



# PSNA News

Phytochemical Society of North America

Sociedad Fitoquímica de América del Norte

Société Phytochimique de L'Amérique du Nord

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## PRESIDENT'S LETTER

### What does the future hold for the PSNA?

Without question, it is an exciting time to be a plant biochemist. We have access to full or partial genomic sequences of *Arabidopsis*, and rice, and expressed sequence data for many more. Proteomic technology is improving rapidly, thus providing added value to genomic sequence databases. Modern imaging techniques make it possible to map the location of proteins within a living cell, and recent advances have led to similar localization studies on metabolites themselves. Advances in mass spectrometry continue at a break-neck pace, enabling the identification and quantification of plant metabolites in numbers that would have been inconceivable only a few short years ago.

If these are such exciting times, then why does the PSNA struggle as a society? Our membership is down, attendance at recent meetings has been flagging, and it is becoming increasingly difficult to identify members who are willing to work on behalf of the society. I believe

that there are a number of factors that have led to this situation, some of which I will outline here. A number of these issues have already been identified in previous President's Letters [PSNA News 41 (2) and 43 (2)]; however, it is well past time that we come to grips with them as a society. Not all of you will agree with my point of view, nor does this letter represent the viewpoint of all of the members of our Executive Committee. Nevertheless, we need to deal with the issues facing our society, or else face its lingering demise.

First, we must recognize that our society is well below critical mass. How can this situation be remedied, and from what sources can we recruit additional members? When I mention the Society to colleagues from around the country, few have even heard of it, and those that have assume that the society's interests are restricted to natural products chemistry. Many of these scientists and their students could make outstanding contributions to our meetings if only they could be convinced to attend. In fact, when I have asked these same individuals whether they would enjoy being members of a society whose focus was plant bio-

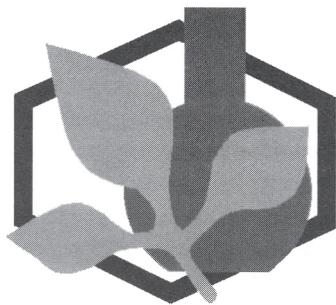
chemistry, their responses have been a unanimous "Yes!". They have all agreed that plant biochemistry is poorly represented at other meetings including that of the American Society for Plant Biology. Thus, I believe that the PSNA has so far missed the opportunity to broaden itself in order to capture new membership. There is an opportunity for the PSNA to become the home society for plant biochemists if we are willing to modestly redefine our society.

Second, we must deal with the fact that our society is "factionalized", a term first used by past-president Rick Dixon to describe the alternating chemical and biochemical nature of past meetings, and their attendees. This is, or course, regrettable in a time when interdisciplinary studies will be increasingly important in solving problems that require the integration of genomic, proteomic, and metabolomic data. I suspect that the inconsistency of our meeting topics has been an important factor in the decline we have seen in both membership and meeting attendance. I see two potential solutions to this problem. One would be to move the society toward plant biochemistry in general and away from

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## Upcoming Annual Meetings

2005 July 30- August 3  
San Diego, California

2006

2007

# *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. Annual dues and changes of address should be sent to the PSNA Treasurer. Also check the PSNA website at [www.pdna-online.org](http://www.pdna-online.org) for regular updates.

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Vincenzo De Luca (2005)  
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Johnathan Gershenzon (2005)  
Richard Dixon (2005)

more traditional phytochemistry, a topic that is also served by meetings such as those organized by the American Society of Pharmacognosy, for example. This seems unnecessary, counter-productive, and against the traditions of the Society. A far better solution would be to embrace the diversity of our membership and organize meetings on less-specialized topics, with parallel sessions organized to address the specific interests of the attendees, an approach successfully employed by the International Society for Chemical Ecology at our joint meeting in Ottawa this past year. This strategy would build interest and membership in the long term, and lead to more consistent meeting attendance from our members year after year.

Finally, I think that it is time that we ask ourselves whether the Society is due for a name change. As Departments of Botany across the country are changing their name to Departments of Plant Biology in an effort to sound more appealing (and a little less dusty!) to potential undergraduate and graduate students, we need to ask ourselves whether the name of our Society accurately reflects the interest of our members. Would a name such as The North American Society for Plant Biochemistry be more appealing to individuals who are currently not members of our society? Could such a name change boost our membership without disenfranchising our more traditional phytochemical colleagues? I don't know the answers to these questions, but I know that they are questions worth asking.

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## **PSNA Membership Drive**

The PSNA Executive Committee would like to invite all members of the society to participate in our first membership drive. In order to maintain a vibrant society, we must all get involved and encourage those interested in the society to join. You may be surprised to find those working around you that are not aware of the PSNA and its mission. The annual PSNA membership dues remain remarkably low when compared to those of similar societies, so please encourage your friends and colleagues to join the PSNA!

## **The PSNA Mission Statement**

The objectives of the society shall be to encourage and stimulate research into the chemistry and biochemistry of plant constituents, their effects upon plant and animal physiology and pathology, and their industrial importance and utilization, and to encourage and stimulate communication of these interests among members by providing a forum for the presentation, discussion and publication of scientific research for the advancement of science and promotion of the common welfare.

Please photocopy the membership application enclosed in this newsletter and distribute it directly to those interested parties, individuals, departments, and groups.

## **Info on the 2005 PSNA Meeting**

A proposed schedule can be found on page 12. The meeting details are being worked out and as soon as they are available they will be posted on the PSNA website. We hope to have registration, abstract submission and hotel details available soon. For current info contact Mark Berhow or Chales Cantrell

## **The Return of the PSNA Newsletter and Website**

Mark Berhow  
PSNA Secretary

First of all, I want to thank my predecessor, Dr. Peter Facchini, for all the work he did in this position for the past years. This is a rather thankless job, that most folks (including myself) take for granted, until we stop getting the regular newsletters and mailings. He has done a great job in updating the newsletter and has set a standard I hope to be able to meet. Thanks Peter for a job well done.

I agreed to volunteer for this job back at the 2003 Peoria meeting, and it has taken a while for me to get all the pieces gathered and find the time to work out the details of transferring and updating the website to create a newsletter template from which to publish. As usual, life and work has interfered with my time management, so I am now finally getting all the things set up and ready to go.

However, it has been a year since the PSNA membership has received a newsletter. I hope with this issue to get back on track and get out a newsletter on a regular schedule. Owing to the costs (and labor) involved in mailing a hard copy, I propose to continue Peter's lead of printing and mailing one hard copy of the newsletter a year, which will have the yearly membership and meeting information. I would like to produce three other newsletters a year in electronic format, which can be emailed to our members and posted on the website. Vince DeLuca has volunteered to help me prepare and edit the newsletters. What we need now are regular submissions from our membership. Research developments, events, meeting reports, job opportunities, and career summaries are all fair game for submission.

Please consider providing Vince and myself with regular updates if you can.

One of the things I needed to do was overhaul the website to update it and making more visually appealing. I have finally finished that update and will be adding revised text and pages that I hope will be of benefit to both our membership and to the phytochemical research community. I had to move the site to private web hosting organization, as I could not host the site on our USDA server. I chose what appears to be a fine outfit called fatcow.com, which offers a generous space package for a reasonable yearly fee. I have moved the old web site to the new host and updated some of the material. You can access the website at [www.psn-online.org](http://www.psn-online.org). I still need to transfer the old text over to the new design, and I hope to replace the old design with the new by the end of January. Meanwhile the old design at the new site is up and running. I will try to keep the site up to date with meeting information and key links. One of the things we will explore is using paypal credit card services to accept membership renewals and book purchase right on our website. I would also like to see an extensive posting of job opportunities on our site. Again, I would encourage members to send me job postings, job links, meeting links, and interesting research updates/links to post on the PSNA site. The more we contribute the more we all benefit!

Please send me you input as to what you would like to see posted on the web. I am reluctant to post a membership list, just to prevent you from getting even more junk mail and spam email, but if folks want that I can do it.

Again, I apologize for taking so long to get this all up and running. But, hopefully from here on out we can stay in regular touch with our membership.

## Farewell to Neil Towers



We learned of the sad news that Dr Neil Towers, Professor Emeritus, from the University of British Columbia died quietly in his sleep on the morning of Monday, November 15, 2004. Those of us, who knew Neil, were aware that he had experience a serious life-threatening disease a couple of years ago and that he had recovered sufficiently to continue his research activities until very recently when his disease took him. Many of us who attended the 2004 annual meeting in Ottawa heard a visibly frail Neil give a remarkably lucid lecture that summarized various unique events that marked his life together with his well known and original contributions to the field of phytochemistry and its importance to human activities. I remember well the humanity and originality of the presentation together with Neil's tremendous enthusiasm for our chosen

discipline of research. It did have a revitalizing effect on those of us who might have been experiencing frustrations with our own particular research projects.

Neil Towers was one of the founding fathers of the PSNA, the idea of which seems to have germinated in discussions held in Montreal in 1959 on the occasion of the 9th International Botanical Congress [Brown, (1992) *Recent Advances in Phytochemistry, Volume 12 Phenolic Metabolism in Plants*; Chapter 12 p378-393]. The names of Stewart Brown, Ted Geisman, Gestur Johnson, Arthur Niesh, Vic Runeckles come to mind when considering those early days and the efforts that gave rise to the first two day symposium of the "Plant Phenolics Group of North America (PPGNA) that was held on August 31 and September 01, 1961! As part of the natural evolution to





broaden the appeal of the organization and to expand its membership base, the PPGNA was formally and legally converted into the Phytochemical Society of North America on January 1, 1967. Neil Towers served the PSNA well where he was

the only individual who served 2 separate terms as president in 1973 and in 1986.

It is with great sadness that we bid farewell to Neil Towers, but we are confident that he will remain in our memories through the sev-

eral generations of people he has touched, including students that he trained into a way of life that is research and through his unique vision of the world that is apparent in his many research publications.

## **Report of the 2004 Annual Meeting of the Phytochemical Society of North America**

by Vincenzo De Luca, Pierre Laflamme, Jun Murata and Mark Berhow

The joint meeting between the Phytochemical Society of North America and the International Society of Chemical Ecology was successfully held between July 24 to 28 2004. The meeting was very well organized and took place almost entirely on the beautiful downtown campus of the University of Ottawa. We congratulate Thor Arnason, Bernard Philogene and Mamdouh Abou-Zaid for their organization of a very successful joint meeting. The downtown location of the University assured the availability of scenic views of the Parliament and the various other government buildings within the backdrop of the Rideau Canal and the spectacular Ottawa River. Within walking distance from the University was the ByWard market (designed by Lt-Col John By in 1826), a lively 4 square block area of downtown Ottawa surrounded by fine museums, gourmet coffee shops, great restaurants and nightspots that were open late into the evenings for Ottawa citizens and Conference participants alike.

### **Meeting Symposia**

Since the scientific program was very heavy, the meeting organizers arranged for most of our meals at the University cafeteria where the food was plentiful. The theme of the meeting on "Chemical Ecology and Phytochemistry in Forest Ecosystems" included 12 symposium talks that covered a series of interesting and timely topics. The

meeting kicked off with ISCE silver medal address by Jeremy McNeil who gave an interesting and very entertaining address that related his personal journey in the field of ecology and chemical ecology and set the casual, informative and stimulating tone for the meeting. The mix of talks included presentations by Jonathan Gershenzon, Norman Lewis, Joerg Bohlmann, T Yoshida and Peter Constabel who described



Jonathan Gershenzon, Ragai Ibrahim, Clint Chapple



Pierre Laflamme, Vincenzo De Luca, Ernst Bleichert, Joerg Bohlmann, Niel Towers, Ragai Ibrahim

the advances (including the impact of genomics) that have been made in our understanding of the chemistry, biochemistry and molecular biology of the major secondary metabolites (terpenoids and phenolics) of tree species. The excellent presentations of Murray Isman and Robin Marles, respectively illustrated the continuing importance of tropical forests as a source of new chemical defenses to control the spread of damaging insects and boreal forests as a source of new botanical products based on the scientific evaluation of traditional foods and medicines. Murray pointed out how important natural pesticides are for developing countries that cannot afford the more expensive (but not necessarily better) products in the West.

The intimate relationship between Phytochemistry and Chemical Ecology was further cemented by the symposium talks of G. A. Wright, E. Plettner, H Mustaparta, K Raffa, C Tittiger. A clear, very well organized and detailed presentation was given by symposia speaker Erika Plettner from Simon Fraser University, on the mechanism of ligand recognition by the pheromone-binding proteins from the gypsy moth, while Hanna

Mustaparta from the Norwegian University of Science and Technology, showed us an in depth mapping of an insects' brain pattern upon pheromone perception which was quite fascinating! On the other hand, Peter Constabel from the University of Victoria, illustrated that there are still researchers out there who not only delve deeper into the details of how phytochemicals, particularly those found in the *Populus* genus, are synthesized by studying their regulation, but he also addresses the question of the biology of such compounds in the organism. It was also nice to see that Northern blots are still being done! Ken Raffa from

the University of Wisconsin illustrated how bark beetle populations fluctuate depending on the density of conifers which was a very elegant example of plant-insect interaction. He furthermore, correlated these fluctuations with the levels of terpenoids found within the conifers. On a related topic, Claus Tittiger from the University of Nevada presented quite remarkable work on how the bark beetle midgut's gene expression profiles varies based upon their diet. Robin J. Marles from Health Canada informed us that Canada's own forests conceal a treasure chest of natural products which can be further investigated in terms of their synthesis and regulation. One simply has to follow Neil Tower's footsteps and rather than travel to exotic places, interact and collaborate with Canada's Native people, and involve them in the research.

### Art Niesh Young Investigator Minisymposium

This year's Arthur Neish Young Investigator Minisymposium focused on wine grape and speaker Patrick Pollefeys from l'Université Laval, illustrated the genetic diversity existing among the French and American wine grape varieties by using microsatellite and RAPD markers, while Jihong Wang from Brock University, presented a very concise



Clint Chapple, Thor Arnason, Bernard Philogene



PSNA Grape Minisymposium Young Investigators, Patrick Pollefeys, Diane Martin, Jane Coventry, Jihong Wang, Debra Inglis



Peter Constabel, Mark Bernards

and clear picture of how methyl anthranilate, the specific aroma associated with Concord grape (*V. labrusca*), is made and also pointed out why the *Vitis vinifera* varieties lack this compound. Diane Martin from UBC described her initial studies of a few of the monoterpene synthases of wine grape and their developmental appearance during the early stages of grape development. Jane Coventry from the University of Guelph, demonstrated a very nice example of how field work can be conducted in order to understand the biology of wine grape, which can be something of a rarity these days. The minisymposium was followed by a tasting of Niagara wines (sponsored in part by Brock University and Brock's Cool Climate Oenology and Viticulture Institute) during the poster session in the evening, where Dr Debra Inglis provided a description to participants of some of the wines being highlighted. The wine tasting was pleasant and casual and produced animated, lively discussions around the 96 posters that covered a wide diversity of subjects in phytochemistry and chemical ecology.

### Other interesting talks

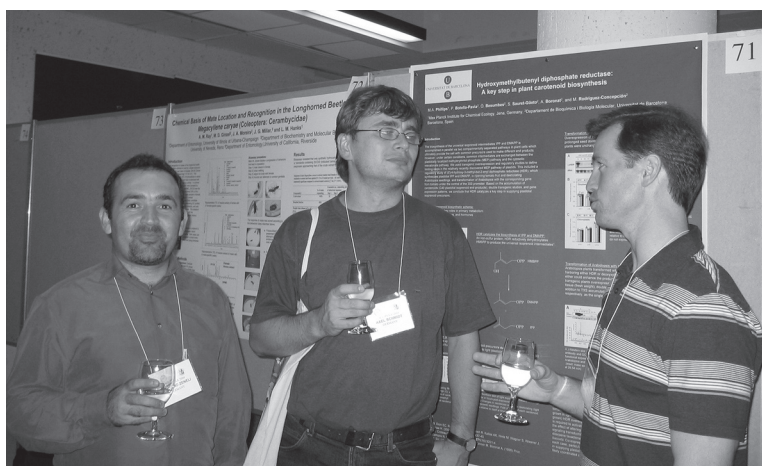
Rainer Jetter from UBC gave a very insightful presentation on the very-long-chain polyketides in the cuticular wax of *Taxus* needles where components in the cuticular wax in the adaxial and abaxial surfaces were composed of 2-alcohols and -diols, respectively. These different wax compositions were used to imply two different functions of the wax in adaxial surface which is exposed to UV radiation and abaxial surface which is under water stress because of the presence of guard cells. Interestingly, he also described an interesting method to harvest cuticular wax using rubber gum. David Gang from the University of Arizona described their ef-

forts to establish micropropagation protocol for ginger and turmeric in order to produce pathogen-free plant materials. In addition he reported on their efforts to produce EST libraries from various tissues in order to use these genomic tools to uncover the biosynthesis of useful metabolites in the rhizome including the exotic spices, gingerol and curcumin. Axel Schmidt from the Max Planck Institute of Chemical Ecology described their studies on the molecular regulation of induced chemical defences in Norway spruce. These studies showed that MeJa at a concentration of 100mM, can induce resistance on full-size trees against *ceratocystis polonica*. The effects MeJa on expression analysis also showed the many genes that respond to MeJa/pathogen and volatile profiling where they recognized many similarities in the defense responses of Norway spruce to those of many other herbaceous species.

### PSNA Business Meeting

Although none of the PSNA executives were able to make it to Ottawa for various reasons, including difficulties with crossing the US border, the business meeting was still held and was chaired by president-elect, Clint Chapple. The Ottawa meeting broke even financially thanks in part to the financial support received from the Canadian Forestry Service, PSNA, Simon Fraser University, University of Ottawa, Brock University, Brock's Cool Climate Oenology and Viticulture Institute and the Canadian Society of Apiarists. The finances of the society appear to be on a sound footing, although there appears to have been continued decline in the Society membership.

The meeting focused on a number of topics, important to the future of the Society. Since it was still not clear where the next PSNA meeting was to be held, this initiated a seri-



Norman Lewis, Laurence Davin Lewis, Thomas Hartmann



Joerg Bohlman and Norman's son



ous discussion about the sites of future meetings and the types of scientific topics that could attract a larger meeting attendance and re-establish the critical mass of membership required for a viable society. The close connection between the meetings to the annual publication of the *Recent Advances in Phytochemistry* was extensively discussed, with various positions being raised concerning changes to this tradition. While it was generally agreed that this might be a valuable and desirable publication, some members were encouraging changes that might increase the flexibility of the annual meetings to accommodate more student and young researcher participation. Issues of changes were raised since some reasoned that the continued serious erosion in the membership base was due to a certain amount of dissatisfaction that the society might be drifting away from its original roots and that it was not satisfying the needs of the chemistry component of the society. Others argued that the society should broaden its appeal to include primary metabolism, gear it to a younger audience and fill a gap in the growing need for a 'plant biochemistry society'. It remains that only a few appear to want to serve the present form of the PSNA and there is a growing fear that the society will soon become extinct without new ideas and involvement of a younger audience. With this, John Romeo reminded the membership that our contract for publishing the book was soon up and that after 10 years on the job he was soliciting the selection of his replacement if this tradition was to be continued.

These sobering thoughts for the business meeting were relayed back to the executive of the Society soon after the meeting in Ottawa. This set off a flurry of e-mails and discussions that hopefully, will set a new course for a dynamic and meaningful PSNA.

### **First Class Dining**

The evening was highlighted by wonderful food and by an inspired presentation by a phytochemistry pioneer, Neil Towers, who enlightened and inspired us with his presentation on the importance of natural products in human activities, through his ethnobotanical travels around the globe to discover



new compounds hidden in the history and cultural practices of various aboriginal societies. His presentation certainly inspired the younger generation of phytochemists, plant biochemists/molecular biologists and phyto/chemical ecologists of the enormous research tasks and opportunities that remain to be achieved, together with the opportunities this brings to bring human society together through this type of research.



### **Award Ceremonies**

The banquet dinner was followed by a series of awards where Jeremy MacNeil received the ISCE Silver medal for his achievements in chemical ecology, Jim Tumlinson received Silver Medal Award for career achievement in chemical ecology and Silverstein-Simeone lecture Award winner was John Carlson.



### **Travel Awards**

Several deserving individuals received awards to permit their travel to the meeting, (A.K.W. Hee (Malaysia-New Zealand); T. Nakayama (Japan); P.O.C. Olsson (Sweden); R.L. Genna (U.K.); D. Eliyahu (USA); M. Burow (Germany); R. Miller (Australia); T. Strand (USA); C. Liyanapathirana (Canada); N. Yoshinaga (Japan).



### **Best Poster Awards**

This year 2 best poster prizes were awarded to Ms Dawn Hall from the Biology Department at Brock University, St Catharines, Ontario and Mr. Jared M Fine from University of Minnesota who both received a \$500 award. Congratulations to both of them.





**Dawn Hall**

Although my favourite subjects in high school were math and the sciences I was unable to make a decision about which field to pursue in university. To resolve this problem I began university as an undeclared major taking primarily biology and chemistry courses. After my first two years I was asked to choose a major and consequently had to make an important decision. Biology had always been of great interest to me and I decided that this was a field I would like to pursue.

Within the first two weeks of my third year I knew that I had made the correct decision. One of the classes I was taking was a second year class about the evolution of plants. Although this course focused on the origin of seed plants it was sufficient to stimulate a deep interest in plants. The ability of plants to interact with their environment, protect themselves against insect and pathogen attack and endure a harsh winter, while remaining sedentary, was intriguing to me. The final two years of my undergraduate degree involved diversifying my knowledge of plants while studying photosynthesis, plant physiology, and plant-pathogen interactions. The production of diverse arrays of natural products by plants that contribute many physiological and biological processes through conserved biochemical pathways caught my attention.

For the past two years I have been pursuing a Master's degree, in the lab of Dr. Vincenzo De Luca at Brock University in St. Catharines, Ontario. Recently, I have decided to pursue a doctorate degree in this same lab. The focus on plant secondary metabolites at the cellular, biochemical and biological level allows me to investigate many of the steps that contribute to the production of vast arrays of secondary products. Anthocyanins are the plant secondary metabolites responsible for the blue, purple, red and orange pigmentation seen in many plants, including grape. The terminal steps of anthocyanin biosynthesis involve hydroxylation, methylation, acylation and glucosylation of the anthocyanin backbone which results in the modification of the colour and stability of these small molecules. The onset of veraison in grapes is characterized by increased accumulation of anthocyanin pigments resulting in a change in berry colour from green to red/blue between 8 to 10 wks after flowering. European *Vitis vinifera* (*V. vinifera*) and native North American grapes *Vitis labrusca* (*V. labrusca*) both contain monoglucosylated anthocyanins, whereas further 5-O-glucosylation produces the characteristic blue colour of Concord grapes (*V. labrusca*) used in juice making.

My project involves the molecular cloning and biochemical characterization of the enzyme UDP-glucose:anthocyanin 5-O-glucosyltransferase (5GT) responsible for glucosylation of the anthocyanin at the 5-O position. Crude enzyme extracts were prepared from post-veraison whole berry tissues of *V. labrusca* and *V. vinifera*. 5GT activity was only seen in *V. labrusca* crude extracts and further studies indicate that this activity is located within the grape skin. Molecular cloning of two putative full length 5GTs from *V. labrusca* post-veraison skin

display 31 to 59% identity to the previously characterized 5GTs from other species. Corresponding to the biochemical data, RT-PCR analysis indicates that 5GT transcripts are detected in post-veraison *V. labrusca* peel but not in *V. labrusca* flesh or post-veraison *V. vinifera* peel.

The next three years of my doctorate research will continue with the completion of the developmental, temporal and biochemical characterization of the 5GTs from *V. labrusca*. Of particular interest to me however is the development of a number of tools for cellular biology which will facilitate the localization of 5GT transcripts and protein to specific cell types within the peel. My interest in this pathway increases with every day that passes and each new result that I obtain and I look forward to many exciting developments in the upcoming years.



**Jared M Fine**

Jared is an active member of the ISCE who is presently doing his doctoral studies with Professor Peter Sorensen in the Department of Fisheries, Wildlife and Conservation Biology at the University of Minnesota. The focus of his research interests and specialization is the biology of the sea lamprey (*Petromyzon marinus*). This organism shares its life cycle between the adult stage spent in the ocean and a return of the adult in freshwater streams in order to spawn. The poster presentation focused on the bioassay guided fractionation (HPLC fractionation, olfactory recording, behavioral assays, and mass spectrometry) that identified at least 3 sulphated steroids as the sea lamprey migratory pheromone.

**Proposed Schedule for  
2005 PSNA Annual Meeting  
Integrative Plant Biochemistry  
as We Approach 2010!**

**Saturday, July 30th**

Registration – 3:00 PM – 8 PM  
Evening Mixer – 6:30 – 9:30 PM

**Sunday, July 31st**

Session I – Metabolic Networks  
8:30 AM - 9:10 AM  
Wout Boerjan – Phenylpropanoid  
metabolism  
9:10 AM - 9:30 AM  
Short Talk from Submitted Ab-  
stracts  
9:30 AM - 10:10 AM  
Dan Bush / Gloria Coruzzi – Nitro-  
gen Metabolism  
10:10 AM - 10:30 AM Break  
10:30 AM - 11:10 AM Natalia  
Dudareva – Plant Volatiles  
11:10 AM - 11:30 AM Short Talk  
from Submitted Abstracts

11:30 AM - 2:00 PM Lunch

Session II – Temporal and Spatial  
Regulation of Metabolism  
2:00 PM - 2:40 PM  
Peter Facchini – Cellular and Sub-  
cellular Compartmentalization  
2:40 PM - 3:00 PM  
Short Talk from Submitted Ab-  
stracts  
3:00 PM - 3:20 PM  
Break  
3:20 PM - 4:00 PM  
Brenda Winkel-Shirley – Probing  
Higher Order Complexes  
4:00 PM - 4:20 PM  
Short Talk from Submitted Ab-  
stracts  
4:20 PM - 5:00 PM Jon Page  
– Hops, trichomes and prenylated  
flavonoids

6:00 PM - 7:30 PM Dinner

7:30 PM - 10:00 PM  
Poster Session / Wine-Beer-Cheese  
Mixer

**Monday, August 1**

Session III – Biosynthesis and  
Regulation of Signaling Molecules  
8:30 AM - 9:10 AM  
Yunde Zhao – Auxin Homeostasis  
9:10 AM - 9:30 AM  
Mary Wildermuth – Salicylate Bio-  
synthesis (Short Talk)  
9:30 AM - 10:10 AM  
David Nes – phytosterol methyla-  
tion  
10:10 AM - 10:30 AM Break  
10:30 AM - 11:10 AM Eran  
Pichersky – Methylation as a new  
regulatory mechanism?  
11:10 AM - 11:30 AM Michele  
Auldridge – Carotenoid Cleavage  
Dioxygenases (Short Talk)

11:30 AM - 2:00 PM Lunch

Session IV – Translational Opportu-  
nities in Plant Biochemistry (Chap-  
pell Chair)  
2:00 PM - 2:30 PM I. Kang – Natu-  
ral Product Repository  
2:30 PM - 3:00 PM  
Sequoia – Microprobe NMR Meth-  
odology  
3:00 PM - 3:30 PM  
Break  
3:30 PM - 4:00 PM  
Sekhar Boddupalli – Galileo Phar-  
maceuticals – Harvesting Phyto-  
chemical Diversity  
4:00 PM - 4:30 PM  
Dean DellaPenna – Translational  
Research and Human Health  
4:30 PM - 5:00 PM  
Sigma (Chappell Contact)

6:00 PM - 7:30 PM Dinner

7:30 PM - 10:00 PM  
Poster Session / Wine-Beer-Cheese  
Mixer

**Tuesday, August 2**

Session V – Conservation and Di-  
vergence in Enzyme Function  
8:30 AM - 9:10 AM  
Joerg Degenhardt – Allelic Varia-  
tion in Terpene Synthases  
9:10 AM - 9:30 AM Sarah  
O'Connor – MIT – Alkaloid Bio-  
synthesis (Short Talk)  
9:30 AM - 10:10 AM  
Chang-Jun Liu – Noble/Salk  
– Functional Divergence in O-  
Methyltransferases  
10:10 AM - 10:30 AM Break  
10:30 AM - 11:10 AM Eyal Fried-  
man – Esterases and Methylketone  
biosynthesis  
11:10 AM - 11:30 AM Short Talk  
from Submitted Abstracts

11:30 AM - 6:30 PM Open - Boxed  
Lunch To Go  
Possible Structural Modeling Work-  
shop In 3D  
Visit (Zoo, Quail Botanical Gar-  
dens, Beach Barbeque)

6:30 PM - 10:00 PM Banquet  
and After Dinner Speaker

**Wednesday, August 3**

Session VI – Lipids, Fatty Acids  
and Related Molecules  
8:30 AM - 9:10 AM  
Basil Nikolau – Cuticular Waxes  
– Lipid Metabolism  
9:10 AM - 9:30 AM  
David Schultz - Anacardic Acids  
(Short Talk)  
9:30 AM - 10:10 AM  
Christoph Benning - Sulfolipids  
10:10 AM - 10:30 AM Break  
10:30 AM - 10:50 AM Short Talk  
from Submitted Abstracts

11:30 AM Lunch and Departure

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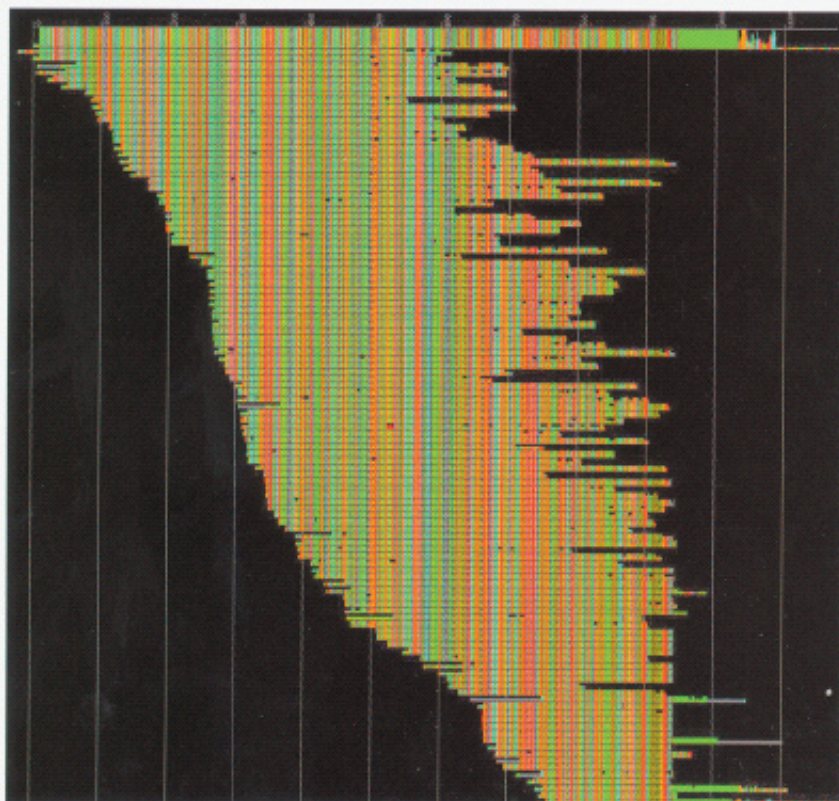
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recent advances in phytochemistry – volume 38

# Secondary Metabolism in Model Systems

J.T. Romeo



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