



*The Bulletin*  
of the  
Virginia Section  
AMERICAN CHEMICAL SOCIETY

SEPTEMBER MEETING NOTICE

● AWARDS MEETING ●

*Virginia Commonwealth University  
Richmond, Virginia*

*Friday, September 22, 2006*

**RECEPTION:** 5:00 - 6:45 p.m.  
Lobby/Atrium  
Temple Building  
901 West Main Street

**AWARDS PROGRAM:** 7:00 p.m.  
Room 1160  
Temple Building

**MENU:** Light Appetizers (5:00-5:30); Shrimp, Meatballs, Roast Beef, Rolls, Cheese, Fruit, Brownies, Lemon Bars (5:30 - 6:45); Soft Drinks, Beer, and Wine

**PRICE:** Members/Guests - \$12.00; Students, High School Teachers/Spouses, Retired ACS Members/Spouses, Retired Teachers/Spouses - \$6.00

**RESERVATIONS:** Please make reservations by NOON on **Wednesday, September 20** by calling Mrs. Diane Ruff at (804) 828-1298

**HOST:** Dr. Sally Hunnicutt, (804) 827-0531, sshunnic @ vcu.edu

**PROGRAM:** **DISTINGUISHED SERVICE AWARD: Dr. William Rademaker**  
**“Fifty Years of High School Chemistry”**

**SEPTEMBER 2006**

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			reservations due		meeting	
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## ***DISTINGUISHED SERVICE AWARD***

### ***Dr. William J. Rademaker***



William Rademaker was born in Salisbury, Maryland and spent part of his youth in Philadelphia, Pennsylvania. He received a B.S. degree in Chemistry from Villanova University in 1962 and a Ph.D. in Inorganic Chemistry from the University of Florida in 1969. This was followed by a postdoctoral research appointment at the University of Virginia where he worked with Dr. Russell Grimes. In the fall of 1970, Bill began a career in secondary education in the Waverly Central Schools in New York. He moved to Chesterfield County in 1980 and taught at Midlothian High School until his retirement in June of 2006. While teaching at Midlothian, he was recognized as Teacher of the Year in Chesterfield County (1988) and was a finalist for Virginia Teacher of the Year. That same year, the Virginia Section of the ACS gave Bill the Distinguished Service Award for High School Chemistry Teaching. In 2000, he was recognized as an Outstanding Chemistry Teacher by James Madison University.

Bill joined the American Chemical Society as a student affiliate member in 1958 and has been an ACS member ever since. He was part of the pilot program for the ACS program for high school chemistry, *Chemistry in the Community*, in Chesterfield County.

He served the Virginia Section as Treasurer, Secretary, Vice-Chair, and Chair-Elect, and was Chair in 1999. Bill has also served as Chair of the Education Committee and currently works on the Awards Committee in selecting the Middle School and High School Distinguished Teachers. He is married to Dr. Analie Rademaker, who is also retired. They have two children, Abby and Josh, and two grandchildren, Jane and George.

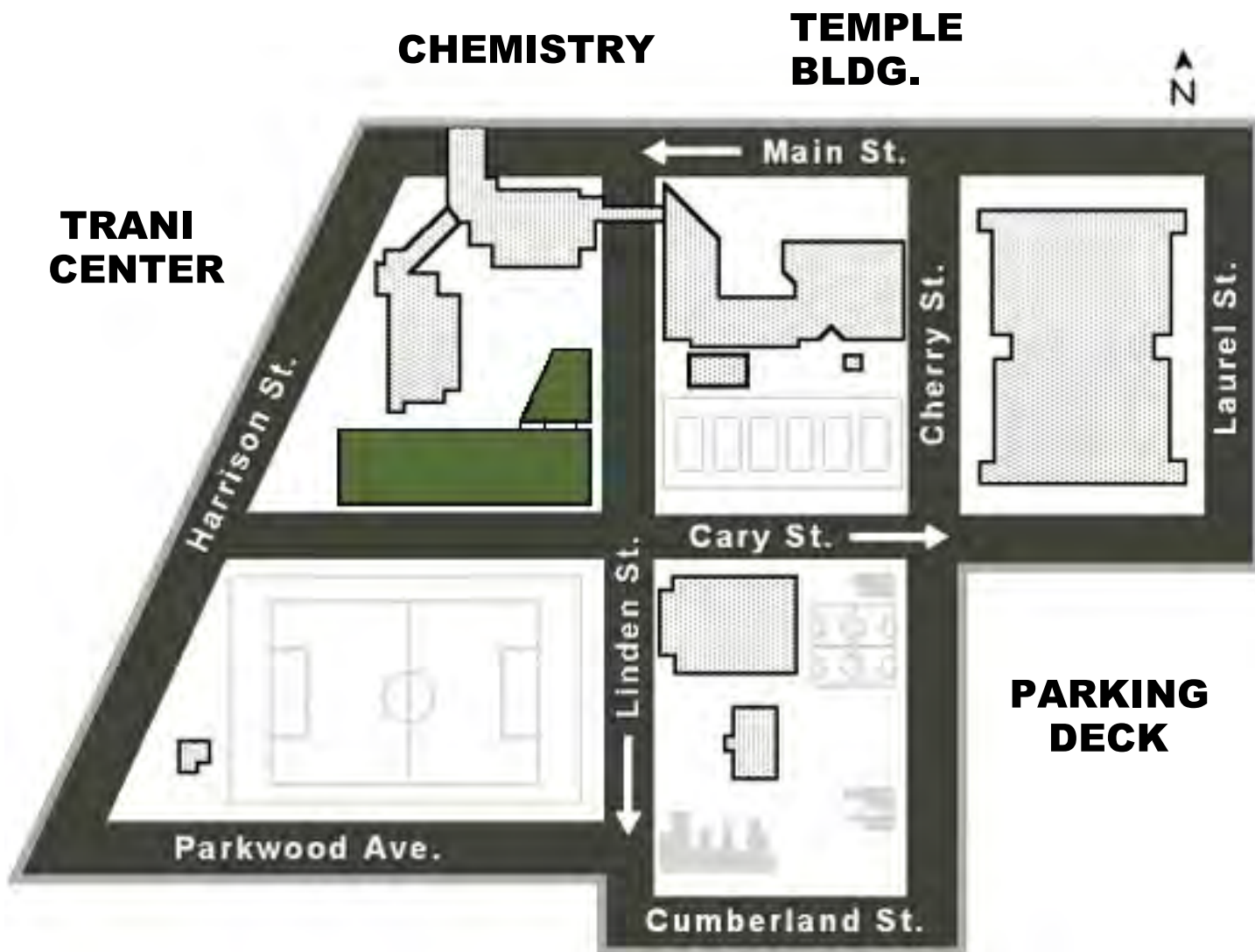
### ***“Fifty Years of High School Chemistry”***

This presentation will provide a retrospective look at the high school chemistry classroom. The evolution of various approaches to methodology and content will be traced. The discussion will include classical programs such as CBA and Chem Study as well as some more recent developments such as “Chemistry in the Community.” The impact of standardized testing, the Virginia Standards of Learning, End of Course tests, and risk management will also be discussed.

## ***DIRECTIONS***

The Reception will be held in the lobby of the Temple Building (formerly the General Purpose Academic Building) at Virginia Commonwealth University. The Temple Building is at 901 West Main Street in Richmond, one block west of Richmond’s Landmark Theater (formerly the Mosque). This is just south of the Chemistry Department which is housed in Oliver Hall, 1001 W. Main Street. Note that Main Street is one-way west and Cary Street is one-way east, and that you cannot turn left from Main Street on to Linden. There is parking on the streets around the Temple Building and in the Main Street Parking Deck, 801 W. Main Street (enter from Cherry or Laurel Streets). The Awards Program and Dr. Rademaker’s talk will be held in Room 1160 on the first floor of the Temple Building.

**MAP**



**\*\* VIRGINIA SECTION NEWS \*\***

**FUTURE MEETINGS OF THE SECTION**

DATE: October 24, 2006 (Tuesday)  
 LOCATION: College of William & Mary  
 Williamsburg, Va.  
 HOST: Dr. Lawrence Sacks  
 PHONE: (757) 930-2045  
 SPEAKER: Dr. E. Ann Nalley  
 TOPIC: "Chemistry, Transforming Lives"

DATE: November 17, 2006  
 LOCATION: University of Mary Washington  
 Fredericksburg, Va.  
 HOST: Dr. Roy Gratz  
 PHONE: (540) 654-1412  
 SPEAKER: Dr. Leanna Giancarlo

**JOINT MEETING WITH THE  
 HAMPTON ROADS SECTION**

DATE: December 1, 2006  
LOCATION: John Tyler Community College  
Chester, Va.  
HOST: Dr. Kristine Smetana, (804) 706-5143  
SPEAKER: Dr. Manfred Psiorz  
**Presentation of Teaching Awards**

## **THE CHAIR'S CORNER**

The Virginia Section was invited to bid to hold the 2009 Southeastern Regional Meeting in Richmond. The bid preparation was completed in a very short time. Unfortunately, we were unsuccessful, as the Puerto Rico Section was selected to host the meeting. I would like to commend these individuals who worked very hard to prepare our bid: Joe Pompano, Will Lewis, Trey Gregory, Ken Chapman, Brian Moores, Jerry Bass, Pat Barber, Ann Sullivan, and Bill Welstead. Thanks for a great effort. The Section is now considering the preparation of a bid for the 2011 regional meeting. We would welcome assistance from interested persons.

Eddie Thomas has resigned as Councilor for the Virginia Section. The Executive Committee has appointed Dr. Ann Sullivan to fill his position as Councilor until the 2007 officer election. Eddie was appointed to fill Ann's present position as Alternate Councilor until the election is held and new officers take their positions in January, 2007.

Please note my new address and telephone number: Dorothy Eseonu, 4336 Wilcot Drive, Midlothian, VA 23113; (804) 379-5411. My e-mail address is unchanged: dneseonu @ vu.edu.

We have an exciting program of meetings scheduled for the fall and winter, beginning with our annual Awards Meeting at Virginia Commonwealth University on September 22. We will be honoring an outstanding individual from the Virginia Section who has contributed significantly to our society and profession. And be sure to put October 24 on your calendar for a very special meeting at the College of William & Mary. Dr. E. Ann Nalley, President of the American Chemical Society, will be speaking at a joint meeting with the Hampton Roads Section. We look forward to your participation in our meetings and other activities of the Virginia Section.

Dorothy Eseonu, Section Chair

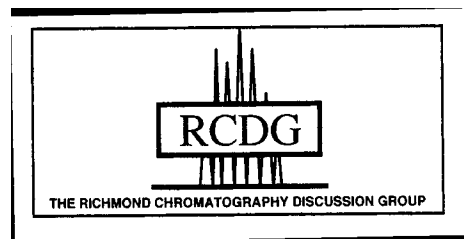
## **QUESTIONS FROM THE PAST**

This question was asked in the Summer Bulletin: The list of 50-yr members of the ACS (page 8 of the Summer issue) includes three persons who have served as Chair of the Virginia Section. Their terms were 1976, 1981, and 1982. **Who are the three former Chairs?** Franklin D. Kizer was Chair in 1976, William F. Kuhn in 1981, and Trevor B. Hill in 1982.

A new question from the past: On Dec. 13, 2005, Dr. Joseph Nagyvary, a professor emeritus at Texas A&M, was awarded a gold medal in Tokyo by the Japanese Society of Applied Physics. Dr. Nagyvary has spent 30 years researching Stradivarius violins and their composition. The gold medal recognized his discovery of nanocomposites in the varnish of the Stradivarius violin. Dr. Nagyvary presented some of his research on violins at a meeting of the Virginia Section. **When was that meeting and where was it held? Bonus question: Who played the violin that Dr. Nagyvary brought to the meeting?**

## 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 sponsors lectures at various locations in the Richmond area. Check out their website: [www.rcdg.org](http://www.rcdg.org).



## 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. She can be reached at [asullivan@reynolds.edu](mailto:asullivan@reynolds.edu).

## SOUTHEASTERN REGIONAL MEETING

The 58<sup>th</sup> Southeastern Regional Meeting of the American Chemical Society, **SERMACS 2006**, hosted by the ACS Savannah River Section in collaboration with the AIChE-Central Savannah River Section, will be held at the Augusta Marriott Hotel & Suites in Augusta, Georgia, November 1-4, 2006. "Linking Chemistry in the Southeast" is the theme of the meeting. The program includes 25 symposia and a variety of special events including a Vendor Exposition, Graduate School Fair, Golf Tournament, Diversity Reception, and a Soirée on the Historic Augusta Canal. Some symposia of special interest include **Alternative Fuels–The Hydrogen Economy, Advances in Food Safety Sensors, Chemistry of Explosives, Chemistry of Drug Abuse, Chemistry & the Law, Catalysis in Organic Chemistry, Chemistry of Aging, Environmental Remediation Chemistry, Nucleic Acids Research, Applied Geochemistry, and Issues in Emergency Response**. The deadline for booking hotel rooms at the meeting discount rates is October 1. Advance registration closes on October 9. Full information can be found at <http://www.sermacs2006.org>. The General Chair is Chris Bannochie [(803) 725-8088] and the Programming Chair is Tom Crute [(706) 667-4517].



## SCIENCE FAIR WINNERS

The Virginia Section sponsors chemistry prizes at the Metro Richmond Science Fair. This year's Fair was held at Mills Godwin High School in Henrico County. The first place prize in Chemistry was awarded to David Fisher of the Maggie Walker Governor's School. Second place went to Rishi Ganeriwala, a student at the Center for Science, Mathematics and Technology at Mills E. Godwin High School in Henrico County. Aakriti Malhotra from the Math & Science High School at Clover Hill in Chesterfield County took the third place award. Top scorers in the junior division were Valerie Ngoh and Valerie Westerman, both of the Moody Middle School in Henrico County.

**WORDS OF WISDOM FOR SEPTEMBER :** "Happiness Is Not The  
Absence Of Problems, But The Ability To Deal With Them"

## 2006 CHEMISTRY OLYMPIAD RESULTS

The 2006 Chemistry Olympiad was very successful. Over 1,000 students from 35 public and private high schools participated in the competition. Two levels of examinations, First and Second Year, were administered. Team awards were given to schools in several categories. A Team Award is given to a school that has the highest combined total for three students. Awards were presented in three categories for each level of examination. The winners of the 2006 Team Awards are:

### First Year Examination:

Category	School
Small School	St. Stephen's and St. Agnes' School
Governor's School	Maggie Walker Governor's School
Large School	Deep Run High School

### Second Year Examination:

Category	School
Small School	St. Stephen's & St Agnes' School
Governor's School	Maggie Walker Governor's School
Large School	Albemarle High School

Thirteen students and several alternates were invited to compete at the second level by taking the national exam (no more than two students from a school are allowed to participate in the national exam). Nine of those who were selected took the exam. Sydney Creutz, a junior at Albemarle High School, did very well on the national exam and was selected as one of 20 students to attend the International Chemical Olympiad study camp at the Air Force Academy in Colorado (more information on Ms. Creutz and additional Olympiad results appear below). Students selected to participate in the national examination:

School	Students
Albemarle High School	Sydney Creutz*, Greg Echelberger*, Kurt Walters†
Douglas Freeman High School	Daniel J. Allan*
Freedom High School	Tae Um*
Harrisonburg High School	Evan Baugh*, Nathan Seifert, Elliot Kulakow†
Maggie L. Walker Governor's School	Medhi Razvi*, Keith Moran, Mathew Shapiro, Menaka Nayar
Mills E. Godwin High School	John Sions*, Robert Foley
New Horizons Governor's School	Dustin Sward
Waynesboro High School	Thomas Brokamp*
Western Albemarle High School	Jennifer Ross*

\*participated in national examination

†alternate

Each of the students listed above received a \$25 gift certificate from Barnes & Noble.

At each school, the student with the highest score received a National Olympiad or Element pin. Their teachers also received pins. Here are the highest-scoring students:

SCHOOL	FIRST-YEAR EXAM	SECOND-YEAR EXAM
Albemarle High School	Samouil Farhi	Sydney Creutz
Charlottesville High School	Mirandi Amarante* Rachel Fifer*	
Chesapeake Bay Governor's School - Warsaw	David Coates	
Colonial Heights High School	Rishi Luthar	
Deep Run High School - Ms. Lavendar	Omkar Kharkar	
Deep Run High School - Ms. Nolan	Alyson Aversa	
Douglas Freeman High School	Joseph Fields	Daniel Allen
Faith Christian Academy	Julie Allbeck	
Fredericksburg Academy	Phillip Jackson	Michael Weaver
Freedom High School	Creigh Richert	Tae Um
Grace Christian School	Whitney Moore	
Harrisonburg High School	Camila Domonoske	Nathan Seifert
Hermitage High School	Karen Quach	Kendall Lewis*, Emil Trinidad*
Highland School	Georgia Broaddus	Junsung Chung
Highland Springs High School	Travis Schmidt	Joseph Penick*, Laticia Stewart*
James River High School		Kelli Canada
Maggie Walker Governor's School - Bowie	Sarah Haack	
Maggie Walker Governor's School - Morris	Ilya Dubovoy	
Maggie Walker Governor's School - Ross	Michael Wong	Mehdi Razdi
Matoaca High School - Malone	Damian Njoku	
Matoaca High School - Edwards	Alexander Matthews	Sean Yaworsky
Miller School of Albemarle	Shui He	
Mills E. Godwin High School - Parham	Richard Rhodemyre	
Mills E. Godwin High School - Shore	John Ely	

SCHOOL	FIRST-YEAR EXAM	SECOND-YEAR EXAM
Mills E. Godwin High School - Delano	James Mitchell	
Mills E. Godwin High School - Cirillo		John Sions
New Horizons Governor's School		Justin Sward
Potomac Falls High School - Murphy	Azhar Ahmed	
Potomac Falls High School - Leonard	Austin Baird*, Brennan Thralls*	Evan Dent*, Eric DuVon*
Potomac Falls High School - Velazquez	Jeffrey Geiger	
Prince George High School - Schmieder	Kathryn Majewski	
Prince George High School - Wade Jones	Andrew Bailey*, Caroline Price*	
Richmond Community High School	Malcolm Bressendorf	
Shenandoah Valley Christian Academy	Amanda Koth*, Bret Lebo*	
St. Stephen's & St. Agnes' School - Oakes	John Jakes	Joseph Ahdoot
St. Stephen's & St. Agnes' School - Malliaris	Patrick Kane	
St. Stephen's & St. Agnes' School - Beckrich	Erika Herrera	
Stafford High School - Dennis	Katerine Cooke*, Sean House*	Nathaniel Mack
Stafford High School - Sharp	Christian Millson	
Stafford High School - Rankin	Emily Mikkelson	
Stafford High School - De Silva		David Kim
Surry County High School	Joseph Gwaltney	
The Blue Ridge School	John Duncan	
The Steward School	Charles Carter	
The Southside Governor's School - Alberta	Pinar Smith	
The Southside Governor's School - Keysville	Chelsea Howlett	
Waynesboro High School		Thomas Brokamp
Western Albemarle High School	Conor Pratt	Jennifer Ross

\* tied for top score



The students with the three highest scores from all participating schools, separated by category and by test, received a \$25 gift certificate from Barnes and Noble for first place, a \$15 gift certificate for second place and a \$10 gift certificate for third place. Those students who were also nominated for the National Exam received a \$25 gift certificate, instead of their place amount. The top scorers:

#### FIRST-YEAR OLYMPIAD LOCAL EXAMINATION:

PLACE	SMALL SCHOOL	GOVERNOR'S SCHOOL	LARGE SCHOOL
First	<b>Patrick Kane</b> -- St. Stephen's and St. Agnes' School	<b>Ilya Dubovoy</b> – Maggie L. Walker Governor's School	<b>Samoul Farhi</b> – Albemarle High School <b>Omkar Kharkar</b> – Deep Run High School
Second	<b>John Jakes</b> – St. Stephen's and St. Agnes' School	<b>Michael Wong</b> – Maggie L. Walker Governor's School	<b>Camila Domonoske</b> – Harrisonburg High School
Third	<b>Creigh Richert</b> – Freedom High School <b>Shui He</b> – The Miller School	<b>Eric Haley, Yu-Sung</b> – Maggie L. Walker Governor's School	<b>Conor Pratt</b> – Western Albemarle High School

#### SECOND-YEAR OLYMPIAD LOCAL EXAMINATION:

PLACE	SMALL SCHOOL	GOVERNOR'S SCHOOL	LARGE SCHOOL
First	<b>Tae Um</b> – Freedom High School	<b>Mehdi Razdi</b> * – Maggie L. Walker Governor's School	<b>Sydney Creutz</b> * – Albemarle High School
Second	<b>Joseph Ahdoot</b> – St. Stephen's & St. Agnes' School	<b>Keith Moran</b> – Maggie L. Walker Governor's School	<b>Greg Echelberg</b> * – Albemarle High School
Third	<b>Michael Weaver</b> – Fredericksburg Academy	<b>Matthew Shapiro</b> – Maggie L. Walker Governor's School	<b>Nathan Seifert</b> – Harrisonburg High School

\*these students were invited to take the National Olympiad Examination (Olympiad rules allow only two students from a school to take the National Examination, and each participant must be an American citizen)



**Students Taking National  
Chemistry Olympiad Exam**



**Some of the Top Scorers  
from the Virginia Section**

## ALBEMARLE HIGH SCHOOL STUDENT HONORED

**Sydney Creutz**, from Albemarle High School in Charlottesville, was selected to participate in the 2006 U.S. Chemistry Olympiad Study Camp and was chosen as an alternate for the team that represented the United States at the International Chemistry Olympiad in the Republic of Korea. The two-week Study Camp was held in June at the United States Air Force Academy in Colorado Springs, Colorado. The Camp participants engaged in intensive activities in preparation for the 38<sup>th</sup> annual International Chemistry Olympiad competition. Four students from the Camp were selected to represent the United States in the International contest. Ms. Creutz was one of only 20 students invited to attend the Camp, and one of the two alternates for the USNCO team. This was a great honor. The selection was based on her performance on the national Chemistry Olympiad Examination and her work at the Study Camp. Her chemistry teacher at Albemarle High School was Mr. Marvin Curry, who received the Virginia Section's Distinguished Service Award for High School Chemistry Teaching in 1987. Congratulations to Ms. Creutz, Mr. Curry, and Albemarle High School for this outstanding achievement. Ms. Creutz is now a freshman at the Massachusetts Institute of Technology.



**Students at the U.S.  
Chemistry Olympiad  
Study Camp in Colorado**



## INTERNATIONAL OLYMPIAD RESULTS

The team from China won the 2006 International Olympiad competition. Teams from Taiwan, the Russian Federation, and South Korea finished in a tie for second place. U.S. team members were awarded one bronze and three silver medals. More than 250 students from 68 countries competed in the Olympiad which included theoretical and practical exams that each lasted five hours. The United States Team consisted of Michael Blaisse from Harrisburg, PA; Greg Brockman of Thompson, ND; Andrew Freddo of Colts Neck, NJ; and Alex Zozula of East Brunswick, NJ. Alternates were Xiaoran (Taylor) Yi of San Diego, CA and **Sydney Creutz** of Earlysville, VA

## CHEMISTRY SEMINARS AT THE UNIVERSITY OF VIRGINIA

September 1 - **Professor Craig Crews**, Yale University, "A Small Molecule Approach to Cell Biology"

September 15 - **Professor Amos Smith**, University of Pennsylvania, "Evolution of the Petasis-Ferrier Union/Rearrangement Tactic in Complex Molecule Synthesis: Challenges, Excitement, and Frustrations" (**IRELAND LECTURE**)

October 20 - **Dr. Russell Hemley**, Carnegie Institution of Washington

October 27 - **Professor Sherry Chemler**, University of Buffalo, "New Copper(II) Chemistry for the Synthesis of Nitrogen Heterocycles: Carboamination of Unactivated Olefins"

Chemistry colloquia are held at 4:00 p.m. in Room 304 of the Chemistry Building. The complete colloquium schedule is on-line at <http://www.virginia.edu/chem/newsandevents/seminars/>.

## **CHEMISTRY SEMINARS AT VIRGINIA COMMONWEALTH UNIVERSITY**

- August 29 - **Sang Bok Lee**, University of Maryland, "Controlling Dimensions of Template-Synthesized Nanotubes: From Biomedicine to Fast Electrochemical Devices"
- August 31 - **Dr. Suzanne Bell**, West Virginia University, "Analysis of Breath for Compounds of Forensic Interest"
- September 7 - **Dr. Muhammad Yousaf**, University of North Carolina at Chapel Hill, "Interfacing Surface Chemistry with Cell Biology"
- September 19 - **Professor Holden Thorp**, University of North Carolina at Chapel Hill, "Aqueous Electron Transfer Reactions of Tyrosine and Carbon Nanotubes"
- September 21 - **Dr. Susan Kauzlarich**, University of California at Davis, "Synthesis of Core/Shell Nanoparticles for Biological Applications"
- October 5 - **Professor Sharon Huo**, Clark University, "Mapping the Early Steps of Amyloid Formation with Computational Approaches"
- October 26 - **Dr. Liem X. Dang**, Pacific Northwest National Laboratory, "Recent Advances in Studies of Molecular Processes at Interfaces"

Seminars are held at 3:45 p.m. in the Kapp Lecture Hall, Room 1024 in the Mary E. Kapp Wing of Oliver Hall, 1001 West Main Street. Call (804) 828-1298 for more information.

## **CHEMICAL ENGINEERING SEMINARS AT THE UNIVERSITY OF VIRGINIA**

- August 24 - **Professor Michael S. Wong**, Rice University
- August 31 - **Professors Ramon L. Espino and Donald J. Kirwan**, University of Virginia
- September 7 - **Professor Robert Armstrong**, Massachusetts Institute of Technology (**Bernard A. Hess Lecture**)
- September 14 - **Professor Edward Cussler**, University of Minnesota
- September 21 - **Dr. Jack Johnston**, ExxonMobil Company
- September 28 - **Professor Ralph Allen**, University of Virginia
- October 12 - **Professor Randy Weinstein**, Villanova University
- November 2 - **Professor Alexander Katz**, University of California, Berkeley

Seminars are held at 11:00 a.m. in Room 005 of the Chemical Engineering Building. Call (434) 924-7778 for more information.

## NATIONAL CHEMISTRY WEEK

**October 22-28, 2006**  
**Theme: "Your Home—It's All Built on Chemistry"**



Information: <http://www.chemistry.org>

There will be a NCW Poster Contest for children in kindergarten through 12<sup>th</sup> grade and a NCW Chemvention Competition for student affiliate chapters. See the ACS Chemistry website for more information on these and other NCW activities.

**The NCW Coordinator for the Virginia Section is Dr. Kristine Smetana, Associate Professor of Chemistry at John Tyler Community College. Contact her for information on NCW activities within the Virginia Section and to volunteer your help for this year's National Chemistry Week: (804) 706-5143; ksmetana @jtcc.edu.**

## CHEMISTRY GRADUATES AT VIRGINIA SECTION SCHOOLS

Two schools from the Virginia Section ranked high in terms of numbers of chemistry graduates in 2004-05. The University of Virginia ranked sixth in the country with 113 Bachelor's graduates, while the College of William & Mary, with 57 graduates, ranked 22<sup>nd</sup>. William & Mary ranked fifth in terms of ACS certified graduates with 49, while UVA ranked ninth with 42 certified graduates. Bachelor's graduates at other Virginia Section schools (number of certified graduates in parentheses): Hampden-Sydney -11(9); James Madison University - 23(7); Randolph-Macon College - 7(6); University of Richmond - 15(6); Virginia Commonwealth University - 40(2). Data are from the July 24, 2006 issue of *C&EN* and include only schools with Chemistry programs approved by the ACS.

## ABSTRACTS OF POSTER PRESENTATIONS APRIL 14, 2006 - UNIVERSITY OF VIRGINIA

**Modulation of Carboxylate Leaving Group Ability in Trans-platinum Planar Amine Compounds with N<sub>2</sub>O<sub>2</sub> Ligand Donor Sets**, Kenneth M. Knott, Genevieve H. Bulluss, Erin S.F. Ma, Eugenio Alvarado, Sheena M. Aris, and Nicholas Farrell, Virginia Commonwealth University, Richmond VA.

Trans-platinum complexes, such as TDDP, have traditionally found to be inactive against tumors. However, replacing an ammine with a planar amine greatly enhances the cytotoxicity of this class of compounds. Trans-platinum complexes containing planar amines, trans-[PtCl<sub>2</sub>(L)(L')] (where L = NH<sub>3</sub>, L' = py, quin, pic; L=L' = py, quin, pic), display a unique profile of biological activity against certain types of tumors. The presence of Pt-Cl bonds means that these compounds may have high kinetic reactivity, which may have a consequence for toxic side effects. Modification of the ligands to an N<sub>2</sub>O<sub>2</sub> donor set enhances solubility whilst retaining the cytotoxicity of the parent chloride compounds. This

strategy has proven successful with the use of the inert dicarboxylate leaving groups of the clinical compounds carboplatin and oxaliplatin. Therefore, we have developed a series of TPA carboxylate compounds and substituted picoline compounds to investigate the chemistry and biological activity related to the nature of the leaving group and effects of steric hinderance. These initial results indicate that the new compounds are more soluble, and retain cytotoxicity while slowing hydrolysis to aquated species in comparison to the parent chlorides.

### **Uses of Grasses and Amendments for Nutrient Reduction During Rainfall Simulation, Nikisha Tarver and Asmare Atally, Virginia State University, Petersburg, VA.**

Nutrient runoff from agricultural fields is known to contaminate receiving streams and cause eutrophication. Grass cover crops are recommended to retain nutrients that could be lost in runoff. This study examined the effectiveness of native(volunteer) and planted Orchardgrass (*Dactylis glomerata*) to retard the flow of nutrients from soils that received poultry manure. Six treatments, three replications and two grasses were randomly assigned to four blocks in a greenhouse setting. Poultry litter, alum and lime were each applied at 2.5 Mg/ha. It was predicted that addition of alum and lime in agricultural soils planted with grass would serve as a better deterrent to nutrient loss than grass or soil alone. The study used 30x32x15.5 cm plastic containers packed with Bourne (fine-loamy, mixed, thermic Typic Fragiudult) soil to its bulk density. Grasses were clipped four times to encourage root development. The clippings and roots were both acid digested and analyzed for nutrient elements. Moisture and temperature in the soil was monitored every hour using a CR-10X data logger attached to moisture probes embedded in each plastic container. Simulated rain was applied at 65 mm per hour for 45 minutes and both runoff and percolation water collected. These water samples were assayed for nutrient content, and the resulting data was analyzed using statistical package. Results indicated that grasses grew better with poultry litter than soil alone, and amending litter with lime or soil with poultry litter. Amending the poultry litter with alum or lime and covering the soil with grass has greatly reduced nutrient loss in runoff. However, more nutrients were observed in percolation water from treatments that contained amendments.

### **Real-time Monitoring of Multinuclear Platinum Drug Binding to Electrode-Immobilized DNA Using a Quartz Crystal Microbalance, Christopher M. Shuford, Melissa C. Rhoten, \*John B. Mangrum and \*Nicholas P. Farrell, Longwood University, Farmville, VA, and \*Virginia Commonwealth University, Richmond, VA.**

A series of noncovalent polynuclear platinum complexes, AH-88, AH-57, and AH-44, are being investigated for their potential use as anticancer agents. These complexes represent analogs of BBR 3464, a trinuclear platinum compound currently in phase II clinical trials. Polynuclear platinum complexes are unique in that they offer different modes of binding to DNA compared to cisplatin. These complexes lack displaceable chlorine groups on the platinum centers, which prevents covalent binding to DNA. However, they do have the ability to interact with DNA through hydrogen bonding and electrostatic interactions. This poster describes the use of gold quartz crystal microbalance (QCM) electrodes to monitor, in real time, the interaction of these potential anticancer agents with surface-immobilized DNA. Experimental results show reversible, non-covalent interaction of AH-57 and AH-44 with surface-immobilized DNA at low concentrations (ca. 50  $\mu$ M). Preliminary results indicate that AH-88 also interacts with the immobilized DNA but at higher concentrations.

### **The Facilitation of Cell Elution from Rape Kit Cotton Swabs, Sarah J. Linke, Kate Manning, Jessica C. Voorhees, Jerome P. Ferrance, James P. Landers, University of Virginia, Charlottesville, VA.**

Genetic analysis of DNA obtained from rape kit cotton swabs is a well-established forensic technique. The proven utility of forensic DNA evidence has contributed to an increased demand for analytical services. Although the conventional methodology is effective, it involves a significant amount of sample handling. In addition, the time-consuming nature of the procedures involved has led to the development of a large backlog of casework samples.

The current protocol for rape kit sample analysis involves the independent analysis of victim and perpetrator DNA from extracted vaginal cotton swabs. The solutions used in this method include proteinase K and an anionic detergent to selectively lyse vaginal epithelial cells while eluting intact sperm cells. Centrifugation pellets the sperm cells, separating them from the solution containing vaginal epithelial cell DNA. This preferential lysis method allows for independent genetic analysis of male and female DNA; however, an overnight incubation is often required for optimal DNA recovery.

The use of microchip technology is advantageous compared to conventional DNA analysis methods, as it allows for a reduction of extensive analysis times and a significant decrease in sample volumes. The analytical techniques performed on microchips can be integrated with sequential analytical steps in the form of a lab-on-a-chip. However, the conventional separation of sperm cells from epithelial cell DNA requires centrifugation, a step which is not easily

amenable to a microdevice.

A successful method of separating vaginal cells from sperm cells using a microdevice has been recently demonstrated.<sup>1</sup> The procedure exploits the physical differences between the two cell types: sedimentation of epithelial cells in one reservoir of a glass microdevice occurs while sperm cells move towards an outlet reservoir following the initiation of a pressure-driven flow. The method allows for independent DNA extraction from the two cell types, and is particularly beneficial because it can be combined with other sample preparation and analysis steps as part of a lab-on-a-chip. However, the success of this technique is dependent on the efficient recovery of intact sperm and epithelial cells, a particular challenge for many rape kit samples featuring low numbers of sperm cells. An enhanced cell elution process is therefore vital for maximizing the recovery of sperm and epithelial cell DNA.

The research to be presented describes the development of an improved method for cell elution from cotton swabs. The effects of anionic detergents<sup>2</sup>, as well as enzymes that digest the cellulose and pectin components of a swab<sup>3</sup> were investigated. Results indicate that elution using enzymes improved the recovery of sperm cells without lysing epithelial cells, and that the use of detergent alone provided a considerable enhancement in cell recovery over enzymatic methods. This research represents a major step towards the development of a microdevice capable of DNA analysis for forensic casework.

(1) Horsman, K.; Barker, S.L.R.; Ferrance, J.P.; Forrest, K.A.; Koen, K.A.; Landers, J.P. *Anal Chem* 2005,77, 742-9.

(2) Voorhees, J.C.; Manning, K.; Linke, S.J.; Ferrance, J.P.; Landers, J.P. *J Forensic Sci* 2006 in preparation.

(3) Voorhees, J.C.; Ferrance, J.P.; Landers, J.P. *J Forensic Sci* 2006 in press.

**Integration of Volume Reduction SPE to Increase pre-PCR DNA Concentration and Purity**, John Wass, Joan Bienvenue, Jerome P. Ferrance, and James P. Landers, University of Virginia, Charlottesville, VA.

Current methods for forensic DNA analysis require a substantial amount of time and resources to accomplish. Developments in analytical processes to account for such inefficiency has spawned the vision of an automated micro total analysis system (µTAS) that combines purification, amplification, separation and detection into one device, and will be capable of superseding the conventional techniques currently used. Combining multiple processes on a micro scale decreases analysis time, while simultaneously decreasing costly reagent and sample consumption; contamination is likewise diminished due to limited user intervention in an automated process.

The ability to isolate small quantities of DNA in large volumes is essential for accurate forensic analysis. The incorporation of a volume reduction solid-phase extraction (vrSPE) step prior to a more stringent µSPE purification step serves to increase sample concentration (necessary for downstream analysis processes), as acting as a preliminary extraction phase that will increase sample purity. The stationary phase described here for the vrSPE uses anion-exchange resin beads. This stationary phase allows the elution buffer from the vrSPE bed to serve as the loading buffer for an integrated µSPE bed, and thus permits the two consecutive extractions without user interference. A method utilizing anion-exchange resin beads to effectively reduce sample volume, while simultaneously increasing sample concentration is presented, along with results for evaluation and optimization of this phase and protocol.

**Development and Optimization of a Sensitive ELISA to Measure Monocyte Chemoattractant Protein-1 (MCP-1) in Mouse Urine**, Yian Y. Lee, Sylvia Cechova, and Carthene Bazemore-Walker, University of Virginia, Charlottesville, VA.

An enzyme-linked immunosorbent assay (ELISA) was developed for the quantification of a potential lupus biomarker and inflammatory cytokine, monocyte chemoattractant protein-1 (MCP-1) in mouse urine. The ELISA utilized two polyclonal antibodies and was performed using the sandwich method. Optimal assay conditions were found using 0.4 µg/ml capture antibody, 0.1 µg/ml detection antibody, 3% BSA in PBS buffer (serving as diluent and blocking buffers), and 0.025% Tween 20 in PBS (serving as wash buffer). Upon spiking, 67-136% of added MCP-1 could be recovered from diluent and urine samples. Using optimized assay conditions, the LLD was found to be 6.5 pg/ml of murine MCP-1 with a practical working range for the standard curve between 0-250 pg/ml.

**A Combined Quantum Mechanical and Molecular Mechanical Technique used in the Study of HIV-1 Protease – Inhibitor Interactions**, Jimmy Marion and Carol Parish, University of Richmond, Richmond, VA.

The HIV-1 protease (HIV-1 PR) hydrolyzes viral polyproteins allowing the creation of functional proteins that are required for viral assembly and activity. HIV-1 PR is an important target for inhibition as disruption of the formation of functional proteins leads to immature virus development. A combined quantum mechanical and molecular mechanical (QM/MM) technique has been used to study enzyme-inhibitor interactions. This QM/MM technique allows for the



calculation of molecular polarization effects of selected inhibitors due to interactions with the HIV-1 protease. In this study, the QM/MM method will be used to study the energetics and structural interactions between the HIV-1 PR and various FDA-approved inhibitors such as Nelfinavir, Mozenavir and Tipranavir.

**Direct UV Photolysis and Advanced Oxidation of Estrone with Byproduct Formation**, Kirsten E. Studer and Charles M. Sharpless, University of Mary Washington, Fredericksburg, VA.

Endocrine disrupting compounds (EDCs) are anthropogenic chemicals that disrupt the endocrine system of animals and humans, even at low exposures. One such compound is estrone (E1). This research investigated the feasibility of photochemical degradation for remediation of drinking water containing E1. Photolysis was carried out with a 500 W medium-pressure mercury lamp. Both direct and indirect photolysis were studied, the latter using H<sub>2</sub>O<sub>2</sub> as a source for OH radicals. Using reversed-phase HPLC with absorbance detection to follow the reaction, E1 degraded into two distinct byproducts after 2 min of direct photolysis and after 1 min of advanced oxidation. The absorbance spectra of the products seen by HPLC indicate that the phenol ring is still intact in these compounds. Further studies using GC-MS are underway to determine the nature of the byproducts formed. MSTFA is being used to derivatize concentrated E1 samples and the resulting spectra are being analyzed to identify the byproducts. Preliminary data suggest the formation of a carboxylic acid and/or an ester. Ongoing work is also being devoted to determining the rates of direct photolysis as a function of wavelength and direct photolysis quantum yields will be reported.

**Quantum Mechanical Studies of Five, Seven and Eight-Membered Eneidyne**, Evan Wang and Carol Parish, University of Richmond, Richmond, VA.

Eneidyne molecules have tremendous potential in the field of anti-cancer drugs. These molecules can cyclize into benzyne diradicals, which destroy cells by abstracting hydrogens from the DNA, leading to DNA cleavage and cell death. When the eneidyne molecules bind with cancer cells, this beautiful mechanism can be utilized against tumor growth. However, the specificity for cancer cells is not yet achieved. In this project, the cyclization energetics of five, seven, and eight-membered molecules with the eneidyne moiety are studied using quantum mechanical methods. These results will provide insight into how different structural variations in the eneidyne moiety affect the energies of the cyclization pathway and how the aromatic driving force might be harnessed in the design of triggered warhead drugs. Overall, the study contributes to the ultimate goal of finding ways in which the cyclization of eneidyne molecules can be controlled and used specifically against cancer cells.

**Dialkyldicyanofumarate Diesters as Acceptors for Charge-Transfer Molecule-Based Magnets**, Alexis Wells, Bradley D. Newkirk and Gordon T. Yee, Virginia Polytechnic Institute and State University, Blacksburg, VA.

Dicyanofumarate diesters are made by replacing two nitrile (CN) groups on tetracyanoethylene (TCNE) with ester functional groups. These compounds are relatively easy to synthesize and also to reduce by one electron, making them good acceptors for charge-transfer salt production. Charge-transfer salt magnets arise upon the reaction of dialkylfumarates with decamethylmetallocenes, M(Cp)<sub>2</sub>, where M = Cr, Mn. By varying the length in the alkyl chains of the ester, structure-property relationships can be analyzed to reveal information concerning magnetic coupling. Presented here is the synthesis of two new acceptors: di-n-butyl dicyanofumarate and di-iso-butyl dicyanofumarate, along with their reactions with Cr(Cp)<sub>2</sub> and Mn(Cp)<sub>2</sub> to form salts. Magnetic measurements of the di-iso-butyl dicyanofumarate metallocene charge-transfer salts have been made, characterizing them as metamagnets.

## **NOMINATIONS FOR 2007 ESSELEN AWARD**

The Northeastern Section of the ACS is soliciting nominations for the 2007 Esselen Award for Chemistry in the Public Interest. The award consists of a \$5,000 prize and a medal of recognition. The deadline for nominations is October 15, 2006. Nominations and inquiries should be directed to Dr. Robert S. Langer, c/o Karen Piper, 19 Mill Road, Harvard, MA 01451. The Esselen Award recognizes a chemist whose scientific and technical work has contributed to the public well-being, and has thereby communicated positive values of the chemical profession. Recent winners include Richard DiMarchi (2006), Jean Fréchet (2005), James Jorgenson (2004), and Bruce Roth (2003).

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## CAN YOU IDENTIFY THESE PERSONS?



The photograph is from 2006. The couple recently celebrated their 50<sup>th</sup> wedding anniversary. He is Alumni Distinguished Professor Emeritus of Chemistry at Virginia Tech. He was born in Ashland, graduated from Petersburg High School, received a B.S. degree in chemistry from Randolph-Macon College and a Ph.D. in chemistry from Lehigh University. In 1994, he was named Virginia's Outstanding Scientist. He has given several talks to the Virginia Section, including one on "Surface Chemistry" at the College of William and Mary in April, 1986 and, more recently, he spoke on "Oil Films on Water Surfaces: A Study of Science and Technology, History and Ethics" at the December 2003 meeting of the Section, held in Petersburg.

The "Mystery person" shown in the Summer Bulletin was **Hiram Hanmer**. He was Chair of the Section in 1942 and received the Distinguished service Award in 1952.

