N E W S L E T T E R

Oklahoma Section
American Chemical Society

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Chemical Analyses Without Separations. How Possible Is It ?

Thursday – 09 November , 2006
Room 103 Physical Sciences
Oklahoma State University
Stillwater OK 74078

Dr. Neil Purdie
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Department of Chemistry
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As indicated in the biographical sketch, the grail of our most recent research aspirations has been to find ways to measure, not just identify, significant analytes in complex matrices, without relying upon separations. To accomplish this the procedure must have keen selectivity, almost specificity, to avoid interferences.

One way is instrument-only based, e.g. the combination of UV-vis absorbance and molecular chirality or circular dichroism spectropolarimetry, with which we were able to identify and measure controlled substances, natural products, and pharmaceuticals present in very complex mixtures, some of which were cleverly and intentionally designed to mask their existence. Included were opiates, amphetamines, tetracyclines, cocaine alkaloids, LSD, barbiturates, nicotine, PCP, cannabinoids, peptides, and insulins

The other option, and the subject of this presentation, was to develop a direct chemically-based color test that would be even more selective than enzymatic- and/or antibody-based assays both of which have experimental limitations. At that point in time our interests had shifted to the issues of serum cholesterol level and the obvious failures of the very speculative risk prediction models for [Continued Page 3]

[Reservation Information on Page 2]

Schedule:

6:00 – 7:30 PM Dinner: The Hideaway Pizza in Stillwater.

8:00 PM

Speaker: Room number & building will be announced at the Hideaway Pizza eatery. Or else check the web site for this information.

Menu: One topping pizza, salad and drink. Alternatively, individuals can order from the menu [for items such as pasta] if the buffet is not to their liking. Alcoholic drinks can also be obtained through individual purchases.

Cost: $7.75 / person from the regular buffet. Or a person can individually order from the regular Hideaway Pizza menu.

Deadline: For more detailed information, please contact Barry Lavine: 405.744.5945 bklab@chem.okstate.edu

Dr. Neil Purdie

Professor and Chair
Department of Chemistry
OSU Stillwater.

Dr. Neil Purdie is a graduate of the University of Glasgow, Scotland completing his B.Sc. degree with First Class Honors in 1958, and his PhD in Physical Chemistry in 1961. He was retained as an Assistant Lecturer from 1960-62 and followed that with a one-year postdoc position with Norman Sutin at Brookhaven National Laboratory on Long Island. He returned to Glasgow as a Research Fellow until 1965 when he joined the Chemistry Department of Oklahoma State University and hasn't left….yet, except for a one year sabbatical with Ted Eyring at the University of Utah. At OSU he was promoted to Associate Professor with tenure in 1970 and to Full Professor in 1975. He has had the good (?) fortune to serve as Department Head/Chairman for almost 20 years.

The spectral range of his research interests began with physical, progressed through inorganic until it reached analytical, to now, where it is closer to clinical. His work has been recognized in over one hundred scientific publications in the form of articles, reviews, book chapters, encyclopedia entries, a specialty textbook, and mentoring 35 advanced degree graduates. He has accumulated 10 patents, and four research awards, two of which were state-wide awards. His personal research grail has been to accomplish analyses without separations.

His reputation as a classroom instructor can be validated by his being the recipient of 11 teaching awards, one of which was the first Oklahoma Medal for Excellence at the College level presented to an OSU faculty member.

His personal interests have included college soccer, where he received the coveted blue jacket; golf (sort of), and performances in theatre and choir that improved upon his public image and easy presentations, things that are indispensable in the classroom. . . . . .

[Continued from Page 1]

heart disease. This new reagent closely resembles the original chemical color test for cholesterol but, in our case, conditions are more benign.

The other option, and the subject of this presentation, was to develop a direct chemically-based color test that would be even more selective than enzymatic- and/or antibody-based assays both of which have experimental limitations. At that point in time our interests had shifted to the issues of serum cholesterol levels and the obvious failures of the very speculative risk prediction models for heart disease. This new reagent closely resembles the original chemical color test for cholesterol but, in our case, conditions are more benign. The reagent is selective to the –CH=CH-CH_2- molecular grouping, and the bonus we got from using this assay was that plasma polyunsaturated fatty acids (PUFA) contain the same grouping, so multiple reactions, seven in all, occur in parallel and reach color endpoints simultaneously. The reality of a full spectrum being the simple sum of individual spectra for component parts, was validated by comparing it with data for mixtures prepared from standard reference materials.

The task at hand is to measure the concentrations of all seven lipids, and to use the data to derive significantly more meaningful risk prediction models.

Section News

1. Chemistry Club at Moore High School.

Valerie Ferguson, Chemistry Teacher and Head of the Science Department at Moore High School, has started to organize a chemistry club at Moore High School, Moore, OK. Their initial efforts will center on designing a club t-shirt and participation in National Chemistry Week activities.

2. National Chemistry Week [October 22-28, 2006]

The theme for NCW is "Your Home: It's All Built on Chemistry". Local section activities include an information booth on the OU campus before the OU/Colorado football game [Saturday, Oct. 21]. The OU College of Architecture has agreed to join this NCW activity. Examples of chemistry in the home, such as paints, coatings, plastics, and concrete, will be demonstrate using student design projects from the architecture, interior design, and construction science programs. This booth will be setup on the west side of the stadium, in front of Gould Hall. Additional activities will be held at Quail Springs Mall [Edmond] on Saturday, Oct. 28th. The display will have information and activities for all ages.

3. Section Chair "Storms" Capitol Hill

Chuck Rice, Chair of the Oklahoma Section and Assistant Professor in the Department of Chemistry and Biochemistry at the University of Oklahoma, traveled to Washington, DC to lobby Congress for increased science funding. On Capitol Hill, Prof. Rice met with staff of Sen. James Inhofe, Sen. Tom Coburn, and Rep. Tom Cole. These efforts were to ensure that the National Science Foundation budget remains on track for doubling within the next ten years. Prof. Rice was one of 2 chemists selected nationwide by the ACS Office for Government and Legislative Affairs, joining 100+ other scientists, engineers, and technicians from over 30 scientific associations and societies.

Charles Rice
Chair – Oklahoma Section ACS

Letters To The Editor ***

One of the pitfalls of science is connecting the "effect" with the correct "cause". Examples of miss-association of cause and effect abound in history e.g., the nature of electric current [fluid flow], the cause of malaria [bad air], the Black Death [alignment of the planets], and cancer [a virus].

Pursuing the wrong "cause" usually results in implementing even more draconian measures as the "effect" continues unabated, resulting in further lost time and resources.

I'm amazed at the rapidity and intensity of how thought proceeded from the atmospheric carbon dioxide CO_2 is increasing so nations must curtail the production of man-made CO_2 to mitigate global warming. As a physicist, with experience in microwave astronomy and remote sensing, I am perplexed that alternate causes of global warming have not been pursued at least as intensely as the one based on CO_2.

The sun, I believe, is still the most likely culprit in any global warming. For more than 100 years there have been efforts to link sunspot or solar activity and our climate with mixed results.

New microwave technology can now permit the quantitative measurements in a microwave frequency range for study, i.e., the millimeter and sub-millimeter waves up to 300 Gigahertz [GHz]. The importance of this is that while the atmosphere is transparent to the lower microwave frequencies [no heating], the atmosphere is opaque to millimeter/sub-millimeter waves.

This opaqueness is due to the fact that water vapor and oxygen highly absorb millimeter/sub-millimeter waves. Based on the measurements of solar infrared, visible and ultraviolet wavelengths, the theoretical model of the sun is that of a thermal radiator of 5800 degree Kelvin. However, radio frequencies do not conform to this model and can appear at times to emanate from a non-thermal source of millions of degrees.

Measurement of solar radiation by the University of Technology, Finland, indicate that the solar millimeter radiation is indeed from the non-thermal synchrotron mechanism and as such can have a significantly greater energy level than that from the 5800 degree Kelvin theoretical thermal sun. With the acute atmospheric absorption [heating] by millimeter waves, we have the potential basis of a "solar generated atmospheric microwave oven."

Robert A. Mennella
Hendersonville, N.C.

[Mr. Mennella was a research physicist in radio astronomy and microwave remote sensing at the Naval Research Laboratory, and the Manned Spacecraft Center.]

*** Reprinted From: The Wall Street Journal, January 31, 2006, Page A15

Zap! Pow! . . . . . .

Oklahoma Chemist Award - 2007

Nominations for Oklahoma Chemist of the Year - 2007 are now being accepted.

Five [5] copies of a single nomination should be sent by no later than January 22, 2007 to:

Dr. K. Darrell Berlin-Chair
Oklahoma Chemist Awards Committee
Department of Chemistry
Oklahoma State University
Stillwater OK 74078
405.744.5950
kdb@okstate.edu

Criteria and Guidelines for the Preparation of the Nomination and For Selection of the Recipient of The Oklahoma Chemist Award.

1. A nomination letter for the candidate by a colleague, friend, etc.
2. A complete, up-to-date resumé of the candidate.
3. A two-page "highlight" of the candidate's major accomplishments.
4. Five [5] letters of support for the nominee.
   [a] Two [2] letters from colleagues at the candidate's place of employment.
   [b] Three [3] letters from outside the candidate's place of employment. Letters from individuals with expertise in the candidate's field are especially welcomed.
5. Special information on the candidate is also solicited, especially as to how the candidate has advanced chemistry in the state of Oklahoma.
6. Candidates may be involved in research or in chemical education within the state.

kdb . . . . . 

November 2006 Section Meeting
Thursday, 09 November, 2006
Oklahoma State University

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