

THE NUCLEUS

January 2008

Vol. LXXXVI, No. 5

Monthly Meeting

Dr. Hannah Sevian of UMass Boston Speaks at the Brookline Holiday Inn

2008 Chair's Statement

By Marietta Schwartz

Summer Scholar Report

By Ryan Heney and Dr. Evan Kantrowitz

A Guide to New Orleans Eateries

By Paul Hanson, Ph.D.



2008 Chair's Statement

Greetings to all former, current, and future NESACS members! And there are a lot of you – well over 6000 chemists at last count. The section membership covers all walks of life, from industry to academia and everything in between, as well as people at all career stages, from college students to retired chemists. I am looking forward to my year as Section Chair, and hope that you all will continue to participate fully in the variety of NESACS activities that will be taking place over the next twelve months. During my time as program chair and chair-elect, I have continued to explore possible collaborations with area special-interest groups, and am pleased to report that BAGIM (the Boston Area Group for Informatics and Modeling) has expressed an interest in formally allying themselves with NESACS in a manner similar to that of the Medicinal Chemistry Group. We are also looking into the formation of a local Silver Circle group for retired chemists, and former section chair Pam Mabrouk is exploring the

possibility of creating a local branch of the WomenChemists' Committee. There is a lot going on this year!

NESACS as a whole is a vibrant and active section. This past year, the section received three ChemLuminary awards at the national meeting in August, and was runner-up for three more. This is an amazing accomplishment, and a great deal of credit goes to the section members responsible for organizing the relevant activities and putting together the award packets. NESACS has a long history of outstanding service, and I hope to continue that practice in the next year.

Currently, attendance at the monthly section meetings averages less than 50 members. We are exploring ways to make meetings more attractive. I would love to hear from any of you with your thoughts and ideas. What would make YOU come to a monthly meeting? Would a different day be better? Different time? Different format? We need your perspective; it is your section, after all!

You can keep track of upcoming events by reading *The Nucleus*, but you can always check the section website (newly redesigned) at <http://www.nesacs.org> for breaking news (as well as to read *The Nucleus* in PDF format when you can't find your paper copy). You can also read our outstanding blog at <http://blog.nesacs.org/>. I hope to see more and more of you attending the many and varied events that we offer, and wish you all the best in the upcoming year. ◇

The Arno Heyn Memorial Book Prize

I want to say a few words about Arno Heyn, for whose memory this award exists.

I had known Arno for a little over fifty years. We were brought together by George Ehrenfried and later the Sub Sig Outing Club, and remained friends because of our mutual interest in hiking and other outdoor sports, as well as chemistry. But it was only in his last fifteen years that I had learned to know him really well, as a result of our work together on the *Nucleus*. He was the editor of *the NUCLEUS* from 1989 to 2004.

Around 1990 Arno asked me to help him with *the NUCLEUS*, to take on the post of Associate Editor. We worked well together, each supplementing gaps in the other's knowledge, and I want to give you my understanding of him.

Arno was not only highly intelligent and extremely well organized, but, unlike many brilliant people, he was also a hands-on person, capable of handling problems mechanical, chemical or in the kitchen. He was a great hiker, a good skier, but also a great

Continued on page 4

We Focus on Doing Chemistry!

- FDA Inspected
- cGMP Synthesis
- Controlled Substances
- Custom Synthesis
- Small Lots Manufacturing
- Polymer Chemistry
- Process Development

Chemo Dynamics, LP

Contact: S. N. Bharathi, Ph.D.
3 Crossman Road South
Sayreville, NJ 08872
Phone: (732)721-4700
Fax: (731)721-6835
www.chemodynamics.com
E-Mail: info@chemodynamics.com

The Northeastern Section of the American Chemical Society, Inc.

Office: Marilou Cashman, 23 Cottage St., Natick, MA 01360. 1-800-872-2054 (Voice or FAX) or 508-653-6329.

e-mail: mcash0953(at)aol.com

Any Section business may be conducted via the business office above.

NESACS Homepage:

http://www.NESACS.org

David Cunningham, Webmaster

ACS Hotline, Washington, D.C.:

1-800-227-5558

Officers 2008

Chair:

Marietta Schwartz

Chemistry Department, UMASS-Boston

Boston, MA 02125

617-287-6146; marietta.schwartz(at)umb.edu

Chair-Elect:

Dr. E. Joseph Billo

Chemistry Department, Boston College

Chestnut Hill, MA 02467

617-552-3619, joseph.billo(at)bc.edu

Immediate Past Chair:

Mukund Chorghade

14 Carlson Circle, Natick, MA 01360

508-651-7809 and 308-3891

Chorghade(at)comcast.net

Secretary:

Michael Singer

Sigma-Aldrich

3 Strathmore Rd., Natick, MA 01360

508-651-8151X291; msinger(at)sial.com

Treasurer:

James Piper

19 Mill Rd., Harvard, MA 01451

978-456-3155, piper28(at)attglobal.net

Auditor:

Anthony Rosner

Archivist:

Myron S. Simon

20 Somerset Rd.

Newton, MA 02465; 617-332-5273

Romysimon(at)mindspring.com

Trustees:

Joseph A. Lima, Esther A. H. Hopkins,

Michael E. Strem

Councilors

Term Ends 12/31/2008

Doris I. Lewis

Morton Z. Hoffman

Christine Jaworek-Lopes

Mary Burgess

Donald O. Rickter

Alternate Councilors

Patrick M. Gordon

Michael P. Filosa

Lawrence Scott

Liming Shao

S.B. Rajur

Term Ends 12/31/2009

Catherine Costello

Patricia Mabrouk

Michaeline F. Chen

Dorothy J. Phillips

Amy Tapper

Julia H. Miwa

Alfred Viola

Jerry P. Jasinski

Eva B. Binnun

Barney Grubbs

Term Ends 12/31/2010

Thomas R. Gilbert

Pamela Nagafuji

Robert Lichter

Michael Singer

Timothy B. Frigo

Mark Froimowitz

David Cunningham

Erik Rozners

All Chairs of standing Committees, the editor of THE NUCLEUS, and the Trustees of Section Funds are members of the Board of Directors. Any Councilor of the American Chemical Society residing within the section area is an ex officio member of the Board of Directors.



Contents

2008 Chair's Statement _____ 2

By Marietta Schwartz

Arno Heyn Memorial Book Prize _____ 2

By Myron S. Simon

Announcements _____ 4

Grants-in-Aid, NESACS Student Affiliates

Monthly Meeting _____ 5

Dr. Hannah Sevian speaks at Holiday Inn, Brookline

Call for Nominations _____ 6

Philip L. Levins Memorial Prize, James Flack Norris Award

The 3rd/4th Annual NESACS/WCC Golf Tournament _____ 7

By Amy Tapper

Summer Scholar Report _____ 8

Identification and Screening of Potentially Novel Inhibitors of Fructose-1,6-Biphosphatase

By Ryan Heney and Dr. Evan Kantrowitz, Boston College

A Guide to New Orleans Eateries _____ 10

By Paul Hanson, Ph.D.

Cover: Professor Marietta Schwartz of UMass Boston, 2008 Chair of NESACS.

Photo provided by Professor Schwartz

Deadlines: March 2008 Issue: January 14, 2008

April 2008 Issue: February 11, 2008

THE NUCLEUS

The Nucleus is published monthly, except June and August by the Northeastern Section of the American Chemical Society, Inc. Forms close for advertising on the 1st of the month of the preceding issue. Text must be received by the editor six weeks before the date of issue.

Editor:

Michael P. Filosa, Ph.D., editor, ZINK Imaging Inc., 1265 Main Street, Waltham, MA 02451 Email: Michael.Filosa(at)zink.com; Tel: 781-386-8479.

Associate Editors:

Myron S. Simon, 20 Somerset Rd., W. Newton, MA 02465, Tel: 617-332-5273
Sheila E Rodman, Konarka Technologies Inc., 116 John St. Suite 12, Lowell, MA 01852 email:srodman(at)konarka.com tel 978-569-1414

Board of Publications:

Vivian K. Walworth (Chair), Mary Mahaney, David Cunningham

Business Manager:

Karen Piper, 19 Mill Rd., Harvard, MA 01451, Tel: 978-456-8622

Advertising Manager:

Vincent J. Gale, P.O. Box 1150, Marshfield, MA 02050, Tel: 781-837-0424; FAX: 781-837-1453

Contributing Editors:

Morton Hoffman, Feature Editor; Dennis Sardella, Book Reviews

Calendar Coordinator:

Sheila Rodman, email: srodman(at)konarka.com

Photographers:

Morton Z. Hoffman and James Phillips

Proofreaders:

Donald O. Rickter, Myron S. Simon, Vivian K. Walworth, E. Joseph Billo

Webmaster:

David Cunningham, webmaster(at)nesacs.org

Copyright 2008, Northeastern Section of the American Chemical Society, Inc.

Grants-in-Aid Awarded

NESACS Student Affiliates

The Northeastern Section of the American Chemical Society (NESACS) provides *Grants-in-Aid* of \$350 to undergraduates to attend the Spring ACS National meeting and to present a paper at the Undergraduate Research Poster Session in the Division of Chemical Education. The institutions of the successful applicants are expected to match the award. Applications are accepted from students at colleges and universities within the Northeastern Section. The undergraduate student must be a chemistry, biochemistry, chemical engineering, or molecular biology major in good standing with at least junior status, and must be currently engaged in undergraduate research. The students awarded the Grants for the ACS National Meeting in New Orleans in April, 2008, are:

- Kevin Robbins, Keene State College (Research Advisor, Colin Abernethy), *New Soft Scorpionate Complexes of Vanadium*
- Jeffrey Garber, Dartmouth College (Research Advisor, Robert Grubbs) *Amphiphilic Block Copolymer Precursors to Cobalt Polymer Hybrids*
- Jonathan Doran, University of Massachusetts Dartmouth (Research Advisor, Donald Boerth) *Nucleophilic Displacement Reactions*

In addition to presenting a paper at the National Meeting, recipients are also required to present their paper at the NSCRC (Northeast Student Chemistry Research Conference) on April 19, 2008. ◇

For late breaking news, job postings and the latest meeting and event information please visit us at

WWW.NESACS.ORG

Simmons and Suffolk Chapters receive recognition from ACS.

Dear Dr. Chorghade:

On behalf of the staff of the ACS Undergraduate Programs Office, I am pleased to inform you that the following list of Student Affiliates chapters in the Northeastern Section have won awards for their accomplishments for the 2006-2007 academic year.

The list of all of the awardees will be published in the November/December 2007 issue of *in Chemistry* magazine as well as *C&E News*. You are invited to join us as we honor the award winning chapters at the Student Affiliates award ceremony at the spring National Meeting in New Orleans on Sunday, April 6, 2008.

Listed next to the institution's name is the name of the faculty advisor and their e-mail address. Please join our office and congratulate these chapters on their achievements!

Institution Name: Simmons College
Faculty Advisor Name: Dr. Richard Gurney

Faculty Advisor Email Address: richard.gurney(at)simmons.edu
Award Type: Commendable

Institution Name: Suffolk University
Faculty Advisor Name: Dr. Doris Lewis

Faculty Advisor Email Address: dlewis(at)suffolk.edu
Award Type: Outstanding

If you have any questions on the awards, please contact our office.

Best Regards,

Nancy Bakowski
Manager, Undergraduate Programs
Office, American Chemical Society ◇

Corporate Patrons (\$2000+)

Abbott Laboratories
Lyophilization Service of New England
Merck
National ACS
Novartis
Pfizer
Sepracor
Vertex Pharmaceuticals

Patrons (\$1000-\$1999)

Astra-Zeneca R&D Boston
IRIX Pharmaceuticals
Millenium Pharmaceuticals
Shasun Pharmaceuticals
Strem Chemicals
ZINK Imaging
Ziopharm Oncology, Inc.

Donors (\$300-\$999)

Cambridge Major Laboratories
Occidental Petroleum
PCI Synthesis
Royal Society of Chemistry
Serono Research Institute
Wyeth Pharmaceuticals

Arno Heyn Book Prize

Continued from page 2

reader and thinker, electrician, carpenter, and antique gas stove repairer. That he took up locksmith work when he retired from teaching was no surprise. He was just fond of working with mechanical things.

The side of Arno I most admired, however, was his exceptional precision in planning and executing. For example, he was able to plan out every phase of the production of the Nucleus a year in advance, and see to it that it was carried through just as he had planned.

He was a gentle person, pleasant to work with, a reliable friend, a welcome voice on the phone, and consistent with his sign-off, "See you."

I just wanted you to know about the man we memorialize tonight.

Myron S. (Myke) Simon

(Editor: Dr. Simon presented these comments upon his receipt of the third annual Arno Heyn Memorial Book Prize) ◇

Monthly Meeting

The 884th Meeting of the Northeastern Section of the American Chemical Society

Thursday, January 10, 2008

Holiday Inn

1200 Beacon Street, Brookline, MA

4:30 pm Board Meeting

5:30 pm Social Hour

6:15 pm Dinner

7:30 pm Award Meeting, Professor Marietta Schwartz, NESACS Chair, Presiding

Evening Lecture: Dr. Hannah Sevian, *Incremental Movement Toward an Inquiry Lab Curriculum in General Chemistry: Can Changing a Single Laboratory Experiment Improve Student Performance?*

Dinner reservations should be made no later than noon, Thursday, January 3, 2008. Please call or fax Marilou Cashman at (800) 872-2054 or e-mail at MCash0953(at)aoil.com. Reservations not cancelled at least 24 hours in advance must be paid. Members, \$30.00; Non-members, \$35; Retirees, \$20; Students, \$10.

THE PUBLIC IS INVITED.

Directions

From the Mass Pike East/Route 90:

Take the Mass Pike East to exit 18, Allston/Cambridge. The exit will be on the left. Bear right, following signs towards Cambridge. Turn right on to Storrow Drive. Follow Storrow Drive to the Boston University exit. Off the exit follow Carlton Street approximately one block to Commonwealth Avenue and turn right. Follow Commonwealth Avenue west and turn left at the second traffic light onto Saint Paul Street. The hotel is six blocks down on the left, on the corner of Beacon Street and Saint Paul Street

From 93 North or South:

Take Exit 26, Storrow Drive. Follow Storrow Drive to the Kenmore Square exit, the exit will be on the left. Off the exit, turn right at the first light onto Beacon St. The hotel is one mile up on the right at 1200 Beacon St.

The Holiday Inn is conveniently located at the MBTA Green C Line "St. Paul Street" Stop.

Parking

Meter parking is available on Beacon Street as well as Holiday Inn garage parking (It is \$6 for unlimited parking. Guests can pick up a voucher from the hotel and pay when they leave.)

Next Meeting: TBD

Biography

Hannah Sevian (Associate Professor, Chemistry and Curriculum & Instruction, UMass Boston) was trained as a theoretical physical chemist, did post-doctoral work in polymer chemistry and materials science, taught the educational gamut of chemistry and physics in both English and Spanish in a Boston-area urban high school, and has established herself in the last six years in the field of chemistry education research. She was lead author on three chapters of the recently published, NSF-funded *Active Chemistry* high school curriculum and contributed to developing three other chapters of an earlier edition.

Research in Dr. Sevian's lab is concerned with how people learn chemistry, how specific teaching practices influence student learning in chemistry, how scientists can learn from teachers to communicate science more effectively, and what is needed particularly by and for underrepresented minority students to better enable them to study science. The unifying feature of her work is that it is directed at improving equity and creating capacity for more students to have access to learning science.

Dr. Sevian is the Principal Investigator on the Boston Science Partnership (NSF math-science partnership), through which she works with all teachers of middle and high school science in Boston as well as STEM faculty at two universities and at two public community colleges in Boston, and she conducts the associated research on STEM faculty involvement and teacher content knowledge gains. She is also the PI on another NSF grant to conduct a research study of the STEM pipeline of public school stu-

continued on page 12

Abstract

In response to current research about how students learn science, many institutions are working to transform their general chemistry laboratory curricula to be inquiry-oriented because current

research shows that wholesale change in general chemistry lab curriculum from traditional, directive student experiments to discovery-based student experiments has a significant positive impact on student learning. However, there are many barriers to wholesale change, notably cost and

institutional capacities, and as a result many general chemistry laboratory curricula remain largely traditional in pedagogy. One alternative to wholesale change is incremental change, the gradual modification of the curriculum to incorporate research about how stu-

continued on page 12

Call for Nominations

Philip L. Levins Memorial Prize

Nominations for the Philip L. Levins Memorial Prize for outstanding performance by a graduate student on the way to a career in chemical science should be sent to the Administrative Secretary of NESACS, 23 Cottage St., Natick, MA 01760 by **March 1, 2008**.

The graduate student's research should be in the area of organic analytical chemistry and may include other areas of organic analytical chemistry such as environmental analysis, biochemical analysis, or polymer analysis.

Nominations may be made by a faculty member, or the student may submit an application. A biographical sketch, transcripts of graduate and undergraduate grades, a description of present research activity and three references must be included. The nomination should be specific concerning the contribution the student has made to

Call for Nominations

James Flack Norris Award for Outstanding Achievement in the Teaching of Chemistry

Nominations are invited for the 2008 James Flack Norris Award for Outstanding Achievement in the Teaching of Chemistry. The Norris Award, one of the oldest awards given by a Section of the American Chemical Society, is presented annually by the Northeastern Section. The Award consists of a certificate and an honorarium of \$3,000.

Nominees must have served with special distinction as teachers of chemistry at any level: secondary school, college, and/or graduate school. Since 1951, awardees have included eminent and less widely-known but equally effective teachers at all levels.

The awardee for 2007 was Professor Diane M. Bunce of the Department

the research and publications (if any) with multiple authors.

The award will be presented at the May 2008 Section Meeting. ◇

of Chemistry of the Catholic University of America

Nominations should focus on the candidate's contributions to and effectiveness in teaching chemistry. The nominee's curriculum vitae should be included. Seconding letters are also an important part of a nominating packet. These may show the impact of the nominee's teaching in inspiring colleagues and students toward an active life in chemistry and/or related sciences, or may attest to the influence of the nominee's other activities in chemical education, such as textbooks, journal articles, or other professional activity at the local or national level. The committee looks for impact of the candidate's activities at the National and International level.

The nomination materials should consist of a primary nomination letter, supporting letters, the candidate's curriculum vitae. Reprints or other publications should NOT be included. The material should not exceed thirty pages.

Please direct questions about the content of a nomination to the Chairperson of the Norris Award Committee. For 2008 the Committee Chairperson is Professor Barry Snider, Department of Chemistry, Brandeis University, email: [snider\(at\)Brandeis.edu](mailto:snider(at)Brandeis.edu).

Send nomination packets electronically in Adobe PDF format to Ms. Marilou Cashman, Administrative Secretary of NESACS, email: [mcash0953\(at\)aol.com](mailto:mcash0953(at)aol.com).

The deadline for nominations is **April 15, 2008**. ◇

iQsynthesis
Custom Molecules for Life
Formerly Gateway Technologies

Custom Synthesis Services
IQsynthesis, formerly Gateway Chemical Technology, provides customized chemical synthesis at milligram to kilogram quantities.

- Active Pharmaceutical Ingredients
- Analytical Reference Standards
- Precursors and Intermediates
- Degradants and Metabolites
- Agrochemicals
- Bio-organic Molecules
- Chiral Synthesis
- Combinational Platforms
- Process Development

iQsynthesis
11810 Borman Drive
St. Louis, MO 63146
314-991-1857
1-800-506-9892
www.iqsynthesis.com
info@iqsynthesis.com

INNOVATION | QUALITY

**Looking for seminars
in the Boston area?**

Check out the
NESACS Calendar

www.nesacs.org/seminars

The 3rd/4th Annual NESACS/WCC Golf Tournament

By Amy Tapper (Photos by Amy Tapper)



The first place team! (L-R) Paul Delfino, Jim Bannister, Stu Needleman receiving their award from Harry Mandeville.

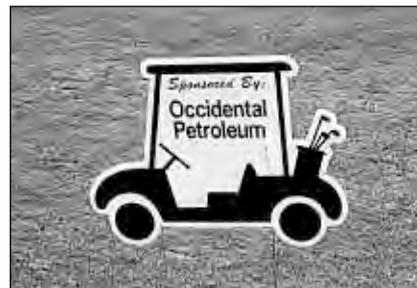
This year the 3rd Annual NESACS Golf Tournament was held in conjunction with the 234th National ACS meeting held in Boston. The tournament was co-sponsored by the National Women Chemists Committee (WCC). It has been a tradition for the WCC to hold a golf tournament during the spring National ACS meeting. The tournament was the 3rd annual for NESACS and the 4th annual for WCC. This year the tournament was held on August 22nd at Putterham Meadows in Brookline, MA.

The golfers were paired in foursomes and each player was given goodie bags of snacks and golf essentials with ACS logo balls, tees, golf towel and repair tools. Two sponsors, Shasun and IRIX Pharma also donated golf balls, tees, and a practice tool. The golfers teed off in a shotgun start at 2 PM. The format for play was a scramble, which allows players of all levels the opportunity to play in a tournament. Each golfer must play one of his or her drives off the front nine and back nine of the course. After the drive, all of the players on the team play from the longest or best-placed shot.

The main focuses of the tournament are for networking and to raise funds to support the many beneficial programs of NESACS and WCC. This

year the tournament was a great success with almost 100 players and extremely generous donations from the sponsors. The top sponsor of the tournament was Lyophilization Services of New England (LSNE). The other sponsors were Occidental Petroleum, Strem Chemicals, Shasun Pharmaceuticals, PCI Synthesis, Vertex Pharmaceuticals, Cambridge Major Laboratories, IRIX Pharma Services, ZINK Imaging, Katie Hunt and Bruce Bursten from the American Chemical Society. Each sponsor had a sign with their company name on the tees throughout the course. In order to view the services of our sponsors, visit the NESACS website at www.nesacs.org and click on the sponsor link. The sponsors will be recognized on the NESACS website and in *The Nucleus* for 1 year.

The tournament was followed by a delicious buffet dinner on the patio of the clubhouse overlooking the 18th green and an award ceremony. Awards were given to the 1st, 2nd, 3rd, and last place teams. The winning team players each received a gift certificate to Golfer's Warehouse, while the last place players each got a can of tennis balls. The 1st place team with a score of 57 was Stu Needleman, Jim Bannister, and Paul Delfino. The 2nd place team with a score of 62 was Matt Halvorsen, Aimee Hodge, and Damon Abernathy. The 3rd place team winning in a tie-breaker, with a score of 63, was Amy Tapper, Geoff Tapper, Harry Mandeville, and Panos Kalaritis. The other prizes given were closest to the line and closest to the pin. For closest to the line, a line is drawn with paint along the fairway. The person who drives the ball off the tee closest to the line wins. For the men, the winner was Bridge Hunter and for the women it was Trish Fremgen. The closest to the pin prize was played from a par 3 hole. The player who hits their drive closest to the pin wins. For the



Signage for one of the sponsors of the tournament: Occidental Petroleum. Represented at the tournament by past-ACS President, Bill Carroll.



Closest to the pin- Perry Catchings of Prime Organics of Woburn.



Closest to the pin- Amy Tapper of Momenta Pharmaceuticals, Inc.

men the winner was Perry Catchings and for the women it was Amy Tapper.

Former ACS President, Bill Carroll, and President-Elect, Bruce Bursten, played in the tournament. Also in attendance to cheer on the players was current ACS President, Katie Hunt.

Details for the 2008 tournament

Text and photos continued on page 13

Summer Scholar Report

Identification and Screening of Potentially Novel Inhibitors of Fructose-1,6-Bisphosphatase

Ryan Heney and Dr. Evan Kantrowitz

Boston College, Department of Biochemistry, Merkert Chemistry Center
Chestnut Hill, MA 02467

Fructose-1,6-bisphosphatase (FBPase) is an allosteric enzyme that is critically involved in the control of gluconeogenesis, the process by which glucose is synthesized in the cell from carbon non-sugar substrates such as pyruvate and amino acids. FBPase catalyzes the hydrolysis of fructose-1,6-bisphosphate into fructose-6-phosphate and inorganic phosphate, as shown in **Figure 1**. FBPase has a reciprocal relationship with phosphofructokinase, an enzyme involved in the metabolism of glucose.

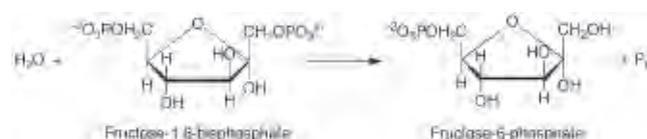


Figure 1. Reaction catalyzed by FBPase in gluconeogenesis; the reverse reaction is catalyzed in glycolysis by phosphofructokinase and involves the transfer of the P_i through the conversion of ATP to ADP.

The delicate balance between these two pathways is crucial for the regulation of blood glucose levels, and the breakdown of this regulatory mechanism is typical of Type 2 diabetes and results in hyperglycemia. FBPase is a tetramer of four identical polypeptide chains, which can be considered a dimer of dimers. Each chain has an active site that binds the substrate fructose-1,6-bisphosphate, and an allosteric regulatory site that binds AMP (see **Figure 2**).

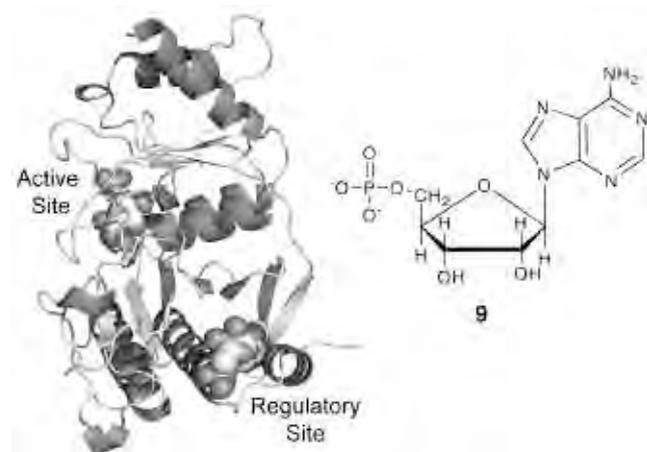


Figure 2. (left) Fructose-1,6-bisphosphate bound in the active site and AMP bound in the allosteric site of an FBPase monomer. (right) The structure of AMP **9**, the natural allosteric inhibitor of FBPase.

The enzyme exists in two structural states; the active or R state exists in the absence of AMP and the inactive or T state exists when AMP is bound to the enzyme. The structures of

FBPase in both the T and R states have been determined.¹ The enzyme does not exhibit substrate cooperativity though cooperativity is observed in the binding of AMP and metal cofactors to the enzyme.² The binding of AMP, the natural inhibitor of FBPase, at the allosteric regulatory site results in the conversion of the enzyme from the active R state to the inactive T state via a quaternary conformational change involving the rotation of the two dimeric halves of the molecule by 17° with respect to each other. One of the major projects in the laboratory is to identify and develop novel inhibitors that are capable of causing inactivation of the enzyme as lead candidates for the development of anti-diabetic drugs. FBPase is a particularly attractive candidate as a target for anti-diabetics as it is involved solely in the gluconeogenesis pathway. A complementary goal to the development of new inhibitors is to further investigate the mechanistic links between allostery and catalysis.

A virtual high-throughput screening (vHTS) system is being developed in the Kantrowitz lab. The vHTS system uses a library of the three-dimensional structures of commercially available compounds in combination with docking programs such as AUTODOCK.³ By using UNIX shell scripts, the vHTS system automates the steps necessary to run large numbers of docking calculations on a cluster of computers. The vHTS system also processes the output from the docking programs and stores the results in a MySQL database for easy data analysis.

RESULTS

Identification of possible FBPase inhibitors by the vHTS system

In this project the vHTS system was used to identify potential small molecule inhibitors of FBPase that bind to the allosteric site by docking approximately 2.8 million commercially available compounds. The top 1,000 compounds were then docked using four different programs, AUTODOCK,³ DOCK5,⁴ SURFLEX⁵ and GLIDE

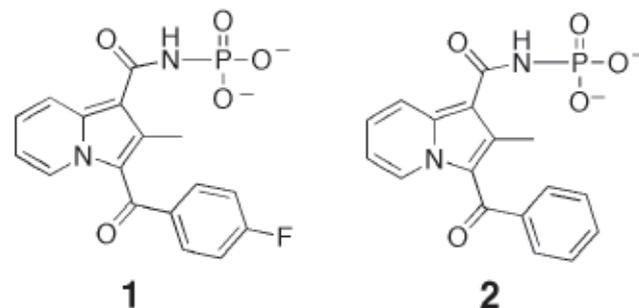


Figure 3. Initially identified potential FBPase inhibitor **1** and analog **2** originally proposed for synthesis.

(Schrödinger, Inc). One of the top ten compounds indicated by vHTS as a strong FBPase inhibitor was carboxamidophosphoric acid **1** (see **Figure 3**).

By the time **1** was identified by vHTS, it was no longer commercially available, and so a synthesis was designed for **2**, which exhibited a similar binding energy as calculated by AUTODOCK.³ Problems quickly arose with the synthesis of **2**, and it was determined that a more productive methodology would be to purchase several commercially available compounds identified by the vHTS for kinetic studies to identify new lead compounds. Five compounds with high predicted affinity for the allosteric site were chosen on the grounds of structural diversity, computer-generated binding configurations, and predicted water-solubility. The structures of the compounds selected for screening, **3-5**, **7** and **8** as well as **6**, a previously identified FBPase inhibitor synthesized in our lab, are shown in **Figure 4**.

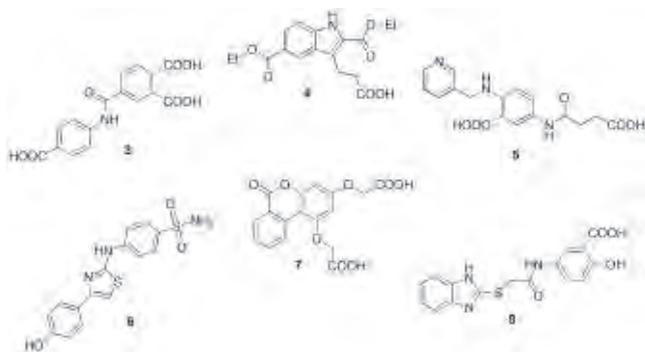


Figure 4. Potential inhibitors of FBPase and known inhibitor **6**.

Ability of Selected Compounds to inhibit FBPase

The compounds shown in **Figure 4** were tested for their ability to inhibit FBPase by a coupled spectrophotometric assay.⁶ AMP (**9**), the natural substrate for the allosteric site, was also tested as a control. The compounds inhibited

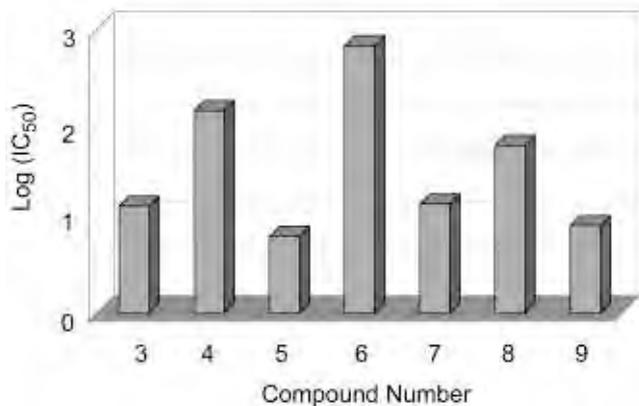


Figure 5. Log(IC₅₀) values of the tested compounds. See **Figure 4** for compound legend. **9** is the natural inhibitor, AMP. IC₅₀ is the concentration of the compound necessary to inhibit the enzyme 50% under the experimental conditions in micromolar.

FBPase to varying degrees, as shown in **Figure 5**. Compounds **3**, **5**, and **7**, appeared to be particularly potent inhibitors; however, only **5** was more potent than AMP.

Future Directions

This project is continuing during the current academic year as part of the research component for an undergraduate thesis. Future directions include the design and synthesis of second-generation inhibitors to further improve the ability of the lead compound to inhibit the activity of FBPase.

Experimental Procedure

Enzyme Purification

The plasmid that contained the gene for pig kidney FBPase expressed with a C-terminal histidine tag under the control of a T7 promoter⁷ was transformed into competent EK1601⁸ cells. The transformed cells were plated on yeast extract-tryptone (YT) media plates containing 150 μg/mL ampicillin. Cells were grown in YT + ampicillin media at 37°C until the A₆₀₀ reached 0.7. Cells were then induced by the addition of 0.4 mM isopropylthiogalactoside and incubated overnight at 37°C. Cells were harvested via centrifugation and suspended in lysis buffer (5 mM potassium phosphate, 2.5 μg/mL leupepin, 0.1 mg/mL lysozyme). Cells were lysed by sonication and the lysate was clarified by centrifugation. Supernatant was collected and a Ni-immobilized metal affinity column was used to purify the enzyme. The column was eluted with a gradient of imidazole (0 – 500 mM) in an elution buffer of 0.05 M potassium phosphate and 0.5 M NaCl at pH 8. Fractions containing enzyme were combined and checked for purity by native polyacrylamide gel electrophoresis. Pure portions were dialyzed against a buffer containing 50 mM imidazole, 1 mM MgCl₂, and 2 mM 2-mercaptoethanol at pH 8.

The activity of the enzyme in the absence and presence of inhibitors was determined by a spectrophotometric assay that monitors the reduction of NADP⁺ to NADPH at 340 nm.⁶ For this assay, fructose-6-phosphate, the product of the FBPase reaction, is enzymatically converted to 6-phosphoglucono-δ-lactone employing a coupled reaction system. The fructose-6-phosphate is first converted to glucose-6-phosphate by phosphoglucose isomerase, which in turn is converted to 6-phosphoglucono-δ-lactone by glucose-6-phosphate dehydrogenase, reducing NADP⁺ to NADPH.

References

- Liang, J.-Y., Zhang, Y., Huang, S., Ke, H. & Lipscomb, W. N. (1992). Activity and Allosteric Regulation in Fructose-1,6-Bisphosphatase. In *Proc. Robert A. Welch Found. Conf. Chem. Res., 36th (Regulation of Proteins by Ligands)*, pp. 57-99. The Robert A. Welch Foundation, Houston.
- Nimmo, H. G. & Tipton, K. F. (1975). The Allosteric Properties of Beef-liver Fructose Bisphosphatase. *Eur. J. Biochem.* **58**, 575-585.
- Goodsell, D. S., Morris, G. M. & Olson, A. J. (1996). Automated docking of flexible ligands: applications of AutoDock. *J. Mol. Recognit.* **9**, 1-5.
- Shoichet, B. K., Bodian, D. L. & Kuntz, I. D. (1992). Molecular docking using shape descriptors. *J. Comp. Chem.* **13**, 380-397.

Continued on page 12

A Guide to New Orleans Eateries

For the upcoming *INFORMEX* and *ACS National Meetings*
by Paul Hanson, Ph. D.

To the Editor of The Nucleus:
Saturday, November 17, 2007

Back in June 2007, I moved to Boston from New Orleans to restart my career. The reason being that the flooding in the wake of Hurricane Katrina wiped out my house and lab; however, that story is for another time. THIS letter is to point you to some of the great eating you can find during the ACS meeting because when you're not getting some great science, you're going to need to eat.

The hour is late. You've landed in New Orleans, La., *aka NOLA*, and made it to your hotel. You're hungry for dinner so now where to? Most likely you'll be going into the French Quarter, *aka the Vieux Carre*, and the best part of the Quarter is that you can walk everywhere. In the French Quarter, there are some essential places for eating. Just across the street from Cafe du Monde (see below) is Jackson Square and Muriel's restaurant. At

Muriel's you can get some delicious creole fusion cuisine and perhaps see, or feel, the ghosts that haunt the place. Yes, there are lots of ghosts and like everyone, I've got a few stories to tell - another time. Got a few extra dollars but need a place to eat and talk some science in style? Make reservations at Bayona (413 Dauphine). Bayona is consistently one of the best restaurants in the city and if you go by taste/dollar, it rises to the top against more well-known, and more expensive, places. If you're more adventurous, or on a smaller budget, head down Royal street, towards Esplanade, to some hidden gems. Benichen and Mona Lisa (121 Royal) are an African and Italian restaurant, respectively, that have some brilliant food at very agreeable prices (\$8-15 for lunch, \$8-20 for dinner). Benichen is also a fabulous option for the vegetarians - you'll love the plantains with the Jama-jama. One of the amazing things about New Orleans,

and the South at large, is the fried chicken. Pre-K, the amount of fried chicken being consumed on Sundays after church would simply astound you. These days, that's scaled back a bit but the chicken is still delicious. Just around the corner from Benichen and Mona Lisa, is Fiorella's (45 French Market Place, just behind the French Market). For about \$15, you can split a plate of fried chicken that will boggle your mind. They cook the chicken just as it is ordered, so plan on having a few beers before it arrives because chicken this good takes about 30 minutes to get ready.

It's early, way too early. The coffee in the hotel is just not going to cut it, so what are your options? Of course, the first option begins with beignets (pronounced ben-nays) at Cafe du Monde. Now, you could sit at Cafe du Monde like all the other tourists OR you could get your order to go, then head over to watch the Mississippi while you munch and sip your cafe au lait (\$3 total). Honestly, the River is just too much to not see. If you don't want the hassle of Cafe du Monde, try Croissant d'Or Patisserie (617 Ursulines) or En Vie(1239 Decatur). They are a bit of a walk, but if you take the River walk, the Mississippi is an inspiring way to start the day. More importantly, these places have very good coffee and some tasty morning snacks. Further afield, if you want to get a "local's" version of breakfast head to Cafe Rose Nicaud, on Frenchman's street, to get some spicy grits, bacon, and a biscuit (\$6-8). The coffee, though, that's what you need. They've got very good coffee, as well as espresso. The staff are really friendly, generally, and will appreciate your coming further afield for the breakfast. The locals who eat there will also crack you up with discussions of absent mayors, wrecked judiciary, and the general pulse of the city.

The morning sessions are over, and you're looking at what to do for



Eastern Scientific

301 Winter Street
Hanover MA 02339

781-826-3456

Vacuum Pump Problems?

Eastern Scientific specializes in the repair and precision rebuilding of all makes of mechanical vacuum pumps.

*Free pick-up & delivery
Restrictions apply*



New Orleans

Continued from page 10

lunch. New Orleans should have some places to eat lunch, right? Head back to the Quarter and migrate to the Napoleon house! There are some epic sandwiches waiting for you to pair with a Pimm's cup. Just order it, trust me. One sandwich you're "gonna wanna" eat before you leave is the Po' Boy. THE BEST Po' Boy is going to be found at Liuzza's by the Track, just off Esplanade (1518 N.Lopez). This bar is way off the beaten path, but if you get a cab with a couple of other people, you won't be disappointed. Get the garlic oyster Po' Boy, dressed. A "dressed" Po' Boy is one with all the fixin's, typically mayo, lettuce, and tomato. The mayo is a blend of seasonings with the mayonnaise and is unbelievably tasty. If you don't want to venture too far from the convention center, head into the Central Business District (CBD) and bust a leg over to Johnny's Po' Boys (511 Saint Louis) for a sandwich that is easily split by two people for \$6.

The last session of the day has ended and none of the hospitality options look all that great, so you want to head out for some most excellent food. If you want to go where the "locals" go to eat and get some music, then walk down Royal (or Decatur) and cross Esplanade into the Marigny Triangle. If you start from Canal Street, the walk is about 15-20 minutes to Esplanade if you stay off the madness of Bourbon St. If you stay on

Royal street and cross Esplanade, an excellent lunch can be had at Sukho Thai (1913 Royal) for about \$8, \$11 if you want the Thai iced tea with lunch. Their dinners of panang duck, or clay pot shrimp, will dazzle your taste buds. **BONUS:** They are a BYOB establishment, so pick up some beverage of choice on the way. Another great lunch or dinner spot is Mona's, on Frenchman street, more or less around the corner from Sukho-thai, where you can get some delicious Mediterranean food (\$8-13). A **FABULOUS** dinner spot on Frenchman's Street is Adolfo's (611 Frenchman). The chef serves up

some classic Italian cuisine that captures the best of the Gulf. A very respectable option for the vegetarians can be had here as well. The place is small, so get there by 7 pm if you want to get a table without waiting 40 minutes. Alternatively, if you get there late, just a few doors down from Adolfo's is the Marigny Brasserie, corner of Frenchman and Royal. This is a great place for a swanky drink and some great food at pretty good prices (\$20-35/entree). At the bar, you can always order some basic pub fair and the hamburger is worth the effort (\$10)! Across the street from Adolfo's is Snug Harbor which is one of THE places for New Orleans Jazz and some great eats.

If you eat, you drink, and in New Orleans this is nearly a vocation. If you'd like to try a swanky place or two, try the W French Quarter Hotel (316 Charters street) or the bar in the Hotel Monteleone (214 Royal). The former has a beautiful courtyard for enjoying your drink and the bar is also a hip and hopping place. The Hotel Monteleone has a rotating bar, converted from a merry-go-round, where a good pace is one drink per revolution. From there, you'll head back out and over to Bourbon street. The key to Bourbon street is to get through it as soon as possible and over the the Marigny. *lol* The key sights of Bourbon street will depend on you. ;-) As you walk down Bourbon street to the Marigny, you should stop and get a "Hand-Grenade" (\$5-8) and Tropical Isle. You'll see people walking around with these drinks that look like radiator fluid in a tall plastic cup and this is what you're looking for. Of course, the best part is that you'll buy it from some guy who is selling them out of an alley. No kidding. Along the way, if some kid, or adult, bets you \$20 that s/he can tell you where you got your shoes, just laugh and keep walking. If you stop, s/he'll tell you that you got your shoes on your feet, so pony up mister! *lol* Once you're in the Marigny, hit the R-Bar (on Royal street) or the Hookah cafe (500 Frenchman street). The former is a bed-and-brew that has a great juke box, cool regulars, and lots of good

vibes. This is where people land after leaving a show at one of the nearby clubs, such as the Apple Barrel, Snug Harbor, and other clubs that feature classic New Orleans musicians. At the Hookah cafe you can get water pipes with all SORTS of great flavored tobacco and feel like a New Orleans hipster. The Hookah cafe also has good tapas and a great, if a bit pricey, bar. Word to the wise, most shows don't start until 10 pm, so be prepared to stay out late! Pick up a copy of the Gambit or check out WWOZ for a list of the shows going on around town.

Now to places further a field that will require either a cab or the St. Charles street car, which just recently restarted. One of the real gems is Dante's Kitchen. Take the St. Charles street car from Canal Street, just outside the French Quarter, to the River Bend, where St. Charles becomes Carrollton. Get off, head two blocks further to Dante street and you'll see it (736 Dante St). If you want to go inexpensive, just get the pate plate, the stone ground corn grits, and a glass of wine. You'll be so happy that you did because you'll taste heaven for ~\$15-20. The entrees run another \$18-30, but let me assure you, you will NOT be disappointed. The next place to try is Jacques-Imo's on Oak street (8324 Oak St). As before, take the St. Charles street car around the River bend and then get off at Oak Street. Cross Oak Street and head down about 3-4 blocks. When you see a restaurant with a stop-light, a crazy painted car, and a long line, you'll be where you should. Right next door is the Maple Leaf bar where you'll find some fabulous music in the evenings, it'll also be where you can get your beer as you wait to get into Jaques-Imo's. If it's tuesday night, stay the night at the Maple Leaf after eating at Jacques-Imo's so you can catch Kermit Ruffins. Believe me, you need to see this guy and his band. Now let me tell you how good Jacques-Imo's is: I brought a speaker down to talk at UNO and we went to Jacques-Imo's for dinner. We waited **THREE HOURS** to eat; he couldn't believe it. He'd never waited

Continued on page 12

New Orleans

Continued from page 11

to eat that long anywhere. We laughed and drank as we waited, he was a great sport, and then we ate - really well. He admitted that the food was worth the wait. If you go, order the Alligator cheese-cake! For the entree, I love the paneed rabbit and there is a vegetarian option there as well! A stuffed eggplant that will rock your world. Every meal includes a small spinach salad with fried oysters, corn bread that you'll dream of, two sides of your choice, and best - you can do it all for about \$30. My kind of place!

In the opposite direction from Dante's Kitchen and Jacques-Imo's are a couple of real treasures. These will require cab sharing, but are really worth the effort. First, Lola's (3312 Esplanade) makes the world's best paella. The place is low key, BYOB with a wine shop across the street, and runs about \$10-15 for an entree. The room fills up early, so bring an extra bottle if you have to wait. ;-) Next on the list is Feelings Cafe D'Aunoy (2600 Chartres). This is a bit more swanky, but still presents a very reasonable meal for \$15-20. Around the corner is Mimi's in the Marigny which has not only great drinks but delicious tapas. Mimi's is a great place to start for the evening and then work back to Frenchman's, back into the Quarter, then back to your hotel. *lol* If you head in the opposite direction, down river, you'll cross the railroad tracks and be on the way to Elizabeth's Restaurant (601 Gallier) in the Bywater. The upstairs bar is full of hipsters, but the dinner downstairs is worth the trip. The mayor eats here, when he's actually visible, and once your order arrives, you'll know why he materializes there. Finally, for the best hamburger and pizza that you'll EVER eat, if you think you're up for an adventure, take a cab to Sugar Park Tavern (800 France St). When you pull up to it, you'll think, "this is nuts". The place looks like you could be shot at as you go in, but you're totally SAFE. This is THE bar you've always wanted to find: where the lights are dim, the people are all locals who bring their dogs (watch

Biography

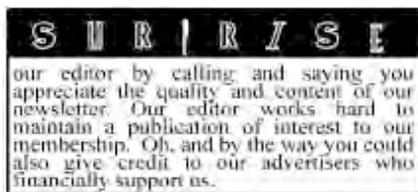
Continued from page 5

dents in an urban system through high school, community colleges, and four-year university. She is a co-PI on an NSF GK-12 project (WISP-1 and WISP-2 grants) and conducts associated research on the development of scientific research explanations by graduate students. She was awarded the 2006 UMass President's Public Service Award for her work at UMass Boston and in public schools, and the 2007 Boston Higher Education Partnership Service Award for her work with students and teachers in Boston Public Schools. ◇

out for stitch, he loves everyone), and the food is unbelievably delicious and cheap! The music varies from live to whatever the bartender decides. Don't be afraid to talk to people, they'll love that you heard about it from a newsletter and they'll love you all the more for being a scientist - because bohemians LOVE scientists. Why? My hunch is that both are looking for ways to redefine the world on their own terms. ;-) We can talk about that over a drink and dinner, if you'd like.

Oh, a final word on tipping. New Orleans is a service-based town, even in the midst of the reconstruction, so the general rule is 15%, 20% if they treat you good or look like they need a lift. Don't forget that there is a city tax (13%) on your hotel room when you budget for the trip; that hurts if you haven't planned for it. If you want to see the wreckage of the city, there are some tours you can take, but really, a good tip goes further for the folks trying to rebuild down there. That and tell everyone you know how good the food is and that they should go visit as well.

Sincerely yours,
Paul Hanson, Ph.D. ◇



Abstract

Continued from page 5

dents learn science best. We have designed and are engaged in a series of studies to investigate the incremental impact on student learning of phasing inquiry-oriented labs into a traditional freshman chemistry lab curriculum. Green chemistry is an environmentally conscious philosophical approach to doing chemistry. We use a research-based instructional materials development cycle to create green, inquiry-based lab experiments for use in university freshman and high school chemistry courses. These include a green stoichiometry lab, an acid-base equilibrium lab, a lab connecting solubility, equilibrium & periodicity, and a colligative properties lab. For our research studies, we create matched pairs of lab experiments for students to do - one that is green and has an inquiry-based pedagogy, and a second that is not green and has a traditional pedagogy. Both lab experiments in a matched pair cover the same chemistry content, require the same calculations, and have students use the same laboratory equipment and similar procedures. I will present a comparison study we recently completed of student performance after completing either a traditional or a green inquiry stoichiometry experiment. I will also briefly discuss studies we are currently engaged in to examine the impact of two or more inquiry experiments on student performance. ◇

Summer Scholar

Continued from page 9

- Jain, A. N. (2003). Surfex: fully automatic flexible molecular docking using a molecular similarity-based search engine. *J Med Chem* **46**, 499-511.
- Riou, J.-P., Claus, T. H., Flockhart, D. A., Corbin, J. D. & Pilkis, S. J. (1977). *In vivo* and *in vitro* phosphorylation of rat liver fructose 1,6-bisphosphatase. *Proc. Natl. Acad. Sci. U. S. A.* **74**, 4615-4619.
- Studier, F. W., Rosenberg, A. H., Dunn, J. J. & Dubendorff, J. W. (1990). Use of T7 RNA Polymerase to Direct Express-

Continued on page 13

BUSINESS DIRECTORY

Golf Tournament

Continued from page 7



Second place team: (L-R) Damon Abernathy, Aimee Hodge and Matt Halvorsen with Harry Mandeville



Third place team: (L-R) Geoff Tapper, Amy Tapper, Panos Kalaritis, and Harry Mandeville.

will be publicized this spring in *The Nucleus* and on the NESACS website.



Summer Scholar

Continued from page 12

sion of Cloned Genes. *Methods Enzymol.* **185**, 60-89.

8. Giroux, E., Williams, M. K. & Kantrowitz, E. R. (1994). Shared active sites of fructose-1,6-bisphosphatase: Arginine-243 mediates substrate binding and fructose 2,6-bisphosphate inhibition. *J. Biol. Chem.* **269**, 31404-31409. ◇

Q. Exactly, how many awards and scholarships does NESACS sponsor?

A) One b) Two c) Many

www.nesacs.org/awards

SERVICES

- CHN O S
- Halogens Bomb Oxidation
- Metals ICP ICP/MS AAS
- Anions Ion Chromatography
- Dry Box Air Sensitive Samples
- Fuel Testing BTU Prox Ultimate Sulfur Ash Analysis
- Inquire about other capabilities

Desert Analytics
3860 S. Palo Verde, Suite 303
Tucson, AZ 85714 - 520.623.3381
thelab@desertanalytics.com
We accept VISA, MC & AMEX

WWW.DESERTANALYTICS.COM

SERVICES

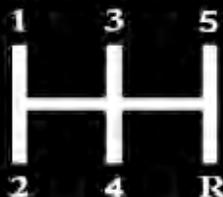
Bruker Daltonics

Hit the Target!

... with sub-ppm confidence on the Bruker microTOF-Q™ for empirical formula determination

www.bdal.com - (978) 663-3660

think forward ESI-Qq-TOF MS



Time to shift gears

PCI Synthesis allows you to accelerate your chemistry needs!

PCI Synthesis transforms basic or proprietary chemistry technology into the precise requirements our customers seek.

Take advantage of our FDA inspected facilities for fine chemical syntheses and/or cGMP syntheses

PCI Synthesis

R&D	Headquarters
88 Jackson Rd.	9 Opportunity Way
Devens, MA 01434	Newburyport, MA 01950
Ph: 978-772-2111	Fm: 978-462-5555
Fax: 978-862-0036	Fax: 978-465-2057

e-mail: info@pcisynthesis.com
<http://www.pcisynthesis.com>

THE FUTURE OF LIQUID CHROMATOGRAPHY IS ACQUITY UPLC



Waters ACQUITY UltraPerformance LC® (UPLC®) provides more information, increases laboratory throughput, and can enhance your lab's existing MS technologies.

Learn more about the UPLC advantage at: www.waters.com/uplc

©2007 Waters Corporation. Waters, ACQUITY, UltraPerformance LC, and UPLC are registered trademarks of Waters Corporation.

Waters
THE SCIENCE OF WHAT'S POSSIBLE.™

BUSINESS DIRECTORY

SERVICES

STATISTICAL QC Onsite inspection looming ?
Failed your inorganic PT ?
Dealing with deficiencies ?
We can help!

Laboratory Compliance Services, Inc.
978-235-2075 labcompliance@verizon.net

Front Run OrganX, inc.

Custom Synthesis & Process Chemistry

WHEN QUALITY MATTERS

High Purity, Scalable Solutions
to Challenging Organic Synthesis

Starting Materials to Pre-clinical
Single to Multi-Step mg to Kgm

98% min. purity

Phone 978-356-7133 Fax 978-356-7449

Email Frontrun@Sprynet.com
www.FrontRunOrg.com

Preclinic DMPK

LCMS, MSn, Mass analysis with
ESI/APCI/Maldi-TOF/NanoSpray

www.HT-LABS.com

info@HT-Labs.com (858)677-9432

Achieve Your Goals in Organic Chemistry

We deliver *On time, On cost,
and On target.*

For Excellence in Organic Chemistry

Come to Organix Inc. for:

- Contract research and development
- Custom synthesis (milligram to kilogram) in all areas of organic and medicinal chemistry
- ¹H NMR and ¹³C NMR Spectra
- Structural Interpretation
- LC/MS Services

ORGANIX
Inc.

Phone: (781) 932.4142

Fax: (781) 933.6695

Email: organix@organixinc.com

www.organixinc.com

SERVICES

**J.G. FINKENBEINER, INC.**
(781) 899-3138

Scientific
glassblowers
serving
New England
for over 40 years

Solving your Pyrex or Quartz
glassware needs from custom
fabrication to repairs

www.finkenbeiner.com

SCHWARZKOPF Microanalytical Laboratory

Elemental & Trace Analysis
Organics, Inorganics
Organometallics
Metals by AA & Graphic Furnace
Functional Grps. - Mol. Wt.
Calorimetry
Total S. F. Halogens TOX
Coneg Testing Custom Analysis
56-19 37th Ave. Woodside, N.Y. 11377
(718) 429-6248
schwarzkopfmicro@aol.com

SERVICES

**micron inc.**
Analytical Services

Complete Materials Characterization
Morphology Chemistry Structure

3815 LANCASTER PIKE, WILMINGTON DE. 19805
PHONE 302 - 998 - 1184, FAX 302 - 998 - 1836

MICRONANALYTICAL@COMPUSERVE.COM
WWW.MICRONANALYTICAL.COM

**LABORATORY
EQUIPMENT**

Bought • Sold • Exchanged
JANUARY SPECIAL

Buchi Syncore Polyvap System
with R-24 rack and vacuum cover.
Additional rack configurations
available

Call for details
American Instrument Exchange, Inc.
1023 Western Ave., Haverhill, MA 01832
TEL: 978-521-2221 FAX: 978-521-8822
www.americainstrument.com
E-Mail: info@americainstrument.com

Rapid Results • Quality • Accuracy • Competitive Pricing



Robertson Microlit Laboratories

- Elemental CHN, S, X, Analysis - *(some new services)*
- Metals by ICP-OES, ICP-MS, A/A
- FTIR, UV/VIS Spectroscopy
- Ion Chromatography
- Bioavailability
- Polarimetry
- DSC
- KF Aquametry, Titrimetry

P. O. Box 927 • 29 Samson Avenue • Madison, NJ 07940

Tel: (973) 966-6668 • Fax (973) 966-0136

www.robertson-microlit.com • email: results@robertsonmicrolit.com

FDA Inspected



DuPont Analytical Solutions

From rapid, routine testing to complex problem-solving. One
of the world's largest, and most diverse analytical laboratories,
with the experience to solve your analytical challenges in :

Electronic Materials • Personal Care • Catalysis • Coatings, Pigments, and Adhesives
Specialty Chemicals • Films and Packaging • Pharmaceuticals • Plastics • Fibers • Textiles

DuPont Analytical Solutions
P.O. Box 80302
Wilmington, DE 19880-0302
Phone: (302) 695-1018

e-mail: DASolutions@usa.dupont.com
web: <http://analyticalsolutions.dupont.com>
FAX: (302) 695-1717

Contact us for all your analytical needs.



BUSINESS DIRECTORY

SERVICES



PolyOrg, Inc.
Chemical Solutions for
the Life Science Industry

- Custom Organic Synthesis
- Process Development
- Contract R & D
- Pharmaceutical Intermediates
- Medicinal Chemistry Support
- Biotechnology Specialty Reagents
- Solid Support Reactions
- Process Validation
- Gram to Multi-Kilogram Synthesis



PolyOrg Inc.
10 Powers Street, Leominster, MA 01453
Phone: 978-466-7978 1-866-Poly-002
Fax: 978-466-8084 info@polyorginc.com
www.polyorginc.com

Chemical Analysis Services



CHEMIR
Analytical Services

- Materials Identification
- Deformulation
- Polymer Analysis & Testing
- Failure Analysis
- Consulting Services

800.659.7659
www.chemir.com



NMR - IR/FTIR - UV/VIS/FL
Sampling supplies & accessories
See our full catalogs / current pricing at
www.newera-spectro.com

CAGE Code: 44ME9
DUNS: 556785657



NEWERA
New Era Enterprises, Inc.
1-800-821-4667
cs@newera-spectro.com

SERVICES

Arendt & Assoc. IP Group
Registered Patent Attorneys

- Global Patent Protection
- Licensing
- Controlling Patent Costs

(978)897-8400 or (978)807-5270
111 Interlake 495, Southborough, MA
jarendt@arendtpatentlaw.com

Elemental Analysis

HUFFMAN LABORATORIES, INC.
Quality Analytical Services Since 1936
Phone (303) 278-4455
FAX (303) 278-7012
chemistry@huffmanlabs.com
www.huffmanlabs.com

CHNOS ash
ICP · AA · ICP/MS
TOC · TOX · BTU
Problem Solving

NMR Service 500MHz

*Mass
*Elemental Analysis
NuMega Resonance Labs
Tel: (858) 793-6057

TELL OUR ADVERTISERS

Membership surveys show that you want more articles in our newsletter. If you tell our advertisers that you saw their ad here, they will provide more financial support and this will allow us to add more articles.

FREE RECRUITING WEB SITE LISTING

The *Nucleus* readership is Northern New England's largest source for chemical and biochemical personnel. The *Nucleus* reaches more than 7,000 readers each month.

You can benefit from this large audience by using *The Nucleus* for recruiting chemists and biochemists:

- Companies for lab. management and sales personnel
- University & College teaching positions
- Hospitals for technical and research personnel

Our ACS publications are said to provide more **qualified resumes** than newspaper ads because of the highly targeted technical audience.

For further information and free web site listing visit:
www.mboservices.net

CAREER SERVICES

NESACS VOLUNTEERING

We need several volunteers to help with Nucleus activities

No experience needed

Just a willingness to learn and a sense of humor

For further information contact
Vivian Walworth
Phone-978-369-3735
Fax-978-369-7306
Email vwalworth@comcast.net

Index of Advertisers

Am. Instrument Exchange.....	14
Arendt & Associates IP Group.....	15
Bruker Daltronics, Inc.....	13
Chemir Analytical Services.....	15
Chemo Dynamics LP.....	2
Desert Analytics Laboratory.....	13
DuPont Analytical Solutions.....	14
Eastern Scientific Co.....	10
G. Finkenbeiner, Inc.....	14
Front Run OrganX, Inc.....	14
HT Laboratories, Inc.....	14
Huffman Laboratories, Inc.....	15
IQSynthesis.....	6
Laboratory Compliance Services..	14
Mass-Vac, Inc.....	16
Micron Inc.....	14
New Era Enterprises, Inc.....	15
NuMega Resonance Labs.....	15
Organix, Inc.....	14
PCI Synthesis.....	13
PolyOrg Inc.....	15
Robertson Microlit Labs.....	14
Schwarzkopf Microanalytical.....	14
Waters Corporation.....	13

THE
NUCLEUS

19 Mill Road
Harvard, MA 01451

NONPROFIT ORG.
U.S. POSTAGE PAID
NORTHEASTERN
SECTION
AMERICAN CHEMICAL
SOCIETY

NESACS Monthly Meeting Dates for 2008

Date

January 10, 2008

February 14, 2008

March 13, 2008

April 17, 2008*

May 8, 2008

September 11, 2008

October 16, 2008*

November 13, 2008

December 11, 2008

* Not the second Thursday of the month ◇

What exactly goes on at NESACS'
monthly Board meetings?
www.nesacs.org/reports

STOP WASTING \$\$\$ on vacuum pumps!!

Rebuilding is smart.

A new pump costs **four times** what rebuilding costs.

Rebuilding is easy.

Just call 978 667 2393 for service second-to-none.

Mass-Vac does the job right.

- Factory trained technicians.
- Rebuilt and new pumps in stock.
- No-hassle parts and labor guarantee.
- Complete line of filtration and trap systems.

Because a really old, really healthy vacuum pump is a beautiful thing!



Mass-Vac, Inc.

247 Rangeway Road • PO Box 359 • North Billerica, MA 01862
978 667 2393 Fax 978 671 0014 sales@massvac.com www.massvac.com

Calendar

Check the NESACS Homepage
for late additions:
<http://www.NESACS.org>

Note also the Chemistry Department web
pages for travel directions and updates.

These include:

- <http://chemserv.bc.edu/seminar.html>
- <http://www.bu.edu/chemistry/events/>
- <http://www.chem.brandeis.edu/colloquium.shtml>
- <http://www-chem.harvard.edu/events/>
- <http://web.mit.edu/chemistry/>
- www.chem.neu.edu/web/calendar/index.html
- <http://chem.tufts.edu/seminars.html> [CHEM.]
- <http://ase.tufts.edu/chemical/seminar.htm> [CHEM. ENGG.]
- <http://www.chem.umb.edu/>
- www.umassd.edu/cas/chemistry/seminars.cfm
- www.uml.edu/Dept/Chemistry/speakers.html
- <http://www.unh.edu/chemistry/seminars.html>

Jan 8

Prof. David Y. Gin (Memorial Sloan-Kettering
Cancer Center)
"Synthesis of Carbohydrate Immunostimulants
and Bioactive Alkaloids"
Boston College, Merkert 130
4:00 pm

Jan 10

Prof. M. Shane Hutson (Vanderbilt Univ.)
"Wavelength-Dependent Structural Failure of
Collagen During Mid-IR Laser Surgery"
Boston College, Merkert 130
4:00 pm

Jan 15

Prof. Ross A. Widenhofer (Duke Univ.)
"Gold and Platinum-Catalyzed
Hydrofunctionalization of C=C Bonds"
Boston College, Merkert 130
4:00 pm

Jan 23

Dr. Vern Schramm (Albert Einstein College of
Medicine)
TBA
Northeastern Univ, 129 Hurtig Hall
12:00 pm

Jan 24

Xudong Yao (U. Conn.)
"Labeling, Sorting and Mass Spectrometry of
Phosphopeptides"
Univ. New Hampshire, L103
11:10 am

Notices for The Nucleus Calendar of Seminars should be sent to:

Sheila E Rodman
250 Kennedy Drive
Unit #403, Malden, MA 02148.
E-MAIL: serodman(at)hotmail.com

What's Yours?

DMPK Scientist,
LC/MS Product Specialist,
Mass Spec Operator,
Staff Investigator,
Process Chemist,
QA Manager,
Synthetic Chemist,
Lab Instructor . . .

Many local employers post positions
on the NESACS job board.

Find yours at
www.nesacs.org/jobs