



# **NEWSLETTER**

**Oklahoma Section**

**American Chemical Society**

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Volume 10 Number 5

November 1, 2004

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## **Large-Scale Bioanalytical Chemistry: The Foundation of the “Omics” Revolution.**

**Thursday - November 18, 2004**

**Noble Conference Center**

**Sam Noble Parkway**

**Ardmore OK**

**Dr. Lloyd W. Sumner**

**Staff Scientist & Head: Biological Mass Sepcrometry**

**The Noble Foundation**

**2510 Sam Noble Parkway**

**Ardmore OK 73401**

The magnitude in which biology is queried is rapidly evolving toward the large-scale quantitative and qualitative profiling of gene expression products at the mRNA, protein, and metabolite levels. These large-scale functional genomics or systems biology approaches yield global snapshots of the dynamic biochemistry of life. When these snapshots are compared before and after genetic perturbations, differences can be used to decipher gene function or to evaluate the holistic response of a biological system. The Noble Foundation has initiated an integrated functional genomics approach to study the model legume *Medicago truncatula* that includes transcriptomics, proteomics, and the emerging science of metabolomics. At the core of these “omics” approaches are large-scale analytical chemistry, high-throughput sequencing, and modern mass spectrometry.

**[Continued Page 3]**

**[Reservation Information on Page 2]** 

**Schedule:**

**6:00 PM** Social Hour: **Noble Conference Center**  
**7:00 PM** Dinner: **Noble Conference Center**  
**8:00 PM** Speaker: **Noble Conference Center**

**Menu:** *It's BBQ Time!* Sliced beef; Ribs; Polish Sausage; Beans; Potato Salad; Cole Slaw; Rolls; Relish Tray; Cobbler; Iced Tea; Water.

**Cost:** \$14.00-ACS Member; \$8.00-ACS Student Affiliate

**Deadline: Friday - 12 November, 2004 - 3:00 PM**

**Tim Smith : 580.745.2444 / tsmith@sosu.edu**

**Traveler's Aid:**

1. *From I-35:* **Take Exit 33 and turn left [East] on Prairie Valley Road/Veteran's Boulevard. Continue on Veteran's Boulevard 3.0 miles until the intersection of Same Noble parkway. Turn left [East] on Sam Noble Parkway 1.4 miles. The Conference Center entrance is on the left [North] side of Sam Noble Parkway, directly across the road from the Noble Foundation complex. The Conference Center is  $\approx$  1/4 mile from the highway.**

**Lloyd W. Sumner, Ph.D.**

Assistant Scientist & Head, Biological Mass Spectrometry

The Samuel Roberts Noble Foundation

2510 Sam Noble Parkway

Ardmore, OK 73401

Phone: 580.224.6710

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[lwsunmer@noble.org](mailto:lwsunmer@noble.org)

<http://www.noble.org/plantbio/MS/index.html>

**Professional Preparation.**

Ph.D. Analytical Chemistry, 1993, OSU, Stillwater, OK

B.S. Chemistry 1989, Cameron University, Lawton, OK

Certificate Fundamental Electronics: 1984 Great Plains Vocational School, Lawton, OK

**Employment History.**

1999–present: Assistant Staff Scientist & Head of Biological Mass Spectrometry, Samuel Roberts Noble Foundation, Ardmore, OK

1994–1999: Associate Director of the Laboratory for Biological Mass Spectrometry, Texas A & M University, College Station, TX

1993–1999: Laboratory Manager of the Applied Mass Spectrometry Core Facility, Texas A & M University, College Station, TX

1991–1993: Graduate Student and Mass Spectrometry Facility Analyst, Oklahoma State University, Stillwater, OK

**Honors, Awards, and Appointments.**

External Scientific Advisory Committee Member–Colorado State University Metabolomics Consortium [2004-present]

Editorial Board: Metabolomics [Kluwer] initiation date, Oct. 2004.

Scientific Advisory Board, Metabolomics Society, Cambridge, MA [2004-present].

Scientific Consultant for Sigma-Aldrich Plant Biotech Initiative [2004-present]

Adjunct Assistant Professor, Oklahoma State University, Department of Biochemistry and Molecular Biology, 2004-present.

Member International Advisory Committee for Plant Metabolomics [2001-Present]

Graduate Faculty Appointment, Texas A&M University, Department of Chemistry, August 1999

Graduate Research Fellowship, Samuel Roberts Noble Foundation, 1990-1993.

Temple W. Chronister Memorial Scholarship, 1989

Ansley Memorial Scholarship, 1988

### Selected Publications.

Potential of Metabolomics as a Functional Genomics Tool. Raoul J. Bino, Robert D. Hall, Oliver Fiehn, Joachim Kopka, Kazuki Saito, John Draper, Basil J. Nikolau, Pedro Mendes, Ute Roessner-Tunali, Michael H. Beale, Richard N. Trethewey, B. Markus Lange, Eve Syrkin Wurtele, and **Lloyd W. Sumner**, *Trends in Plant Science*, 2004 Sep; 9(9):418-425.

Metabolic profiling of *Medicago truncatula* cell cultures reveals effects of biotic and abiotic elicitors on metabolism. Corey D. Broeckling, David V. Huhman, Mohamed Farag, Joel T. Smith, Gregory D. May, Pedro Mendes, Richard A. Dixon, and **Lloyd W. Sumner**, *J. Exp. Bot.* In press.


Plant Metabolomics: Large-scale Phytochemistry in the Functional Genomics Era, **Lloyd W. Sumner**, Pedro Mendes, and Richard A. Dixon, *Phytochemistry*, 2003, 62, 817-836.

Metabolomics Spectral Formatting, Alignment and Conversion Tools (MSFACTs) Anthony L. Duran, Jian Yang, Lianjiang Wang, **Lloyd W. Sumner**, *Bioinformatics*, 2003, 19(17) 2283-2293.

Metabolic Profiling of Saponin Glycosides in *Medicago sativa* and *Medicago truncatula* using HPLC Coupled to an Electrospray Ion-trap Mass Spectrometer, D.H. Huhman and **L.W. Sumner**, *Phytochemistry*, 2002, 59, 347-360.

Legume Natural Products: Understanding and manipulating complex pathways for human and animal health, Richard A Dixon and **Lloyd W. Sumner**, *Plant Physiology*, 2003, 131, 878-885.

Mapping the Proteome of *Medicago truncatula*, Bonnie Watson, Victor Asirvatham, Liangjiang Wang, **Lloyd W. Sumner**, *Plant Physiology*, 2003, 131, 1104-1123.

Proteomics of *Medicago sativa* Cell Walls, Bonnie S. Watson, Zhentian Lei, Richard A. Dixon, **Lloyd W. Sumner**, *Phytochemistry*, 2004, 65 (12) 1709-1720..... 

### Large Scale Bioanalytical Chemistry: The Foundation of the “Omics” Revolution.

[Continued From Page 1]

The goals of this presentation are to: [1] summarize the technologies currently being used in proteomics and metabolomics, [2] illustrate the technologies by providing specific examples of their use with *Medicago truncatula*, and [3] suggest that there is and will continue to be a need for scientists having cross disciplinary training in analytical chemistry, biochemistry and/or biology.

The Sumner Group

The Samuel Roberts Noble Foundation, Ardmore, OK.

<http://www.noble.org/plantbio/MS/index.html>

## Oklahoma Chemist Award - 2005

Nominations for **Oklahoma Chemist of the Year - 2005** are now being accepted.

1. Five [5] copies of each nomination must be submitted.
2. The nomination packet should contain the the following information:
  - a. **A nomination letter** for the candidate by a colleague.
  - b. **A complete, up-to-date resumé** of the candidate.
  - c. **A two page “highlight”** of the major accomplishments of the nominee.
  - d. **Five [5] letters of support:** 2 letters from colleagues at the candidate's place of employment and 3 letters from outside the candidate's place of employment. Letters from individuals with expertise in the candidate's field are especially welcome.
  - e. Special information on the candidate is also solicited, especially as to how the candidate has advanced chemistry in the State of Oklahoma in the area of his/her expertise.
  - f. Nominees may be involved in research or chemical education within the state.

**Nominations should be sent to:**

**Dr. K. Darrell Berlin**  
**Department of Chemistry**  
**Oklahoma State University**  
**Stillwater OK 74078**

**Nomination Deadline:**

**January 17, 2005**

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## **2004 Section Election.**

The Section ballots are scheduled to be mailed near the end of October 2004. The positions up for election are: Chair-Elect, Treasurer and Councilor. Nominations for the various offices are always needed and welcomed. If you wish to nominate someone, or stand for one of these offices yourself, contact: **Blake Sonobe, Nominations Chair:** 580.774.3266 or [blake.sonobe@swosu.edu](mailto:blake.sonobe@swosu.edu).

## **Automotive News [excerpts] - October 11, 2004.**

### **Hybrids top fuel economy list.**

WASHINGTON –There is a new fuel economy champion of sorts.

The Ford Escape Hybrid, with ratings of 36 mpg in the city and 31 on the highway, is the most fuel-efficient light truck, according to the government's 2005 Fuel Economy Guide. The Honda Insight with a manual transmission is again the overall leader with ratings of 61/66. Other hybrids were close behind.

### **A chance for cheaper fuel cells.**

A fuel cell large enough to power a vehicle can cost \$100,000 – the biggest reason the technology isn't ready for prime time.

That's why industry insiders paid heed when a California company said last week that it had developed a cheaper, hardier membrane for fuel cells. A fuel cell's membrane chemically strips the hydrogen atom's electron to generate electricity.

PolyFuel claims its membrane generates more power, costs half as much as today's materials and works well in cold weather. Honda has experimented with a similar membrane in its fuel cells.

Fuel cells may be 10 years from commercial use. But the announcement suggests that automakers are making progress.

### **Tax bill losses outnumber wins.**

Congressional negotiators eliminated proposed tax credits mainly aimed at hybrids and fuel cell vehicles from a giant corporate tax bill before sending it to the House and Senate for passage last week.

The bill's sponsors had proposed credits of up to \$4,000 for a hybrid and up to \$8,000 for a fuel cell vehicle.

Tax credits have been a top lobbying priority of automakers. But some key players, especially House Ways and Means Chairman, Bill Thomas, R-Calif. believe vehicles with waiting lists don't need taxpayer-funded incentives.

Negotiators also rolled back a special tax write-off for businesspeople who buy light trucks weighing 6000 pounds or more, gross weight. The provision, part of an economic stimulus law enacted two years ago, was criticized widely as a subsidy for the wealthy.

### **C&E News – August 23, 2004. [page 21]**

#### **Much natural gas wasted each year.**

More than 100 billion m<sup>3</sup> of natural gas, enough to meet the needs of Germany and France, is vented or flared each year, says a report by the Government Accountability Office [formerly the General Accounting Office] released on August 16. The report notes that the price of natural gas in the U.S. has almost tripled since 1995, and the increase in price and demand has hurt U.S. chemical companies that depend on gas for fuel and feedstock. Most of the natural gas is flared in eight countries: Algeria, Angola, Indonesia, Iran, Mexico, Nigeria, Russia, and Venezuela. The U. S. produces about 24 billion m<sup>3</sup> of natural gas annually and flares about 0.4% of that total. Along with wasting resources, flaring and venting also increases greenhouse gas emissions for methane [an estimated 4% of all methane emissions] and carbon dioxide [1%]. The report adds that data gathering on flaring and venting is quite weak, and the Energy Information Administration relies mostly on voluntary reporting. GAO says the U.S. Government and other nations could greatly reduce global flaring and venting. The report [GAO-04-809] is available at <http://www.gao.gov>.

### **Wall Street Journal – 10/14/04. [Two Articles on page B-1]**

#### **1. Not Just Tilting Anymore**

#### **2. Plans for Huge Wind Turbines Jolt Kansans.**

The 2nd article dealt with landowners in the famous Kansas Flint Hills. The Flint Hills are the largest expanse of tallgrass prairie left in North America. The Flint Hills probably rank right up there with the famous Sand Hills of Western Nebraska and the huge grasslands of the Western Dakotas.

Many of the Flint Hills landowners are against wind turbine "farms" and are not leasing their land for this purpose. The Sierra Club is for wind turbine farms. Sierra Club spokespersons have suggested those who refuse to lease land are "elitist" in their outlook!

#### **Some "selected" data from the 1<sup>st</sup> article.**

The "typical" tower is 327 feet tall. Each turbine has 3 blades. Each blade is 87 feet long.

1. The 1.8¢ federal tax credit/kwh has been extended to the end of 2005 to be in effect for 10 years for wind turbine generated electricity.

2. Wind turbine proponents claim wind turbines generate electricity at 2.5¢-4.0¢ /kwh which includes the federal subsidy. [Do they factor in the cost for “down time” when insufficient wind to turn?]
3. A new gas fired generating plant produces electricity at 5.5¢/kwh hour at current natural gas prices + plant capital costs. [No mention of projected plant lifetime.]

## **November Section Meeting**

**Thursday 18 November, 2004**

**Noble Conference Center  
Sam Noble Parkway  
Ardmore OK**

*Large-Scale Bioanalytical Chemistry: The Foundation of the  
“Omics” Revolution.*



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