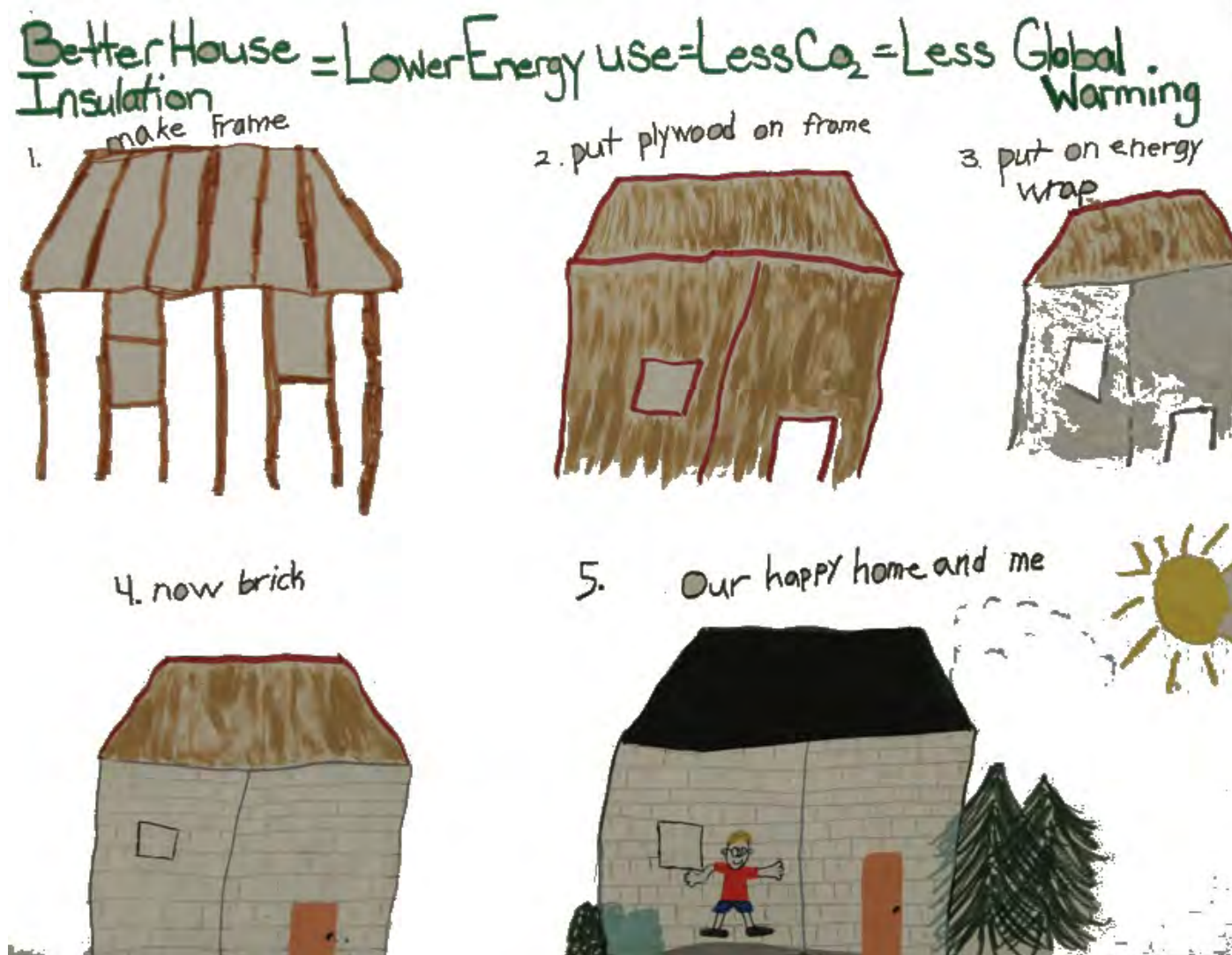




The Bulletin  
of the  
Virginia Section  
AMERICAN CHEMICAL SOCIETY

SUMMER 2007 ISSUE



**NCW POSTER WINNER**

The drawing shown above was the first-place winner in the K—2nd grade category of the National Chemistry Week Poster Contest. It was drawn by Parker King, a second grade student from the Virginia Section. Parker won the national contest that required students to design a poster based on the NCW theme, “Your Home—It’s All Built on Chemistry!” He received a \$200.00 Amazon.com gift certificate for his winning entry. Go to the Virginia Section website, <http://membership.acs.org/V/VA/> to see his poster in full color.

**\*\*\* VIRGINIA SECTION NEWS \*\*\*****VIRGINIA SECTION MEETINGS - FALL 2007**

- September 14** Virginia Commonwealth University, Richmond  
Annual Awards Program (see below)  
Local Contact Person: Dr. Sally Hunnicutt, (804) 828-8599
- October 26** Randolph-Macon College, Ashland  
Dr. Stanley Manahan  
Local Contact Person: Dr. Serge Schreiner, (804) 752-7206
- November 19** Mary Washington College, Fredericksburg  
Dr. Jack Breazeale  
Local Contact Person: Dr. Roy Gratz, (540) 654-1412
- December 7** John Tyler Community College, Chester  
Local Contact Person: Dr. Kristine Smetana, (804) 706-5143

**SEPTEMBER AWARDS MEETING**

The September meeting of the Virginia Section will be held in Richmond at Virginia Commonwealth University on Friday, September 14, 2007. The Virginia Section will be presenting its Distinguished Service Award to Dr. Jeffrey I. Seeman. He will be speaking on "Building the Principled Life." Also, one or more Industrial Awards will be presented. Meeting details will appear in the September issue of the Bulletin. For more information, please contact Dr. Sally Hunnicutt at VCU [(804) 827-0531; sshunnic@vcu.edu] or Virginia Section Chair Elect Trey Gregory at (804) 504-8840; cgregory@bichemicals.com.

**VIRGINIA SECTION LAUNCHES YOUNGER CHEMISTS' COMMITTEE**

During the January Executive Committee Meeting of the Virginia Section of the ACS, the executive committee voted to form a Younger Chemists Committee, headed by Janet Asper (Assistant Professor, University of Mary Washington).

Who are younger chemists? The ACS has defined younger chemists as "chemists not yet established in their careers". As you can see from that broad definition, you can find yourself a younger chemist at many times in your life and in your career path.

Why does Virginia need a committee for younger chemists? The Virginia Section wants to identify and address the needs and concerns of younger chemists. The goals of the ACS-YCC are to make the ACS relevant to younger chemists, to increase the involvement of younger chemists in the ACS at all levels and to develop mechanisms to integrate younger chemists into the profession.

How will the new YCC meet these goals? In the inaugural year there are plans for YCC meetings that complement the Virginia Section meeting schedule, offering different venues, topics and formats that will hopefully interest and engage younger chemists. The YCC will work closely with the Student Affiliate Chapters and graduate programs in the section to plan informative and fun activities for younger chemists. These activities will be open to all section members and will be publicized in this newsletter and by electronic means.

If you have any questions or want to get involved, please contact Janet Asper by e-mail at [jasper@umw.edu](mailto:jasper@umw.edu) or by phone at (540) 654-1143. Stay tuned for more information!!!

### **SERMACS 2011**

The Virginia Section will host the 2011 SERMACS meeting in Richmond. Joe Pompano, the General Meeting Chair, invites you to participate in the ongoing organizational meetings that will occur from 5:30 to 6 p.m. before each local section meeting. The plans for the SERMACS meeting are not complete and the committee would welcome input about the program, speakers, and the format of the meeting. The most important part of this meeting is to have topics that are of interest to our members while being pertinent to the larger Southeastern community. If you have ideas for topics, seminars, or a general theme, please contact Joe Pompano or the Program Chair, Ann Sullivan.

### **REPORT ON THE MARCH SECTION MEETING**

The Virginia Section met on Friday, March 23 at Hampden-Sydney College in Hampden-Sydney, Virginia. About 40 persons heard Dr. Peter Lantos of the Target Group speak on "Chemistry—the Good and the Evil." Dr. Lantos was introduced by Ben Barnhill, a junior chemistry major from Salem, Virginia, and president of the Alpha Chi Sigma chapter at Hampden-Sydney. The program was preceded by a delicious meal in Pannill Commons. Thanks to Dr. William Anderson and the chemistry faculty and students at Hampden-Sydney College for hosting this meeting.

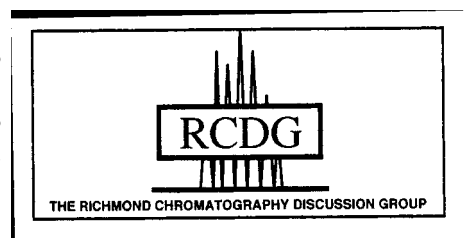
### **REPORT ON THE APRIL SECTION MEETING**

About 70 persons attended the University of Virginia meeting on April 13, 2007 (the 264<sup>th</sup> anniversary of the birth of Thomas Jefferson), and heard Dr. William Bare of Randolph College speak on "Why Matter Matters: An Overview of the Two Thousand Year Debate on the Atomic Theory." The speaker was introduced by My-Linh Tong Nguyen, senior chemistry major at the University of

Virginia. Dr. Bare's talk was preceded by the 21st annual Poster Session that featured student research at various colleges and universities. A total of 28 posters by students from eleven colleges and universities were presented (a complete list of authors and titles and abstracts of some of the papers are included in this issue of the Bulletin). Section Chair Dr. Will Lewis recognized ten outstanding senior chemistry majors from colleges and universities within the Virginia Section (the names of the recipients are listed below). The Section thanks Dr. James Demas, Ms. Susan Collins, and others at the University of Virginia who assisted with this successful meeting. Special thanks to Ms. Collins for preparing the poster program and abstracts.

## RCDG

The purpose of the Richmond Chromatography Discussion Group is to promote the interests of the chromatographic and other separation sciences by expanding the awareness and capabilities of individuals from the scientific community. To meet this goal the group publishes a newsletter and presents lectures at various locations in the Richmond area. Check out their website: [www.rcdg.org](http://www.rcdg.org).



## OUTSTANDING CHEMISTRY GRADUATES

At the April meeting, the Virginia Section recognized graduating seniors from colleges and universities within the Section. Schools in the Virginia Section were invited to nominate senior chemistry majors for this honor. The outstanding students for the year 2007:

<u>College/University</u>	<u>Student</u>
College of William & Mary	Megan A. Fikse
Eastern Mennonite University	Aaron Trimble
James Madison University	Katy Zimmerman
Longwood University	Christopher M. Shuford
Mary Baldwin College	Patricia Grace
Randolph-Macon College	Susan Borowski
University of Mary Washington	Asako Kubota
University of Virginia	My-Linh Tong Nguyen
Virginia Commonwealth University	Minh A. Nguyen
Virginia Union University	Yaw Obeng-Boampong

## THANKS TO SUSAN COLLINS

The Virginia Section Bulletin expresses special thanks to Ms. Susan Collins, who has retired from the University of Virginia. Ms. Collins coordinated the student poster sessions that have been sponsored by the Virginia Section and held at the April meetings in Charlottesville. She prepared the program of posters and compiled the poster abstracts which were printed in the Bulletin. Her outstanding work, cooperation, and helpful manner have been greatly appreciated. We wish her well in her future endeavors.

...Jim Beck, Editor, the Virginia Section Bulletin

## DEATH OF TWO SECTION SPEAKERS



Dr. Harry H. Sisler died on December 23, 2006 at the age of 89. He was a professor of chemistry at the University of Florida prior to his retirement in 1985. He spoke to the Virginia Section on May 20, 1966 in Waynesboro. His topic was "The Chloramination Reaction in the Synthesis of New Nitrogen-Phosphorus, Nitrogen-Arsenic, and Nitrogen-Antimony Compounds."

Dr. Norman Hackerman died on June 16, 2007 at the age of 95. He was an emeritus professor and former president of both the University of Texas, Austin, and Rice University. He spoke to the Virginia Section on "Corrosion and Its Control" in a meeting at Mary Washington College on November 17, 2000.



## NEW MEMBERS OF THE VIRGINIA SECTION

We welcome these new members of the Virginia Section:

SUSAN BARKER  
 RANA N EL DANAF  
 ERNEST EDWARD GRISDALE  
 MATTHEW L KELLAM  
 MARY KOMBOLIAS  
 JIN LI  
 ROBERT MALTAIS  
 MARK MISHLER  
 JOHN THOMAS PIERCE  
 JOHN A SHANKS  
 RHODORA V SNOW  
 CHI FO TSANG  
 ZHIQUAN Q YAN

RAM BHAGAT  
 JAMES A FOSTER  
 MATTHEW C T HARTMAN  
 KELLY KINCANNON  
 JASON A LAGONA  
 JOHN T LOPER  
 REBECCA MASTERS  
 OLIVIA L MOOREN  
 LESLEY RUSSELL  
 JUNAID AHMED SIDDIQUI  
 GENE A STARK  
 THOMAS H WALLS  
 DRYI ZHANG

JOHN H CROSS  
 ABBY K GAMBREL  
 ANURADHA ILLENDUL  
 GANESH DEVDAS KINI  
 DAVID LAHTI  
 KEVIN R LYNCH  
 THOMAS L MATOCHIK  
 CHARLES NICHOLAS JR  
 TAPASHI SENGUPTA  
 MATTHEW SIDERHURST  
 VANDANA TOTLANI  
 BRIAN WHEATLEY

## JOHN TYLER CHEMISTRY CLUB RECOGNIZED

The Chemistry Club at John Tyler Community College has received the school's Daniel E. Dalton Award. This award is given for "extraordinary contributions by a student club or organization to the extracurricular life of the institution and for outstanding service to its student, staff, and faculty." The JTCC Chemistry Club was very active in National Chemistry Week and Earth Day activities on their campus and at the Science Museum of Virginia. They sponsored many activities designed to increase science awareness both on and off campus. Dr. Kristine Samaria Smetana, Chemistry Club advisor, is shown with Robin Turner, the president of the Club.



## WORDS OF WISDOM FOR THE SUMMER:

"Service should not be a question of whom you serve, but how well you serve"

## EARTH DAY HAIKU WINNER

Congratulations to Caitlin Kelly, a third-grade student from Mechanicsville, who won a second-place award in the 3<sup>rd</sup> - 4<sup>th</sup> grade category of the Earth Day illustrated haiku contest that was sponsored by the American Chemical Society. Caitlin received a \$75.00 gift certificate for Amazon.com. The poster and haiku were to illustrate the Earth Day theme "Recycling—Chemistry Can!" Her haiku says

**Old cans recycled.  
Brand new on grocery shelf  
Recycling is great!**



## 2007 REGIONAL AWARD FOR VOLUNTEER SERVICE

The Southeastern Region of the American Chemical Society is soliciting nominations for an award that will recognize the volunteer efforts of individuals who have served the Southeastern Region and who have contributed significantly to the goals and objectives of the American Chemical Society. All nominations and supporting materials must be received by September 1, 2007. The award will be presented at the 2007 SERMACS meeting in Greenville, South Carolina, October 23-27. Nominations may be made at this website:

<http://www2.ncsu.edu/ncsu/chemistry/outreach/ACSserm/sermVSAwardNomination.html>.



## **VIRGINIA SECTION IS AWARD FINALIST**

The Virginia Section is a finalist for a ChemLuminary Award. The ChemLuminary awards are given by the ACS Committee on Local Section Activities to recognize "Outstanding Performance by a Local Section." The Virginia Section is competing against the Detroit and Indiana Sections in the Medium Large Size Section category. The awards will be presented in Boston at the national ACS meeting.

### **QUESTIONS FROM THE PAST**

This question was asked in the April Bulletin: Nobel laureate Dr. Alan MacDiarmid died on February 7, 2007. He shared the 2000 Nobel Prize in Chemistry for his work with colleagues on the discovery and development of electronically conductive polymers. Dr. MacDiarmid spoke to the Virginia Section on "Silicon Hydrides and Their Monomeric and Polymeric Organo-Derivatives Containing Si-O-As Bonds". **Where and when was the meeting held at which he addressed the members of the Section?** Dr. MacDiarmid spoke to the Virginia Section on October 28, 1960. The meeting was held at the Lakewood Supper Club near Hopewell. The steak dinner was \$2.50; the seafood platter cost \$2.00. At the time of the meeting, Dr. MacDiarmid was an Assistant Professor of Chemistry at the University of Pennsylvania.

A new question from the past: In November, 1969, the Virginia Section hosted a Southeastern Regional Meeting, held in Richmond. There were ten symposia, including one on early reports from studies on the moon rocks, and about 300 general papers. The General Chairman for the meeting worked for Philip Morris while the Program Chairman was employed by the American Tobacco Company. **Who were these two gentlemen?**

### **GRANTS FOR K-12 SCIENCE PROJECTS**

The Virginia Section is soliciting proposals for grants to support school science projects in grades K through 12. The \$50 to \$500 grants will be provided to teachers in the Virginia Section for the purchase of materials and supplies. To apply for support, request an application form from Mr. Ryan Warren, 6001 Grove Avenue, Richmond, VA 23226; (804) 288-2804; warrencr @ vcu.edu. Or complete an application on-line by accessing the Virginia Section website at <http://membership.acs.org/VVA/grants.htm>.

### **E-MAIL NOTICES OF SECTION MEETINGS**

If your Bulletin does not always arrive in a timely fashion or if you simply would like to be reminded of Section meetings, you may wish to take advantage of our meeting notification service. Just send us your e-mail address and we will send you, via e-mail, a brief reminder of the upcoming meeting. We'll try to get the notice to you about a week before the meeting date so you'll have time to make a dinner reservation if you decide to attend the meeting. Send your e-mail address to James Beck at [beckjd1977 @ comcast.net](mailto:beckjd1977@comcast.net).

### **TEACHER AWARDS**

The Virginia Section is soliciting nominees for two teaching awards: the Outstanding High School Chemistry Teacher Award and the Outstanding Middle School Science Teacher Award. If you would like to nominate persons for these awards, contact Dr. William Rademaker at (804) 794-3752; [wrad @ verizon.net](mailto:wrad@verizon.net). Each award consists of a plaque and a check for \$300.00. The teacher awards are sponsored by Boehringer Ingelheim Chemicals; the 2007 awards will be presented at the December 7 Section meeting.

## **SIXTY-YEAR MEMBERS OF THE ACS**

Congratulations to these Section members, each of whom has been a member of the American Chemical Society for 60 years:

<b>Thomas I. Crowell</b>	<b>Charlottesville</b>
<b>Roger W. Hill</b>	<b>Charlottesville</b>
<b>Raymond J. Kray</b>	<b>Charlottesville</b>
<b>Edward T. Kubu</b>	<b>Richmond</b>
<b>Robert L. Lynch</b>	<b>Richmond</b>
<b>William F. Minor</b>	<b>Charlottesville</b>
<b>George A. Simmons</b>	<b>Woodstock</b>
<b>C. Robert Walter</b>	<b>Mechanicsville</b>
<b>John H. Wood</b>	<b>Richmond</b>
<b>Malcolm R. J. Wyllie</b>	<b>Troy</b>

## **FIFTY-YEAR MEMBERS OF THE ACS**

Congratulations to these Section members, each of whom has been a member of the American Chemical Society for 50 years:

<b>Dr. Robert G. Bass</b>	<b>Crozier</b>
<b>Dr. Edward R. Bowman</b>	<b>Richmond</b>
<b>Dr. Thomas H. Brownlee</b>	<b>Middletown</b>
<b>Dr. John B. Gallini</b>	<b>Richmond</b>
<b>Dr. James A. Marshall</b>	<b>Charlottesville</b>
<b>Mr. Dermot M. Murphy</b>	<b>Richmond</b>
<b>Mr. Elmer V. O'Grady</b>	<b>Midlothian</b>
<b>Dr. Lester Seiden</b>	<b>Richmond</b>
<b>Mr. Don W. Simroth</b>	<b>Charlottesville</b>
<b>Mr. Nicholas A. Spinelli</b>	<b>Chester</b>
<b>Dr. Thomas Van Auken</b>	<b>Richmond</b>
<b>Mr. Harry P. Woods</b>	<b>Richmond</b>



## VIRGINIA SECTION WEBSITE

Information on Virginia Section meetings, copies of the Bulletin, and much more can be found on the Virginia Section Website. It can be accessed via <http://membership.acs.org/VVA/>. Dr. Ann Sullivan is the webmaster.

## SOUTHEASTERN REGIONAL MEETING

**SERMACS 2007**, sponsored by the Western Carolinas Section, will be held in Greenville, South Carolina, October 24-27. Online abstract submission and meeting registration is now open at the meeting website: <http://www.sermacs2007.org/>. The meeting will feature an outstanding technical program, as well as a variety of educational, cultural and recreational events. There are special programs for all aspects of the ACS membership, including industrial and government scientists, educators, and students. Please see the website for complete details.

## POSTER PRESENTATIONS UNIVERSITY OF VIRGINIA - APRIL, 2007

**Richard Anthony, Otis Bryant, Seth Hunter,** Department of Chemistry, Virginia Commonwealth  
**Thu-Phong Huyn, Lawrence Lanberg, D.L. Polo** University  
and L.M. Vallarino

*Complexes of Co(II), Ni(II), Cu(II), and Zn(II) with 2-(N-4-Methylanylineamide)-3-naphthalenecarboxylic Acid, as Models for Metal-Doped Polyimides*

**Christopher K. Arnatt** and H.J. Sipe, Jr. Department of Chemistry, Hampden-Sydney College

*Electron Spin Resonance Study of Phenytoin and Related Compounds*

**James Baldwin** and Kevin Dunn Department of Chemistry, Hampden-Sydney College

*Microencapsulation of Essential Oils for Use in Cold Process Soap Making*

**Nicholas Bandy** and H.J. Sipe, Jr. Department of Chemistry, Hampden-Sydney College

*A Study of Phenoxy Radicals from Bisphenol-A, 4,4'-Ethylidenebisphenol, and 4,4'-Methylenebis(2,6-di-tert-butylphenol) by ESR Spectroscopy*

Wenying Xu<sup>1</sup>, Fran Wittich<sup>1</sup>, **Neal Banks**<sup>1</sup>, James<sup>1</sup> Department of Chemistry, University of Virginia,  
Zink<sup>1</sup>, J.N. Demas<sup>1</sup> and <sup>2</sup>B.A. DeGraff and <sup>2</sup>Department of Chemistry, James Madison University

*Quenching of Ru(phen)<sub>2</sub>Dppz by Water and its Suitability to Humidity Sensors*

**Warner E. Braxton**<sup>1</sup>, Everett E. Carpenter<sup>2</sup> and<sup>1</sup>Department of Chemistry and Physics, Virginia  
Colleen M. Taylor<sup>1</sup> State University, <sup>2</sup>Department of Chemistry,  
Virginia Commonwealth University

*Introducing Nanotechnology and Specialized Synthetic Techniques into the Chemistry Curriculum*

**Kena Chambers**<sup>1</sup>, Maryanne Collinson<sup>2</sup> and Colleen Taylor<sup>1</sup>

<sup>1</sup>Department of Chemistry and Physics, Virginia State University, and <sup>2</sup>Department of Chemistry, Virginia Commonwealth University

***Materials Chemistry Synthetic Techniques and Electrochemistry Concepts Applied in the Undergraduate Classroom***

**Samantha L. Davis** and Roy F. Gratz

Department of Chemistry, University of Mary Washington

***Liquid Crystal Preparation: 1,4-bis(5-heptyl-1,2,4-oxadiazoyl)-benzene***

**Meeta Desai**, Vladimir Garkov<sup>1</sup> and Michael Schell<sup>2</sup>

Department of Chemistry, <sup>1</sup>Mary Baldwin College and <sup>2</sup>The Uniformed Services University for the Health Sciences

***Activity-Dependent Regulation of Mitochondrial Morphology in Neurons***

**Melanie Dorion** and Karl Zachary

Department of Chemistry, Mary Baldwin College

***Interaction of Silver Nanoparticles with Yeast Alcohol Dehydrogenase***

**Katherine Fenstermacher** and Karl Zachary

Department of Chemistry, Mary Baldwin College

***Host-Guest Interactions between Conformational Isomers of Calix[4]arene and Carbon<sub>60</sub> Fullerene***

**Sharon J. Francis** and Colleen M. Taylor

Department of Chemistry and Physics, Virginia State University

***Synthesis of Covalently Modified Phenanthroline Ligands to Anchor Iron Centers to a Semi-permeable Membrane***

**Patricia Grace** and Karl Zachary

Department of Chemistry, Mary Baldwin College

***Spectrophotometric and Thermodynamic Study of Cucurbituril 7-Methyl Viologen Inclusion Behavior***

**Sam Grizzard**<sup>1</sup>, E. Sivamanni<sup>2</sup>, Camille Perkins<sup>1</sup>, Jacqueline Swoopes<sup>1</sup>, E. Westbrook<sup>2</sup>, R. Juliano<sup>4</sup>, R. Qu<sup>3</sup>, and R.K. DeLong<sup>1</sup>

<sup>1</sup>Department of Chemistry and Physics, Virginia State University, <sup>2</sup>Agricultural Research Station, Virginia State University, <sup>3</sup>Crop Sciences, North Carolina State University, and <sup>4</sup>Molecular Pharmacology and Cancer Nanotechnology Program, University of North Carolina

***Chemical Characterization of DNA, RNA and Protamine Nanoparticles and Bio-Activity Analyses***

**Travis M. Hartberger**<sup>1</sup>, Jian Wen<sup>2,1</sup>, Jerome P. Ferrance<sup>1</sup> and James P. Landers<sup>1,3</sup>

<sup>1</sup>Department of Chemistry, University of Virginia, <sup>2</sup>Department of Molecular Physiology and Biological Physics and <sup>3</sup>Department of Pathology, University of Virginia School of Medicine

***Microfluidics for Clinical Diagnostics: Surface Treatment for Large Volume Blood Sample DNA Purification***

**Fabrian Keels**, Florence Etop and Colleen M. Taylor

Department of Chemistry and Physics, Virginia State University

***Implementing Computer-based Data Collection into Lower-Level Physics Laboratory Curriculum***

Asako Kubota and Janet Asper  
Department of Chemistry, University of Mary  
Washington

*Solvent-Free Deprotection of Boc Protected Alkylguanidines*

Daniel Scott Lutterbie and Daniel McCain  
Department of Chemistry, Virginia Military  
Institute

*The Activation of the Protein Phosphatase PP2C-alpha Via the Metal Ions  
Mg<sup>2+</sup>, Mn<sup>2+</sup>, and Fe<sup>2+</sup>*

John Robbins, Andrew McLeod, Robert O' Cain  
and Kevin Dunn  
Department of Chemistry, Hampden-  
Sydney College

*Characterization of Fatty Matter in Cold Process Soap by <sup>13</sup>NMR Spectroscopy*

Theron W. Ng-A-Qui and Colleen M. Taylor  
Department of Chemistry and Physics, Virginia  
State University

*Examination of the Ion-Pair Effect During the Dissociation of tris-(1,10-phenanthroline)-  
Iron(II) Ion in Solvents of Varied Composition*

Sean P. Platt and H.J. Sipe  
Department of Chemistry, Hampden-  
Sydney College

*Oxygen Consumption Studies of Phenoxy Radicals of Desacetylbisacodyl*

Melvin Rajaratnam and Ca Diep  
Department of Chemistry, Shenandoah University

*Electrochemical Performance of a Nanocomposite Electrode Fabricated by  
Layer-by-Layer Assembly of Pt Nanoparticles, Glucose Oxidase and  
Poly(dipyrrole) as a Glucose Biosensor*

Melissa Rich and Jill Venton  
Department of Chemistry, University of Virginia

*Formation of Oriented Carbon Nanotube Ribbons*

Christopher M. Shuford<sup>1</sup>, Melissa C. Rhoten<sup>1</sup>,  
John B. Mangrum<sup>2</sup> and Nicholas P. Farrell<sup>2</sup>  
<sup>1</sup>Department of Chemistry and Physics, Longwood  
University and <sup>2</sup>Department of Chemistry, Virginia  
Commonwealth University

*Use of a Quartz Crystal Microbalance to Monitor the Interactions of Multinuclear Platinum  
Complexes to Biologically Relevant Molecules*

Gregory Springsted and Carol Parish  
Department of Chemistry, University of Richmond

*Molecular Dynamics Analysis of Potential Inhibitors of HIV-1 Protease*

Amanda Stefano, Vladimir Garkov and Lundy  
Pentz  
Department of Chemistry, Mary Baldwin College

*Inhibition of Alcohol Dehydrogenase by 4-Methylpyrazole*

Paul Walsh and Raymond Scott  
Department of Chemistry, University of Mary  
Washington

*The Study and Characterization of Electrogenenerated Chemiluminescence*

R.G. Weatherford<sup>1</sup>, T.H. Jones<sup>1</sup>, D.W. Davidson<sup>2</sup>,  
and R.R. Snelling<sup>3</sup>  
<sup>1</sup>Department of Chemistry, Virginia Military  
Institute, <sup>2</sup>Department of Biology, University of  
Utah, and <sup>3</sup>Los Angeles Museum of  
Natural History

*The Venom Chemistry of the Ant Myrmecaria melanogaster Emery*

## ABSTRACTS OF POSTER PRESENTATIONS APRIL 13, 2007 - UNIVERSITY OF VIRGINIA

**Complexes of Co(II), Ni(II), Cu(II), and Zn(II) with 2-(N-4-methylanylineamide)-3-naphthalenecarboxylic acid, as Models for Metal-Doped Polyimides.** Richard Anthony, Otis Bryant, Seth Hunter, Thu-Phong Huynh, Lawrence Lanberg (CHEM 406 - Advanced Inorganic Chemistry Lab), Instructors: D.L. Polo and L.M. Vallarino, Virginia Commonwealth University, Richmond, VA 23284.

Polyimides, a class of organic polymers that possess high thermal stability as well as excellent mechanical properties, have become increasingly important as construction materials for industrial applications. Polyimides often contain an appreciable percentage of amic-acid sites that can act as ligands for metal ions, resulting in the formation of metal-containing polymers that combine the properties of the host matrix with the specific properties of the guest metal ions. As part of an ongoing project, the CHEM 406 class of 2007 at V.C.U. has undertaken the synthesis and characterization of the complexes of several metal ions, Co(II), Ni(II), Cu(II) and Zn(II), with the anion of 2-(N-4-methylanylineamide)-3-naphthalenecarboxylic acid. The formulas and the suggested structures of the complexes are reported.

**Electron Spin Resonance Study of Phenytoin and Related Compounds.** Christopher K. Arnatt and H. J. Sipe, Jr., Department of Chemistry, Hampden-Sydney College, Hampden-Sydney, VA 23943

Phenytoin (PHT) is prescribed largely as an antiepileptic drug and is known to be teratogenic. In many previous studies it has been suggested that this teratogenic effect is due to the oxidative damage it causes to DNA and cells. Fast-flow EPR spectroscopy using both a Hemoglobin/H<sub>2</sub>O<sub>2</sub> system and a Cerium<sup>4+</sup> oxidation system failed to yield any spectrum for PHT itself. When related compounds were studied under the same fast-flow conditions it was found that the main metabolite of PHT, 5-(4-Hydroxyphenyl)-5-phenylhydantoin (HPPH), formed phenoxyl free radicals. These results suggest a possible mechanism for toxicity might possibly be related to the production of HPPH phenoxyl radicals by peroxidase enzymes in fetal liver and other developing tissues.

**Microencapsulation of Essential Oils for Use in Cold Process Soap Making.** James B. Baldwin, III, and Kevin Dunn, Department of Chemistry, Hampden-Sydney College, Hampden-Sydney, VA 23943

The purpose of this project is to develop a microencapsulation technique to be used in cold process soap making to prevent seizing of the soap. It was found that seizing in soap is caused by an increased rate of reaction due to the introduction of scent oil, such as clove oil, which reacts rapidly with sodium hydroxide. Using physical microencapsulation, a microcapsule consisting of eugenol, carnauba wax, deionized water, and a small amount of 12 ppt NaOH solution can be used to protect the scent oil from reacting with the 333 ppt sodium hydroxide solution used during the soap making process. It was found that the use of the developed microencapsulation technique succeeds in protecting the scent oil, eugenol, from the 333 ppt sodium hydroxide solution.

**Quenching of Ru(phen)<sub>2</sub>Dppz by Water and its Suitability to Humidity Sensors.** Wenying Xu, Fran Wittich, Neal Banks, James Zink, J. N. Demas and \*B. A. DeGraff, Chemistry Department, University of Virginia, Charlottesville, VA 22904 and \*James Madison University, Harrisonburg, VA 22807.

The luminescent properties of [Ru(phen)<sub>2</sub>Dppz]<sup>2+</sup> (where dppz = dipyrido[3,2-a:2'3'-c]phenazine) were studied in non-aqueous solution and in polymer support to determine its potential usefulness in relative humidity sensors. An appropriate humidity sensor will be highly sensitive to small changes in relative humidity near ambient indoor atmospheric humidity (30%-60% relative humidity). The emission intensity and lifetime (τ) of [Ru(phen)<sub>2</sub>Dppz]<sup>2+</sup> have been shown to be highly sensitive to water concentration in both solution and polymer support, displaying a six fold change in emission intensity in the polymer support and a fifty fold change in acetonitrile. Non-linear Stern-Volmer lifetime plots eliminated a Perrin quenching model in favor of a ground-state associational quenching mechanism coupled to diffusional quenching.

**A Study of Phenoxy Radicals from Bisphenol-A, 4,4'-Ethylidenebisphenol, and 4,4'-Methylenebis(2,6-di-*tert*-butylphenol) By ESR Spectroscopy.** Nicholas Bandy and H. J. Sipe, Jr., Department of Chemistry, Hampden-Sydney College, Hampden-Sydney, VA 23943

Phenoxy radicals from Bisphenol-A, a ubiquitous plasticizer, were generated with both hemoglobin biochemical pathways and Ce<sup>IV</sup> oxidation. The structurally related compounds 4,4'-Ethylidenebisphenol and 4,4'-Methylenebis(2,6-di-*tert*-butylphenol) were also used to generate phenoxy radicals with both chemical and biochemical oxidative methods. ESR spectroscopy was performed on the radicals resulting from all three compounds. Computer analysis of the spectroscopic results gave hyperfine coupling constants and splitting consistent with expectations and previous works.

**Introducing Nanotechnology and Specialized Synthetic Techniques into the Chemistry Curriculum.**

Warner E. Braxton, III, \*Everett E. Carpenter and Dr. Colleen M. Taylor, Department of Chemistry and Physics, Virginia State University, Petersburg, Virginia 23806, and \*Department of Chemistry, Virginia Commonwealth University, Richmond VA 23284

Iron nanoparticles were synthesized as part of the Research Experience for Undergraduates program and a developing collaboration between Virginia Commonwealth and Virginia State University chemistry faculty. The partnership development strategy includes incorporating aspects of the research, such as specialized synthetic techniques, into an advanced classroom, hands-on, activity. An outcome of this project is a publishable experiment that will allow chemistry students to obtain research experience in nanoparticle synthesis while fulfilling their course requirements in the teaching laboratory.

**Materials Chemistry Synthetic Techniques and Electrochemistry Concepts Applied in the Undergraduate Classroom.**

Kena Chambers, \*Maryanne Collinson and Colleen Taylor, Department of Chemistry and Physics, Virginia State University, Petersburg, VA 23806 and \*Department of Chemistry, Virginia Commonwealth University, Richmond VA 23284

A research project through the REU program at Virginia Commonwealth University (VCU) included the synthesis of silica-based nanoparticles within thin-film polycarbonate membranes. The concepts learned over the summer are being applied in the development of a multidisciplinary advanced chemistry classroom activity. The research included the use of a potentiostat and applications of cyclic voltammetry. These techniques developed in the research lab will be used to develop student led laboratory exercises.

**Chemical Characterization of DNA, RNA and Protamine Nanoparticles and Bio-Activity Analyses.**

Sam Grizzard<sup>1</sup>, E. Sivamani<sup>3</sup>, Camille Perkins<sup>1</sup>, Jacqueline Swoopes<sup>1</sup>, E. Westbrook<sup>2</sup>, R. Juliano<sup>4</sup>, R. Qu<sup>3</sup> and R.K. DeLong<sup>1</sup>

1 - Virginia State University, Department of Chemistry and Physics, Petersburg, VA 23806; 2 - Virginia State University, Agricultural Research Station, Petersburg, VA 23806; 3 - North Carolina State University, Crop Sciences, Raleigh, NC 27695; 4 - University of North Carolina-Chapel Hill, Molecular Pharmacology and Cancer Nanotechnology Program, Chapel Hill, NC 27599

This series of experiments is intended to explore the potential applications of protamine-bound nucleic acids in the fields of plant biotechnology and microbiological genetic engineering. The primary focus is to determine the degree to which nucleic acids can be loaded, retained, and delivered by protamine nanoparticles. The success of our loading and retention techniques involving pDNA and siRNA were tested in a battery of degradation trials (including physical, hydrolytic, oxidative, and elevated temperature) and results were gathered through HPLC, gel electrophoresis, and UV spectrophotometry. Loading and retention data is also gathered and expressed qualitatively through scanning electron microscopy techniques. Parallel experiments involving recombinant pDNA in plant cells and viability trials involving *S. Cerevisiae* were conducted to evaluate the bio-activity and cytotoxicity effects of protamine:nucleic acid nanoparticles. Our results suggest increased stabilization effect in nucleic acids when biological samples are placed under environmental stress, as seen in the pDNA and siRNA trials, and with only negligible toxic effects, as seen in the viability and bioactivity trials

**Activity-Dependent Regulation of Mitochondrial Morphology in Neurons.** Meeta Desai, Vladimir Garkov and \*Michael Schell, Mary Baldwin College, Staunton, VA 24401 and \*The Uniformed Services University for the Health Sciences, Bethesda, MD 20814

Mitochondria, cellular organelles often referred to as the “powerhouses” of cells, play a crucial role in ATP or energy production. ATP is particularly important in the brain because large quantities of ATP are required for synaptic activity, or the passing of information through cells in the nervous system. The enzyme pyruvate dehydrogenase kinase (PDK), which controls the switch between anaerobic metabolism, which produces 2 molecules of ATP, and aerobic metabolism, which produces 36 molecules of ATP was targeted to study the effects of metabolism on neurons. Fusion proteins were created by attaching PDK1 onto two different fluorescent proteins to allow visualization of the mitochondria in cells. The fusion proteins were found to correctly localize into mitochondria, where PDK is supposed to localize. The hypothesis that neurons over-expressing PDK1 would undergo cell death due to decreased ATP levels was tested, but no significant effect on neuron survival was found. Additionally, it was tested whether mitochondria change shape in the presence of molecules that increase synaptic activity and molecules that decrease synaptic activity. An increase in the number of vesicular (obviously round) shaped mitochondria in neurons with increased synaptic activity was observed in fixed cells. It can be concluded that synaptic activity influences mitochondrial shape.

**Interaction of Silver Nanoparticles with Yeast Alcohol Dehydrogenase.** Melanie Dorion and Karl Zachary, Department of Chemistry, Mary Baldwin College, Staunton VA 24401

Silver has long been established as toxic to many microorganisms. Historically, silver ions have been used to treat a variety of conditions and kill bacteria and fungi. Recent advances in nanotechnology have made silver nanoparticles available. These nanoparticles were found to act faster and be more efficient against a wider range of microorganisms. The current work is based on a proposed mechanism of silver suggesting silver's interaction with sulfur compounds. This study investigates possible interactions of silver nanoparticles with sulfur containing enzymes alcohol dehydrogenase (ADH) and lactate dehydrogenase (LDH) by the use of kinetic analysis. ADH results find significant decreases in initial velocities at 75  $\mu\text{g}/\text{mL}$  of silver indicating an interaction between the nanoparticles and the enzyme. No significant results were found for LDH. Inhibition as competitive or noncompetitive could not clearly be established.

**Host-Guest Interactions between Conformational Isomers of Calix[4]arene and Carbon<sub>60</sub> Fullerene.** Katherine Fenstermacher and Karl Zachary, Department of Chemistry, Mary Baldwin College, Staunton VA 24401

Two families of molecules frequently involved in host-guest chemistry are the calix[n]arenes and the fullerenes. Calix[4]arenes can exist in 4 different conformations: the cone, partial cone, 1,3-alternate, and the 1,2-alternate. This project investigated whether functionalized calix[4]arenes in the cone or the 1,3-alternate conformation experienced more charge transfer to C<sub>60</sub> fullerene as measured by UV-Vis. Both of the conformers showed evidence of charge transfer to C<sub>60</sub> with the cone conformer experiencing greater charge transfer than the 1,3-alternate.

**Synthesis of Covalently Modified Phenanthroline Ligands to Anchor Iron Centers to a Semi-permeable Membrane.** Sharon J. Francis and Colleen Taylor, Department of Chemistry and Physics, Virginia State University, Petersburg, VA 23806

This research includes the synthesis of covalently modified phenanthroline ligands that are capable of condensing with surface hydroxyl groups of a variety of materials. The first step of the synthesis was the reduction of 5-nitro-1,10-phenanthroline to 5-amino-1,10-phenanthroline. The product was obtained in high yield and recrystallized from methanol. A solvent system was developed for fractional column separation and thin layer chromatography for the reduced product from a crude sample. Infrared spectroscopic data were also collected. The characterization of covalently attached iron centers required UV/Visible spectroscopic identification and quantification. Initial data were collected to establish a Beer's law plot for quantification of the attached iron centers. A variety of other organic chemistry techniques were employed.



## PHOTOS FROM THE UVA MEETING - APRIL 13, 2007

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### ***CAN YOU IDENTIFY THESE PERSONS?***

The photograph is from April 13, 2007 when the subjects attended the Poster Session at the University of Virginia. All three are recipients of the Virginia's Section Distinguished Service Award. The man on the left received his award in 2000; the one in the center was the 1992 recipient, and the old man on the right was the award winner in 1991.



The "mystery person" in the April issue was Dr. Willard W. Harrison, who is now a Professor of Chemistry at the University of Florida.

