Monthly Meeting
Henry A. Hill Award to C. E. Kolb

Nucleus Buyer's Guide
Listing of Suppliers, Products and Services

Alzheimer's Disease
An Article by Martin Freier

Uncorked: The Science of Champagne
A book review by Dennis Sardella
ACS SHORT COURSE

Synthetic Organic Chemistry: Modern Methods and Strategies

Designed to improve the skills and marketability of practicing B.S., M.S., and Ph.D. chemists. The NESACS Committee on Continuing Education is pleased to sponsor this new National ACS Two Day Short Course, at a registration fee less than half of that charged at National ACS Meetings. This Short Course is designed for chemists concerned with any aspect of laboratory or manufacturing operations involving the preparation of organic compounds. It will be invaluable to chemists with any level of training (B.S., M.S., or Ph.D.) who need to update their knowledge of modern organic chemistry. Registrants are encouraged to bring a small set of molecular models to the course.

DATES and TIME: Thursday, Nov. 17, 2005; 8:00 a.m.–5:00 p.m. and Friday, Nov. 18, 2005; 8:30 a.m. – 5:00 p.m.
PLACE: Room 320, Curry Student Center, Northeastern University, 360 Huntington Ave., Boston, MA

KEY TOPICS TO BE DISCUSSED:
Basic strategy in designing syntheses of organic compounds; key methods of synthetic organic chemistry in context of their applications to large numbers of actual syntheses; how to control stereochemistry in cyclic and acyclic systems and recent developments in asymmetric syntheses; topics such as the synthon approach to organic synthesis, the use of protecting groups, and stereoelectronic effects; use of enzymes and other biological techniques in synthesis.

PROGRAM AGENDA: Topics will be selected from the following list.

• Introductory Concepts for Planning Syntheses: Strategy for Designing Syntheses; Synthetic Equivalency; Protecting Groups; Construction of Carbocyclic Systems.
• Enantioselective Synthesis: Basic Concepts; Enantioselective Reagents and Catalysis; Biological Methods.
• Enolates and Enol Derivatives: Regio- and Stereoselective Enolate Formation and Alkylation; Stereoselective Aldol Condensations; Five- and Six-membered Ring-forming Reactions of Enolates.
• Dialkylation and Coupling Reactions.
• Carbocation Reactions: Alkene Cyclization Reactions; Polycyclizations; Cyclization of Pentadienyl Cations.
• Radical Cyclization Reactions: Use of Azo Compounds; Use of Halides and Other Initiator Groups; Tandem Cyclizations.
• Carbene, Carbene Complexes and Other Carbene-like Species: Addition to Alkenes and Alkynes; Carbene Insertion Reactions.
• Cycloadditions: 4+2 Cycloadditions: Diels-Alder Reaction; Intramolecular Diels-Alder Reaction; 3+2 Cycloadditions; 2+2 Cycloadditions; Higher Order Cycloadditions.
• Ene, Carbyonylation, and Other x-Cyclization Reactions: Ene Reaction; Diene, Allene, and Alkyne Cyclizations; Electrocyclic Ring Closure of 1, 3-Dienes; Carbyonylation Reactions.
• Alkene Synthesis: Wittig Reaction and Modifications; Peterson Reaction of Silanes; Julia Condensation of Sulfoxones; Use of Transition Metal Alkylidene Reagents; Alkene and Alkyne Metathesis Reactions; Additions to Alkynes.
• Rearrangements: Cyclopropane Derivatives; Gröb and Related Fragmentations; Cope and Claisen Rearrangements.
• Advanced Applications.

INSTRUCTOR: Paul Helquist, Professor of Chemistry, University of Notre Dame, is the author of more than 80 papers and articles concerning new synthetic methods, the total synthesis of natural products, and applications of organometallic chemistry. You will benefit from Prof. Helquist’s extensive research and teaching experience.

PRE-REGISTRATION REQUIRED – Registration Fees:
ACS Members if received before Nov. 3 .... $500.00; if received after Nov. 3 .... $595.00
Non-ACS Members if received before Nov. 3. $600.00; if received after Nov. 3 .... $695.00

There will be a limited number of scholarships for unemployed ACS Members on a space-available basis.

Parking Fee: about $14.00/day. University cafeterias will be available for lunches.

For further information contact: Prof. Alfred Viola at (617) 373 2809

Registration form for ACS Short Course:
Synthetic Organic Chemistry: Modern Methods and Strategies. Nov. 17-18, 2005

Name: ___________________________________ Business Affiliation: _______________________________
Mailing ___________________________________ Telephone: ____________________________________
Address (Circle: Home or Work) E-mail: ___________________________________

Mail with remittance to: Prof. Alfred Viola, Chair
Please make checks payable to NESACS
(Sorry, we cannot accept credit cards or purchase orders.)

Department of Chemistry
Northeastern University
Boston, MA 02115
The Nucleus is distributed to the members of the Northeastern Section of the American Chemical Society, to the secretaries of the Local Sections, and to editors of all local A.C.S. Section publications.

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Deadlines:  December Issue: October 14, 2005
January Issue: November 11, 2005

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The Nucleus October 2005 3
The Henry A. Hill Award, awarded annually to a member of the Northeastern Section for distinguished contributions to the section and the profession of chemistry, will be presented at the October meeting to Charles E. Kolb. Dr. Kolb obtained his S.B. from MIT, and his M.A. (1968) and Ph.D. (1971) in Physical Chemistry from Princeton University. Dr. Kolb is current President and CEO of Aerodyne Research, Inc., where he began his career as a Senior Research Scientist in 1971. Dr. Kolb has authored or co-authored over 175 publications, where his research interests have focused on atmospheric and environmental chemistry, combustion chemistry, chemical lasers, materials chemistry, and the chemical physics of rocket and aircraft exhaust plumes. Dr. Kolb has served as Associate in Atmospheric Chemistry, Center for Earth and Planetary Physics, Harvard U. (1976-85); Research Affiliate, Spectroscopy Laboratory and Dept. of Aeronautics and Astronautics; MIT (1981-1993), Editorial Advisory Board, International Journal of Chemical Kinetics (1990-92); Atmospheric Sciences Editor, Geophysical Research Letters (1996-99). Dr Kolb was the recipient of the 1997 ACS award for Creative Advances in Environmental Science and Technology. He is a fellow of the American Physical Society, the American Geophysical Union, and the Optical Society of America. Dr. Kolb’s service to the Northeastern Section of ACS includes the following: Current Chairman of the Richards Award Committee, where he has served in the past (1998-2001); Trustee (1994-1996); Co-chair – Elementary Education Task Force (1990-1994); Chair – Nominations Committee (1992); Section Chair (1991), Section Chair-elect (1990); various board committee service including the program, budget, nominations, and professional relations committees.

The ACS invites undergraduate students to submit abstracts of their research papers for presentation at the Undergraduate Research Poster Session (URPS), which will be part of the extensive programming for undergraduates at this national meeting. Submit your abstract electronically by November 7, 2005 to <www.acs.org/meetings>. Click on the CHED division and then select the URPS site that is appropriate to the subject of your paper. Please follow the directions carefully.

For further information, contact:
LaTrease Garrison
ACS Student Affiliates Program
1155 Sixteenth Street, NW
Washington, DC 20036
Tel: (800) 227-5558, ext. 6166
e-mail: SAprogram@acs.org

Call for Papers

Undergraduate Research Poster Session
231st National Meeting of the American Chemical Society
Atlanta, Georgia
March 26 –30, 2006

The ACS invites undergraduate students to submit abstracts of their research papers for presentation at the Undergraduate Research Poster Session (URPS), which will be part of the extensive programming for undergraduates at this national meeting. Submit your abstract electronically by November 7, 2005 to <www.acs.org/meetings>. Click on the CHED division and then select the URPS site that is appropriate to the subject of your paper. Please follow the directions carefully.

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Washington, DC 20036
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e-mail: SAprogram@acs.org

Call for Abstracts!

4th Annual Environmental Research Symposium
Bridgewater State College
Saturday, November 12, 2005
Co-Sponsored by NESACS

Poster abstract submission is open to all undergraduate and graduate students in the Northeastern Section at http://www.bridgew.edu/Environmental

Grants-in-Aid to Undergraduates

to Attend the 231st ACS National Meeting in Atlanta, Georgia March 26-30, 2006

Complete Details can be found in the September issue, at the NESACS website, www.nesacs.org or by contacting:
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Abstract

Using its proprietary Target Visualization Technology™, EPIX discovers and develops innovative pharmaceuticals for imaging that are designed to transform the diagnosis, treatment and monitoring of disease. Vasovist™, the lead product candidate which is under NDA review, is the first imaging pharmaceutical specifically designed for Magnetic Resonance Angiography. A second drug candidate, EP-2104R, currently in Phase II clinical studies is designed for imaging blood clots using MRI.

During the development of these pharmaceuticals significant quantities of clinical trial material (CTM) were required. Consequently, we were inspired to investigate efficient manufacturing processes for the active pharmaceutical ingredient (API). Designing and executing safe, efficient and reproducible manufacturing processes involves several factors, one of which is the necessary synergy between Analytical and Process chemistry.

Biography

John C. Amedio, Jr. is the Senior Director, Analytical and Chemical R&D, EPIX Pharmaceuticals, Cambridge, MA. EPIX is a pharmaceutical company specializing in the discovery and development of magnetic resonance imaging (MRI) contrast agents for medical diagnostics. At EPIX, John is responsible for Chemistry, Manufacturing and Controls (CMC), which include regulatory agency document preparation, active pharmaceutical ingredient (API) synthesis, drug product pre-formulation and formulation, analytical methods development and the preparation of clinical trial materials (CTM). He also coordinates the selection and management of contractors for product development, including manufacturing.

Before joining EPIX in 1995 John was employed with Sandoz Research Institute (currently Novartis Pharmaceuticals), East Hanover, New Jersey, as a Unit Leader in the Chemical Research and Development department. He was responsible for the design, invention, execution and implementation of multi-step chemical processes for API’s from the laboratory to manufacturing. As a visiting scientist with Sandoz Pharm AG, Basel, Switzerland, he held the position of Laboratory Head, Kilolaboratory, assigned to the Pre-clinical research group. His group’s responsibilities included the optimization and scale-up of intermediates and API’s (used for pre-clinical research and Phase I clinical trials), and the chemical process optimization of these synthetic organic materials from milligram to kilogram quantities.

John received a B.S. in Chemistry from Manhattan College and obtained
News from NERM 2005

Submitted by Morton Hoffman
(Boston University)
NESACS Representative to the NERM Steering Committee

The 33rd Northeast Regional Meeting was held on the campus of Sacred Heart University in Fairfield, CT, July 14-17, 2005. Linda Farber (Sacred Heart University), Kraig Steffen (Fairfield University), and Mathieu Freeman (Green Farms Academy) served as General Chair and Co-Program Chairs, respectively. The meeting was dedicated to the memory of Professor Babu George of Sacred Heart University, who led its organization until his death in March, 2004.

Three hundred attendees presented more than 161 papers across the spectrum of chemistry, with symposia on nanomaterials, applications of FTIR, nutritional chemistry, organic electrochemistry, microwave chemistry, and environmental chemistry. An extensive chemical education program was held, including sessions and workshops for undergraduates and high school teachers. Special events included the Industrial Innovations Awards Symposium, a spectacular chemical demonstration show, an awards banquet, undergraduate research poster sessions, and a keynote address by ACS President Bill Carroll. In attendance were Anne O’Brien, District I Director, and candidates for the position of ACS President-Elect. The exposition had 17 exhibitors and included vendor workshops.

At the end of the meeting, the NERM Steering Committee met and voted to adopt the articles of incorporation that will constitute the bylaws of the Northeast Region, American Chemical Society, Inc., when incorporation is accomplished in Washington, DC, later this year. Nineteen local sections comprise the Northeast Region: Binghamton, Central Massachusetts, Connecticut Valley, Cornell, Corning, Eastern New York, Green Mountain, Maine, Mid-Hudson, New Haven, Northeastern, Northern New York, Norwich, Penn-York, Rhode Island, Rochester, Syracuse, Western Connecticut, and Western New York. Julie Smist (Springfield College) and Richard Cobb (Eastman Kodak) were elected Chair and Vice-Chair of the Region, respectively, through 2007, and Willem Leenstra (University of Vermont) was elected Secretary/Treasurer through 2006. The Region’s plan is to build a treasury of approximately $40,000 over the course of several years to provide seed money for regional meetings, the development of regional programs, and the funding of scholarships. The funds will come from the profits of regional meetings, dues and assessments from local sections in the regions, and private contributions.

The next meeting of the Board of Directors of the Region will be held at NERM-2006, October 5-7, in Binghamton, NY.

There will be no NERM in 2007 because the ACS national meeting will be held in Boston in August of that year. Tentatively scheduled is NERM-2008, June 22-26, in Burlington, VT, and bids are being accepted for NERM-2009. The Rochester Section has expressed an interest to host NERM in 2010 despite the fact that the ACS national meeting will again be held in Boston in that year; the arrangement may be feasible, given the distance between the two cities. A discussion was held with a representative of the Middle Atlantic Region about holding a joint NERM/MARM in 2011, possibly hosted jointly by the New York, North Jersey, Connecticut Valley, and Northeastern local sections.

Biography
Continued from page 5

a Ph.D. degree in Synthetic Organic Chemistry from the University of Delaware under the direction of Professor D.F. Taber. His graduate work involved the study of transition metal-mediated asymmetric cyclizations and the total synthesis/isolation of natural products. Additionally, he completed a two-year post-doctoral appointment with Professor James D. White at Oregon State University, where he completed the total synthesis of complex natural products (cyclodepsipeptides and pyrrolizidine alkaloids). John is the author and co-author of several peer-reviewed articles, publications and patents, and has given numerous invited presentations.

Our editor by calling and saying you appreciate the quality and content of our newsletter. Our editor works hard to maintain a publication of interest to our membership. Oh, and by the way you could also give credit to our advertisers who financially support us.
YCC News

YCC/NESACS–JCF/GDCh Exchange to Germany
March 12–19, 2006

The Younger Chemists Committee (YCC) of the Northeastern Section and the NESACS Education Committee invite applications from undergraduate and graduate students of chemistry, biochemistry, and chemical engineering at colleges and universities within the Section to spend a week in Germany as the guests of the Jungchemikerforum (JCF) of the Gesellschaft Deutscher Chemiker (GDCh). The exchange group will consist of up to 12 students and a number of faculty and industrial representatives.

The trip to Konstanz (Baden-Württemberg), which is on the Bodensee at the border with Switzerland, will take place March 12-19, 2006. The visit will include a student chemistry research conference (Frühjahrssymposium), symposia on careers, education, and international opportunities, visits to industrial and scientific institutions, and the opportunity to engage in extensive networking with German and other European students. Each student representative from the U.S. will be expected to make a poster or oral presentation on his/her research at the Frühjahrssymposium, and upon return at the Northeast Student Chemistry Research Conference (NSCRC) on Saturday, April 22. Travel expenses will be provided by NESACS; accommodations in Germany will be covered by GDCh. A working knowledge of German, while useful, will not be specifically required; the language of the Frühjahrssymposium and other events will be English.

Application forms are available from department chairs and on the YCC <http://www.nsycc.org/> and NESACS <http://www.nesacs.org/> websites. The following material must be submitted with the application form: the abstract of the presentation to be made at the Frühjahrssymposium and the NSCRC, an essay on the relevance of the exchange to the student’s professional goals, a letter of recommendation from the student’s research supervisor, and the approval of the supervisor and the chair of the department of the student’s absence from classes, the research laboratory, and other responsibilities. In addition, finalists will be interviewed by members of the Organizing Committee.

For more information, contact Dr. Michael Strem, Chair of the Organizing Committee, at mstrem@strem.com.

Deadline for receipt of applications: November 1, 2005

ACS Northeast Regional Undergraduate Day

Saturday, November 5, 2005

The Fourteenth Annual ACS Northeast Regional Undergraduate Day will be held in celebration of National Chemistry Week (October 16 - 22) on Saturday, November 5, in the Life Sciences and Engineering Building at Boston University (24 Cummington St., Boston). The keynote speaker will be Dr. Michael Gilbert of EIC Laboratories, who will speak on recently developed electrically releasing adhesives.

Also planned are talks by other prominent researchers; a workshop on hands-on chemistry with children; seminars on graduate school preparation, industrial careers and alternative employment pathways; a graduate industry fair with résumé review and information about ACS career services; and a workshop on the activation of ACS student affiliates chapters. There will be a $10 registration fee to offset the cost of lunch, which will be provided, and workshop materials.

The event is sponsored by NESACS, and is hosted by the Boston University Department of Chemistry and Chemia, the ACS Student Affiliates Chapter at B.U.

For more information, contact Matt Vigneau at 617-353-2503; fax: 617-353-6466; mvigneau@bu.edu
Alzheimer’s Disease (AD) is the most common form of dementia among senior citizens. First identified by Alois Alzheimer in 1907, AD is a neurodegenerative disease that affects those parts of the brain that control thought, memory, and language. Even as the pace of medical discovery is accelerating, this epidemic is claiming more lives today than it did 100 years ago. AD afflicts approximately 4.5 million Americans and affects countless caregivers and family members. Since age is the most important known risk factor, the number of patients continues to double every 5 years beyond age 65. Therefore, as our population is aging, more families will be affected by this disease. The problem in dealing with AD is not a lack of effort on the part of chemists or scientists. What is needed is more innovation in dealing with a disease that can be neither diagnosed nor cured.

More than 70 dementia-types of diseases have thus far been identified with characteristics that are similar to AD. Unlike some of the other degenerative diseases, scientists have not been able to develop a reliable and positive diagnosis for AD. The only reliable and positive diagnosis can be obtained by performing a post-mortem. Therefore, a misdiagnosis is likely and in some cases could make treatment very difficult and costly.

According to Dr. Jonathan N. Kremsky, Founder and CEO of Prime Organics, Inc., a privately-held contract developer and manufacturer of organic chemicals for the pharmaceutical and biotechnology industries, when his COO, Perry L. Catchings Sr., attended a conference in China, in 2002, he was there to explore new business opportunities. He happened to cross paths with Dr. Xudong Huang, Assistant Professor of Psychiatry in Harvard University Medical School and Associate Research Scientist at the MassGeneral Institute of Neurodegenerative Disease (MIND). Huang was there to learn about new developments. In reality, he was struggling with a chemical synthesis problem that was not solvable without a staff of organic chemists and a chemical synthesis facility. As a result of their discussions, Prime Organics, Inc., agreed to help Dr. Huang in both the synthesis and development of his innovative compounds.

What is so unique about Prime Organics, Inc.’s collaboration with Dr. Huang?

“We were able to synthesize these new compounds in a relatively short time within our facility and with our staff,” Kremsky remarked.

Given how little documentation or training was available at the time, this was quite an accomplishment. But Kremsky expected this kind of successful outcome from his experienced and respected team of chemists, most of whom have PhD’s. As contractors, Prime Organics Inc., has been in the one-of-a-kind organic synthesis contracting business for more than 10 years, despite the increasing competition from China and India.

Huang himself is a chemist with an MS from Tufts University and a PhD in Radio Analytical Chemistry from MIT. What attracted him to MassGeneral’s MIND was the extensive range of neurodegenerative disease research going on since 2001, when it was founded. Collaboration
Alzheimer’s Disease
Continued from page 8

with Prime Organics, Inc., allowed him to concentrate on the design of the drug and testing its efficacy and validity. Prime Organics, Inc. gave him access to experienced synthetic chemists and a facility to produce the drug in limited quantities and to test it.

According to Huang there are only a few symptom-relief FDA-approved treatments available for AD. However, these FDA-approved treatments are only very short-term solutions for the declining cognitive functions of the AD patients. In contrast, the new drug design is based on the metallo-neurochemistry involved in AD. The prevailing theories assign a central role to a protein fragment called beta-amyloid (βA), which is generated from abnormal processing of amyloid precursor protein (APP), found widely throughout the body but whose normal function remains unknown.

While considerable efforts have been expended on studying the basic biology of amyloid precursor protein (APP) and other AD-related proteins, and in identifying the pathways of βA metabolism, little attention was paid to the critical neurochemical factors involved; in particular, the role of certain toxic transition metals (copper, iron, and zinc), such as the effects of the metal redox interactions between them, APP and βA. In the presence of those metals, βA aggregates are formed. The toxic metals interact with APP and βA and the results (in the form of plaques) are fatal. However, the plaques of the deceased patient are only evident in the brain after a post-mortem is conducted. The amyloid hypothesis considers the production and aggregation of βA and the resulting plaques as the cause of the interference with normal neural behavior and hence the mental decline of Alzheimer’s patients.

What caught Huang’s attention was the fact that post-mortem studies showed that the insoluble plaques from Alzheimer’s patients were laced with copper, iron, and zinc metals. Metal chelators were able to dissolve these plaques. The important role those metals appeared to have played was a clear indication that safe metal-complexing agents could be a part of the strategy to deal with AD plaque aggregation. The metal-complexing agents Huang encountered exhibited poor target specificity and bioavailability and were, therefore, not effective as drugs. It became clear that the long-term use of these agents would likely perturb the homeostasis of many biometals and deleteriously affect normal physiological functions of essential metal-requiring biomolecules.

Because of the shortcomings evident in the existing chelators, it occurred to Huang that a new class of metal-complexing agents that specifically target the beta amyloids would be required. Therefore, Huang decided that his strategy would be to design a new bifunctional molecule. He succeeded in synthesizing the XHI molecule: ([(4-benzothiazol-2-yl-phenyl-carbamoyl)-methyl]-{[2-[[2-{(4-benzothiazol-2-yl-phenylecarbamoyl)-methyl]-carboxymethyl-amino}-{ethyl]-carboxymethyl-amino}-{ethyl}-amino)-acetic acid). The design concept he used is based on the conjugation of known functional moieties or ‘pharmaphores’. The new molecule contains one metal-complexing moiety (MCM) and two identical amyloid-binding moieties (ABMs) covalently linked by amide bonds.

The bifunctional molecule thus combines the amyloid-binding and metal-chelating parts in the same molecule. The idea here is that if you can localize the drug at the target amyloid and remove the damaging metal species you can eliminate the cause of plaque formation. As chelator, the molecule acts by attaching to the metals ions associated with the amyloid. The amyloid-binding moiety exhibits high affinity (tight binding) and specificity for the amyloid, and so concentrates the drug at the most vulnerable site. By complexing with the metal ions, Huang reasoned, the molecule should be able to interrupt the AD amyloid pathogenesis by suppressing the oxidative damage surrounding the immediate area of amyloid deposits.

What is particularly interesting is that the new compound also addresses Continued on page 17
Uncorked: The Science of Champagne
142 pp., ISBN 0-691-11919-8; $19.95 hardcover)
A book review by Dennis J. Sardella

When Socrates said that the unexamined life is not worth living, I’m fairly certain that he meant it to apply to much more weighty issues than the bubbles rising in a glass of champagne, the contemplation of which may seem at first blush to be the province of over-privileged people with way too much time on their hands. However, the apparently mundane and trivial can often mask matters of more substance, as is the case with Gérard Liger-Belair’s intriguing little book (140 pages, not including references, glossary and contents) on champagne, and specifically on its bubbles, which he has studied intensively for the past several years, since joining the faculty of the Department of Physical Sciences at the University of Reims Champagne-Ardenne.

Many a graduate student (or researcher, come to think of it) has stared moodily or absentmindedly at the bubbles rising in a glass of beer (the typical graduate student probably being unable to afford champagne), and perhaps even engaged in the type of philosophico-scientific discussions that late nights, weariness, and fellow-laborers can engender. Most, however, do not have the type of epiphany that launches them on a lifelong research project. Liger-Belair is the exception, and Uncorked is in effect a status report on his continuing attempt, not simply to gaze at the bubbles rising gracefully in a flute of champagne, but to develop a physical chemistry research program by turning the scientist’s eye (and techniques such as high-speed stroboscopic photography) on the process of bubble creation and growth, the kinetics and hydrodynamics of ascension, formation of bubble rafts, bubble bursting, with the goal of not simply appreciating the aesthetics of champagne, but of understanding the basic physics and chemistry. Adam Gopnik in his book of essays, Paris To The Moon, said “I looked for the large in the small, the macro in the micro, the figure in the carpet, and if some big truths passed by, I hope some significant small ones got caught.” The results, described here for the general reader are an elaboration of Liger-Belair’s 2003 Scientific American article, “The Science of Bubbly.”

Liger-Belair begins with two chapters devoted to a brief historical overview of the discovery and development of champagne, reaching back in time beyond the famed monk Dom Pérignon, whose exclamation to his fellow monks about champagne’s effervescence (“Brothers, I am drinking stars!”) is often mistakenly taken to mark the wine’s discovery (Pérignon was, apparently, not the discoverer of champagne, but a refiner of technique for its production – an achievement worthy enough in itself, since it launched an industry and assured the perpetuation of Dom Pérignon’s name).

The science portion of Uncorked begins with a description of the nucleation process and Liger-Belair’s rather surprising discovery that the nucleation sites are not the irregularities in the surface of the champagne flute, as most chemists would probably have guessed, but small bits of extraneous fiber with air trapped inside (illustrated nicely by several photos chronicling the time-evolution of bubble formation), meaning that bubbles will not form in a scrupulously cleaned champagne flute.

The next chapter covers experimental studies of the growth of bubbles and particularly the role of surfactants in controlling bubble growth and their rate of ascension. Liger-Belair also discusses the difference in the behavior between champagne and beer, with its higher content of both surfactants and dissolved gas. I could not help recalling a remark

Continued on page 17
Your Buyers Guide Listing is free! If you are not listed in this year's Guide, please contact Vince Gale at: Phone 781-837-0424, Email cust-svc@adelphia.net.

The purpose of the Guide is to provide a ready reference of companies providing products and services that are of interest to our American Chemical Society members. It is estimated that our members will purchase $350,000,000 of products and services in the next twelve months. Our members will use this guide as a way of finding vendors who can service their needs when they are trying to solve a problem, need equipment, restock inventory, or require consultant services, they will keep this reference until the next one is published.

This directory will be given to our 7,500 members for their use. This issue has excellent advertising value because it is kept and referenced for the full year.

If you wish to be in next year’s Guide, please contact Vince Gale as noted above. For other advertising opportunities to American Chemical Society members visit — http://www.mboservices.net

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164,166,178
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- **59-Patents**
  - Banner & Witcoff, Ltd.

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- **64-Chemical Process**
  - Chemir Analytical Services
- **65-Contract research**
  - Chemir Analytical Services
  - Chemo Dynamics LP
  - Polymer Processing Institute
  - Xenobiotic Laboratories, Inc.
- **65A-Contract testing laboratory**
  - Chemir Analytical Services
  - Gateway Chemical Technology
  - Micron Inc.
  - Schwarzkopf Microanalytical
  - Toxikon Corporation
- **66-Engineering**
  - Castagna Consulting Group, LLC

#### DETECTORS

- **84A-Discharge ionization**
  - GOW-MAC Instrument Co.
- **85-Flame ionization**
  - GOW-MAC Instrument Co.
- **86-Gas leak**
  - GOW-MAC Instrument Co.
  - MKS Instruments, Inc.
- **87A-Thermal conductivity**
  - GOW-MAC Instrument Co.

#### ELECTRON MICROSCOPY

- **89-Electron Microscopy**
  - EDAX Inc
  - Micron Inc.

#### ENVIRONMENTAL ANALYSIS

- **90-Environmental analysis**
  - Bioremediation Consulting Inc.
  - Bruker Daltonics Inc.
  - Schwarzkopf Microanalytical

#### ESCA SERVICES

- **91-ESCA services**
  - Micron Inc.

#### FURNITURE, LAB

- **92-Furniture, lab**
  - Kewaunee Scientific Corp.

#### GENERAL EQUIPMENT

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  - Hellma Cells
- **95-Autoclaves**
  - BioPro International Inc.
- **96-Baths**
  - Julabo USA, Inc.
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  - Eastern Scientific Co.
  - Eppendorf North American
- **104- Crushers & grinders**
  - Glen Mills Inc.
- **105A-Deuterium Lamps**
  - Bulbtronics, Inc.
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  - Eastern Scientific Co.
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  - Bulbtronics, Inc.
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  - Kimble/Kontes
  - Quartz Plus Inc.
- **118-Homogenizers**
  - Sonics & Materials, Inc.

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- **119A-Labware**
  - Cargille Laboratories
- **120A-Light sources**
  - Bulbtronics, Inc.
  - Hellma Cells
- **122-PID lamps**
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- **124-Power supplies**
  - Bulbtronics, Inc.
  - MKS Instruments, Inc.
- **127-Pressure vessels**
  - Pressure Products Industries
- **129-Pumps**
  - Eastern Scientific Co.
- **133-Spectrophotometer cells**
  - Hellma Cells
- **134-Tungsten halogen lamps**
  - Bulbtronics, Inc.
- **135A-UV-visible lamps**
  - Bulbtronics, Inc.
  - Hellma Cells
- **137-Vacuum equipment**
  - Mass Vac, Inc.
  - MKS Instruments, Inc.
- **138-Valves**
  - Clark Solutions
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  - Kinetic Systems

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- **144-Microscope accessories**
  - Cargille Laboratories
  - Structure Probe, Inc.

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- **145-Organic microanalysis**
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- **146-Organic synthesis**
  - Matrix Scientific
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#### ORGANOMETALLICS

- **147-Organometallics**
  - Schwarzkopf Microanalytical

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- **148-Instruments**
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  - Rudolph Instruments
- **149-Standards**
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- **151-Quality control**
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- **152-Radiation equipment**
  - Bruker Daltonics Inc.

#### SPECTROMETERS

- **164-Atomic absorption instruments**
  - Technology Exchange Corp.
- **166-Emission**
  - Hellma Cells
  - Spex Fluorescence (Jobin Yvon)
  - Technology Exchange Corp.
- **167-Fluorescence**
  - McPherson, Inc.
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- **168-Gratings**
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- **169-IR**
  - Bruker Daltonics Inc.
- **171-IR & UV cells**
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  - Hellma Cells
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  - Acquisition Solutions
  - Bruker Daltonics Inc.
  - Hiden Analytical
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  - Waters Corporation
- **173-NMR**
  - Bruker Daltonics Inc.
- **174-Raman**
  - InPhotonics
  - Spex Fluorescence (Jobin Yvon)
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  - Hellma Cells
- **178-X-ray fluorescence**
  - Bruker Daltonics Inc.
  - EDAX Inc
  - Technology Exchange Corp.

#### EDUCATION & PUBLICATIONS

- **179B-Training & education**
  - Excel for Scientists & Engineers
  - Technology Exchange Corp.
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#### SUPPLIES

- **181-Solvents & thinners**
  - Cambridge Isotope Laboratories

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To be in next year's Guide, contact Vince Gale at:
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*The Nucleus October 2005*
CONNECTIONS TO CHEMISTRY 2005

The Northeastern Section of the American Chemical Society (NESACS) and the Education Committee of the Northeastern Section invite high school chemistry teachers to a program at Burlington High School (Burlington, MA) on Wednesday, October 19th, 3:30 – 8:00 PM.

This program will help connect high school teachers with the numerous education resources available from the American Chemical Society. The following workshops will illustrate some of these resources:

- **It’s a Small, Small World** with Arthur Watterson, Organic Chemist and Director, Institute for NanoScience and Engineering Technology, UMass Lowell. Nanochemistry is the emerging chemistry of the 21st century. Explore the nano world and experiment with nanomaterials that behave in surprising ways. (Workshop A)

- **Toying with Chemistry** with John Mauch, Chemistry Teacher, Belmont High School (MA). The theme of this year’s National Chemistry Week is the *Joy of Toys*. Many toys, both simple and complex, owe their fun to chemistry such as Catch-A-Bubble, Silly Putty, Super Balls, the Drinking Bird, the Putt Putt Steam Boat and the Fuel Cell Hydrogen Powered Toy Car. The chemical concepts that are used in these toys will be discussed before you get to play and experiment in the laboratory. (Workshop B)

- **Why Don’t You Just Make All the Plastic Alike?** with William Carroll, Polymer Chemist, Occidental Chemical Corp. and ACS President. There are different uses for different plastics. When plastics are recycled, they can be mixed and melted together. However, they are more valuable when the various types are separated and used individually. Participate in a recycling separation experiment using spectroscopic, visual and physical methods. (Workshop C)

- **Seeing the Unseeable: Demonstrating with Technology** with Walter Rohr, Chemistry Teacher, formerly of Eastchester High School (NY). Inexpensive technology can be used to add a new repertoire of demonstrations. The use of techniques such as fast data collection, data collection integrated with videos and frame-by-frame analysis can lead to a better understanding of the observed phenomena. (Workshop D)

- **Power from the Nucleus** with Leo Bobek, Nuclear Reactor Supervisor, UMass Lowell. The current concern about carbon dioxide emission from burning fossil fuels and the connection with global warming is leading to a resurgence of interest in nuclear power generation. Nuclear technology for power generation will be discussed, as well as for other applications such as medicine and space travel. Using safe handling procedures, experiment with various radioactive sources. (Workshop E)

**Program**

3:30 – 4:00 Registration and Refreshments
4:00 – 4:25 Welcome and Overview
4:30 – 6:10 Five Simultaneous 45 Minute Workshops
   Presented in Each Session:
   Session I: 4:30 – 5:15
   Session II: 5:25 – 6:10
6:15 – 8:00 Dinner and Address
   Address: *Do We Have a Future, or What? Wild Guesses What Chemical Education Will Be Like in 2015*
   William Carroll, President of the American Chemical Society and Vice President of Occidental Chemical Corp., Dallas, TX

The deadline for registration is Friday, October 14th. The registration fee is $18.00 and is non-refundable after October 12th. Workshop and program-related materials, dinner, a one-year subscription to ChemMatters, and a certificate for three hours of Professional Development will be provided to all workshop participants.

The registration form can be obtained from the NESACS Web site http://www.nesacs.org under Connections to Chemistry 2005.

For additional information, contact Dr. Ruth Tanner, Chair, Education Committee, NESACS: 978/934-3662 or Ruth_Tanner@uml.edu
Champagne
Continued from page 10

from an Alsatian colleague in Strasbourg, who said whimsically that “Here you are standing at the border of two great cultures, the beer-drinking culture and the wine-drinking culture.” Apparently the difference between those cultures is not simply sociological, but physico-chemical as well!

The book’s longest chapter deals with the bursting of bubbles and includes some rather impressive and aesthetically appealing photos of the actual bursting process and the subsequent jet of liquid expelled from the surface of the wine, which give it its characteristic fizziness and bouquet.

Liger-Belair concludes with a brief look into the future, speculating on the potential influence that global warming may have on the champagne industry, including the possibility that the center of production could conceivably shift from a too-warm France to Britain – yet another Anglo-Saxon assault on Gallic culture.

Uncorked, with only 142 pages of text (double-spaced), of which approximately 40 are photos or diagrams, can fairly be described as a slender volume, and the work described in it might at first glance look like something that would qualify for one of Senator William Proxmire’s infamous “Golden Fleece” awards. However, to anyone who goes beyond the pictorial, it is clear that there is scientific substance to complement the aesthetic appeal of the photos, and that Liger-Belair’s work is in fact real science. The text includes references to critical radii for bubble formation, Henry’s Law, intermolecular forces, surfactants, fluid dynamics and numerous other concepts that I had discussed not long before in my freshman chemistry course. While He eschews detailed discussions of the theory, readers with an appetite for the technical who consult any of the original papers listed in the bibliography (many of them in journals such as Langmuir and Physical Review) will find mathematics and scientific sophistication aplenty. For those content simply to find another level on which to appreciate the taste, sight and sound of a glass of good champagne, or to simply enjoy just looking at the pictures, Uncorked offers an enjoyable and informative read. Proxmire might have hated it, but I think that Don Ho would have loved it.

Alzheimer’s Disease
Continued from page 9

the problem that there are no approved methods for diagnosing AD. Molecules that bind gadolinium are commonly used as Magnetic Resonance Imaging (MRI) contrast agents. As chelator, the new compound is thus able to bind the gadolinium. Therefore, the complex of gadolinium and the drug compound will be able to act as an amyloid-targeted molecular imaging agent.

The combination of diagnostics plus therapy is a strategy known these days in pharma and biotech by a new term identified as “theranostics.” Similar to the strategy used in theranostics, the AD’s MRI diagnostic test would be performed on the patient who is likely to be helped by the drug. However, the patient would only be treated with the drug if there is MRI diagnostic test evidence of Alzheimer’s.

Preliminary in vitro and in vivo tests of the new molecule were favorable and clearly demonstrated that it drastically reduces metal-induced ßA aggregation, decreases the amount of APP expression and, therefore, the amount of ßA peptide formed. What is particularly impressive is the relatively low animal toxicity of the drug that could be administered orally.

Kremsky was so pleased with the test results of the new molecule that he decided to form a new drug development company, called Functional Pharmaceuticals Inc., which would further explore this class of molecules commercially under a license agreement with Massachusetts General Hospital. Since A, peptide, APP, and metals are involved in other neurodegenerative diseases, such as Parkinson’s, Prion, and ALS, Kremsky hopes to also use a similar concept to diagnose and treat those diseases. Functional Pharmaceuticals, Inc. is currently involved with raising venture capital to develop and commercialize this new therapeutic and diagnostic platform.

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http://www.NESACS.org

Note also the Chemistry Department web pages for travel directions and updates. These include:
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http://www.bu.edu/chemistry/events/
http://www.chem.brandeis.edu/colloquium.shtml
http://www-chem.harvard.edu/events/
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http://chem.tufts.edu/seminars.html
http://www.chem.umb.edu/
http://www.uml.edu/Dept/Chemistry/speakers.html
http://www.unh.edu/chemistry/seminars.html

Oct 3
Prof. Gary Haller (Yale Univ.)
Distinguished Lectures in Nanotechnology Series
Tufts Univ., Dept. of Chemical Engineering,
Crane Room, Paige Hall, 12 Upper Campus Road, Medford, 12:00 m

Oct 4
Prof. Michael P. Doyle (Univ. of Maryland)
“New Advances in Catalysis with Dirhodium (II) Compounds”
Brandeis Univ., Edison Leeks Bldg.,
Gerstenzang 122, 3:30 pm

Oct 6
Prof. Steven Bradforth (Univ. of Southern Calif.)
“Energy Flow in UV-excited Solution-phase Polymers: Nucleic Acids and Cyclic Polymers”
Boston College, Merkert 130, 4:00 pm
Prof. Stuart Rowan (Case Western Univ.)
“Supramolecular Polymerizations: Using Weak Forces to Build Responsive Materials”
Dartmouth College, Hanover, NH, Room 006, Steele Hall, 10:30 - 11:45 am

Oct 10
Dr. Alex Bradley (DuPont)
“Advanced Interconnect Materials for the Integrated Circuit”
UNH, Iddles L103, 11:10 am

Oct 11
Prof. Peter Vollhardt (Univ. of Calif. Berkeley)
“Apparent Progress in the Total Synthesis of Carbon” (Novartis Lecture Series, Part 2)
Boston College, Merkert 130, 4:00 pm
Dr. Ed Grabowski (Merck Pharmaceutical Research)
Special Seminar: “Reflections on Process Research”
UNH, Iddles L103, 11:10 am

Oct 13
Prof. Bern Kohler (Ohio State Univ.)
Boston College, Merkert 130, 4:00 pm
Dr. Ed Grabowski (Merck Pharmaceutical Research)
“Novel Asymmetric Hydrogenations”
Dartmouth College, Hanover, NH, Room 006, Steele Hall, 10:30 - 11:45 am

Oct 17
Prof. Olafs Daugulis (Univ. of Houston)
“Regioselective Functionalization of Unreactive C-H Bonds”
Brandeis Univ., Edison Leeks Bldg.,
Gerstenzang 122, 3:30 pm
Prof. Catherine L. Drennan (MIT)
“From Epoxidation to Halogenation, the Diverse Reactivity of Mononuclear Iron Enzymes - A Structural Perspective”
Harvard Univ., Pfizer Lecture Hall, 4:15 pm to 5:15 pm

Oct 19
Prof. Seth Cohen (Univ. of Calif. San Diego)
“New Approaches for Metalloprotein Inhibition”
Boston College, Merkert 130, 4:00 pm

Oct 20
Prof. Charles Schmuttenmaer (Yale Univ.)
“Terahertz Emission Spectroscopy: From Molecular Monolayers to Magnetic Thin Films” (Phys. Chem.)
Boston College, Merkert 130, 4:00 pm
Prof. Howard R. Mayne (UNH)
“Exploring the Rugged Landscape -- Towards Understanding and Manipulating the Properties of Mixed van der Waals Clusters”
Dartmouth College, Hanover, NH, Room 006, Steele Hall, 10:30 - 11:45 am

Oct 24
Prof. Ged Parkin (Columbia Univ.)
“Kinetic and Equilibrium Isotope Effects Pertaining to the Interaction of C-H and H-H Bonds with Transition Metal Centers: When Is a Bond Not a Bond?”
Brandeis Univ., Edison Leeks Bldg.,
Gerstenzang 122, 3:30 pm

Oct 25
Prof. Lizbeth Hedstrom (Brandeis Univ.)
“IMP Dehydrogenase and the Dynamics of Drug Selectivity”
Boston College, Merkert 130, 4:00 pm

Oct 27
Prof. Kenneth Suslick (Univ. of Illinois, Urbana-Champaign)
“Chemical Effects of Ultrasound” (Phys. Chem.)
Boston College, Merkert 130, 4:00 pm
Prof. Justin DuBois (Stanford Univ.)
“Drawing Inspiration for Reaction Design from Nature’s Products”
Dartmouth College, Hanover, NH, Room 006, Steele Hall, 10:30 - 11:45 am

Notices for the Nucleus Calendar should be sent to:
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