



# PSNA News

Phytochemical Society of North America  
Sociedad Fitoquímica de América del Norte  
Société Phytochimique de L'Amérique du Nord

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## PSNA 2008 Meeting

June 25 to June 29 in Pullman, Washington

**A Polyphenol Symposium will be held by the "Tannin Research Community" at the 2008 PSNA meeting in Pullman.**

The Tannin Research Community's major objectives are to promote interdisciplinary collaboration to improve our understanding of the chemistry of polyphenols and their biological and physiological significance, and to focus on their expanded application in industry and in human health, nutrition and food industries. We look forward to a great meeting in Pullman!

**2008 PSNA Meeting Website**  
<http://psna.wsu.edu>

The 2008 PSNA Meeting website will have all the registration and abstract submission information by March 1st. You can access the meeting page from the PSNA webpage at <http://www.psna-online.org> or directly at <http://psna.wsu.edu>

### The Secretary's Message

Mark Berhow  
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The PSNA Newsletter and website can provide an excellent opportunity to be a clearing-house for information on the exciting world of plant chemistry and biochemistry research. It has the unique position to be a central forum for any and all phytochemical research and the potential to be a go to site for jobs, research grant opportunities and recognition.

If the membership took a little time to contribute a short article or pass along a pertinent website address, we could have a lively forum on our hands. It can be anything: a important paper that was accepted or cited in some way; an upcoming meeting; a great presentation from a past meeting; new funding received by a research group; new funding opportunities; graduate student, post doc, faculty, and private sector positions; descriptions of research programs; or anything related to phytochemistry. Thanks in advance for your help!

### IV International Symposium on Tropical & Subtropical Fruits

November 3-7, 2008 – Bogor, Indonesia, under the auspices of the International Society for Horticultural Sciences.

The Theme of the Symposium is "Fruits for better life". The Symposium will review current progress and explore potential application in the research of tropical and subtropical fruits. The aims of the symposium are to facilitate discussion and exchange of scientific and technical information and to promote international cooperation in all aspects of tropical and subtropical fruits, including both fundamental and applied aspects of research, extension, education, production and supply-chain management.

The program will include a range of activities, including: (1) Oral Presentation; (2) Poster Presentation; (3) Workshops; (4) Professional Tours to Fruit Orchard, Tropical Fruits Garden and Botanical Garden; (5) Concurrent horticulture product

*(continues on page 3)*



In this Issue: Frank A. Loewus, Phytochemical Pioneer; Report from the 2007 PSNA Meeting in St. Louis; The PSNA Young Members Committee proposals for meeting activities

This is the printed version of the PSNA Newsletter. The web PDF version can be downloaded from the website: [www.psna-online.org](http://www.psna-online.org).



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WWW.PSNA-ONLINE.ORG



# The Phytochemical Society of North America

The Phytochemical Society of North America (PSNA) is a nonprofit scientific organization whose membership is open to anyone with an interest in phytochemistry and the role of plant substances in related fields. Annual membership dues are U.S. \$40 for regular members and \$20 for student members. Annual meetings featuring symposium topics of current interest and contributed papers by conference participants are held throughout the United States, Canada, and Mexico. PSNA meetings provide participants with exposure to the cutting-edge research of prominent international scientists, but are still small enough to offer informality and intimacy that are conducive to the exchange of ideas. This newsletter is circulated to members to keep them informed of upcoming meetings and developments within the society, and to provide a forum for the exchange of information and ideas. If you would like additional information about the PSNA, or if you have material that you would like included in the newsletter, please contact the PSNA Secretary or visit our website at [www.pсна-online.org](http://www.pсна-online.org). Annual dues and changes of address should be sent to the PSNA Treasurer. Also check the PSNA website for regular updates.

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exhibition; (6) Excursion for accompanying person; (6) Beside the main programs, additional pre and post symposium tours could be arranged.

It is not necessary to present a paper or poster to attend the symposium. We extend an invitation to researchers, educators, government officials, students, growers, companies and all who are interested in tropical and subtropical fruits.

Further information and circulars including the registration form, hotel reservation form and payment instructions will be periodically sent to you and upgraded on the website ([www.ifs2008.info](http://www.ifs2008.info)). We warmly encourage all interested people to visit this web site now and in the coming months for news and deadlines.

The success of our Symposium depends upon your participation. I

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hope you will make a special effort to attend. We kindly request you to forward it or to pass the information to other possible interested persons dealing with tropical and subtropical fruits.

Roedhy Poerwanto, Convenor

### XXIV International Conference on Polyphenols

ICP/JIEP 2008 - July 8-11, 2008 -  
Salamanca, Spain

In cooperation with the organizing committee and the scientific committee of ICP 2008 (Salamanca, Spain), we are organising the XXIV International Conference on Polyphenols scheduled on 8th-11th July 2008. The list of invited speakers is of absolute excellence and the venue of the conference is very wonderful: our Spanish colleagues are making any effort in order to offer an adequate welcome to the conference delegates.

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Please visit the website of the conference!

During next ICP 2008 there will be the presentation of the first volume of a new book series, edited by Groupe Polyphénols and published by Wiley-Blackwell, called "Recent Advances in Polyphenol Research" which includes all lectures of ICP 2006 (Winnipeg, Manitoba-Canada), plus 4 additional chapters. All conference delegates of ICP 2006 will be able to acquire the book with a special reduction in price of 50%. (<http://www.blackwellpublishing.com/book.asp?ref=9781405158374>)

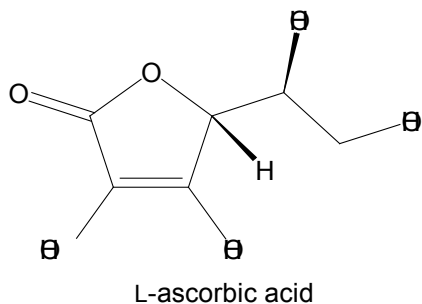
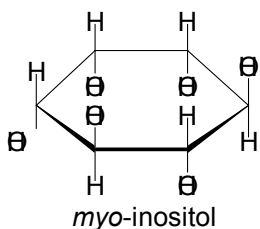
Finally, I have the pleasure of inviting everybody you to visit the new web site of Groupe Polyphénols: all suggestions and criticism are welcome.

Hoping to meet you everybody in Salamanca next July 2008, I wish to everybody you a Merry Christmas and Happy New Year.

Vincenzo Lattanzio  
President of Groupe Polyphénols

<http://www.groupepolyphenols.com/>  
<http://polyphenols2008.com>

# Frank A. Loewus, his wife Mary, ascorbic acid and *myo*-inositol PSNA Phytochemistry Pioneer – 2007



## Prelude (1919 – 1952)

In 1919, five months short of my birth, my father purchased a *faux* Victorian home perched on the shoreline overlooking Lake Superior in Duluth, Minnesota, a comfortable environment for my mother and her two children. Its 9 rooms provided ample space for family as well as the usual homeless old relative or acquaintance which in those days was considered an act of charity. He employed a capable housekeeper to relieve his wife of heavy duties as delivery approached since she was progressively weakened by hypothyroidism. Birth was normal but its toll on my mother's health was overwhelming. She died in 1921.

In those times, workdays were long. I saw little of my father except at suppertime. My sharpest childhood memories revolved around his rare fishing excursions on various lakes north of our city. Only my brother, four years older, was allowed to accompany him in the boat. I spent my time wandering through abundant woodlands that crowded the shoreline. With time, I found this singular lifestyle fed both my time and thoughts. In my sixth



year, a young Chippewa woman, Louise Martin, from an Ojibwa reservation west of town was hired to handle household duties. Her stories fascinated me, especially those which brought meaning of a natural world beyond the schoolroom. I would climb on a stool next to her worktable and watch her slice large chunks of rising bread dough, braid them into glistening loaves and after further leavening pop them into the oven. While still warm she would slice off a "heel" from a fresh-baked loaf, slather it with butter for me and proceed to tell me tales of the 'wendigo' and its fearsome tactics. Her love of hummingbirds became mine. She could mimic the cry of the loon and as she sliced firm white shaggy manes I had gathered from the field behind our house, she left some on the table to dissolve into inky blackness, a demonstration of their ephemeral nature.

In 1928 my father remarried but his happiness and prosperity soon evaporated as the Great Depression set in, leading first to job loss and then to a lingering illness and death in 1936. When I finished high school a year later my only choice for higher education was our local Junior College. I chose to pursue

pre-forestry. One course, biology, had an incredibly-gifted instructor, Margurite Kittridge. With Federal funds stemming from President Roosevelt's efforts to restart the economy, Ms Kittridge hired several assistants to setup and run both plant and zoological lab projects. As one of those chosen to assist, life science quickly became my educational beacon. I also found a close friend in Chalmer (Gus) Gustafson, a fellow assistant. With two years of pre-forestry behind us, we entered the Forestry program at the Univ. of Minnesota. Gus chose hard-core courses aimed at civil service but I drifted into science specialization leading to biochemistry. Good luck brought me to the desk of Ross A Gortner, author of a well-known textbook "Outlines of Biochemistry" and a strong proponent for a role of colloids in living processes. Quickly, he laid out a three year program involving basic chemistry and physics as well as specific courses in colloids and the structure of matter. There was no turning back. I was committed to a path demanding a graduate education in biochemistry!

War clouds were rapidly gathering as I finished Gortner's list of courses and prepared for graduate



school. I even had a graduate assistantship lined up at Kansas State Univ. It was not to be. Either I enlisted or waited for the draft to claim my future. Like my friend Gus, I enlisted in the Army Air Corp. Five years later, I returned to the States from my tour of duty in the South Pacific, the Philippines and occupation of Japan. During separation from service at Fort Sheridan, the officer handling my papers noted my BSc. degree in biochemistry and asked if I would like to schedule a job interview in this regard. Within an hour I had an offer from a distillery in Lawrenceburg, Indiana. It involved six months of training followed by a solid position in industry. After a brief visit to my step-mother in Duluth, I boarded a train for Minneapolis with connections to Chicago and the new job. A six hour lay-over in the Twin Cities led to complete change of plans! I used that time to visit my *alma mater*. Gortner had died in 1942 but David Briggs, a professor whose classes I had attended, was on hand. He welcomed me warmly. Upon learning of my plans to enter industry, he countered with the suggestion that I use my entitlement in the GI Bill to apply to graduate school. Moreover, he offered me a quarter-time research assistantship in his lab. Classes were already in session. I spent the rest of that day cancelling my Indiana commitment and arranging for late registration into graduate school with a major in biochemistry and a minor in organic chemistry. It was a decision that shaped my future beyond my fondest dreams!

Scarcely two months later, during a lab experiment involving reactions in a fume hood, I heard the word 'Duluth' echoing from an adjacent hood. I turned to see if it was someone I knew. That was how I met my future spouse, Mary-Esther Walz! We had much in common: born and raised in Duluth, one parent fami-

lies during our adolescent years, a sister in nursing, a brother attending or graduated from West Point Military Academy, the goal of a PhD in biochemistry, promise of a creative career and a love of the northlands. Now, approaching our 60<sup>th</sup> year of marriage, with professional careers behind us, three children and six grandchildren around us, we do indeed feel blessed.

### **The Windy City – Chicago (1952 – 1955)**

1951 found myself in the final stages of winding up a PhD dissertation on the chemistry of amylose retrogradation so I decided to seek job interviews during the 75<sup>th</sup> national meeting of the Am. Chem. Soc. in New York. One interview with Professor Frank Westheimer was of great interest. In collaboration with Harvey Fisher, Eric Conn and Birgit Vennesland, this group at the Univ. of Chicago provided evidence of an enzymic hydrogen transfer from ethanol to NAD. They needed someone to study stereospecific aspects of hydrogen transfer in alcohol dehydrogenase (ADH). Westheimer asked me to visit Professor Vennesland in Chicago during my return to Minnesota and obtain her approval of my qualifications for this task. The interview went well and I had an even greater pleasure of meeting Harvey Fisher and Eric Conn. Both assured me of their help in getting started on the project. When I arrived in February, 1952, Harvey and Eric were just completing their classic study on the enzymatic transfer of hydrogen catalyzed by yeast ADH. Their next goal, to broaden their discovery to beef heart lactate dehydrogenase (LDH), had just started. It was a golden opportunity to introduce me to all experimental details. That phase of the study proceeded smoothly and both studies were published back-to-back (*J.*

*Biol. Chem.* **202**:687 and 699, 1953). Mary had remained in St. Paul to complete her study on interactions between enzymes and competitive inhibitors and to care for our infant daughter, Rebecca. They joined me six months later. Her PhD. thesis (M.W. Loewus & D.R. Briggs, *J. Biol. Chem.* **199**:857-864, 1952) used the inhibitor,  $\alpha$ -naphthyl propionate, to show that chymotrypsin had a single catalytically active site (data reproduced as Fig. X.2 on page 463 in "The Enzymes" Eds. M. Dixon & E.C. Webb, Academic Press, NY, 1964).

My three years at the Univ. of Chicago provided challenges and opportunities undreamed of during my graduate school days. It tested my ability to work independently but with the comfort of knowing my mentors were available for advice and guidance. With the stereospecific nature of hydrogen transfer at the reduced carbon of NAD by ADH and LDH established, what remained was experimental evidence that the same applied to substrates. This was my assignment. Considering my lack of experience, progress was indeed rapid and results appeared promptly (*J. Am. Chem. Soc.* **75**:5018-5023, 1953). In looking back at the impact this paper had on chemistry and biochemistry (see K-S You, *CRC Crit. Rev. Biochem.* **17**:313-451, 1985) which cites 291 papers on stereospecificity for nicotinamide nucleotides in enzymatic and chemical hydride transfer reactions, seven of which emerged from my Chicago days, I can only wonder at what the future will bring once the focus of genetic and molecular biology is trained on this process. While "googling" the Internet recently, I stumbled upon John Warcup Cornforth's Nobel Prize Lecture in Chemistry (1975) on the stereochemistry of enzyme-catalyzed reactions, (<http://nobelprize.org/laureates/1975/press.html>). There, on

pages 190-191, while discussing our 1953 paper he prophetically wrote:

“Now although this last experiment was not carried out for the purpose, it can be regarded as proving that the hydrolysis of a typical sulphonic ester of a primary alcohol proceeds with inversion of configuration at carbon; which was something never demonstrated before although it had been shown to be true of secondary alcohols in which the asymmetry owed nothing to isotopic substitution. Knowledge of the stereochemistry of a chemical reaction is one of the most useful guides in elucidating the correct mechanism and in excluding alternatives.”

### Sunny California (1955 – 1964)

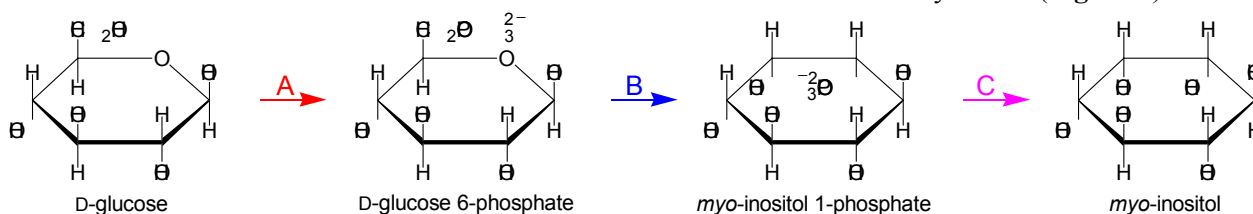
In 1955 I accepted a position as Research Chemist at the USDA's Western Regional Research Laboratory in Berkeley, CA. My project focused on oxidative processes in stored fruit and I redirected my interests toward ascorbic acid (AsA) biosynthesis in plants using sugar precursors labeled with radioactive tracers ( $^3\text{H}$  or  $^{14}\text{C}$ ) which had just been made available by HS Isabel at the National Bureau of Standards. Analytical sensitivity was later enhanced with use of liquid

scintillation procedures. Our results indicated that detached ripening strawberries supplied via cut stems rapidly converted terminally-labeled D- $^{14}\text{C}$ glucose to AsA without disturbing its position in the carbon chain and without an inversion of the carbon chain of AsA as observed in rats, a mammal capable of AsA biosynthesis (Loewus F.A. *et al.*, *J. Biol. Chem.* **235**:937-939, 1960). During my nine years at the WRRL much effort went into our study of AsA biosynthesis in plants but conclusive results were never achieved. Then, in a single brilliant contribution in 1998, Nicholas Smirnov and his colleagues at Exeter Univ provided a plausible pathway of AsA biosynthesis in plants that has since been substantiated (Dowdle *et al.*, *Plant J.*, **52**:674-689, 2007). I greatly value Nick Smirnov's kind inclusion of my name in his acknowledgements at the end of this magnificent paper since our earlier efforts may have wetted his curiosity.

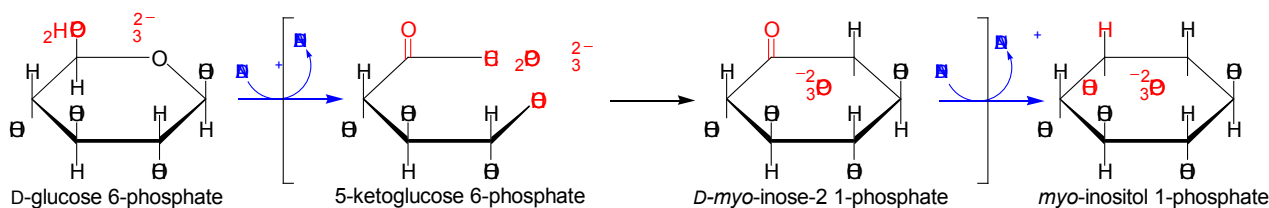
In the course of our research on AsA, our attention shifted to *myo*-inositol (MI) since this cyclitol is readily oxidized in plants to produce D-glucuronic acid, a putative AsA precursor in both plants and ani-

mals. We found free MI produced in two steps, an aldol condensation between terminal carbons of D-glucose-6-P followed by removal of the phosphate group by a specific phosphatase. When radiolabeled MI was supplied to leaf or fruit, subsequent metabolism revealed that the bulk of label appeared in cell wall components, notably hemicellulose and pectin as labeled pentosyl and uronosyl residues. When I told Dr Elizabeth Neufeld, then a research associate in Professor Zev Hassid's group at the Univ of California, Berkeley, of our findings she asked to see our data and then offered to discuss the work with Hassid. His kindly advice was to let him sponsor our paper in the Proceedings of the National Academy, USA. Even now, 45 years later I find occasional citations in the literature.

At this point our research objectives broadened to include the biochemistry of MI, especially its biosynthesis from D-glucose and subsequent cyclization of D-glucose-6-P to MI. Biosynthesis involved three steps beginning with D-glucose (**Figure 1**). Cyclization involved three sequential steps catalyzed by a single NAD-dependent enzyme, Ins(3) $\text{P}_1$  synthase. (**Figure 2**).



**Figure 1.** Conversion of D-glucose to MI. (A) Hexokinase – EC 2.7.1.1, (B) Ins(3)P synthase – EC 5.5.1.4, (C) MI monophosphatase – EC 3.1.3.25. (Loewus F.A. & Kelly S. *Biochem. Biophys. Res. Commun.* **7**:204-208, 1962).



**Figure 2.** Enzymatic mechanism of 1L-MI-1-phosphate synthase (a.k.a. Ins(3) $\text{P}_1$ ). ((Loewus F.A. & Murthy P.P.N, *Plant Sci.* **150**:1-19, 2000).

Knowledge gained by our findings regarding overall conversion of MI to uronosyl and pentosyl components of pectin in plant cell walls enabled me to revisit the matter of the absolute chiral configuration of 1- $^{3}\text{H}$ ethanol recovered from 5-D- $^{3}\text{H}$ xylose that had been recovered as free D-xylose from a ripening strawberry labeled with 2- $^{3}\text{H}$ MI. Professor Ray Lemieux at the Univ. of Ottawa, had prepared 5-D- $^{2}\text{H}$ xylose in which the hydrogen on carbon 5 in the R position had a 30% excess of deuterium. This pentose was degraded to 1- $^{2}\text{H}$ ethanol possessing a dextrorotation of the expected magnitude (Lemieux R.U. & Howard J., *Can. J. Chem.* **41**:308-316, 1963). Using tritium as a marker, I isolated and purified D- $^{3}\text{H}$ xylose from a ripening strawberry that had been stem-labeled with [2- $^{3}\text{H}$ ]MI. Free  $^{3}\text{H}$ xylose recovered from this berry was used to prepare 1- $^{3}\text{H}$ ethanol according to Lemieux's procedure. When this was oxidized to acetaldehyde by ADH, the oxidized substrate was devoid of tritium. When this 1- $^{3}\text{H}$ ethanol was used to couple ADH to LDH with only a catalytic quantity of  $\text{NAD}^{+}$ , all of the  $^{3}\text{H}$  was recovered in lactate which was purified as its phenacyl derivative (Loewus F.A., *Arch. Biochem. Biophys.* **105**:590-598, 1964). Clearly, the  $^{3}\text{H}$ ethanol prepared from 5-D- $^{3}\text{H}$ xylose of strawberries labeled with [2- $^{3}\text{H}$ ]MI was R-1- $^{3}\text{H}$ ethanol. It is of historical interest to point out that assignment of absolute configuration of chiral ethanol reported in my 1964 paper agrees with that assigned by optical rotation as presented in the discussion reported by Levy *et al.* (*J. Am. Chem. Soc.* **79**:2949-2953, 1957). I further purified and ran optical rotations of this 1- $^{2}\text{H}$ ethanol using USDA/WRRRL facilities after leaving Chicago. The final confirming word on absolute configuration of chiral  $^{2}\text{H}$ ethanol was obtained by neutron diffraction

(Metzenthin *et al.*, *J. Org. Chem.* **62**:5017-5022, 1997). Curiously, my 1964 paper was never cited in subsequent papers of others involved in journalistic debate over the absolute configuration of chiral ethanol.

### On to SUNY/Buffalo (1964 – 1975)

My appointment as full Professor with tenure in the Department of Biology, SUNY/Buffalo carried with it opportunities to compete for federally supported research funds unbundled from bureaucratic processes I had encountered previously. Moreover, the SUNY system had created a centralized administrative facility in Albany staffed by experienced professionals to handle all grants stemming from the four major state universities. I chose to direct my first request to General Medical Sciences, NIH, with a proposal based on my studies of MI biosynthesis and metabolism in plants since such research would impact comparable activities related to medicine. It was also a practical decision since I needed to equip a completely empty lab with instruments, supplies, a technician and student support. Only NIH would consider funding for such a tall order. Cooperation came from all sides! My grant was activated on the day I arrived in Buffalo.

A week later I faced a class of 600 first year students of biology seated in a huge amphitheater occupying a two floor space. The broad lecture table in front was crowded with wire-spoiled tape recorders all crazily plugged into whatever outlets were available – all turned on to catch my words of *wisdom*. My introductory lecture was carefully rehearsed but I was not prepared for the unexpected – just minutes into my presentation one of the recorders began to squeak – than another took up the beat. Here my military experience kicked in. I interrupted the

lecture – the room was quiet except for irritating squeaks. Carefully I passed my hand over the recorders until it blocked the noise from one. I hit the OFF button. Now to find the other culprit. Again I palmed the recorders until I focused on a promising choice. My finger found the power key and the squeak evaporated. The room resounded with applause. When they all settled down I said I had a proposition to offer. Take your recorders home and leave them there. In return, I will mimeograph copies of each lecture for each student and set apart five minutes at the end of each lecture for specific questions or, if time is lacking, you may hand me a written query to which I will respond at the next class period before continuing with a new lecture. The rest of that semester was sheer pleasure for me and, hopefully, for the class as well.

My first objective involving the MI project was to develop a sound, reliable analytical procedure. Gas-liquid chromatography promised to deliver the degree of sensitivity required. With Dr. Ramesh H. Shah's expertise in carbohydrate chemistry at hand, we prepared crystalline, fully trimethylsilylated derivatives of the cyclitols most likely to be encountered in our work on MI biosynthesis and metabolism. None were commercially available at the time. These standards proved invaluable! Dr. R. Michael Roberts undertook pioneering studies of MI metabolism in relation to cell wall biogenesis as well as apiose and phytate biosynthesis. Later, when Professor M. (Janny) Kroh came to Pullman on sabbatical leave, we chose lily pollen as our experimental tissue. Annual trips to a commercial bulb-grower's farm in Brookings, OR, enabled us to harvest kilogram amounts which, stored in small vials at  $-20\text{ }^{\circ}\text{C}$ , remained viable for years. The brief time needed (2 to 8 hours) to obtain reproducible data on meta-

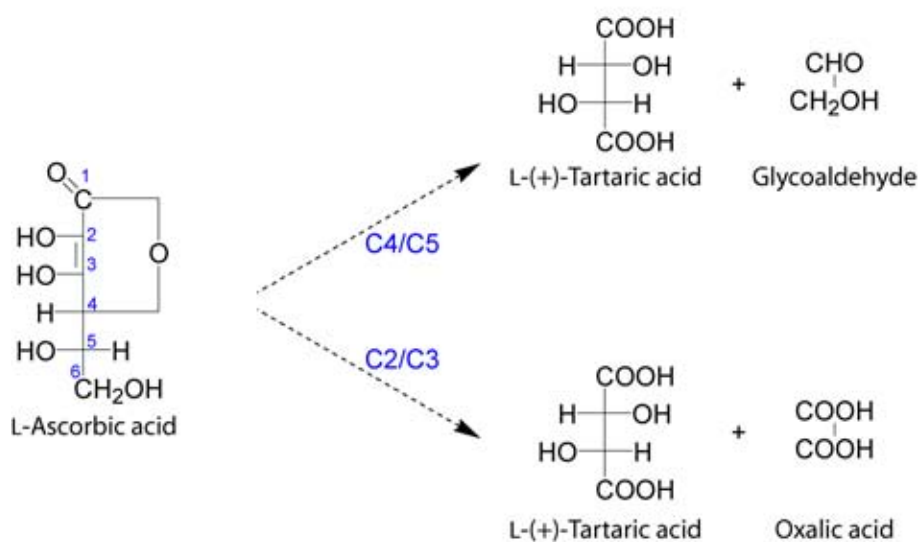
bolic labeling patterns when [2-<sup>14</sup>C] MI was included in the germination medium (Kroh M. & Loewus F.A., *Science* **160**:1352-1353, 1968) and ease in manipulating conditions of growth and nutrition prompted us to choose Janny's procedure for much of our subsequent research on MI biosynthesis and metabolism. With her techniques at hand, Dr. Caesar Labarca explored the utilization of [2-<sup>14</sup>C]MI-labeled stigmatic exudate on pollen tube cell wall biogenesis. As others either completed their course work or joined our project from other institutions, they began to explore MI metabolism in other plants. They included (C.-L. Rosenfield, D.C. Verma, M. Chen, I.B. Maiti, S.C. Gumber) and post docs (K. Sasaki, J.J. Scott, J.D. Everard).

Meanwhile Mary joined our MI program now that our three children were in school. Her studies (from 1971 until retirement in 1990) on isolation, characterization and enzymatic mechanism of NAD-dependent D-glucose 6-phosphate cycloaldolase {now referred to as 1L-MI-P-synthase, EC 5.5.1.4) pro-

vided valuable insight into the properties and role of this "ancient" enzyme and its condensed, sequential, three-step conversion of D-glucose 6-phosphate to MI-1L-phosphate. Of even greater significance was her collaboration with technicians, postdoctoral-, graduate- and undergraduate students in our lab as well as independent investigators at other institutions. The latter included J.A. Schiff (Brandeis Univ.), J. Tupy (Prague), R.W. Wright (WSU), W.R. Sherman (Washington Univ., St Louis), H. Floss (Germany), M. Kroh (Nijmegen, Holland), D.B. Dickinson (Univ. Illinois), C.C. Delwiche (Univ. California, Berkeley) and R.A. Fineberg (Univ. California, Berkeley). Special mention should be made of Mary's collaboration with S.C. Gumber, then a graduate student in our lab. Their work on MI-1-phosphatase (EC 3.1.3.25) provided a cornerstone for the evolving importance of this unique enzyme. And in all true honesty I should add, it was Mary's good humor and love of science that added so much spirit to our research group during our

Buffalo and Pullman days.

While in Buffalo, we also initiated fresh studies on AsA biosynthesis and metabolism. George Wagner, an undergraduate student in biochemistry, joined our group as dishwasher in his sophomore year. I had just purchased an instrument for measuring high molecular weight polysaccharide fragments. It was a troublesome device and I asked George to lend a hand. His skill with lab equipment quickly became apparent. Unfortunately, the military draft swept him into service and I saw no more of him for two years. Then, one day he reappeared and asked if I could help him finish his undergraduate classes and enter graduate school. No sweat! I had a perfect project in mind for him. It involved the role of AsA in the biosynthesis of tartaric acid (TA) in plants, a major discovery made in 1969 by K. Saito & Z. Kasai wherein young grape berries supplied with [1-<sup>14</sup>C]-AsA was cleaved at the C4-C5 bond of the six-carbon chain of AsA to yield carboxyl-labeled TA. Several speculative schemes of TA biosynthesis had been pro-



**Figure 3** Major sites of L-ascorbic acid cleavage in plants. C2/C3 produces oxalic acid and L-tartaric acid. C4/C5 produces L-tartaric acid and a C2 fragment that re-enters the metabolic pool. ((DeBolt *et al.*, *Ann. Bot.* 99:3-8, 2007)



posed earlier but none as appealing as this one. Helen Stafford and I had visited this question earlier (*Plant Physiol.* **33**:155-156, 1956) using 6-[<sup>14</sup>C]AsA but failed to find labeled TA. Subsequently, Helen surveyed a number of plant species in regard to TA content. She found the geranium plant to be rich in TA. When George supplied geranium apices with [1-<sup>14</sup>C]-AsA, the label appeared in oxalic acid (OA) but not TA. When 6-[<sup>14</sup>C]AsA was used, label appeared in TA but not in OA. Clearly, AsA was cleaved between C2 and C3 or between C4 and C5 depending upon the plant species and/or its stage of development. Experiments with grape berries confirmed Saito & Kasai's original findings. We concluded that two unique processes for cleavage of the carbon chain of AsA existed in plants. In the years since these findings were reported, others have confirmed George's observations and we now can say with much confidence that AsA is a (if not **the**) major biosynthetic source of TA and OA in plants (**Figure 3**).

Reflecting back on my life during those research years beyond Chicago, it occurred to me that I had never taken sabbatical leave – nor did I regret it. In a peculiar way, I had found an alternative device. The Marine Biological Laboratory at Woods Hole on Cape Cod, Mass. was established in 1888 as a laboratory for scientific study and investigation and a school for instruction in biology and natural history. Over the years it has become recognized as a premier world center for free interchange of ideas, informal discussions, lectures, and seminars and as well as a testing ground for new and innovative research. In 1968, Bill Hillman (Brookhaven National Laboratory) invited me down to give a talk on *myo*-inositol to students in the Department of Experimental Marine Biology. It was a mutually enjoyable experience. In the following

year, Bill Siegelman (also from BNL and Bill Hillman's successor as Head of the Department) asked if I would join the group for the entire summer. I could bring my family and occupy one of the MBL cottages. That summer, Trevor Goodwin (Univ. of Liverpool) was the international guest of the department. I remained on the faculty of MBL until 1974 (the full 5 year period permitted for a summertime Instructor). Periodic summer commutes between Buffalo and Woods Hole did demand sacrifices, but these were trivial compared to the wealth of knowledge and experience gained. Mary and I will always treasure our memories of those precious summers.

### **Westward Ho – Pullman, WA (1975 – present)**

My move to Washington State Univ. (WSU) was strongly influenced by a desire to be amongst plant-oriented scientists. Diana Bedgar, our lab technician in Buffalo, was willing to move to Pullman, a very important contribution. NIH renewed our grant and Research Foundation/SUNY approved physical transfer of that portion of our supplies and equipment involved in prior NIH grant research. Mary and I are humbly grateful for this show of confidence. Since our research was still in full swing at Buffalo and I had also accepted chairmanship of the Department of Agricultural Chemistry at WSU, I left Buffalo ahead of the main move, leaving to Mary and Diana a huge task of finishing projects and packing. All proceeded as planned and we were back on track in Pullman by June, 1975. The 5-month breather provided time for me to write up the bulk of research stemming from our Buffalo days.

We were scarcely settled in Pullman when my stepmother, age 88, suddenly died. Helen Axelson Loewus married my father in 1928,

just before the Depression hit. Dad lost his job as well as his health. It was Helen who became my spiritual cheerleader. This woman, daughter of a tailor, was only 14 when her father died. With her widowed mother, they emigrated from Sweden to Superior, WI, just across the harbor that separates Duluth from its sister city. There, just two years later, she met her high school requirements and settled in as a seamstress. With time she opened a ladies apparel shop in Duluth and eventually became my stepmother. Her appreciation of the value in education was not lost on me and I must always acknowledge her role in supporting my academic dreams.

Many of the promises that brought me to Pullman never materialized, prompting me to abandon my administrative role. Aside from that, WSU's research climate was well suited to my needs, especially the mix of undergraduate and graduate students interested in plant physiology and biochemistry. I have remained in Pullman as a research scientist beyond Federally-mandated retirement thanks to NIH support.

New projects often emerge from such environments. One example stemmed from reports of AsA in yeasts (Heick *et al.*, *Can. J. Microbiol.* **47**:751-753, 1969). When HPLC chromatography with electrochemical detection was employed to measure AsA in extracts of *Lypomyces starkeyi* by Cecilia Leung and Jerry Nick, they discovered a new AsA-like compound whose retention time as the trimethylsilyl derivative was 1.15 greater to that of the AsA derivative. Mass spectral analysis identified the new compound as D-erythroascorbic acid, a 5-carbon analog of AsA. Unlike AsA, it has no antiscorbutic qualities but it is a common fungal constituent and may play a significant role in plant pathology since OA (a product of C2/C3 cleavage) is a catabolic product.

Another interesting development emerged from Bruce Baldi's research on lily pollen. When suspended in a compatible medium with 4-methylmorpholine *N*-oxide, pollen grains are released from their enveloping exine and if pectinase and related hemicellulases are present in the medium, intine is also removed to leave a "naked" protoplasmic particle which we dubbed a "sporoplast". Bruce has detailed the preparation and properties of these tissues which still retain their viable capacity to germinate, albeit with the same "shmoo-like" shapes created by Al Capp for his Li'l Abner's comic-strip. Potential uses for Bruce's findings have yet to be exploited.

In the midst of these interesting times, I took on organization of the first **joint** annual meeting of the American Society of Plant Physiologists and the Phytochemical Society of North America. It was scheduled August 4-7, 1980 in Pullman. The one thing I did not plan was eruption of Mount St Helens (May 18, 1980), just 10 weeks earlier. The meeting went over with a bang, literally – on the final day, a small eruption sent a sprinkle of ash over the Palouse prairie, enough for everyone to take home a sample. A PSNA symposium on "The Phytochemistry of Cell Recognition and Cell Surface Interactions" appeared as Volume 15 of *Recent Advances in Phytochemistry*. In glancing through its table of contents, I felt greatly rewarded with the thought that here, probably for the first time, attention was brought to bear on a single biochemical or molecular objective rather than a generalized theme.

It is obvious that much of my research life revolved around two simple carbohydrate-like molecules – AsA and MI. Both have studied histories and I cannot end this essay without leaving behind a few remarks in this regard.

Scurvy was a major impediment to ocean travel before the age of steamships. It led to great interest in search of antiscorbutic qualities in plants, culminating in Albert Szent-Györgyi's isolation, purification and crystallization of AsA, the active antiscorbutic agent in Hungarian paprika for which he was awarded the Nobel prize in Medicine (1932). Soon thereafter, Walter Norman Hawthorth's group in Birmingham establishing its chemical structure and received the Nobel prize in Chemistry. Others followed and created a considerable literature on the chemistry, biochemistry and nutritional aspects of AsA. Insight into its biosynthesis lagged until quite recently. We are now enjoying a renaissance, notably so in regard to plants which provide the bulk of human needs for AsA (see Asard, May & Smirnoff, Eds. 2004, *Vitamin C: Function and Biochemistry in Animals and Plants*. BIOS Sci. Publ., New York 323 p.). There may even come a day when biology will uncover ways of unlocking physiological processes already in place which are capable of delivering AsA requirements to humans without supplementation.

At a conference on "Cyclitols and Phosphoinositides" (*Ann. NY Acad. Sci.* 165:577-598, 1969), I introduced my paper on the metabolism of inositol in higher plants with an observation by Th. Posternak taken from his classic book, *The Cyclitols*, 1965:

"...[myo-inositol] is an essential component of plants and will be found everywhere, provided that adequate techniques for its determination are employed."

Little did I then realize that the MI oxidation pathway into which I poured so much research time and effort may or may not play a significant role in furnishing pentosyl and uronosyl units to cell wall biogenesis. A unique 'core pathway' du-

al-radiolabeling approach recently developed by Sharples and Fry (*The Plant J.* 52:252-262, 2007) casts doubt on the importance of MI oxidation in cell wall formation. Their experiments were limited to *Arabidopsis*. Perhaps we need to reexamine MI biosynthesis more carefully before we plunge single-mindedly into its potential metabolic roles. This cyclitol has been part and parcel of so many significant biochemical and physiological processes in nature, particularly so in plants, that we may have overlooked its evolutionary uniqueness as a cellular component.

Frank A. Loewus  
Emeritus Professor  
Institute of Biological Chemistry  
Washington State University



# 2007 Annual Meeting Phytochemical Society of North America



The PSNA had a great meeting in St. Louis July 21-25, 2007. The society was most fortunate to have the Donald Danforth Plant Science Center host the meeting their meeting facilities were excellent, we had room for posters, for socializing, and listening to the program speakers. The meeting agenda featured sessions on the roles of molecules from plants in medicine, defense and ecology, including sessions on alkaloids, plant biochemical pathways, plant polymers, and advances in plant biotechnology. The daily sessions were followed by a short series of 5-minute oral summaries by undergraduate and graduate poster presenters, which I thought was a nice touch. The evening events were two poster sessions on Sunday and Monday, with the meeting banquet on Tuesday.

The St. Louis program followed

on with some changes initiated a few years back to feature eighteen invited speakers talking on a range of subjects that appeal to the breath of research topics covered by our society members. The scientific program organized by Daneel Ferreira, Toni Kutchan and Norman Lewis, built further on maintaining a Gordon Conference-like format for the meeting—and where the diverse areas of phytochemical research are represented. This year, the meeting hosted scientists from many different countries: Austria, Brazil, Canada, Denmark, Germany, Italy, Japan, Korea, Mexico, Nigeria, Thailand and the United States. The invited speakers were: Ed Calhoon (Danforth Center, Jon Clardy (Harvard), Katrina Cornish (Yulex Corp.), William Danforth (Washington University and the Danforth Center), Birgit Draeger (Martin Luther University

Halle-Wittenburg), Douglas Kinghorn (Ohio State University) Kent McCue (USDA, ARS, WRRC), Debra Mohnen (CCRC, University of Georgia), Birger Moller (Center for Molecular Plant Physiology, Denmark) Andres Navarrete (Universidad Nacional Autonoma de Mexico) Soldadae Pedras (University of Saskatoon), Peter Raven (Missouri Botanical Garden), Kazuki Saito (Chiba University), Fumihiko Sato (Kyoto University), David Shintani (University of Nevada), Paul Talalay (John Hopkins University), Brenda Winkel (Virginia Tech University), and Zheng-Hua Ye (University of Georgia)

The society also featured a strong slate of six Arthur Neish Young Investigator Award speakers: Reinhold Jetter, Plant Natural Products Chemistry, University of British Columbia), Joseph Jez (Donald Dan-





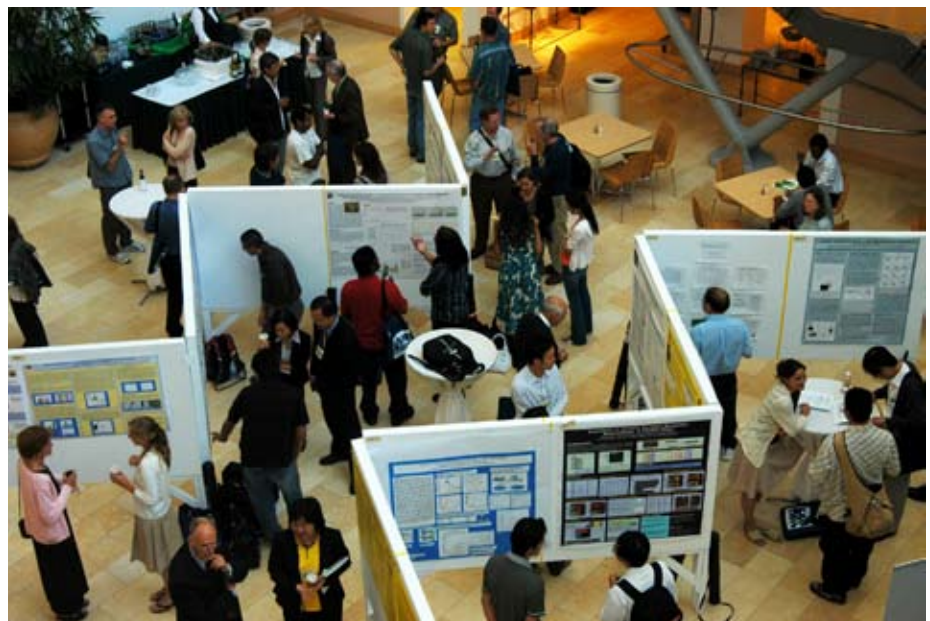


forth Plant Science Center), Michael Jourdes (Washington State University), Markus Lange (Washington State University), Sarah O'Connor (Massachusetts Institute of Technology) and Dorteia Tholl (Virginia Tech University).

The remainder of the speaker program was made up of speakers invited to talk from their abstract submissions. I feel this is a great way to keep our members interested in attending these meetings and for our society members to have a chance to tell the membership what their research program is all about.

The banquet on Tuesday featured the recognition of three Pioneers in Phytochemical research which was initiated in 2006: Dr. Frank Loewus and Dr. Eric Conn. Frank Loewus and his wife Mary were at the meeting, Eric Conn unfortunately could not attend. Students and collaborators talked about their interaction with Dr. Loewus and Dr. Conn and how important their interaction with these scientists was to their work and their interest in science. It is important that we as an organization do all we can to remember and review the work that has laid the foundation for the research we are doing today. A write up on Frank and Mary Loewus' career is in this issue of the newsletter.

Travel awards for \$100 each were given to: Josephat Asiago, Meredith Biedrzycki, Claudia Cardenas, Jose Condori, Jennifer Cooke, Maria Luisa Diaz Chavez, Mario Figueroa, Andreas Gesell, Patricia Gonzalez Barranco, Upul Hathwaik,





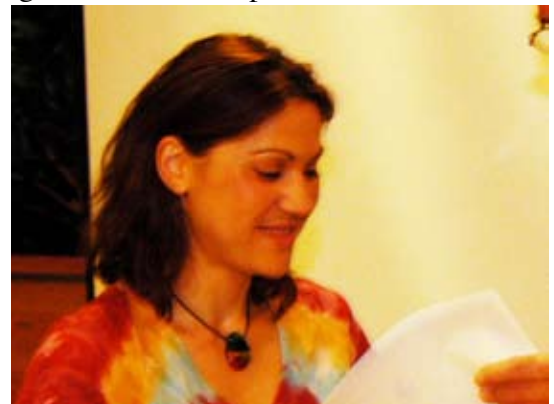
BEST POSTER AWARDS 2007



Phanikanth Turlapati



Rigoberto Rios-Estapa



Marina Petrova Varbanova



Kiani Arkus





Mary Loewus, Frank Loewus and Ralph Quantrano



Kent McCue, Birger Moeller, and Norman Lewis



Jung-Hyun (Lily) Huh, Onyekachi Iroanya, Yeon-Bok Kim, Thongchai Koobkokkrud, Eric McDowell, Cesar Nopo-Olazabal, Francisco Palacios, Ann Patten, Araceli Perez, Rigoberto Rios-Esteva, Isabel Rivero, Phanikanth Turlapati, Daniel Vassao, Martha Vaughan, Mbang Owolabi

As it has been in the past few years, the PSNA is fortunate to have had an excellent slate of speakers. The organizers are to be commended for arranging a diverse, well-paced program, and for allowing time for the all-important interactions between the attendees. Thanks to Toni Kutchan and the staff at the Donald Danforth Center for hosting the meeting and to Daneel Ferreira, Toni Kutchan and Norman Lewis for arranging the speaker program. The PSNA would also like to thank Franck Dayan, Paula Gibbs, Hiroko Hiyashi, J'Lynn Howell and Helen Miller for their assistance with coordinating the meeting. And most especially, thanks to all the participants, without whom the meeting could not be successful. See you all in Pullman in 2008.



Reinhard Jetter



Joseph Jez



Michael Jourdes

**Executive Council Meeting  
Phytochemical Society of  
North America  
July 21, 2007**

Danforth Plant Science Center  
St. Louis, Missouri

Bill Dahl is manager of a small consulting company, which manages the affairs of the Botanical So-



Sarah O'Connor



Markus Lange



Dorthea Tholl and Rachael Mata

ciety of America. The BSA decided to hire Bill in 2001 to manage the affairs of the society. He started off with a staff of 1 and has now grown to a staff of 8. They manage the societies membership functions, finances, subscriptions, journal layout and publication, website, and newsletter, as well as providing a physical address and phone number to answer inquiries. They also oversee the societies endowment fund and provide logistical and office support for the annual meeting. During

this time the membership has grown from 600 in 1980 to 1400 in 2001, to 2800 in 2007. The journal provides the finances to run this management team, not the membership dues. The subscription fees for the membership are provided at cost. The active management of the endowments fund has grown it from \$800,000 in the 1990s to \$4,000,000 in 2007. The current subscribers for the Journal are 1500.

The Society for Economic Botany has received a proposal from the ASB office to manage their society





business. It is currently run out of Hawaii, is a failing society and has been slow to respond to its membership. The New York Botanical Gardens owns their journal, the society sees very little income from it. BSA has proposed to provide membership support, manage membership functions, handle regular communication to the membership through newsletters and the internet and provide the work force for initiating and maintaining fund raising efforts for the society, including writing and submitting grants, and run the annual meetings. They provide a web presence; maintain financial records with QuickBooks online, all accessible to the society governing body.

A similar proposal has been just forwarded to the PSNA via Norm Lewis. Basically the cost to this society would be about \$13,000 per year. The PSNA at the moment only has its assets, and income from the annual dues and annual meeting and residual income from past RAPs. The PSNA currently has no commitment to continue the RAP series, though Elsevier has been successful in the sales of this title and would likely be willing to negotiate a new agreement with us. We published last years meeting proceedings in a special issue of *Phytochemistry* and the PSNA gets no financial proceedings from that journal.

The committee generally com-

mented that they felt the PSNA did not want to become an entity like the ASPB or the ACS, which have large political lobbying components.

Toni Kutchan noted that the meeting was ready to go. The Danforth Center has a nice infrastructure for handling the meeting details. She will be running the clock on the student 5-minute poster talk. Eric Conn and Frank Loewes will be honored by the society at the awards banquet. Eric Conn sent his regrets, but he was feeling ill and will not attend. Next year we will give John Romeo a life membership. Mark Berhow suggested changing the title of this from Life Membership to PSNA Fellowship. This meeting will be fairly expensive and it looks like the society will lose some money on this. Cecilia McIntosh will head up the best paper awards crew and find the judges. Franck will write the checks. Typically the PSNA gives \$100 per award, and budgets \$2500 for travel awards. There are 25 applicants for travel awards this year.

The PSNA bylaws and Constitution has been modified by the committee and has been forwarded to the executive committee. It will be presented at the business meeting.

The Phytochemical Society of Europe is in a similar situation as the PSNA. They are launching a new journal, called *Phytochemical Letters* that they will share with El-

sevier. Elsevier is doing this generally as a favor to the PSE as a way for that organization to raise money. The journal has had a slow start up. They are a rapid publication track, four-page article max.

Membership Committee. Klaus Fischer notes that his efforts have not been very effective and would like to see some one else take up the chairmanship. Franck Dayan noted that another Univ Miss faculty member volunteered some time and generated a list of University departments and contacts concerned with plant chemistry research, and a letter was emailed to the list asking them to spread the word about the PSNA. The PSNA needs to follow up on this. Franck also noted that the effort by Norm Lewis to appeal to the membership to renew has resulted in a 90% renewal rate this year. This was a first try at this and not followed up. We should revise the general letter of appeal into a flyer for the society that notes its mission and annual meeting and send this to these institutions on a regular basis. The email/contact list needs to be updated and added to. Rachel Mata has been very effective for regenerating membership renewals in Mexico. The committee needs to find a new chair.

Norm Lewis noted that the Tannin group is looking for a home. This is a small group of 50-80 researchers that has been meeting every other year. They were in with the ACS and have not been given any support. It was suggested that we encourage this group to attend our meeting and have a session or two dedicated to tannin topics. We could possibly extend our meeting another half day to give the Tannin Group a good home.

Mark Berhow commented that the newsletter is ready to print and a hard copy will be printed and mailed by the end of this month. The problem with the newsletter has been a lack of content, and the PSNA needs participation from the membership



to provide content for the newsletter. The newsletter basically can be broken down into the following functions: content, layout, and distribution. Content is needed, the layout is already in boilerplate, and the distribution takes some time, as Mark must do it off official time. The PSNA needs some volunteers to mine the Internet for newsy news. It was suggested that we contact/mine websites for material from various plant science research programs (universities, research foundations, etc.) for material on programs, grants, etc. It was also suggested that we ask members to submit info on successfully funded grants, recent paper submissions, etc. We also should keep up doing the Phytochemical Pioneers/research bios as a unique feature. The newsletter does not have to be large, and probably should not as the cost of postage has recently gone up, maybe 4-8 pages, but it needs to be more regular 4 times a year if possible. Norm asked Mark to talk to the committee members and divide up some jobs and get back with a report as soon as possible. The next newsletter will be material about the meeting and should be mailed in November.

All of this content material for the newsletter should be coordinated with the web site. The newsletter can be posted and emailed to the membership as well.

Norm Lewis has agreed to serve as president for 2 years. The PSNA will need to form an election committee for president elect nomination. Mark Bernards is serving as president elect as Peter Facchini has declined to serve in that position for a variety of reasons. Peter will make a decision about hosting the 2008 meeting in Calgary at the University hopefully this week. We do not have a meeting site for 2009. 2010 is planned to be a joint meeting with the American Society of Pharmacognacy, which will be in Tampa.

The 2011 meeting will be the 50<sup>th</sup> anniversary and Norm Lewis volunteered to head that effort up.

Daneel Ferreira has finished his work on the constitution revision committee and has volunteered to serve on another committee.

The PSNA is facing a fiscal crisis. Our income is now limited without the income from our yearly book and the dues/registration fees cannot support the societies activities. It is likely that this year we will need to dip into our financial holdings to cover our activities.

- 1) increase membership/increase dues
- 2) revive RAP or something similar. A book on plant biochemistry will be published this year (prepared in 2003) which we could possibly continue. This book will be included in Elsevier's database releases for including in searching and be tracked for SCOPUS. This may address the impact facto problems we had with RAP.
- 3) raise funds with grants/donations

### **PSNA Business Meeting**

July 25, 2007

Donald Danforth Center for Plant Sciences, St. Louis, Missouri  
Mark Berhow, Secretary

President Norman Lewis called the meeting to order. After a few introductory remarks, we proceeded down a brief agenda.

Last year the PSNA formed several new committees to broaden the workload of the Society volunteers and to build the presence of the society in modern scientific circles. Each committee presented a short report on their progress.

The By-Laws and Constitution Committee (Daneel Ferreira, Norman Lewis and Cecilia McIntosh): The committee has finished the revision of these documents for the Society. The new version was accepted

by a majority vote of the membership present. The new version will be posted on the website and published in this issue of the newsletter. Thanks to the committee members for their work on this effort.

Usually, the president of the society serves a three-year term, one year as president elect, one year as president and one year as past president. Due to some organizational issues, the membership has voted for an exception to allow President Norman Lewis to serve a two-year term. Mark A. Bernards has agreed to serve as President elect. A new nomination committee will be formed before the next meeting to recruit a nominee for the next president elect.

Finances: Treasurer Franck Dayan summarized the financial picture of the PSNA. In general the society has been losing money over the past few years. When all was said and done, PSNA lost \$15,201.07 in 2005, lost \$2,298 in 2006. Low income from membership dues coupled with diminishing returns from the *Recent Advances in Phytochemistry* series (which was discontinued in 2006) and an uneven flow of money to and from our annual meetings has put the society in poor financial shape. While we have \$65,425.20 in liquid assets in 2007, we are not bringing in enough money to cover our expenses.

The 2005 meeting in San Diego cost the society \$5,379, while the 2006 Oxford meeting generated \$4,560 for the society.

Membership (Franck Dayan): In 2006 we had 260 people listed as members, but only 130 of them had actually paid the membership dues for 2006. As of July of this year we have 228 paid members of 334 on the roles. We need to continue to encourage our members to pay their dues and build on recruiting new members from research institutions. Last year a spreadsheet of contact information for phytochemical-related

research institutions was created and many of these were sent information on the PSNA. This should be expanded and continued in the coming year.

Franck has recommended that the membership dues be increased to \$60 for regular membership and \$30 for students. It is still quite a bit less than most other professional scientific society fees.

It was mentioned that the society should look into other methods of fund raising. Resurrecting the RAP series is one possibility, especially if we could re-negotiate our publishing contract. One other possibility that was suggested was to seek funds from corporate/university/charitable foundations.

In general, the society is still struggling with a number of uncompleted tasks that are needed to be accomplished to keep the society growing. One possibility that is being explored is to contract out the general operations of the society such as membership records, newsletter distribution, and general meeting organization. The Botanical Society of America has gone to this system, and the PSNA is exploring possibilities. The main problem with this approach is generating the capital required to meet the contract.

Future Meetings (Norman Lewis and David Gang): the 2008 meeting was tentatively scheduled for Canada, but the details have not been worked out. For 2009 suggestions included Baltimore, MD to be organized by Jim Saunders, a joint meeting with Brazilian societies, The 2010 meeting has been proposed to be a joint meeting with the American Society of Pharmacogony in Tampa, Florida. The 50<sup>th</sup> Annual Meeting of the PSNA will be 2012. Suggestions included trying to have joint meeting with the European Phytochemical Society if it could be arranged. The proposed Brazil meeting would be hosted by the Division of Natural

Products and would be for four days with three different sessions, probably in San Paolo. Potential problems include high airfare costs and low US member attendance. We need to build our meeting timetable out as far as 5 years in advance.

The Outreach Committee (Klaus Fischer, Franck Dayan, Rachel Mata, Michael Mazourek): Klaus Fischer has resigned as chairman of this committee as he feels he has not been able to provide the time to be effective. The society needs to improve its efforts to recruit new members and maintain existing members. The membership committee's effort to build a database of institutions involved in phytochemical research is a start in the right direction. The committee has a list of 60 institutions in the USA, but only 15 or so outside the US. This committee is in search of a new chairman.

Proceedings and Publication Committee: The Society commends the unflagging work of John Romeo as the editor of the society's RAP series. As was pointed out in the treasurer's report, it is vitally important that we continue to receive income in the form of royalties to keep the society solvent. No consensus was reached on the best way to publish phytochemical reports to provide both impact and revenue. This committee needs members!

Young Scientist Committee: Christina Coleman, Meredith Biedrzycki, Michael Mazourek, and Lukasz Kutrzeba agreed to serve on this committee. Their initial report appears elsewhere in this newsletter.

The Awards Committee (David Gang and Cecilia McIntosh): A full slate of awards was presented at this meeting.

The Newsletter committee (Mark Berhow, Daniel Cooke, and David Schultz): The chair admits that he is still struggling to get out more than one or two newsletters a year. It is vitally important to get more out and

on a regular basis, as this and the annual meeting are the only real contact we have with our membership. The problem is a lack of material to print. Submissions are needed from the membership!

Website Committee (Charles Cantrell, Mark Berhow, Daniel Cook): As new material comes it is posted. We need to do a bit more mining to link our site to, and have links to, other sites of interest to our members.

### **Potential Conference Activities for Young Members for PSNA 2008 General Scientific Meeting**

Assembled by the  
PSNA Young Members Committee:

Christina Coleman  
Graduate Student  
Department of Pharmacognosy  
University of Mississippi  
cmcolem1@olemiss.edu

Michael Mazourek  
Graduate Student  
Department of Plant Biology  
Cornell University

Meredith Biedrzycki  
Graduate Student  
Dept. of Plant & Soil Sciences  
University of Delaware

Lukasz Kutrzeba  
Graduate Student  
Department of Pharmacognosy  
University of Mississippi

### **INTRODUCTION TO THE YOUNG MEMBERS COMMITTEE**

During this past meeting of the Phytochemical Society of North America (July 2007), a new committee was formed from among the student members to help increase younger member input and to help develop ideas for enhancing younger member involvement. We

hope to capitalize on the intellectual resources of the society by highlighting these aspects with our proposed activities, and to help further strengthen the future of the society by providing ways to invest in the next generation of PSNA members.

### **Mission**

- 1) Facilitate the professional development of student members. The PSNA has a wealth of members with a wide array of expertise in varied scientific careers. Advice and information from multiple perspectives on topics such as seeking positions, writing grants, the publication process, presenting, and so forth, would be valuable guidance for young scientists.
- 2) Contribute to the scientific development of student members. Many new techniques and methods are being created and incorporated into the scientific toolbox at an ever increasing rate, while fundamental skills and technical knowledge remain vital to all disciplines. Scientists who are familiar with a greater variety of approaches can become more involved and are more likely to pursue opportunities for new discoveries.
- 3) Provide opportunities for social interaction of student members. The professional friendships and collaborations that senior members enjoy are often related to social interactions within the scientific community. By forming these relationships early, students benefit personally and the membership base of the society is strengthened.

Toward accomplishing these goals, this committee is proposing that one or more of the following activities be incorporated into upcoming PSNA scientific meetings. Please take some time to review our ideas and provide

us with feedback regarding which activities you think could be reasonably incorporated into the meeting, as well as which activities you feel would be most productive towards achieving our mission. Please direct your feedback to Christina Coleman (cmcolem1@olemiss.edu).

### **EXECUTIVE SUMMARY**

We have identified four potential times for student members to assemble during the PSNA general scientific meeting: before the meeting, lunchtimes, evenings, and after the meeting. The lunch and evening sessions would be the easiest to incorporate into the existing PSNA meeting schedule, but would necessarily be limited in length. Additional time before or after the meeting would likely come at an additional expense, and may be harder to schedule, but would provide larger blocks of time that could lead to more meaningful exchanges. The need for and feasibility of extending the meeting for this purpose should be evaluated to determine if this would be a worthwhile change to the meeting schedule.

The formality level of each of the following types of activities presented could easily be adapted to suit the subject and context of the activity. Ideally, many of the activities would remain informal or moderately formal to encourage active participation of younger members and increase the approachability of established members.

Below are brief descriptions of the types of activities that we have outlined more descriptively later in this report.

#### **Presentation Practice Session**

Giving a talk can be stressful, especially if you've never given one before or if English is not your native language. Asking questions after someone else's talk can also be difficult. The only real way to become

comfortable with either of these situations is through experience. One of the activities we have proposed is a "students only" presentation practice session before the official start of the regular meeting. This would provide an opportunity for student presenters to practice giving their talks, which are scheduled for later in the meeting, in a more relaxed setting among peers. Such a setting could also help encourage shy students to put their hands up and ask a question or two.

#### **Development Workshops**

When you are an undergraduate, it isn't always obvious that two of the most important things a scientist does are writing and presenting. Young researchers often start out weak in these areas in spite of the crucial role these skills play in their futures. Informative sessions on manuscript or grant preparation and submission, things to consider when selecting a lab for grad school or a postdoc, or how to improve presentation skills or effectively make slides would be valuable professional development workshops that could benefit students.

Introductions to cutting-edge methods, classic techniques, or fundamentals refreshers are always good topics for professional development workshops. A specific topic could be chosen based on results from polling the student membership, and speakers would be obtained from within the society or by contacting experts in the topic of interest. Such a workshop would provide a way for young scientists to learn about important factors and possible pitfalls of an experiment. Such knowledge would be valuable for a student starting in a new research direction or looking to find a new way of ap-

proaching a problem, as well as for improving a young scientists' overall understanding of a method prevalent in the literature but not immediately accessible.

Workshops such as those described above could fit into the lunch break during the meeting, an evening, or the afternoon after the regular conference is over, depending on the topic and interest levels.

### **Social Events**

One major benefit of attending a meeting is getting to know your colleagues as people. Forming such bonds early on is of great benefit professionally and helps make future meetings more enjoyable. For this reason, one of our suggestions would be to set aside some time for just students in the evening or before the regular conference. Additional socials to encourage interactions with established members could also be beneficial.

Descriptions of a few activities follows.

### **PRE-MEETING ACTIVITY 1**

#### **Presentation Skills Practice Session**

This event would be focused on helping first time presenters improve their presentation skills and alleviate their concerns with presenting, by providing a low formality (and hopefully less stressful) audience of their peers who can offer encouragement and advice. Ideally the event would be held during the afternoon before the conference reception. The opportunity to participate in the Practice Session would be extended to undergraduate and graduate students (and potentially post-docs), preferably those who are relatively new to presenting at conferences or presenting in general. The invitation would be sent via e-mail shortly after or along with the notification that they will be giving an oral presentation. The degree of interest in

such an opportunity on the part of the presenters would dictate whether this event would be scheduled described below, or adapted to include a workshop-type presentation on presentation skills (see Pre-Meeting Activity 2). After the presenters are notified and their participation confirmed, notice of the event and an itinerary would then be sent to all attending young members via e-mail shortly before the conference date to encourage attendance and involvement. Feedback for the practice presenters would be collected from the audience via evaluation/ comment forms that the practicing presenters could review before giving their presentations during the actual meeting. Focus would be placed on giving constructive criticism and positive or encouraging feedback.

### **PRE-MEETING ACTIVITY 2**

#### **Presentation Skills & PowerPoint Workshop**

This event would be focused on helping first time presenters, or those who wish to learn more about preparing presentations in PowerPoint, by providing a low formality presentation with interactive discussion opportunities. Ideally the event would be held during the afternoon before the conference reception. The topic would be chosen by the event's organizing committee and interest levels and potential audience size could be determined by asking members to 'register' for the workshop, at no additional charge, while they are registering for the conference. For a PowerPoint oriented presentation, attendees would be invited to bring their laptops to follow along and ask specific questions. A guest speaker could be obtained by requesting volunteers, networking or by other means if necessary. Notice of the event and a schedule would then be sent to all attending members via e-mail shortly before the conference

date as a reminder.

### **LUNCH ACTIVITY 1**

#### **Professional Development Workshop - Panel Discussion or Guest Presentation**

This event would provide an opportunity for young members to become more informed with regard to professional skills such as manuscript preparation, grant writing, funding sources, finding suitable positions, and other such topics. Ideally the format would be a panel-type discussion with established members providing their knowledge and opinions on a list of questions/ points relevant to the topic chosen. Panel members would be informed of the main points to be discussed prior to the meeting and ample opportunity would be provided for audience participation and questions. Depending on the topic and the presenters available, a single guest presenter may be more appropriate. Such an event would require box lunches and a meeting room with audio-visual facilities in which food is allowed.

### **LUNCH ACTIVITY 2**

#### **Methods & Lab Techniques Workshop - Panel Discussion or Guest Presentation**

Research is increasingly interdisciplinary and often relies on a team approach and cross-disciplinary research efforts to investigate a question thoroughly. The start-up and troubleshooting phases of bringing an unfamiliar technique into the lab can often be burdensome, and inexperienced researchers can find themselves overwhelmed by an array of possible approaches. The opportunity to connect with a professional who is experienced and skilled in various advanced techniques could provide an efficient, low stress way for a young researcher to get started in a new area. In addition, such an



opportunity could allow a researcher to become more familiar with a type of experiment or technique that that researcher might not use themselves, but encounters frequently in the literature. Panel discussions or guest presentations dealing with specific techniques could therefore be beneficial to both younger members and established members interested in expanding their knowledge base. A selection of topics would be chosen that are either cutting-edge or classical methods gleaned from member requests. The members who register for the meeting could be invited to present and discuss their knowledge of their specific research areas, providing an introduction to the approach, and some important nuts-and-bolts aspects (the kit that works well, how to go about optimizing a method, common pitfalls, what controls does the scientific community currently require, etc.) and answer questions along the way. Given enough interest, concurrent or multiple small sessions could be organized to provide an environment more conducive to group discussion. Presentation style and approach would be at the option of the presenter to allow more flexibility regarding different topics. A chalk-talk style format may be encouraged to allow a presenter to further explain points on the fly.

### EVENING ACTIVITY

Social (with an ice-breaker to encourage communication)

This event would encourage communication between younger and established members, who might not otherwise socialize, by providing an opportunity for conversation in the form of a simple, fun game. Upon entering the social, young members would receive a card or piece of paper with the names of three established members on it (the established members would have agreed to participate

prior to the event). Along with the names of the established members would be two or three simple, non-invasive questions geared towards starting interesting but informative conversations. The young member would be tasked with the job of finding the established members in the crowd and talking with them to learn the answers to their questions (and hopefully continue to socialize). The established member would then initial or sign the younger member's card. If we wanted to make the event more entertaining, once the younger member had found and talked with each of their assigned established members they could then receive the reward of a gold star sticker for their nametag and the option of a simple toy or other amusing reward (established members who participated could receive simple thank you gifts as well). During the event, appetizers, finger food, or a light buffet could be served along with drinks. Tall tables and scattered chairs could also be provided to encourage mingling and crowd movement.

### POST MEETING

Methods or Professional Workshops

The methods workshops or professional workshops described above as lunch events could instead be scheduled for a day or afternoon post-conference in order to provide an extended period of time to cover relevant material. Such an event could be made up of multiple sessions with multiple speakers and could either be centered on a single topic or multiple related topics depending upon interest levels. The time frame of the event, either a half or a whole day, and the associated expense would depend upon the topic and the chosen schedule. Details of such an event would be similar to those necessary for organizing a pre-meeting event.

## WORKSHOP TOPICS

### Pre-Meeting Presentation

#### Workshop Topics

- \* How to Effectively Make Power-Point Slides - using the Power-Point program and slide formatting and layout features
- \* Presentation layout, formats and style - making slides that effectively communicate your topic to your audience (what works and what to avoid)
- \* Presentation Tips and Tricks - how first time presenters can best prepare themselves for giving a presentation
- \* Poster Creation and Presentation Tips

#### Methods & Technical Topics

- \* Introduction to statistical analysis of data - from someone who uses statistics frequently but is not a statistician,
- \* PCR-what?
- \* Recombinant Protein Expression
- \* RNAi/VIGS/...
- \* The Alphabet Soup of Science - focused on PSNA related fields
- \* HPLC or GC or MS or NMR-how much do I need, how do I know what column to start with, how do I present the results in a paper, I'm scared of the expensive machine!
- \* The Basics of Small Molecule Chromatography
- \* Protein Chromatography
- \* DGGE
- \* Basics of Microscopy/ Specific Microscopic techniques (could be presented by equipment specialists from sponsoring companies)
- \* Other member suggestions...

If you know of a topic that you would like to learn more about or on which you would be willing to contribute your expertise during a workshop, PLEASE LET US KNOW!

The more we hear from the PSNA membership, the more prepared we can be to meet the needs and desires of the society as a whole.

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Phytochemical Society of North America  
Sociedad Fitoquímica de América del Norte  
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## Member Annual Renewal Form

Please fill in the following form and return to the Treasurer with your dues payment.

Payments should be made by one of the following: check drawn on a US checking account, US travelers check, or US money order, International Money Order, Credit Card on the PSNA Website or Paypal payment to [psnatreasurer@yahoo.com](mailto:psnatreasurer@yahoo.com) Please make check or money order payable to the Phytochemical Society of North America.

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Phytochemical Society of North America  
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## New Member Application Form

Please fill in the following application and return to the Treasurer with your dues payment. Once your application has been processed, you will receive newsletters and special mailings. You are also eligible for PSNA member discounts on the Recent Advances in Phytochemistry series (See Website).

Payments should be made by one of the following: check drawn on a US checking account, US travelers check, or US money order, International Money Order, Credit Card on the PSNA Website or Paypal payment to [psnatreasurer@yahoo.com](mailto:psnatreasurer@yahoo.com). Please make check or money order payable to the Phytochemical Society of North America.

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# PSNA News

Phytochemical Society of North America  
Sociedad Fitoquímica de América del Norte  
Société Phytochimique de L'Amérique du Nord

Volume 46, Number 3

August 2008



## From the President Mark Bernards

Greetings from Canada! It is my pleasure to write this letter as the new president of the Phytochemical Society of North America. I wanted to use this opportunity to provide my perspective on the current status of the PSNA, and my thoughts as to where we need to place our efforts to move the society forward.

First of all, I would like to extend my personal thanks to Norman Lewis for the past two years of service he has contributed to the PSNA. It is in large part due to his efforts

that the PSNA has a bright future in store. Not only has he devoted a significant amount of time and energy to bring the society's vision back into focus, but he has orchestrated two excellent, back-to-back PSNA meetings, most recently at Pullman WA. Indeed, as was begun at Oxford Mississippi in 2006, the breadth and scope of the 2007 meeting in St. Louis and the 2008 meeting in Pullman were truly reflective of what the society has to offer to its membership. I have been a PSNA member since 1987, and while I haven't attended every annual meeting, in my opinion the 2008 Pullman meeting was the best in recent years. If nothing else, the annual meeting of the society is a highlight, and one of the rewards of membership. The 2009 meeting, to be held at Towson University (Towson, MD), promises to continue this trajectory, providing a broad spectrum of invited speakers covering many aspects of phytochemistry.

The overall health of the PSNA is also reflected in the recent election of the new President Elect of the society, David Gang. A special thanks to David, and his ballot opponent Charles Cantrell for agreeing to allow their names to stand for this important duty. In addition,

there has been a noticeable resurgence in interest and activity level in the society beyond the executive members; more members are becoming involved in the activities of the society, most notably at the student member level. Lastly, there is a relatively broad representation on the PSNA executive and related committees.

However, while the PSNA is on the rebound, it is not without continuing areas of concern. Here I outline three: (1) Membership; (2) Revenue Stream; and (3) Society Mandate.

(1) Membership: Overall, membership in the PSNA (as reflected in paying members) has increased slightly in recent years. The last year for which final figures are available (2007) had membership at 210, more than half of which (142) were regular members. What is disturbing is the relatively small number of student members (only 37 in 2007), which suggests that many members have not included their lab groups in the activities of the society. Admittedly, until recently, I was one of these: none of my students have held regular memberships in the PSNA. Now, two of three are student mem-

*... continues on page 3*



In this issue: The 2008 PSNA Meeting; Helen Stafford 2008 Phytochemical Pioneer Award Recipient; Guidelines for the PSNA Neish Young Investigator Award and the PSNA Presentation Awards

This is the printed version of the PSNA Newsletter. The web PDF version can be downloaded from the website: [www.pсна-online.org](http://www.pсна-online.org).





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ADVISORY COUNCIL  
(Being reorganized)

# The Phytochemical Society of North America

The Phytochemical Society of North America (PSNA) is a nonprofit scientific organization whose membership is open to anyone with an interest in phytochemistry and the role of plant substances in related fields. Annual membership dues are U.S. \$40 for regular members and \$20 for student members. Annual meetings featuring symposium topics of current interest and contributed papers by conference participants are held throughout the United States, Canada, and Mexico. PSNA meetings provide participants with exposure to the cutting-edge research of prominent international scientists, but are still small enough to offer informality and intimacy that are conducive to the exchange of ideas. This newsletter is circulated to members to keep them informed of upcoming meetings and developments within the society, and to provide a forum for the exchange of information and ideas. If you would like additional information about the PSNA, or if you have material that you would like included in the newsletter, please contact the PSNA Secretary or visit our website at [www.pсна-online.org](http://www.pсна-online.org). Annual dues and changes of address should be sent to the PSNA Treasurer. Also check the PSNA website for regular updates.

*The PSNA is an all volunteer organization which depends on its membership to run the organization. We appreciate the time and effort these volunteers are putting in to keep the organization up and running. As a member, please consider volunteering to serve on one of these committees. The PSNA can always use more help!*

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*President's Message from Page 3...*  
bers, which will be reflected in the 2008 numbers once they are available. If more members did the same, our list of paying member would increase drastically.

The overall health of the society, however, requires a solid foundation of regular members. I would like to take this opportunity, therefore, to encourage all current members to renew their memberships for 2008 (if not already done) and be pro-active about encouraging others (colleagues, students, post-docs) to do the same. I believe that increasing our student/post-doc numbers will eventually translate into higher numbers of regular members as students graduate and progress with their science careers.

However, this raises another interesting point: what do you get for your membership dues? For starters, there are a number of monetary advantages: reduced annual meeting

registration cost and reduced subscription rates to *Phytochemistry* (which, by the way, is the flagship journal of the PSNA). Besides these, however, there is also the PSNA Newsletter and connections to a whole community of phytochemists and plant biologists with a broad range of expertise, experience and resource, not to mention a common interest in phytochemicals, the plants that make them and the uses to which they can be put (both by humans and plants!). But sustained membership alone does not ensure a healthy, long-lived society, which brings me to my second concern.

(2) Revenue Stream: In addition to members, a healthy society requires a reliable revenue stream. Membership dues are important, but insufficient for all the activities supported by the society. This is especially true of the annual meeting, wherein society funds are often instrumental in ensuring a quality venue and support for speaker and student travel. Until it was discontinued, the annual publication *Recent Advances in Phytochemistry* represented a modest but consistent revenue stream for the society. While the reasons for discontinuing the series are no longer at issue, the fact that the society no longer has the revenue associated with it remains an issue. Therefore, the executive has decided to resurrect and re-invent the *Recent Advances in Phytochemistry* series, beginning with the 2009 annual meeting at Towson University. Unlike the past, however, production of the book will be overseen by an editorial board, consisting (initially) of myself, Laurence Davin, Kelsey Downum, David Gang, Reinhard Jetter, Susan McCormick, John Romeo, and James Saunders. In subsequent years, we will be looking to the membership for replacement editors as the terms of the inaugural editors come to an end. In addition to establishing the scope of the new

RAP series, the first order of business for this group will be to find a publisher, a process that is currently underway. And this brings me to my last area of concern.

(3) Society Mandate: Generally speaking, the PSNA is about all aspects of plant natural products, including (but not limited to) ecological, biological, biochemical, medical, pharmaceutical, economical and molecular (i.e., in all senses of the term). Arguably, therefore, the mandate of the society has to be equally broad, providing opportunity and representation for all aspects of the phytochemistry community, ranging from molecular biology and biochemistry to chemical ecology on a landscape scale; traditional phytochemistry to structure/function analysis at the enzyme level; molecular structure to gene structure; targeted analyses to metabolomics. It is safe to say that recent activities in the PSNA executive and society as a whole have worked toward maintaining this breadth and making it part of the fabric of the society. We will (indeed must) continue to pursue this broad mandate and involve all members of the society in societal activities. Annual meetings must continue to provide wide ranging programs, making it worthwhile for each and every member to attend each year.

In summary, despite my declaration that there remain areas of concern it is clear that the executive, and increasingly the membership, are taking the necessary steps to tackle them. Because of this, the future of the society is looking up: Membership is on the rise, the Recent Advances in Phytochemistry series is being re-born and we have a string of three great meetings under our belt. We have a great community of scientists with a shared passion, and there remains a strong, grass-roots level support for the PSNA. It is a good time to be a phytochemist!



## 2008 PSNA Annual Meeting Phytochemistry & Biology / Human Health Pullman, Washington, June 25-29, 2008

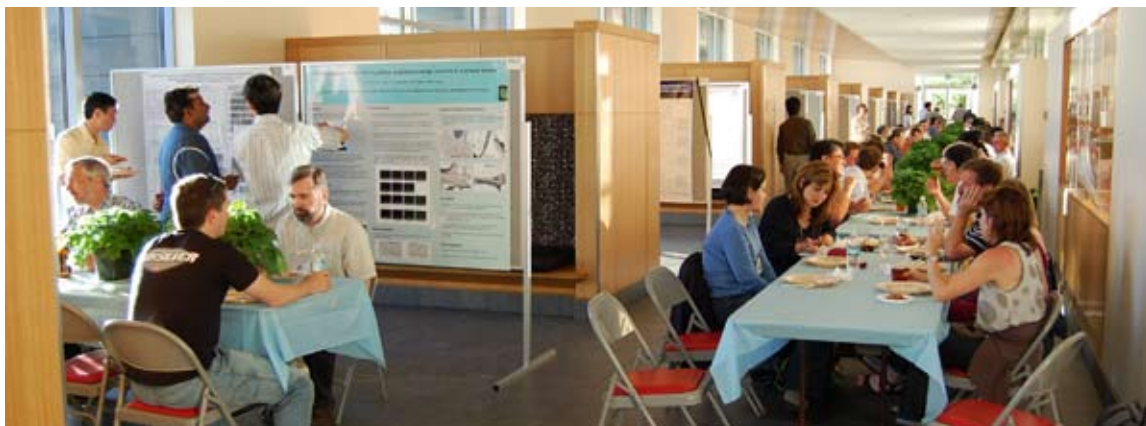
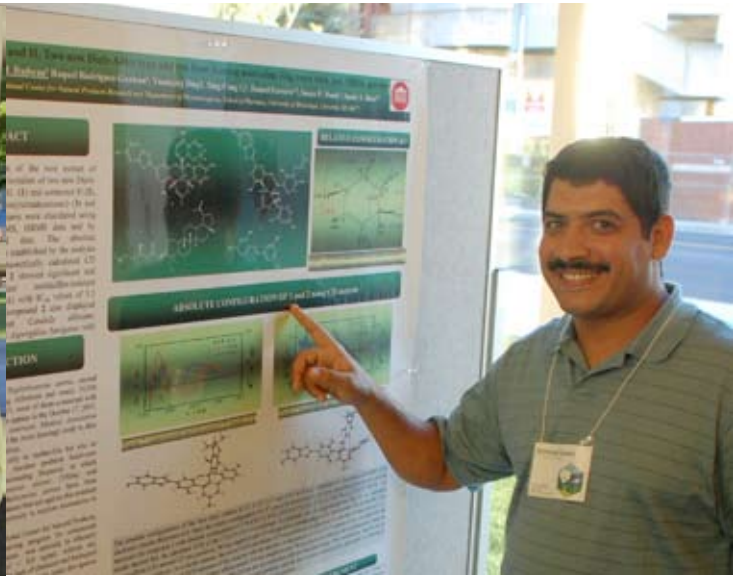
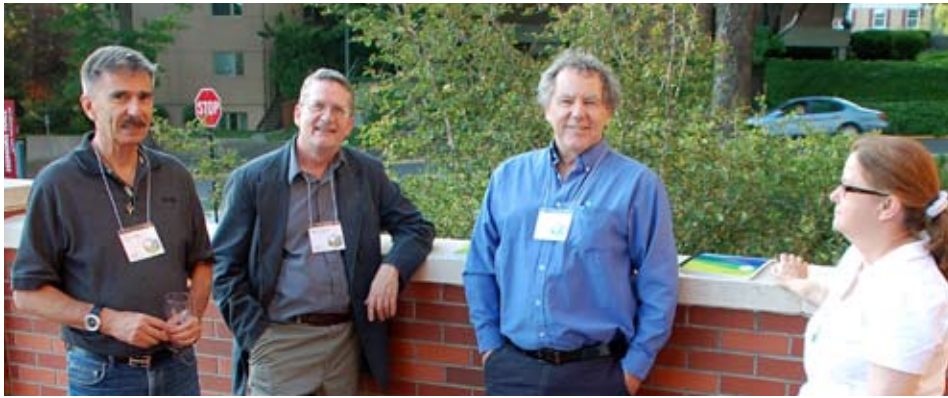
The late June weather in Pullman was cool to start off, but heated up by the end of the weekend for the PSNA's annual meeting. The organizers put together a fine program starting off with an opening reception at Washington State University's Honor Hall Lounge on Wednesday evening, and launching into a great slate of presentations at School of Communications Auditorium the next morning. Sessions included: Phytochemicals and Human Health, Plant Cell Wall Assembly, Metabolic Biochemistry, Bioinformatics, Plant Phenol/Tannin Biochemistry, Metabolic Engineering, Natural Products for Pest Management, and Natural Product Biosynthesis and Metabolic Engineering. The meeting was capped with a special Tannin Research Award symposium put together by the Tannin Group. The meeting organizers prepared a program of speakers from both invited speakers from outside the PSNA and from selected abstracts submitted to the meeting program.

In keeping with a new tradition established at the 2007 meeting, Thursday afternoon featured the four-minute poster oral summary presentations for the poster presentations which followed on Thursday and Friday evenings, featuring a dinner buffet and adult beverages. The nice facility at the new Plant Biological Sciences Building and the great company of the meeting attendees made this an excellent time for catching up on the advances in photochemical science, catching up with old acquaintances, and making new ones.

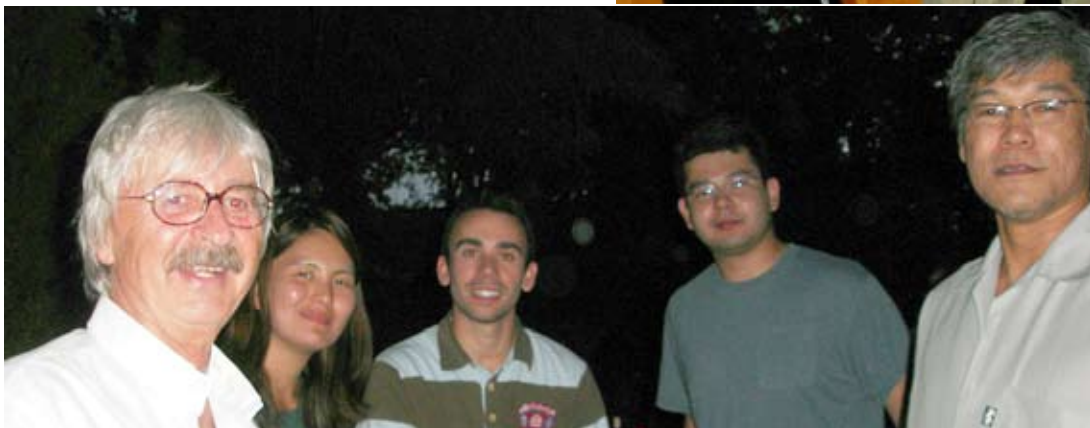
The Young Members Committee held their first event at the Thursday lunch time, the "Ask the Editor" panel discussion on how to avoid problems when submitting manuscripts to a journal. This event precipitated a lively discussion that spilled over to Friday's lunch time.

The Annual PSNA Awards banquet was held at the Old Post Office Wine Cellar and Gallery in downtown Pullman. An excellent dinner













was preceded and followed by a nice selection of Pacific Northwest wines and beers. The Awards Ceremony started by featuring the 2008 Frank and Mary Loewus Travel Award Recipients: Patrick Arsenault (Worcester Polytechnic Institute), Jala Daniel (East Tennessee State University), Hong Han (University of British Columbia), Siddhartha Mallampalli (East Tennessee State University), and Daniel Owens (East Tennessee State University). Next up were the Best Poster Presentation Awards: Oliver Corea (Washington State University), and Vanessa J. Herl (Friedrich-Alexander-University). The Arthur R. Neish Young Investigator Award was given to Nancy

Terrier (INRA, Montpellier, France). John T. Romeo was the 2008 Recipient of Life Membership in the Phytochemical Society of North America. Ulrich Matern and Helen Stafford were the 2008 Recipients of the Phytochemistry Pioneer Award.

The PSNA would like to thank the organizing committee, Norman Lewis, Daneel Ferreira, and Mark Bernards for all their work in putting this meeting together, with the invaluable coordination and administrative assistance of Franck Dayan, Paula Gibbs, Hiroko Hayashi, J'Lynn Howell and Helen Miller, without whom this meeting would not have been possible. Thanks also to the meeting sponsors, Agilent

Technologies, Elsevier Publishing, Waters Corporation, ElSohly Laboratories, Inc., and Washington State University's Institute of Biological Chemistry, the Loyal and Helen Davis Endowment, and the CAH-NRS Office of Alumni and Friends. Thanks also go to session chairs David Gang, Laurence Davin, Mark Bernards, Jim Saunders, Markus Lange, Cecelia McIntosh, Massuo Kato, John Romeo, Toshiaki Ummezawa, and Daneel Ferreira.

The abstract and meeting book can be downloaded as a PDF file from the PSNA website at [www.pdna-online.org](http://www.pdna-online.org). The next meeting is set for Towson University, Maryland in early August 2009.







John T. Romeo: 2008 Recipient of Life Membership in the Phytochemical Society of North America



Ulrich Matern: 2008 Recipient of the Phytochemistry Pioneer Award



Nancy Terrier: 2008 Recipient of the Arthur Neish Young Investigator Award



Takashi Yoshida:  
2008 Recipient of the  
Tannin Award





**Helen A. Stafford**

## **2008 Recipient of the Phytochemistry Pioneer Award**

Honorary address by Frank Loewus (delivered at the Annual Meeting Awards Banquet by Norman Lewis)

Our President, Norman Lewis, has prevailed on me to act as a surrogate for Helen Stafford whose illness precludes her attendance at this meeting and her formal acceptance of the Phytochemistry Pioneer Award of the Phytochemical Society of North America. I share this obligation with Daneel Ferreira whose expertise in plant phenolics will address Helen's contributions in this regard.

It was 1952 when I joined Birgit Vennesland's group in the Department of Biochemistry at the University of Chicago. There I met Helen, an instructor in botany as well as postdoctoral student involved in Birgit's studies on organic acid metabolism and I became aware of Helen's growing knowledge of organic acid metabolism in plants as well as her patient manner of sharing this talent. Prior to her departure to begin her tenure at Reed College, an outstanding institution of undergraduate study, Helen presented a seminar on ascorbic acid biosynthesis in plants and animals drawn from three back-to-back papers by Isherwood and Mapson that had just appeared in the *Biochemical Journal*. Her 45

minute presentation rested in my mind like a perfect song. Even now, 54 years later, her message remains, clear and exciting, the mark of an accomplished teacher.

When I moved to USDA labs in Berkeley, CA in 1955 to begin work on loss of fresh flavor and appearance in frozen strawberries during storage, it was memory of Helen's seminar on ascorbic acid that motivated me to study the biosynthesis of Vitamin C in plants. The following year I invited Helen to spend her three month academic summer break in my lab while we explored the curious fact that theoretical cleavage of the six-carbon chain of ascorbic acid between either C2/C3 or C4/C5 ultimately produced the four-carbon dicarboxylic acid, L-tartaric acid, a major organic acid constituent of the grape. Our experimental results failed to provide fresh clues in this regard but Helen returned to Reed College determined to survey the occurrence and distribution of tartaric acid in plants. By enlisting her eager undergraduate students in this project, she found L-tartaric acid to be a major organic acid in species other than the grape, notably the common geranium.

Another ten years passed before Kazumi Saito at Kyoto University reported that L-tartaric acid in the grape was a metabolic product of

C4/C5 cleavage of the six-carbon chain of L-ascorbic acid. In 1973, George Wagner, a graduate student in my lab at Buffalo discovered that L-tartaric acid from geranium arose due to cleavage of L-ascorbic acid at C2/C3, the C1-C2 fragment forming oxalic acid. Then, in 1998, Glen Wheeler & Nick Smirnoff in Exeter University established an eight-step biosynthetic pathway of ascorbic acid in plants that set the stage in 2002 for Seth DeBolt at the University of Adelaide to complete the story of L-tartaric acid biosynthesis in the grape by both C4/C5 and C2/C3 cleavage depending upon subcellular and developmental processes. (Incidentally, each advance of our understanding regarding L-tartaric acid biosynthesis involved a graduate student as principal investigator.

It was Helen Stafford's determined efforts to wrest from nature the information needed by these students to further explore the complexities of tartaric acid formation in plants that set in motion this train of discoveries. Not unlike Thomas Jefferson's decision to send Lewis and Clark on their perilous journey up the Missouri and down the Columbia Rivers so he could establish the wisdom of the Louisiana Purchase or the history of Pasteur's efforts to resolve underlying conflicts over fermentation versus putrefaction



that mark these heroic individuals as Pioneers, so too, Helen Stafford has earned the distinction of being a Phytochemical Pioneer for opening up the pathway from D-glucose to L-tartaric acid and incidentally, playing an important part in establishing the role of ascorbic acid as a major metabolic source of oxalic acid in all plants.

### 2008 PSNA Annual Meeting Poster Award Winners



**Oliver Corea (Best Graduate  
Student Poster)**

Oliver Corea received a BSc in Genetics at the University of Western Ontario (London, Ontario) in 2004. He continued at UWO to complete an MSc in Cellular and Molecular Biology in 2006 under the supervision of Susanne Kohalmi. There he began work on the characterization of arogenate dehydratases (ADTs) in *Arabidopsis*. These enzymes were proposed to be involved in an alternative route of phenylalanine biosynthesis than that found in many microorganisms; through dehydration/decarboxylation of arogenate, as opposed to prephenate. This initial work focused on functional complementation of a yeast prephenate dehydratase (PDT) knockout, as well as biochemical characterization of ADTs to determine their substrate specificity for either arogenate or

prephenate. The latter project was largely carried out during a three month visit to Norman Lewis' lab at Washington State University. After completing his MSc, he returned to the Lewis lab to pursue a PhD in Molecular Plant Sciences (2007 to present). Current research is aimed at determining the feedback regulation properties of ADTs, and determining their *in vivo* function in *Arabidopsis* through transcriptional and metabolic profiling of single and multiple ADT knockout lines.



**Vanessa J. Herl (Best  
Postdoctoral Poster)**

Vanessa J. Herl received a degree in pharmacy at the Friedrich-Alexander-University (FAU) Erlangen-Nuremberg in 2001. She finished her education as approbated pharmacist in 2002. In the same year, she joined the Chair of Pharmaceutical Biology at the FAU in Erlangen to start her Ph.D. studies under the supervision of Prof. Dr. Wolfgang Kreis. During her Ph.D. studies she focused on genes and enzymes involved in cardenolide biosynthesis in *Digitalis* and *Isoplexis* species. In 2006 she received her Ph.D. from the Faculty of Natural Science of the FAU, and her thesis was awarded by the "Erika und Adolf Dornhecker Foundation" in 2007. Dr. Herl currently holds a postdoctoral position in the laboratory of Prof. Dr. Kreis, and her main research interests are molecular aspects of secondary metabolism in *Digitalis*, *Isoplexis* and *Arabidopsis*,

especially cardenolide-biosynthesis. Her research activities are complemented on collaborations with the Chair of Biotechnology (Prof. Dr. Muller, FAU) and the Institution for Special Botany (Prof. Dr. Albach, University Mainz) in the fields of enzyme crystallization and investigations on the evolution of cardenolide formation in plants, respectively.

### 2008 Frank and Mary Loewus Travel Award Recipients



**Patrick Arsenault**

Patrick Arsenault is in his third year of study towards a PhD at Worcester Polytechnic Institute, Worcester Massachusetts. He works under the supervision of Dr. Pamela Weathers and Dr. Kristin Wobbe in the biology and biochemistry departments, respectively. This lab group is concerned primarily with the elicitation and metabolic engineering of natural plant products with a particular focus on pharmaceutically active compounds from *Artemisia annua*. Patrick works toward the genetic engineering of alternative plant hosts for the production of sesquiterpenes and is also interested in the role of reactive oxygen species and their sequestration by plant compounds. He also does research in relation to plant defense responses to viral infection, specifically turnip crinkle virus. He hopes that some of these diverse research topics will eventu-



ally find a home together in his future independent research. He plans for a career in academics and hopes to continue in some form or another with phytochemistry and the PSNA.

Patrick began his studies at WPI in 2005 immediately after finishing his BS in biology at the University of Massachusetts, Amherst. The meeting in Pullman WA was his first with the PSNA, though he looks forward to many more in the future. Patrick is member of PSNA, ISVB, and ASPB. When not in the lab (as fleeting as those instances may be), he enjoys backpacking, rock climbing, and cooking.



**Jala Daniel**

Jala Daniel is originally from Ann Arbor, Michigan. She received a bachelor's degree in biochemistry and molecular biology from The College of Wooster, OH in 2005. After graduation, she participated in Wake Forest University's Post-Baccalaureate Research Education Program (PREP) for one year. She is currently working on a master's degree in biomedical sciences at East Tennessee State University (ETSU) with Dr. Cecilia McIntosh, and her research is supported in part by an ETSU Graduate Council Research Grant awarded in January 2008.

Jala's thesis research involves determining the expression patterns of eight putative flavonoid glucosyltransferases (GT's) during grapefruit growth and development by quanti-

fying mRNA expression levels in the roots, stems, and leaves. This research is designed to test the hypothesis that these 8 GT's are expressed constitutively. Alternatively, one or more could be expressed in a tissue-specific manner or developmentally regulated. Six growth stages have been defined. The first stage focuses on emerging roots; stages 2-4 focuses on leaves, stems, and roots; stage 5 focuses on comparison of older and younger leaves; and stage 6 is flowers harvested from 4-5 year old trees. Semi-quantitative RT-PCR will be used to evaluate mRNA expression levels. Preliminary results have confirmed that there is variation in the patterns of expression among the GT's. The results of this study will make a significant contribution to the understanding of plant secondary metabolism by linking biochemical function and gene expression patterns in order to help elucidate the metabolic and physiological impact of these gene products.



**Hong Han**

Hong Han is a third-year undergraduate student in Biology Honours Program at the University of British Columbia, Vancouver, Canada. She is expecting to receive her BSc degree in Cell Biology and Genetics from UBC in 2009. She was awarded, among others, a President's Entrance Scholarship, UBC Summer Scholarship, and Dean of Science Scholarship during 2006-

2008. Hong has been working in Dr. Jetter's Lab (Departments of Botany and Chemistry, UBC) since 2007. Her first research project mainly focuses on the leaf development and cuticular wax composition in *Kalanchoe daigremontiana*, which is an interdisciplinary study of the chemistry and biology of plant surfaces. Gas chromatography (GC) and Mass spectrometry (MS), together with mechanic wax removal and extraction techniques, are applied to study the composition and layered arrangement of cuticular wax in *K. daigremontiana* during various leaf developmental stages as well as its physiological and ecological implications. Currently, Hong is conducting experiments on triterpenoid synthase enzymes in preparation for her Honours Thesis. The research involves cloning and characterizing different genes responsible for triterpenoid synthesis, and investigating the mechanisms of these enzymes by site-directed mutagenesis and chimeragenesis approaches. After receiving BSc from UBC, Hong is planning to go to graduate school and continue research in biological and biochemical fields.



**Siddhartha Mallampalli**

Siddhartha Mallampalli was born in (Andhra Pradesh, Srikakulam) which is in the southern part of India. He obtained a bachelor's degree in biotechnology from Andhra Uni-

versity (Andhra Pradesh, India) and earned a master's degree in biotechnology from Bangalore University (India). He is currently pursuing a master's degree in biological sciences at East Tennessee State University (Johnson City, TN), where he is working under the supervision of Dr. Cecilia McIntosh investigating flavonoid glucosyltransferases in *Citrus paradisi*. Dr. McIntosh's lab focuses on regulation of flavonoid biosynthesis, specifically on glycosylation and the enzymes involved in glycosylation. Siddhartha's research interests include biochemistry, molecular biology, and biotechnology, and after completing my master's degree at ETSU, he would like to pursue a Ph.D. He expects that research-intensive Ph.D. training will help prepare him for a future career in biochemical research, biotechnology, or the pharmaceutical industry.



**Daniel Owens**

Daniel Owens began research as an undergraduate contributing to the purification of a flavanone 7-O-glucosyltransferase from *C. paradisi* tissues in the lab of Cecilia McIntosh. Subsequently, he initiated a project investigating the enzyme activity of *C. paradisi* flavanone 3-hydroxylase (F3H), which led to the development of a sensitive new assay for the enzyme employing capillary electrophoresis. He earned a BS degree

with a concentration in biochemistry from East Tennessee State University in 1999 and then attended graduate school at Virginia Tech under the supervision of Brenda Winkel. His graduate research involved investigating the role of 2-oxoglutarate dependant dioxygenases leading to the production of flavonols in *A. thaliana*. A predicted flavonol synthase gene family was investigated demonstrating that only one of the six enzymes is catalytically active and influences flavonol levels. The biochemical properties of Arabidopsis F3H were determined, and evidence that flavonol synthase and/or anthocyanidin synthase can partially complement F3H mutant alleles resulting in an observed "leaky" phenotype (pale brown seed coat) was uncovered. Daniel was awarded a Ph.D. of Biology with an option in molecular cell biology and biotechnology in 2005. He is currently a postdoctoral fellow under the mentorship of Cecilia McIntosh at East Tennessee State University. They are examining flavonoid glucosylation in *C. paradisi*, and have identified a number of putative glucosyltransferases based on a conserved motif (PSPG box) and are currently in the process of analyzing and characterizing these enzymes.

## PSNA Business Meeting

Mark Berhow, Secretary

**Officer Election Results:** The new President elect is David Gang of the University of Arizona. The election committee would like to thank David and Charles Cantrell for their willingness to serve. The new secretary is Soledade Pedres and Franck Dayan will serve another term as Treasurer.

*Standing Committee Reports:*

**Membership-** Daneel Feirrer. There has been a healthy increase in our paid membership over the past year. For this meeting Daneel Feirrer has invited the Tannin Group to

participate and it is hoped that they will make the PSNA their home. We also working to integrate with the European Group Polyphenol as well.

**Website-** Charles Cantrell. The website is pretty good shape, but the committee is looking for younger volunteers to help with the upkeep and revision of the site. We have implemented online payments for both the meetings and membership renewals. Charles Cantrell is looking into a second party web management that for a reasonable fee will handle all the membership renewals and all electronic balloting and notices.

**Newsletter-** Mark Berhow: Mark Berhow will continue to do the layout and mailing, freeing the new secretary to concentrate on content and editing. The committee is always looking for volunteers to provide content and articles.

**Awards-** Cecilia McIntosh. Big thank you to the secret judges in the poster judging. Two awards, best graduate student poster and best post doc poster, plus five travel awards. All travel awards are from the Frank and Mary Lowes Travel award endowment fund.

## Proceedings and Publications-

Mark Bernards: We are looking into reviving the Recent Advances in Phytochemistry book series. We are going to create a new editorial board for the PSNA. The plan is to start with a theme from the 2009 meeting. We are looking at options for publishers either Elsevier, Springer, Wiley and Blackwell or Taylor and Francis. The general idea is that the series will be a published book on a theme covered at each yearly meeting, likely tied to one or two symposia and expanded to other invited authors. The book deal will likely require the PSNA to purchase a certain number of books. This can be built into the meeting registration fee to



make sure we make these sales.

**Future Meetings-** Norman Lewis: 2009 meeting will be at Towson State University north of Baltimore Maryland, Jim Saunders has the organization well under way and is looking forward to seeing the PSNA membership in early August. The 2010 meeting will be a joint meeting with the American Society of Pharmacology in Tampa. The ASP meeting is being arranged by Bill Baker, the PSNA end of things will need a chairman. John Romeo who is at the University of South Florida has been asked if he will help. 2011 will be the PSNA's 50th Anniversary. Two locations being considered are Hawaii with the help of John Pezzuto and Colorado. Norm Lewis is heading up the organizing committee. For 2012 we are looking for volunteers, and a location in Canada.

**Advisory Board-** Mark Bernards and Norm Lewis: We are in the process of filling the empty slots, with the hope that the members of this board will serve to help with both the future meeting organization and the editorial process for our Recent Advances series. Nominees included John Arnason and John Pezzuto.

**Constitution and Bylaws:** Thanks to Cecilia McIntosh and Daneel Feirrer for all their work on the revisions that need to be done. Cecilia is tying up some loose ends for the awards committee and the oral poster guidelines.

**Young Scientists-** Christina Coleman: The committee was formed in 2006 and implemented in 2007. They came up with a draft slate of ideas for the annual meetings which were published in the PSNA Newsletter. This year they organized the "ask the editor" forum which was well attended. For the Maryland 2009 meeting they hope to organize a pre meeting social event and host a practice presentation forum for speaking. The committee members would also like to encourage stu-

dents and post docs to take a more active role in the newsletter/website and contribute material for publication. We also need to keep in better contact with young scientists that attend a given meeting to keep them as active members. Thanks to Michael Michael Mazourek, Meredith Biedrzycki, and Lukasz Kutrzeba for all their hard work.

**Fund Raising-** Daneel Feirrer: This was overlooked in the formation of the standing committees in 2006. Daneel will recruit a few members. This committee will help the meeting organizers to round up funds to support the meeting travel and awards. This must be done 1-2 years in advance and on a continuing basis as many companies and granting agency require a years notice to submit requests and applications.

**Treasurers Report-** Charles Cantrell and Franck Dayan: The money situation is okay for the time being, but we are losing some ground. The loss of income by not having a publication over the past four years is beginning to be felt. The membership fees do not cover all the operating costs for the society and the last few meetings have not covered all their costs. As the society pays for the travel and student awards, we have generally been losing money that has not been supplemented with any new income. Reviving income from a yearly book or journal will definitely help. We are still receiving some royalties from the previous editions of RAP.



## 49th Annual PSNA Meeting 2009

The PSNA meeting will be held at Towson University, a suburb of Baltimore, Maryland on Aug. 8-12, 2009. We will feature a broad Symposia topic on Biologically Active Phytochemicals which should be of interest to all members of the PSNA and will invited a wide spectrum of invited speakers to address this topic. Contributed presentations or posters on any area of Plant Science are welcome. Towson University has committed \$5000 to help sponsor this meeting as well as providing the meeting facilities at no cost to the society. We are looking forward to publishing a volume from this meeting organized by the editorial board of the PSNA and hope that all members of the Society will come and enjoy the 49th Annual Meeting and Symposia of the Phytochemical Society of North America in the Baltimore area.

### Guidlines for the Arthur Neish Young Investigator Mini-Symposium

This mini-symposium is named in honor of Arthur C. Neish (1916-1972). In the 1950's and 1960's, Dr. Neish was a pioneer in the synthesis and use of radiolabeled precursors and was one of the major contributors to knowledge of plant natural product biosynthetic pathways (Romeo, J.T. 2000. *Forward. Recent Advances in Phytochemistry* 34:viii).

He was a strong mentor of young scientists and has been recognized by having the young investigator symposium named after him. Funds supporting this endeavor were donated by the Phytochemical Society of North American (PSNA), the National Science Research Council of Canada (NSRC), Pfizer, and private donors.

The first young investigator mini-symposium was held in 1999 at the PSNA meeting in Montreal.

The society uses the fund to support young investigators as featured speakers to enrich participation in the PSNA, support a diversity of topics, and provide what may be an important professional and career development opportunity for young investigators. There is no application procedure as this is an invitational award.

PSNA members may submit nominations to members of the Awards Committee, the Executive Committee, or the current Meeting Committee. Nominations should include a CV of the nominee and a letter stating reasons for the nomination. For these awards, a new investigator is someone within the first 2-3 years of establishing an independent research program and typically will be no more than 5-6 years past the award date of his or her Ph.D. (or equivalent) degree.

### **PSNA Awards information**

The Phytochemical Society of North America provides professional development opportunities for undergraduate students, graduate students, and postdoctoral researchers through opportunities for research presentations (oral or poster) at its annual conference. The society has travel award, the Frank and Mary Loewus Student Travel Award, and presentation award programs to support this professional development activity.

### **Frank and Mary Loewus Student Travel Award**

These financial awards are to provide some assistance to help support the cost of travel to the annual meeting. Students and postdoctoral researcher are eligible to apply for travel awards, but they must be giv-

ing a presentation of their research (either a poster or an oral presentation). Application is made when registering for the meeting and is done on the registration form. Funds are limited, so not everyone will receive support. Awards, which vary in amount based on the number of applicants) are presented at the conference banquet.

### **Presentation Award Program**

Up to two (2) awards are presented at each meeting for the best student and/or postdoctoral researcher presentations. Awardees receive a certificate and a financial award in the amount of US\$250 each. Awards are presented at the conference banquet.

### **Guidelines for the 3-4 minute Pre-Poster Oral Presentation**

Due to the fast-pace of these presentations, overhead transparencies must be used for the visual aid. The following are some suggestions/hints for preparing this presentation.

### **Organization**

Keep the overheads simple and/or be ready to point to the important parts. Do not try to show all of your data in this short presentation. Use this time to give background information and then invite the audience to visit your poster to see what results you have obtained and your interpretation of these results.

1. First overhead – this should include information on the poster title, authors, and affiliation. It is a good idea to include the poster number if you have this information.
2. Second overhead – present concise background information. Why is this area of research interesting?

3. Third overhead - present the question that your research is trying to answer. This could be presented as a statement of the hypothesis or as a series of questions the research is addressing.
4. Fourth overhead – provide information on the general approaches that are being used in your research. Finish with a statement inviting the audience to visit your poster to see your results and provide the audience with the poster number so that they know where to find your poster.

### **Presentation**

1. Be sure to practice before you give the presentation to be sure that you are keeping the time to 3-4 minutes.
2. When presenting, be sure to face the audience so that they can see and hear you. You can use a pencil or pen to point to areas on your transparencies where you want the audience to focus their attention. If you point on the overhead as it sits on the projector, the pencil will be projected also and you do not have to turn away from the audience.
3. When the time beeps, stop speaking, smile, and say thank you and remove your transparencies so the next person can start. Please note, if you make sure that your presentation takes 3 minutes you will be able to finish before the timer beeps.
4. Enjoy this opportunity!!



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