Analysis*”

Tim Brewer: Promoted from Associate to Full Professor.

Ellene Contis/Jose Vites: Invited workshop presented at the NSF PI meeting, Washington DC, (March 15, 2013) “*Creating a Faculty Fellows Community: Developing Collaboration Through Facilitation*”.

Jeff Guthrie: Received William Fennel Symposium Faculty Mentor Award (Summer 2013); Invited talk at Thompson Rivers University, Kamloops, B.C. Canada (Oct. 2012), “*Affinity Interactions in Bioanalytical and Environmental Analysis*”.

Ingo Janser: Awarded Provost New Faculty Award.

Amy Johnson: Received \$5,000 from the Women in Philanthropy at EMU for a project entitled “*Collaborations between Pre-service and In-service Teachers to Support the Implementation of the Next Generation Science Standards*”.

Vance Kennedy: Selected as Honors College Faculty of the Year (2013).

Larry Kolopajlo: Awarded (\$5,600) NDEP EMU K-12 Summer 2013 CSI Camp, U.S. Army TARDEC.

Harriet Lindsay: Invited talk at University of Arkansas, Nov. 29, 2012 “*Origins of Stereoselectivity in a Catalyzed Tandem Reaction*”.

Harriet Lindsay/Maria Milletti: Received \$18,500 for Jean Dreyfus Boissevain Lectureship for Undergraduate Institution (co-PI Harriet Lindsay) and \$5000 for the College of Arts and Sciences Dean’s PDI funding for the further development of a Summer Student Research Initiative.



Publications

EMU student co-authors are underlined

- “Developing Direct Analysis in Real Time Time-of-Flight Mass Spectrometric Methods for Identification of Organic Dyes in Historic Wool Textiles”; Day, C.J.; Selvius, C.D.; Armitage, R.A., In *Archaeological Chemistry VIII*, Armitage, R. A., Burton, J. H., Eds. American Chemical Society: 2013; Vol. 1147, 69-85.
- “18th-Century Glue Recipes: Towards Identifying Glue Residues from Ferry Farm, George Washington's Boyhood Home”, Fraser, D.; Kaktins, M.; Armitage, R. A., In *Archaeological Chemistry VIII*, Armitage, R. A., Burton, J. H., Eds. American Chemical Society: 2013; Vol. 1147, 109-121.
- “GC-MS Characterization of Carbohydrates in an Archaeological Use Residue: A Case Study from the Coahuila Desert”, Dhakal, B.; Armitage, R. A., In *Archaeological Chemistry VIII*, Armitage, R. A., Burton, J. H., Eds. American Chemical Society: 2013; Vol. 1147, 157-170.
- “Cueva la Conga: First Karst Cave Archaeology in Nicaragua”, Baker, S.; Armitage, R.A., *Latin American Antiquity* **24(3)**, 309-329, 2013.
- “Characterization of Blood in an Encrustation on an African Mask: Spectroscopic and Direct Analysis in Real Time Mass Spectrometric Identification of Haem”, Fraser, D.F., Selvius DeRoo, C., Cody, R.B., and Armitage, R.A. *Analyst* **138**, 4470-4474, 2013. DOI:10.1039/C3AN00633F.
- “Traveling Salesman Solve a “Meals on Wheels” Problem: Utilizing Academic Service-Learning in an Integrated Algebra and Computer Science Course”, Caniglia, J.; Contis, E.T., in *Essays on Mathematics and Statistics: Volume 3*, by Vladimir Akis, Athens Institute for Education and Research, 39-54 (2013).
- “Nutrition, Functional and Sensory Properties of Food”, Ho, C.T.; Mussinan, C.J.; Shahidi, F.; Contis, E.T. (Eds.), RSC Publishing, Cambridge UK (2013).
- “In-canopy gas-phase chemistry during CABINEX 2009: sensitivity of a 1-D canopy model to vertical mixing and isoprene chemistry”, Bryan, A.M.; Bertman, S.B.; Carroll, M.A.; Dusanter, S.; Edwards, G.D., *et al.* in *Atmospheric Chemistry and Physics* (Oct. 2012) <http://www.atmos-chem-phys.net/12/8829/2012/acp-12-8829-2012.pdf>.
- “Mechanistic characterization and crystal structure of a novel small molecule inactivator bound to plasminogen activator inhibitor-1”, Li, S.-H.; Reinke, A. A.; Sanders, K. L.; Emal, C.D.; Whisstock, J. C.; Stuckey, J. A.; Lawrence, D.A. *Proc. Natl. Acad. Sci. USA* **110**, E4941-4949, 2013.
- US Patent Application 61/720,838 – Lawrence D. A., Emal C. D., Li, S., Reinke, A. A., Su E. J., Warnock M., Abernathy, G. A. “Plasminogen Activator Inhibitor-1 Inhibitors and Methods of Use Thereof” – filed 10/31/2012.
- “Membrane Disordering is not Sufficient for Membrane Permeabilization by Islet Amyloidogenic Polypeptide: Studies of IAPP (20-29) Fragment”, Brender, J.R.; Heyl, D.L.; Samisetti, S.; Kotler, S.A.; Osborne, J.M.; Pesaru, R.R.; Ramamoorthy, A., (2013) *Physical Chemistry Chemical Physics*, **15**, 8908-8915.
- “Running Interference on Protein Aggregation: Effects of Non-specific Peptide Inhibitors of Amylin Aggregatio”, Figuroa H.; Heyl, D.L. (2013) In *Proceedings of the 23rd American Peptide Symposium*, Michal Lebl ed., 130-131.
- “Fighting Bacterial Resistance: Modifying the Antimicrobial Peptide Tachyplesi”, Mukkisa, H.; Crisman, L.; Davis, S.; Wood, S.; Heyl, D.L. (2013) In *Proceedings of the 23rd American Peptide Symposium*, Michal Lebl ed., 50-51.
- “Ethacrynic acid as a lead structure for the development of potent urease inhibitors”, Janser, I.; Vortolomei, C.M.; Meka, R.K.; Walsh, C.A.; Janser, R.F.J.; *C. R. Chimie* **16**, 660-664, 2013.
- “Physical Chemistry Laboratory Experiment: The Study of Silver Nanoparticle’s Influence on the Fluorescent Properties of Ruthenium(II) Tris(bipyridine) Chloride”, T.R. Brewer and M. Zielinski, *The Chemical Educator* **18**, 66-77, 2013. DOI:10.1007/s0087132466a.