THE OCTAGON

Volume 95, No. 5, May 2012 Lehigh Valley Section of the American Chemical Society

In This Issue:

Next Meeting
834th Meeting of the LVACS
Tuesday,May 22, 2012

A Night at SteelStacks:
LVACS Career Event

Location: ArtsQuest Center at Steelstacks, Bethlehem, PA 18015

Reception and Networking Session: 5:00-6:30 PM Fowler Blast Furnace Loft, ArtsQuest Center at SteelStacks, 101 Founders Way, Bethlehem, PA 18015 -{Selection of appetizers, including vegetarian; soda/juice; cash bar}

Meeting and Panel Discussion: 6:45-9:00 pm Fowler Blast Furnace Room, ArtsQuest Center at SteelStacks, 101 Founders Way, Bethlehem, PA 18015 - {Coffee/tea/dessert}

Cost: members $30, students/retirees $20. Students get in for $15 if you show us your ID and a "business card" you have made for networking (50/60-year Honorees will be guests of the section.)

Reservations: Nigel Sanders by 4 PM Friday, May 18. 610-861-3457 or nigel.sanders@mineralstech.com

Directions: Directions to the ArtsQuest Center at SteelStacks can be found at: http://www.artsquest.org/directions. A site map is also available including parking areas (free).

Webinar Attendance: If you can't make the drive to ArtsQuest you can still attend the meeting and panel discussion "virtually". A webinar connection will be posted on http://www.lvacs.net one week prior to the meeting.

Program
Networking Reception:
In the 2nd Floor Loft area, a small jazz group from the

Lehigh Valley Charter High School for the Performing Arts will keep us in high energy mode as we network, view posters on local career and volunteer opportunities and see the new Strategic Plan for the Lehigh Valley ACS, just completed by the section's leadership team. The fine chefs of the ArtsQuest Center will have a selection of delicious appetizers to help us "munch our way through!" STUDENTS: Put your "business card" in our Steel Beaker to win a prize!

Meeting and Panel Discussion:

"New Opportunities in Chemically-related Careers"
After the reception, we'll move into the Fowler Blast Furnace Room to hear five area panelists tell us about their career experiences and keys to making your skills count!

Sam Niedbala (Professor of Practice, Chemistry Department, Lehigh University)
"Applying Science to Start-up Companies"
Sam is a Professor of Practice in the Department of Chemistry at Lehigh University located in Bethlehem, Pennsylvania. He is the former Chief Science Officer and a co-founder of OraSure Technologies, Inc. (NASDAQ: OSUR). OraSure develops, manufactures, and markets proprietary immunodiagnostic tests and other diagnostic products capable of detecting substances in a number of different body fluids including saliva for use in commercial laboratories, physicians' offices, hospitals, and for on-site testing. At OraSure, Sam was responsible for development of all new products and technologies as well as over 60 approvals of new medical devices by the U.S. Food and Drug Administration. Sam received his Bachelor of Science from East Stroudsburg University and his Master of Science in Clinical Chemistry and a Ph.D. in Chemistry from Lehigh University. Sam holds professional memberships in the New York Academy of Science, American Association for Clinical Chemistry, American Chemical Society, Society of Forensic Toxicologists, and The American College of Forensic Examiners. He holds numerous patents and over fifty peer-reviewed articles and book chapters in numerous areas of technology and medicine.

Gina Kormanik (Assistant Director, Lehigh Valley Workforce Investment Board, Inc.)
"The Lehigh Valley: a High-Tech Employment Zone"
Gina Kormanik is Assistant Director of the Lehigh Valley Workforce Investment Board, Inc. where she works to align workforce development with economic development and education in the Lehigh Valley. Her involvement with private-sector driven Industry Partnerships has helped Lehigh Valley employers receive over $5 million in training and partnership development funds, resulting in 10,000 workers trained since 2005 in targeted industry clusters.

Prior to joining the LVWIB, Gina served as a member of Lehigh County's Community and Economic Development team, held marketing and strategic planning positions at Lutron Electronics and NationsCredit, and worked in The White House under President Reagan in the Office of Presidential Personnel.

Gina currently serves on the Executive Committee of the Society for Human Resource Management/Lehigh Valley Chapter. Previously, she was elected and served on the Allentown School Board from 2003-2007, was co-chair of the Board's Education Committee and served as a Member of the Lehigh Career & Technical Institute's Joint Operating Committee. She also has served on several boards and commissions through the Lehigh Valley, including the Allentown Human Relations Commission, Allentown Rotary Club Foundation, Parent Teacher organizations, Boys and Girls Club of Allentown and the Lehigh County Historical Society.

She received her Bachelor's degree with honors from Penn State University. Gina and her family live in the west end of Allentown, PA. She enjoys traveling, golf, gardening and cross-country skiing.

Patrick Kelley (Proprietor, Waste Not Technologies LLC, Saylorsburg, PA) ***"Opportunities in the Green Sector"***

Pat has a B.S. degree in chemical engineering from Worcester Polytechnic Institute and an MBA from Rutgers University. His early work experience was with various chemical processing companies. He then spent sixteen years with Mobil Chemical Company in the plastics division where he worked mainly on the extrusion of blown film. In 1992 he left Mobil to start his own plastics processing company. Pat is the sole proprietor of Waste Not Technologies, LLC located in Saylorsburg PA. The company manufactures post and rail fence from recycled HDPE; mostly post consumer milk jugs. Pat has two patents for plastic products. His association with Northampton Community College began in 1992 when he taught his first course in "Polymer Processing". Since that time he has also taught "Introduction to Plastics" and several levels of mathematics. Pat is an active member of The Society of Plastics Engineers, and currently serves as president of the Lehigh Valley chapter. He also serves on the advisory board for the Emerging Technology Application Center at Northampton Community College, and the Solid Waste Advisory Committee of Monroe County, PA.

Bill Suits (Councilor, North Jersey ACS Section and Career Counselor, ACS) "Network now, charting a route to future opportunities"

Those finding work claim networking was key to landing over 75% of their opportunities. Tips will be provided to assist even the introvert as one meets and make new friends. The network assists everyone from new graduates to senior chemists. The key is not how others will help you, but rather what can you do to help them.

Bill Suits serves as a volunteer ACS Career Consultant who has assisted over 2000 in transition over twenty years. He continues to host monthly Careers in Transition meeting in North Jersey. He served as Chair of his section and Chair of the inaugural MARM Board of directors. He continues as a Councilor for North Jersey and has served on LSAC, CEPA and PR and Communications committees nationally. After Graduating from the University of Wisconsin where he played in the Rosebowl, he worked with Chromatography suppliers in sales, marketing and application roles.

Patrick Wernett (Director-Performance Minerals R&D and Quality Assurance, Minerals Technologies, Inc.) "How an Organic Chemist Brings Success to a Minerals Company"

Patrick received his Bachelor of Science Degree in Chemistry from West Chester University where he conducted his undergraduate research in organometallic chemistry, synthesizing bi and tri-dentate ligands having Mn, Mo and W metal centers under Dr. Joel Ressner. He continued his education, receiving his Ph.D. in physical organic chemistry at Lehigh University under the guidance of Dr. John Larsen. While at Lehigh, Patrick's dissertation focused on characterizing the pore structure of coals using a variety of techniques such as SAXS, gas adsorption studies and NMR. Prior to beginning his current carrier at Specialty Minerals, he performed an academic post-doctoral research study at Duke University under Dr. Edward Arnett in the area of thermodynamic studies related to the formation of P, S and N ylides as related to the Wittig reaction.

Patrick has been with Specialty Minerals since 1992 where he began working on water soluble polymers to enhance the strength of precipitated calcium carbonate containing wood free paper. He is currently the Director of R&D and Quality Assurance in the Performance Minerals business area of SMI. His current areas of research involves developing new mineral and organically modified mineral based products to improve and enhance the performance of polymer films, plastic based composites, industrial sealants, paints and coatings.

Fourth Annual LVACS at the Iron Pigs Event

Monday, July 2
LV Iron Pigs
vs
SWB Yankees

BALLPARK FAVORITES

HOT DOGS
HAMBURGERS
BBQ CHICKEN
BAKED ZITI

Includes game ticket and the following:

Two and a half hour all-you-can-eat buffet
In-game group recognition on the IronPigs state-of-the-art videoboard
"Pig in a Poke" group raffle. The IronPigs will be giving away a prize pack exclusively to a group ticket holder every game!
Opportunity for a member of your group to throw out a Ceremonial First Pitch
Adult beverages available for purchase

SIDES

PENNSYLVANIA DUTCH POTATO SALAD
CORN ON THE COB
BBQ BAKED BEANS
POTATO CHIPS

DESSERTS

FRESH SEASONAL FRUITS
ASSORTED COOKIES

Contact Chester, Lindsey, or Bill for tickets.
Tickets are limited to first 100 requests!
We have sold out every year so don't wait until the last minute!

ACCOMPANIMENTS

LETTUCE, TOMATOES, ONION,
AMERICAN CHEESE, MUSTARD AND KETCHUP

COLD BEVERAGES

COCA-COLA, DIET COKE, SPRITE,
NESTLE ICED TEA, MINUTE MAID LEMONADE, DR. PEPPER
(COLD BEVERAGES AVAILABLE THROUGHOUT ENTIRE EVENT)

DRAFT BEER $5.50

BUD LIGHT
BUDWEISER
COORS LIGHT
SHOCK TOP

Message from the Section Chair

"Reinvigorate our LVACS" was the challenge issued this past January, and our membership has responded with enthusiasm! The efforts made by members of our section are wonderful, and create an excitement that we have captured into our strategic plan. Now, we are asking for the expertise of the section to help make the plan into a path forward of growth.

The Strategic Planning Team participated in a weekend-long retreat in February led by Carol Duane, Leadership Advisory Board (LAB) Subcommittee Chair and Amber Hinkle, LAB Co-Chair. Under Carol and Amber's skilled and enthusiastic leadership, a Vision and a Mission Statement were established for LVACS (below). Fifteen Executive Committee members and LVACS Committee Chairs used an environmental scanning tool (STEP) and an analysis of threats, opportunities, weaknesses and strengths (TOWS) to develop SMART goals and strategies for our section. Irrelevant acronyms? Maybe; but what was very relevant was the commitment of all the participants to find ways to make our section thrive. The discussions were often intense, the ideas too numerous to report, and the viewpoints highly diverse. Nevertheless, two days into the process, a skeleton set of goals and strategies emerged, and have – since then – been revised and refined.

Now it is your turn! We're trying to go in a direction that will get more members involved and motivated and so we need to get your views! Our membership is very diverse featuring industry, academia, government, younger members, retirees, minorities, foreign nationals, instructors, and students, to name a few. Participation from all these groups is needed: Your input is required, and there will be a variety of opportunities to facilitate this. No effort is too small!

The Strategic Plan will be introduced during the May monthly meeting to be held at the Steel Stacks in Bethlehem on May 22 (more details in this issue). We hope many of you will be there to provide feedback. Additionally, we will be using the Octagon and our website to further interact on this matter. Your participation will be solicited via e-mails and phone calls. We are setting up a list of contacts at colleges and work places to help coordinate this effort, and our current Committee Chairs will be looking for members to work with them. Please consider volunteering and being part of this movement towards a reinvigorated LVACS!

Thank you,

Lorena Tribe, Chair

Vision: Improving our community through chemistry.

Mission Statement: To promote the chemical sciences in the Lehigh Valley section for the benefit of our members and our community.

WCC Spotlight

Submitted by Danielle Ringhoff

An interview with undergraduate student Heidi Weller, 2012 East Stroudsburg University

Where do you work/study? Where are you from? What do you plan to do after graduation? I am a Biology/Biochemistry double major at East Stroudsburg University. I've lived in Stroudsburg, Pennsylvania, for the past 10 years of my life. For me, that's kind of a big deal, since the longest my family has stayed in one state has been 7 years.

How did you get started in your field? I've always been interested in medicine, and I really enjoyed Biology in high school, so when I started at ESU, I decided to go for a Biology degree with a concentration in pre-medicine.

What took you to where you are today? I think it was in my sophomore year that Biology became too general and there was too much hand-waving about how certain chemical processes took place. I wanted to know more, and Biology just wasn't providing me with the depth of detail that I wanted. I took Biochemistry I and II in my junior year, and I was hooked. So many things became clear to me, and I knew that I wanted to pursue a degree in Biochemistry.

How have you changed and/or how has the "work climate" changed since you started? Myself personally, I feel that I have become more focused on what I want. These days, it's really difficult to start a career, with employment being so low. A lot of people are just grabbing whatever job they can, just so that they can support themselves while looking for something better. With the way employment is, you have to be willing to travel anywhere. The work climate itself hasn't really changed, at least in my experience.

How do you define being successful? To me, success is finding fulfillment in your life and career, in what you do with your time. Everyone has goals in mind, but as we experience new things, our perspectives change, and sometimes so do our goals. As long as I am doing something that I am passionate about and believe in, I am successful.

Does success require compromise? Absolutely. We need to prioritize our commitments in life if we want to be successful. It is easy to get bogged down and distracted by the little things when you try to do everything all at once.

Did/do you have mentors, and how have they helped? Yes. I've had a slew of mentors for every stage in my life. Of course, my parents have always played a major support and mentoring role in my life, always there to help me ask the right questions, but once I got to college, I was able to find several others with more specialized talents to guide me. In college, each on of my professors have played mentor for me at some point. I think the two with the greatest impact on me were my professors Dr. John Freeman and Dr. Michelle Jones-Wilson. Dr. Jones-Wilson was one of my earliest mentors; she was my professor for General Chemistry I and II. She was really tough, and shoved a lot of information into our heads, and, wouldn't you know, demanded that we actually use our brains and apply what we learned in the lab. She showed me that hard work can take you anywhere. You just have to set your mind to a goal, and apply yourself. Dr. Freeman has been my advisor for the past two years. He gives me a lot of sound advice and pushes me beyond my comfort zone, which forces me to be a better student. There are so many other mentors I have had. I could go on-and-on, but in my career here at ESU, they have been at the forefront.

How do you balance work and life? Again, it comes down to priorities. I have to put school first, work second. When I manage to free up some time, I try to spend that time with my family and close friends. I feel that, during the school year, I have to almost hide myself from the world, peeping out into the social world once or twice a month so that I can keep my sanity. Over the years, I have formed friendships with other students, and together we have figured out how to have fun and socialize while still getting our studying and projects done. When things get too crazy, we all find our favorite quiet spots and focus on our work; once that's done, we take a night to celebrate our accomplishments.

What do you do outside work for fun/what are your hobbies? Like I said, I usually spend my free time with my family and close friends. I enjoy going out on "adventures", visiting new places with my friends and exploring. Whether it's a new city or a new hiking trail, I want to explore it. I'm also kind of what some people call a "foodie"; I enjoy food, and all the varieties, so I explore that as well. I enjoy a lot of things that are common to others my age, I like music and dancing, and good times with my friends. I recently discovered horseback-riding, so that is becoming a new hobby as well. One of my favorite activities at school is when the Chemistry Club puts on demo shows for elementary school children. The shows are a lot of fun, and so are the kids; they get so excited about things that have become so common to me, and I love the feeling I get after putting on a show and teaching kids about chemistry.

What was/is your favorites (work-related or non-work-related) book? My favorite book right now is one by Orson Scott Card, titled "Enchantment". It's based on the story of sleeping beauty, with roots in history and Eastern European folklore. I love the mix of fantasy and world history.

What is one of your favorite quotes? My favorite quite comes from a prayer I learned as a child, "If I wish to be understood, I must first

understand". I don't remember the whole prayer, or where it came from, but this quote has really helped me relate to others and work with many different people. It reminds me to be open-minded and not judge others.

Future plans? What do I have planned for the future? I'm applying for graduate school, hoping to pursue a career as a Physician's Assistant (PA). I think my background in chemistry will definitely help me to better understand patient diagnostics, as well as relate to the patient exactly what the drugs they might need to take do and how it will affect them.

ACS Student Chapter Awards

L->R - Chancellor Hillkirk, Greglynn Gibbs - PSU (BCS) Advisor, Heather Schmale - BCS Vice-President, Heather Young - BCS President, Meserret Zekarias - BCS Treasurer, SGA Rep,. Lorena Tribe - (LVACS) Chair, David Aurentz - LVACS NCW Coordinator, Pradip Bandyopadhyay - Science Division Head

About ACS Student Chapter Award Recipients

The Society Committee on Education (SOCED) selects Student chapters to receive special recognition on the basis of their programs and activities, as described in their chapter reports. Awards are classified as outstanding, commendable, and honorable mention. Chapters that do not qualify for either of these awards receive a certificate of achievement for meritorious service.

For the 2010-2011 academic year, the ACS honored 229 chapters - 36 outstanding, 87 commendable and 106 honorable mention chapters. The Penn State Berks Chemical Society was among the 106 honorable mention chapters, represented by Heather Young (President), Heather Schmale (Vice-President), and Meserret Zekarias (Treasurer and SGA Rep) at the Student Chapter Awards Ceremony in San Diego, CA on March 25, 2011.

2010 Undergraduate Chemistry/Biochemistry/Chemical Engineering Award Winners Congratualtions to all graduates!

Albright College
Brittany Tiley & Robert Richards

Cedar Crest College
Shoval REsnick

DeSales University
Todd Bauer

East Stroudsburg University
Brendon Smith

Kutztown University
Kathy Fillman

Lafayette College
Ross Moretti & Thomas Wilson
Aaditya Kanal (Chemical Engineering)

Lehigh University
Matthew Yosua
Liam Smith (Chemical Engineering)

Moravian College
Phil Weiser &Christine McCarl

Muhlenberg College
Brendan Phelan

Submissions to the Octagon

LVACS members, we want to know about what you do! Please submit pieces of interest to the chemistry community for publication in the Octagon. Articles about chemistry or science in the Lehigh Valley are always welcome. Let us know about upcoming events, educational opportunities or job openings.

The Octagon is published eight times per academic year, September through May. Each issue generally arrives three weeks before a section meeting. Thus the deadline for submissions is approximately one week earlier. Please email the editor at lvacs@verizon.net for specific questions about deadlines for any issue. Email submissions to lvacs@verizon.net

A note about formatting:
Please submit text as simple .txt files, or you may paste the text into an email. If you use later versions of MS word please do not submit documents as .docx files. I cannot always read all content in .docx formatted files. It would be best to use the "save as" option, generally found under the file menu, to save the document as .txt. Also images embedded (pasted) in MS word (particularly later versions) are problematic to extract and put in the newsletter while retaining good image quality. Whenever possible, please submit images in a standard format such as .jpg, .jpeg, .gif, .tiff or .bmp as individual files, rather than embedded within a document. If the placement of images is critical you could submit two versions (one embedded so that I can see where you would like images placed) and the other as separate files so that I may maintain figure resolution.

LVACS Officers - 2010

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EXPERTS NEEDED!

The Section is compiling a list of speakers who would be willing to give talks to community groups, schools, etc. on a variety of chemically related topics. If you are interested in having your name added to this list, please contact Roger Egolf at rae4@psu.edu.

The Section in Pictures

Strategic Planning Workshop, Feb. 2012

ACS Chemistry for Life™

Women CHEMISTS Committee

WCC Rising Star Award

The ACS Women Chemists Committee (WCC) invites nominations for the WCC Rising Star Award.

Purpose of the Award:

- ★ To recognize annually up to ten exceptional early to mid-career chemists across all areas of chemistry on a national level
- ★ To help promote retention of women in science and technology based careers

Awardees will receive:

- ★ The opportunity to present contributions at a WCC-sponsored symposium at the spring ACS national meeting
- ★ A $1,000 stipend to cover spring national meeting travel expenses
- ★ Visibility and networking opportunities at the spring national meeting including special recognition at the WCC 'Just Cocktails' Reception and the WCC Luncheon

Eligibility:

- ★ The award is open to all female ACS members in chemistry and chemical engineering working in academic, industrial, government, non-profit or other employment sectors who have demonstrated outstanding promise for contributions to their respective fields and are typically no more than 15 years from receipt of their terminal scientific degree.
- ★ Applicants may be self-nominated or nominated by another individual.
- ★ Those who are already widely recognized in their area of chemistry or chemical engineering and are at the pinnacle of their careers are not eligible.

Nomination:

- ★ Deadline is June 1.
- ★ Apply online at www.acs.org/diversity or request a hard copy from diversity@acs.org.
- ★ Required elements:
  - Nominee's resume or C.V.
  - 1-2 page letter detailing the reasons why the candidate is deserving of the award
  - Nominating letter
  - Nominee's areas of expertise; notable accomplishments; publications, presentations and/or patents; honors and awards
  - Proposed citation for the award

Contact: diversity@acs.org ★ www.acs.org/diversity ★ 202-872-4600

American Chemical Society **www.acs.org**

Lehigh Valley Section of the
American Chemical Society

Undergraduate Research Poster Session

April 24, 2012
East Stroudsburg University

Seventy-five guests attended the LVACS undergraduate awards night and research poster session. Twenty student posters were presented. Poster abstracts follow.

No. 1 FLUORESENCE ANALYSIS OF THE INTERACTIONS OF BILIBRUBIN, FATTY ACIDS, AND HUMAN SERUM ALBUMIN

Tatiana Ballreich & Dr. Marianne Staretz, Department of Chemical and Physical Sciences, Cedar Crest College, 100 College Drive, Allentown, PA 18104

Fluorescence spectroscopy was used to investigate the binding of bilirubin and albumin protein and the effect of different fatty acids on the binding. Human Serum Albumin (HSA) is a protein found in human blood plasma that accounts for approximately half of all protein in the blood. It has several important functions one of which is to serve as a transport protein for a variety of endogenous and exogenous compounds. The endogenous compounds that albumin is known to bind to include bilirubin and fatty acids. If two compounds bind to bilirubin, it is possible that one can be displaced by the other. The binding of bilirubin to albumin has not been previously investigated. Understanding how fatty acids may affect the binding of bilirubin to albumin may provide insight regarding toxic conditions that can result from the buildup of bilirubin in the blood. The results of this analysis will be presented.

No. 2 THE SYNTHESIS OF SEVERAL SPERMIDINE ANALOGS IN A SERIES OF ALCOHOLS AS POSSIBLE GROWTH INHIBITORS OF BREAST CANCER CELLS

Todd Bauer, Peter Kaplan, & Francis C. Mayville Jr., Natural Science Department, DeSales University, Center Valley, PA 18034-9568

Previous research in the synthesis of polyamine derivatives have shown methanol to be a relatively ineffective solvent, approximately 10% product yield. Longer chain alcohols; namely ethanol and 1-butanol were used in the interest of making this synthesis greener and increasing the product yields. 1,8-bis (butyl), 1,8-bis (pentyl), and 1,8-bis (benzyl) spermidine derivatives were synthesized in each alcohol with increasing yield observed as chain length increased. Each product was confirmed using FT-IR and MS. The analogs were produced as possible breast cancer cell growth inhibitors and in previous preliminary studies 1, 8-Bis (propyl) spermidine showed the most promise as a cancer cell growth inhibitor. Each of the above mentioned spermidine analogs synthesized in the ethanol can be used in further breast cancer cell growth inhibition studies.

No. 3 SYNTHESIS OF A SERIES OF ALUMINUM -DIIMINE COMPLEXES: PROGRESS TOWARD REDOX-ACTIVE ALUMINUM SYSTEMS

Bren Cole & Christopher Graves, Albright College, 13th and Bern St, Reading, PA 19604

A series of a-diimine ligands of the type Ar-NC(Me)C(Me)N-Ar (Ar = 2,6-diisopropylphenyl (1), Ar = 2,4,6-trimethylphenyl (2), and Ar = 3,5-bistrifluoromethylphenyl (3)) were prepared on multi-gram scale in 59-98% yield. Ligands were characterized by 1H NMR spectroscopy.

The coordination chemistry of ligand 1 to aluminum was investigated across the three available oxidation states of the ligand. Reaction of neutral ligand with aluminum trichloride affords the coordination complex (diimine)AlCl3 (Al-I). Reaction of the singly reduced and doubly reduced a-diimine ligand with AlCl3 affords the analogous (diimine-1)AlCl2 (Al-II) and (diimine-2)AlCl (Al-III) complexes, respectively. X-ray diffraction studies confirmed the identity of the Al-II complex of the singly reduced ligand 1.

No. 4 SYNTHESIS AND DNA-BINDING OF NOVEL DIRHODIUM COMPOUNDS
Charli Godshall & Jake Donchez, Moravian College, 1200 Main St. Bethlehem, PA 18018

Transition metal compounds can have antitumor properties due to their ability to bind DNA. Several dirhodium compounds containing four ligands bridging a core of two rhodium atoms have been identified that can bind DNA. When four trifluoroacetate (TFA) ligands bridge the dirhodium core, the complex rapidly forms stable adducts on DNA. Replacing these ligands with four trifluoroacetamidate (TFAcm) ligands, however, results in a compound with significantly diminished DNA-binding. In this work, new dirhodium compounds have been synthesized with different combinations of bridging TFA and TFAcm ligands and assessed for their ability to bind to DNA. Ligand-exchange reactions were performed either in refluxing chlorobenzene or in molten ligand. Product mixtures were analyzed and separated by reversed-phase HPLC. Purified dirhodium compounds were characterized by mass spectrometry and their DNA binding kinetics were explored. Proposed structures of these new compounds, rates of DNA binding, and their potential for antitumor activity will be presented.

No. 5 SYNTHESIS OF A SERIES OF ALUMINUM AMIDATE COMPLEXES: PROGRESS TOWARD NOVEL ALUMINUM LEWIS-ACID CATALYSTS FOR HYDROAMINATION
Darryl Hester & Christopher Graves, Albright College, Reading, PA 19612

A series of amidate ligand precursors of the type ([R'(NO)R]H were prepared on multi-gram scale in 74-86% yield. The specific ligands are ([tBu(NO)Ph]H (1), ([Ph(NO)tBu]H (2), ([tBu(NO)tBu]H (3), and ([tBu(NO)C6F5]H (4). All four ligands were characterized by 1H NMR spectroscopy. The coordination chemistry of the ligands to aluminum was investigated. A protonation pathway between the ([R'(NO)R]H amidate precursors and AlMe3 in a 1:1 ratio in refluxing hexane was used to prepare aluminum complexes of the type [R'(NO)R]AlMe2. The products were analyzed by 1H NMR, which indicated successful protonation chemistry for all four ligands. Single crystals of both the [tBu(NO)Ph]AlMe2 and [Ph(NO)tBu]AlMe2 products were obtained. X-ray diffraction studies confirmed coordination of the ligands to the aluminum ion, and demonstrate that in the solid-state both complexes exist as dimers.

No. 6 ALGAE AS A SOURCE OF RENEWABLE ENERGY
Aaditya Khanal, Yue Yin, Javad Tavakoli & Polly Piergiovanni, Chemical and Biomolecular Engineering, Lafayette College, Easton, PA

The demand for energy is increasing at a steady rate of about 5 % per year. 85% of the energy is derived from fossil fuels. Fossil fuels are non-renewable and pose serious hazard to climate change via emitting green house gases. Algae present a very promising source of fuel for the future. They are photosynthetic plants which produce fatty acids by using light and carbon dioxide. Furthermore, algae can be grown in almost any kind of land or water which avoids a direct competition with the food crops for fertile land. Thus, biofuels from algae presents a novel way to reduce dependence in fossil fuels and reduce green-house gas accumulation. The objective of this study was to determine the effect of nutrients concentrations, carbon source, and lighting interval on the growth rate of three different algae including Scenedesmus, Chlorella and Ankistrodesmus. The algae were cultured in BG-11 medium by altering the amount of nitrogen, source of carbon (CO2 or glycerol) and lighting intervals (12, & 18 hrs). Among algae studied Scenedesmus had the highest yield under all conditions with different doubling times in different mediums. Addition of glycerol negatively affected the growth rate of Ankistrodesmus, showed no effect for Scenedesmus and positively affected Chlorella. Nitrogen content affected the growth rate; 3 gr/L of NaNO3 had the most positive effect on the algae growth rate.

No. 7 "FRACKING FLUID IN NATURAL GAS EXTRACTION": WHAT HAPPENS TO ACETALDEHYDE THAT IS LEFT DEEP IN THE EARTH?

Michael Kilmer & Lorena Tribe , The Pennsylvania State University, Berks Campus

Hydraulic Fracturing for natural gas in the United States requires a special fluid composed of sand, water, and potentially harmful chemicals. The fluid is used to fracture layers of Marcellus shale, which allows the natural gas to be extracted. Acetaldehyde (CH3CHO), a component of the fracking soup, is used as a corrosion inhibitor for the piping in the natural gas wells. When ingested over long periods of time, the molecules can have carcinogenic effects and can cause organ failure. I will investigate the role of montmorillonite in inhibiting acetaldehyde from entering the watersheds through adsorption. Density functional theory calculations have been carried out using Gaussian 09. The results have been analyzed with Molden. I will then compare this data to a set of experimental data, so a realistic scenario can be proposed

No. 8 INVESTIGATING THE CONJUGATE ADDITION OF LITHIUM DIALKYLCUPRATES TO ENONES

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The 1,4-addition of a lithium dialkylcuprate reagent to an ,-unsaturated ketone was probed for insight into the details of this reaction. The transformation was studied over a range of conditions by varying temperature, order of addition, and reagent stoichiometry. Experiments have focused on cuprate pre-formation and the need for 2:1 Cu(I):alkyllithium for successful conjugate addition. The role of competing 1,2-addition in this reaction was investigated as well. Experiments were also observed in real time using in situ ATR-IR to probe for intermediate species.

No. 9 EXAMINATION OF THE CHANGE IN FLUORESENCE OF SEMEN STAINS WITH TIME

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According to the World Health Organization "the true extent of sexual violence is unknown". Detection of semen is an essential component in many sexual assault cases. Initial detection of semen stains is often done by looking at the fluorescence emitted by the stain when irradiated by a light source of a specific wavelength. Currently it is unknown if time, fabric type, and/or the source of semen have an effect on the identification of semen stains. The current study analyzed the effects of time, fabric type, and source of semen on the detection of semen stains using forensic light sources. The three fabrics used were 100% light cotton, 100% denim, and 83% Nylon/17% spandex. The stains were documented using digital photography. The intensity of the fluorescence of the stains was quantified using a digital process program ImageJ. The results of these analyses will be presented.

No. 10 ANALYSIS OF THE BINDING OF BENZODIAZEPINES TO HUMAN SERUM ALBUMIN USING EQUILIBRIUM DIALYSIS

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Human Serum Albumin (HSA) is the most abundant protein in the blood accounting for 60% of total plasma protein. It has several functions, one of which is to serve as a transport protein for a variety of endogenous and exogenous compounds such as drugs. The binding of drugs to HSA can influence the distribution as well as rate of metabolism and excretion of the drugs. Benzodiazepines are a class of drugs that have been shown to bind to HSA. The goal of the current study was to investigate the interaction of HSA and various benzodiazepines. Alprazolam, clonazepam, diazepam, flurazepam, lorazepam, nordiazepam, and oxazepam were used in this study. Rapid equilibrium dialysis (RED) was used to examine the binding between albumin and the drugs. The benzodiazepine samples were quantitated using LC/MS/MS. The binding constants for the benzodiazepines were determined and compared. The results of these analyses will be presented.

No. 11 ENVIRONMENTALLY FRIENDLY SYNTHESIS OF NOVEL MONO-AZO AND BIS-AZO DYES USING A POLYMER RESIN

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Due to their vivid colors, azo dyes are among the most popular synthetic dyes in the fashion industry. Original synthesis of azo dyes involves using a coupling reaction which produces a copious amount of environmentally harmful waste. A more efficient and cleaner method using a polymer support resin by means of combinatorial methods to generate a large number of novel azo compounds was found. Only a few specific coupling components and diazonium compounds were considered. Therefore, the aim of this study was to consider different diazonium and coupling components to extend the library of mono-azo compounds and to determine if the method could be used to synthesize bis-azo compounds. Data representing 16 new mono-azo and 4 bis-azo compounds successfully synthesized will be presented, with spectral characterization.

No. 12 THE USE OF P-XSC AS A CHEMOPREVENTATIVE AGENT IN SACCHAROMYES CEREVISIAE

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Selenium is trace element essential in the proper function of a number of crucial proteins and enzymes in the human body. At supra-nutritional, but non-toxic levels, selenium is linked to decreased cancer incidence. The selenium containing molecule 1,4-phenylenebis(methylene) selenocyanate (p-XSC) has been shown to reduce animal tumors, and play a role in cell cycle control and cell proliferation. Saccharomyces cerevisiaewas used as a model system to understandp-XSC's chemo-preventative properties. Our initial studies determined that the highest non-toxic dose of p-XSC in yeast is 100 nanomolar, which is comparable to human cells. Yeast cells were then treated with p-XSC at 100 nanomolar, and changes in cellular viability were measured in cells that contained methylated DNA damage caused by an LD50 dose N-nitroso-N-methyl urea (MNU) of 30 millimolar. Initial results indicate an increased viability in the p-XSC treated cells in response to MNU suggesting a protectionagainst DNA methlyation.

No. 13 CONCERTED PROTON-ELECTRON TRANSFER IN A BASE-APPENDED RADICAL CATION

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In concerted proton electron transfer (CPET), the proton and electron may be transferred in one step; however, they do not necessarily go to the same site on the molecule or the same orbital system. In the course of this project an electron transfer agent tris(4-methoxyphenyl)aminium radical cation and a proton acceptor (pyridine) were combined together to make 6-methoxy-N,N-bis(4-methoxyphenyl)pyridin-3-aminium, a potential CPET agent. The radical cation precursor was synthesized in one step using a Buchwald-Hartwigamination. Cyclic voltammetry established a reduction potential for the radical cation-neutral couple of 0.26 V vs. the ferrocenium-ferrocene couple in acetonitrile. The 6-methoxy-N,N-bis(4-methoxyphenyl)pyridin-3-aminium radical cation has been prepared using tris(4-bromophenyl)aminiumhexafluorophosphate. Reactivity studies between the radical cation and 1,4-cyclohexadiene (CHD) or 9,10-dihydroanthracene (DHA) established that they formed the expected products. We interpret this to indicate that this molecule has been shown to accept both an electron into its pi system and a proton onto its pyridine.

No. 14 EXAMINATION OF FLORIDE LEVELS IN BEVERAGES COMMONLY CONSUMED BY CHILDREN

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Excessive fluoride exposure in children can cause dental fluorosis, a condition characterized by defects in the enamel of the teeth. The recommended levels of fluoride intake for children are 0.7-1.5 mg/L daily. At these levels, there can be a beneficial effect on the prevention of dental caries although higher levels increase risk of dental fluorosis. It is estimated that 32% of American children have some form of fluorosis. Exposure to fluoride can be found in many sources. This project focuses on examining the concentration of fluoride ions found in beverages consumed by children. The results of these analyses will be presented. High levels of fluoride in beverages can lead to excessive exposure to fluoride in children especially while taking dietary supplements. To assist in preventing dental fluorosis, parents and medical/dental practioners must be made aware of any beverages that may expose children to a risk of dental fluorosis.

No. 15 METHOD DEVELOPMENT FOR THE QUALITATIVE AND QUANTITATIVE DETECTION OF PHARMACEUTICALS IN WATER SUPPLIES

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The potentially increasing concentration of pharmaceutical drugs in water supplies for human consumption isan area of growing concern worldwide. Currently there are no regulations set by the United States federal government for the concentration of pharmaceutical drugs in water supplies. In addition, water treatment plants do not test water nor employ a method for the removal of the pharmaceuticals. In order to test the water supplies, a universal method must be developed that can accurately detect trace quantities of commonly used pharmaceuticals. Our research has shown UV-VIS Spectrophotometry, Gas Chromatography-Mass Spectrometry and Spectrofluorometry to be beneficial for the qualitative and quantitative detection of Cetirizine hydrochloride (Zyrtec) in water samples. Further research can then be used to expand this method to other pharmaceutical drugs.

No. 16 SUBSTRATE SPECIFICITY AND STABILITY OF A NOVEL ALGINATE LYASE(AlgL) FROM STENOTROPHOMONAS MALTOPHILIA

Liam T. Smith1, Logan C. MacDonald2, Emily C. Wong3, Bryan W. Berger1,2, Department of Chemical Engineering and2Program in Bioengineering, Lehigh University, 3Division of Infectious Diseases, Lehigh Valley Hospital

Stenotrophomonas maltophilia is a gram-negative bacteria that is an increasing important nocosomial pathogen in immunocompromised patients. Approximately 1% of all nosocomal bacteraemias are due to S. maltophilia infection, with the attributed mortality rate at nearly 28%, placing it among the highest attributed mortality rates observed for nosocomal bacteraemias. A major reason for the high mortality associated with S. maltophilia is its ability to produce exopolysaccharides (EPS) that form a biofilm resistant to antimicrobials, as well asenable binding to stents and ventilators. Our goal is to characterize an alginate lyase (AlgL) discovered in our group for selectivity to degrade the EPS present in S. maltophilia biofilms. I developed a high-yieldE. coli expression system for AlgL, and measured the kinetic parameters for EPS degradation as a function of temperature.My results indicate the discovered AlgL is robust to temperature, and may be a useful starting point for removing biofilm-resistant infections.

No. 17 A LONG-LIVED BASE-APPENDED RADICAL CATION REACTS WITH HYDROGEN ATOM TRANSFER AGENTS

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In this project, a radical cation of a pyridine-appended 10-MPT substrate was attempted and reacted with hydrogen atom transfer substrates. We are investigating long-lived radical cations appended with non-nucleophilic bases to see if they have an increased lifetime. We also wish to investigate the mechanisms by which these compounds react, as stepwise proton and electron transfers are possible, but concerted proton-coupled electron transfer is more thermodynamically favorable. In the synthesis portion of the project, a pyridyl ring on the 3-position of 10-methylphenothiazine resulted after two synthetic steps. Attempts to make the radical cation by one-electron oxidation with thianthrenium was unsuccessful, but reaction with tris-(4-bromophenyl)aminium led to absorptions in the visible part of the spectrum. Reaction with DHA and 1,4-cyclohexadiene led to the decay of these absorptions, and peaks for anthracene and benzene, respectively, could tentatively be assigned in the 1H NMR. These are expected products of PCET.

No. 18 OSMOTIC STRESS ANALYSIS OF THE EFFECTS OF WATER ON A PROTEIN-DNA INTERACTION

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Understanding the role of water on the binding of protein to substrate provides insight into substrate recognition. Osmotic stress, a technique in which neutral osmolyte modifies the activity of a solvent, is a method by which the role of water can be elucidated. The thermodynamics of binding of UV-p(dT)10 to DNA photolyase under conditions of osmotic stress was studied using the technique of isothermal titration calorimetry (ITC). Titrations of DNA into photolyase solution were carried out under conditions of constant temperature and ionic strength, and thermodynamic data on the binding were obtained from the binding curve of the titration. Equilibrium constants were determined over a range of molal concentrations of glycerol, the neutral osmolyte. The data were used to determine the number of water molecules that were released upon formation of the protein-substrate complex. Release of water molecules as a function of the oxidation state of the protein was explored.

No. 19 DETERMINATION OF CAFFEINE IN ENERGY DRINKS BY HIGH PERFORMANCE LIQUID CHROMATOGRAPHY

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This experiment was conducted in order to quantify the concentration of caffeine in unlabeled energy drinks. A running buffer comprised of 40% methanol/60% water was used to create five caffeine standards. The prepared caffeine standards were then analyzed via High Performance Liquid Chromatography (HPLC). The caffeine concentration in the energy drinks was calculated based on the standard calibration curve. The concentrations range from 0.500 mg/mL to 3.33 mg/mL.

No. 20 SYNTHESIS OF CHIRAL ELECTRON RICH METAL COMPLEXES TO DEAROMATIZE AROMATIC MOLECULES

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(R,R')-N,N'-bis((1-methylimidazolyl)-2-methyl)-2,2'-bispyrrolidine (ImBp) was synthesized. It is hoped this tetradentate ligand can be complexed to a d^6 metal in the cis-a conformation which may allow the metal fragment to bind aromatic compounds, and enable addition reactions to specific enantiofaces of the bound aromatic. A crude sample of bispyrrolidine was distilled to separate excess pyrrolidine and other impurities from a mixture of bispyrrolidine stereoisomers. The mixture of stereoisomers was resolved with (R,R)-tartaric acid to separate (R,R)-bispyrrolidinium tartrate from both the (S,S)-bispyrrolidinium tartrate and the meso bispyrrolidinium tartrate in 61.2% yield. The remaining mixture of bispyrrolidine stereoisomers was freed of the tartrate salt and further resolved with (S,S)-tartaric acid to form the (S,S)-bispyrrolidinium tartrate in 41.3% yield. (R,R)-bispyrrolidinium tartrate was reacted with 2-(chloromethyl)-1-methylimidizole hydrochloride to synthesize ImBp in 42.0% yield. Binding ImBp to molybdenum hexacarbonyl has been synthesized in an impure form. Compounds were analyzed by 1H NMR spectroscopy and IR spectroscopy.