



# PSNA News

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

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Spring 2022

## Message from Dorothea Tholl, PSNA President



Dear Colleagues and Friends of the PSNA,

While I am writing this message, we are only two and a half months away from our first in person meeting since the summer of 2019. Given what we have been through in the past years, it seems like a long time ago. Following an excellent virtual conference hosted by Soheil Mahmoud and his colleagues at UBC Okanagan Campus last year, we look forward to meeting many of you face to face. At the same time, we recognize that the virus

has not yet disappeared and travel, especially by international attendees, remains a challenge. Therefore, the upcoming meeting will offer a virtual option for presenting your research and joining all symposia talks.

Co-chair Brenda Winkel (Biological Sciences, Virginia Tech) and I are excited about hosting the PSNA meeting for the first time on the Virginia Tech campus. We have a lineup of excellent speakers and are grateful for the generous support from many Virginia Tech units and departments, The Plant Journal, and our company sponsors. We are particularly pleased of having received grant support from the US National Science Foundation and Department of Agriculture, which allows us to offer ten postdoctoral and 16 student fellowships for attending the meeting. This is a great opportunity for early career phytochemists of diverse backgrounds to share their exciting research and meet many members of our society. The upcoming meeting offers many more possibilities for networking at the Women's breakfast, the Early Career

and Student Workshops and simply by taking some time off to tour the Virginia Tech campus, go on a hike, or enjoy other fun activities.

Another piece of good news I would like to share is the near completion of our new PSNA website. Below is a sneak peek of the new homepage. The new website will improve service to our members in several ways; for example, by joining the society and renewing your membership via the electronic web portal, by finding members with similar research interests, featuring your research via short videos, browsing the latest papers in Phytochemistry Reviews and PSNA member-led special issues of Frontiers in Plant Sciences, learning about upcoming meetings, getting to know our recent award winners, and applying for awards and fellowships yourself. With this improved service we look forward to welcoming new members to the PSNA from North America and beyond.

While my time as president will soon come to a close, I am more than happy to welcome Li Tian (UC Davis) Continues on page ... 3



In this issue:

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- Website Updates
- PSNA Election
- Publication Highlights

The web PDF version can be downloaded from the website: [www.psna-online.org](http://www.psna-online.org).

PSNA News  
Fall 2021



WWW.PSNA-ONLINE.ORG



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The Advisory Board includes Past  
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## 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. \$60 for regular members and \$30 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!

## PSNA EXECUTIVES

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as our incoming president. I am certain that our society will greatly benefit from Li's experience and keep growing its diverse membership under her helm. Lastly, this newsletter features our candidate for the next president elect, Dharendra Kumar

(East Tennessee State University), who has tirelessly supported the PSNA for many years including as its former treasurer and conference organizer. We are grateful for Dharendra's long standing dedication to our society. Please do not forget to cast your vote!

I hope you enjoy the start of the summer and look forward to welcoming many of you in Blacksburg!

Be well!

Dorothea Tholl, PSNA President



## 61st Annual Meeting of the Phytochemical Society of North America

The 61st annual meeting of the Phytochemical Society of North America (PSNA) will be held at the Inn at Virginia Tech and Skelton Conference Center on July 24-28, 2022. This long-standing conference brings together researchers with interest in the chemistry and biochemistry of plant natural products, their effects on plant and animal physiology and pathology, and their agricultural, pharmacological, and industrial utilization.

We are excited to announce that the PSNA 2022 will be held in-person, with a virtual option available for those unable to travel to Blacksburg. Covid-related updates will be made depending on further developments.

### Plenary talk: Dr. Jonathan Gershenzon

Dr. Gershenzon is a world-renowned scientist in the field of phytochemistry and plant chemical ecology. His research uses biochemical, genomic,



and ecological approaches to uncover the functions of plant chemical compounds in interactions with herbivores and gain insights in the evolution of plant-herbivore relationships.

Website: [www.mpg.de/382600/chemical-ecology-gershenzon](http://www.mpg.de/382600/chemical-ecology-gershenzon)

### Symposiums and keynote speakers

**SYMPOSIUM I:** Phytochemical/specialized metabolism: Gene discovery, evolution and regulation- Dr. Bjoern Hamberger, Assistant Professor, Michigan State University

**SYMPOSIUM II:** Emerging approaches and applications – Dr. Aleksandra Skirycz, Assistant Professor Boyce Thompson Institute, Cornell University

**SYMPOSIUM III:** Phytochemistry at the junction of “primary” and “secondary” metabolism - Dr. Hiroshi Maeda, Associate Professor, University of Wisconsin

**SYMPOSIUM IV:** Synthetic biology and metabolic engineering - Dr. Alison Smith, University of Cambridge, UK

**SYMPOSIUM V:** Phytochemical signaling (including growth regulation) – Dr. Gloria Muday, Wake Forest University

**SYMPOSIUM VI:** Phytochemical diversity in plant-organismal interactions - Dr. Diego Salazar Amoretti, Assistant Professor, Florida International University

SYMPOSIUM VII: Phytochemistry in a changing environment - Dr. Tom Sharkey, Michigan State University

SYMPOSIUM VIII: Phytochemistry of functional foods and bioactive natural compounds - Dr. Jessica Cooperstone, Assistant Professor, Ohio State University

SYMPOSIUM IX: Beyond plants: Specialized metabolism in microbes and animals - Dr. Paolina Garbeva, Netherlands Institute of Ecology

The conference also includes a special breakfast event for female attendees on the second day of the program. This event encourages networking, mentoring, and collegiality among junior and senior female scientists.

Additionally, two panel-guided workshops for early career scientists and graduate students will be organized by the PSNA Young Members Committee and facilitate a discussion on career development in academia, government, and industry.

### Deadlines:

Registration: Early-bird June 13, 2022; Regular- July 11, 2022

Abstract submission: May 30, 2022  
For more information please visit <https://www.cpe.vt.edu/psna/index.html>



## PSNA Election 2022

The PSNA holds an election each year for a new President-Elect, who will hold a three-year term as President-Elect, President, and Past-President. The nomination committee is made up of the PSNA Advisory Committee, which seeks candidates that have a demonstrated commitment to the organization and who would be willing to actively carry out the duties and obligations of running the PSNA. This year the nominating committee has selected a single candidate for president, **Dr. Dharendra Kumar**, East Tennessee State University, who has an outstanding record of participation in the PSNA, and who will be running against any write-in PSNA member candidates that the electorate would provide. The election opens on June 24th and will be open to July 8th. All active members should receive an invitation to vote! Please participate and show your support for the ongoing efforts of the PSNA!



### Dr. Dharendra Kumar – candidate for the President of the PSNA

Dear Colleagues,

I am honored to be nominated for the post of president of the Phytochemical Society of North America. Currently, I am a professor and interim chairman of the Department of Bio-

logical Sciences at the East Tennessee State University, Johnson City TN, USA. After receiving my Ph.D. degree in 1998 from the International Center for Genetic Engineering and Biotechnology (ICGEB), India, I joined Dr. Daniel Klessig's research group at the Waksman Institute, Rutgers University, and the Boyce Thompson Institute for Plant Research, Ithaca, NY. In 2005, I joined East Tennessee State University as a tenure-track assistant professor, was tenured and promoted to associate professor in 2011, and became a professor in 2017. Research in my laboratory involves the characterization of the salicylic acid-mediated defense signaling pathway. At ETSU, I teach Biochemistry of Metabolism, Plant Physiology & Development, Functional Genomics & Bioinformatics, and graduate seminar courses.

In 2012, I became a member of the PSNA for the first time and since then I have attended every annual meeting. In 2015, I was elected as the treasurer of the PSNA and I continued to do so until 2021. Besides being the Treasurer for the PSNA, I have also served as a member of the PSNA meeting scientific organizing committee in 2015, and 2016. In 2019, I with Dr. Cecilia McIntosh successfully co-organized the 58th Annual meeting of the PSNA in Johnson City, TN, USA.

As you are aware, in 2020 due to the pandemic, the in-person annual meeting could not be held but to the credit of several PSNA members, a twitter-based online meeting was organized. The idea was that students must be provided with a platform to share their research and the year 2020 cannot go without such an option. In 2021, a full-scale virtual meeting was successfully organized by Dr. Soheil Mahmoud, University of British Columbia, Kelowna,

BC, Canada. This provided an opportunity to explore another mode of organizing a conference, i.e. fully virtual. For the 2022 annual meeting in Blacksburg, VA, USA, the organizers are holding a hybrid meeting i.e. both in-person and an online option for those who cannot travel. To increase participation by students and postdocs, the organizers of the 2022 meeting have made special efforts to provide scholarships to both students and postdocs. I am making all these points to convey to you that PSNA cares for all its members, especially students and postdocs and it is eager and ready to meet any challenges.

As a member of the society, I will continue to work in any capacity to help PSNA grow. Please consider coming to the Blacksburg, VA meeting this July 24-28, 2022. Drs. Dorothea Tholl and Brenda Winkel have put together an excellent and exciting scientific program. I am eager to meet you in person at the meeting this July.

Thank you

Dhirendra Kumar, Ph.D.  
Past PSNA treasurer

## Your Publication Highlights in the PSNA Newsletter

The PSNA newsletter (also shared on Twitter and Facebook) highlights your recent publications and features first authors that are current PSNA members. Interested? Then, please send us a brief non-technical summary of your paper including the title and authors, and a publication link and graphical abstract or image, if possible. In addition, provide a photo and a brief statement including the first author's affiliation and research interests.

## New look of PSNA on the web

PSNA is excited to announce that it is going to have a new look soon. See the snapshot below.

Please send your contributions (text as word document; images as pdf or jpg files) by email to

Dorothea Tholl (tholl@vt.edu)  
or Armando Alcazar Magana (alcazara@oregonstate.edu).

We look forward to hearing from you!

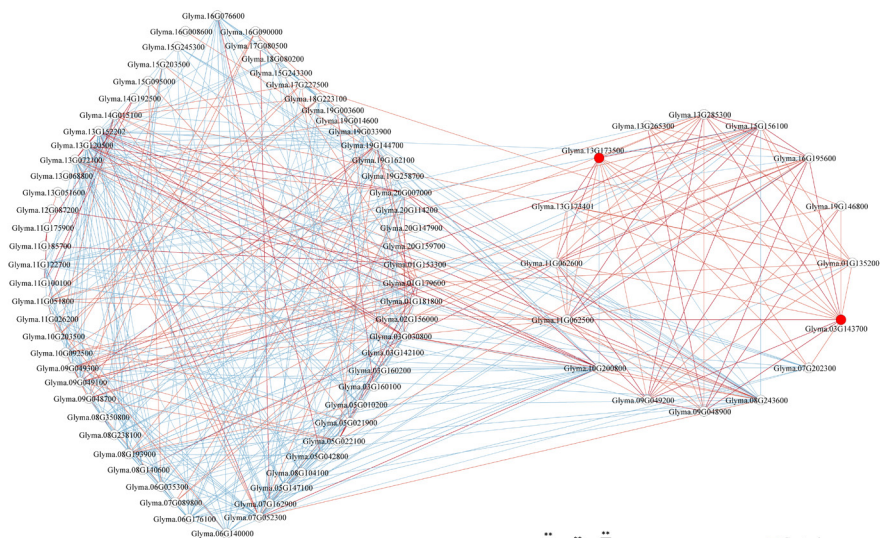
Dorothea Tholl (PSNA President)

Armando Alcazar Magana (Chair, PSNA Young Members Committee)

## Publication Highlights

**Praveen Khatri**

I am a Ph.D. student in the Department of Biology at Western University, London, ON Canada under the mentorship of Dr. Sangeeta Dhaubhadel, Agriculture and Agri-Food Canada, London, ON. My research goal is to understand the isoflavonoid biosynthesis in soybean for resistance against pests and diseases. I focus on Cytochrome P450 monooxygenases (P450s), represent-



ing one of the largest plant protein families. Through numerous biosynthetic and detoxification pathways, P450s contribute to plant growth and development and participate in the synthesis of sterols, hormones, fatty acids, pigments, signaling molecules, structural polymers, phytoalexins, and phenylpropanoids.

*Phytophthora sojae* is a destructive pathogen of soybean that causes losses of billions of dollars all over the world. Multiple biosynthetic pathways in plants are activated in response to *P. sojae* infection which helps to stabilize the plant under pathogen stress, inhibit pathogen growth, synthesize physical barrier molecules, and specialized metabolites that act as antimicrobial compounds. A holistic study of P450s upon *P. sojae* infection can provide insight into how soybean cultivars CYPomes respond toward pathogen invasion. Therefore, we used omics approaches to identify induced P450s upon *P. sojae* infection. Through QTL and transcriptome analyses we identified 21 P450s involved in the biosynthesis of phenylpropanoids, jasmonic acid, ethylene signaling, flavonoids, and terpenoids. Our study highlights a comprehensive analysis of 346 P450s in soybean, their five conserved motif patterns present across different families, and the gene structure that is maintained



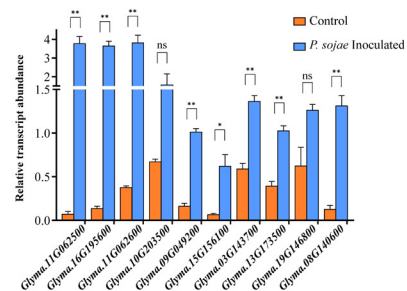
across different P450 families. We also demonstrate for the first time that the length of the variable region between two conserved motifs in soybean P450s remains the same, and discuss its relationship with protein function.

Khatri, P., Wally, O., Rajcan, I., and Dhaubhadel, S. 2022. Comprehensive analysis of cytochrome p450 monooxygenases reveals insight into their role in partial resistance against *Phytophthora sojae* in soybean.

Frontiers in Plant Science. 13. 906. <https://doi.org/10.3389/fpls.2022.862314> (Research topic: Specialized Metabolism in Legume Species - Defense and Medicinal Compounds)

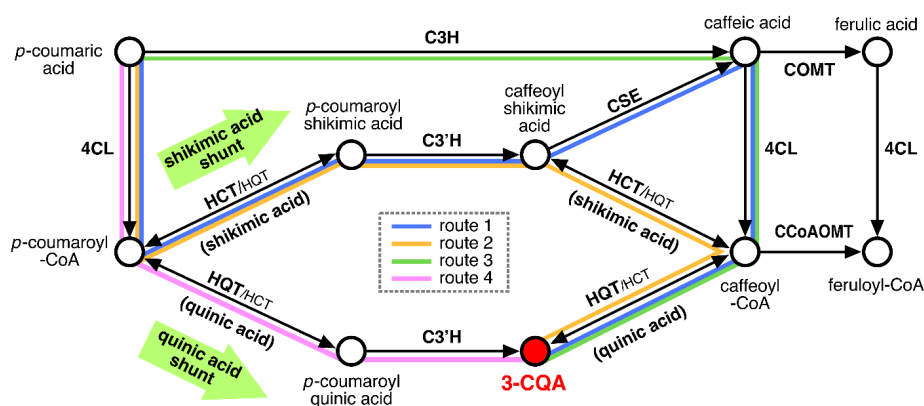
### Armando Alcázar

Armando is a researcher and metabolomics project manager at The University of British Columbia, campus Vancouver. He earned his PhD in an international collaboration including Guanajuato University, Mex; Nagaoka University, Japan and Sid-



ney University, Australia. Then he was a postdoctoral fellow at Oregon State University's Mass Spectrometry Center and The Linus Pauling Institute under the mentoring of Professors Claudia Maier and Fred Stevens. His research focuses on the development of analytical methods for in-depth chemical characterization of biological and clinical samples, using mass spectrometry in conjunction with separation and enrichment





techniques. In 2020, Armando received the Early Career Award Issued by The Plant Journal and The Phytochemical Society of North America. In 2019, Armando was honored to serve as PSNA's Chair of the Young Members Committee. Email: [armando.alcazarmagana@ubc.ca](mailto:armando.alcazarmagana@ubc.ca)

Caffeoylquinic acids: chemistry, biosynthesis, occurrence, analytical challenges, and bioactivity

Caffeoylquinic acids (CQAs) are specialized plant metabolites we encounter in our daily life. Humans consume CQAs in mg-to-gram quantities through dietary consumption of plant products. CQAs are considered beneficial for human health, mainly due to their anti-inflammatory and antioxidant properties. Biotransformation of CQAs by gut microbiota, the discovery of new enzymatic biosynthetic and metabolic pathways, dietary assessment, and assessment of biological properties with potential for drug development are areas of active, ongoing research. Recently, new biosynthetic pathways via a peroxidase-type p-coumaric acid 3-hydroxylase enzyme were discovered.

Armando Alcázar Magana, Naofumi Kamimura, Amala Soumyanath, Jan F. Stevens, and Claudia S. Maier. 2021. *The Plant Journal* 107,1299–1319. doi: <https://doi.org/10.1111/tpj.15390>

## An Appreciation from Mehran Dastmalchi:

Recipient of the 2020 PSNA-TPJ Early Career Award- "Return to the fold"

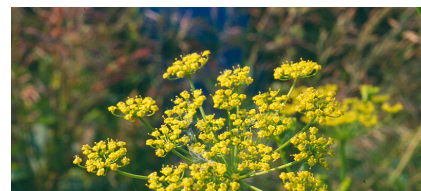


In 2020, I was among the first cohort to win the PSNA-TPJ early career award, along with Armando Alcazar-Magana and Lucas Busta. In the Fall of that year, I started my lab in the Department of Plant Science at McGill University. Receiving this award has undoubtedly helped ease the transition into the role of a principal investigator in more ways than one.

Firstly, it is a recognizable badge of merit that goes far when, for example, funding applications are reviewed, having been bestowed by a community of phytochemists and a respected journal. Secondly, it affords the chance for a relative newcomer to write in the aforementioned journal and compose a syn-

opsis of their work and thoughts on the field – a roadmap, perhaps, for their future contributions. I chose to write my focused review on the “auxiliary proteins guiding metabolic flux in flavonoid biosynthesis.” These elusive partners, in my estimation, are one of the missing and hard-to-pin-down components of plant metabolism. While the catalytically active enzymes are relatively easier to identify and characterize, the proteins involved in chaperoning, scaffolding, and regulating the flow of intermediates are harder to determine but worthwhile in terms of their role in the biosynthetic chassis. Unfortunately, there is no silver bullet in tracking these molecular features, and we have to contend with large families and a great deal of functional redundancy. In the review, I discussed a few examples of auxiliary proteins that have been discovered in flavonoid biosynthesis.

Thirdly, in the list of virtues of such an award, and perhaps more subtle, is the immediate camaraderie that develops amongst recipients. There have been Slack channels set up amongst the junior faculty that call the PSNA their societal home, and sharing of notes on how to start a lab, where to buy everything from tips to deli fridges – darn that supply chain! So I feel naturally obliged and doubly looking forward to re-engagement with the Society. Top on the list would be to meet everyone this summer in Blacksburg, VA, as we collectively heave a sigh of relief (into our masks) at being healthy and in situ. It will be my first in-person conference after the long haul of this pandemic, and I will be happy to share it with my PSNA colleagues. À bientôt!



# The Plant Journal- PSNA Early Career Awards

**Tentative Deadline for application for 2023:** March 15th

**Amount of the award:** \$1000/per

Numbers of awards to be given each year: up to three awards (The number of awards will depend on the availability of funds).

Any unused funds will be used for the following year's award.

### **Eligibility:**

This award is for postdocs and research scientists in academic, research institute, or government labs. Preference will be given to early career individuals who are ready to start an independent position; but, applications from mid-career scientists who are not principle investigators will also be considered.

The applicant should have at least 3-4 peer-reviewed papers (at least 5 for mid-career scientists) published as first author preferably in the field of phytochemistry or a related area.

The applicant should apply for PSNA membership at the time of application for this award.

The applicant should not have received an award from PSNA in the same category.

The awardee will not be eligible for any other conference related PSNA awards in the year the award is made.

### **Application package:**

Applicants will apply directly (no nomination) and provide the following information with their application package.

Evidence of membership of the PSNA at the time of application

The number of PSNA meetings previously attended

Copy of relevant publications

Letter of support from the postdoc/research scientist advisor/s

Abstract of the oral presentation

The potential topic for the invited review

Research Statement (limit three pages) describing their significant contributions to date, future goal, and perspective on phytochemical research

### **Expectations from the awardee:**

The applicant must give an oral presentation (30 min) at the annual PSNA meeting.

The awardee should acknowledge the support of sponsors of the award in their talks.

The *Plant Journal* will extend an invitation to the awardee and their supervisor to contribute a TPJ Focused Review for publication.

### **The outcome of the application:**

The PSNA awards committee will be responsible for all the decisions related to the awards.

All applicants will be notified about the outcome of their application.



# PSNA Newsletters Back Issue Catalog

Dr. John Romeo, a Past PSNA President and a Life Time Member of the PSNA, sent his collection of back issues of the *PSNA Newsletter* dating back to 1976 to the current editor. These have now been scanned to PDF digital format and have recently been posted on the PSNA website. This expands our collection of back issues that had only gone back to 2000 or so. This is a unique collection that catalogs the events and proceedings of the PSNA meetings as well as providing some interesting articles on the state of phytochemical research over the years. If you get a chance go to the PSNA website and click the publications link, download some of the newsletter sets and enjoy!

### **Membership Committee**

Philipp Zerbe (Chair)

Daniel Owens (member)

### **Young Members Committee**

Armando Alcazar (Chair, UBC)

Lucas Busta (member, University of Minnesota Duluth)

Monica Borghi (member, Utah State University)

Praveen Khatri (member, Western University, London, ON)

Anh Nguyen (UBC, CA)

### **Awards & Recognition Committee**

Björn Hamberger (Chair)

Argelia Lorence (member)

Deyu Xie (member)

Aruna Kilaru (member)

Hiroshi Maeda (member)

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Sangeeta Dhaubhadel (Sangeeta.dhaubhadel@agr.gc.ca)

Nikola Kovinich (kovinich@yorku.ca)



## Current PSNA Executive Committee Members

President: Dorothea Tholl



Research interests: My research group investigates the metabolism, function, and biosynthetic evolution of plant and animal specialized metabolites (primarily volatile terpenes) in intra- and inter-specific interactions. Applied aspects of our research include determining the metabolism and function of volatile aroma compounds and defense metabolites in root crops and engineering insect pheromones in plants for developing novel pest management strategies.

President Elect: Li Tian



Research interest: My research group is interested in understanding how phytonutrients (e.g. phenolics) are made in plants using molecular, genetic, and biochemical tools. We also examine how accumulation of

phytonutrients in plants is controlled by different factors under various environmental conditions. Our long-term goal is to apply the knowledge obtained from these investigations to improve the nutritional value and agronomic performance of crop plants.

Past President: Argelia Lorence



Research interests: Vitamin C metabolism, redox biology, phenomics, crop resilience to abiotic stresses, equity diversity and inclusion in STEM

Secretary: Sangeeta Dhaubhadel



Research interests: Seed quality and defense-related traits in legume crops such as soybean, pea and common bean. Our research goal is to understand the molecular mechanisms underlying the synthesis of specialized metabolites involved in those traits and identify the regulators that control the synthesis/accumulation of these beneficial compounds in legumes.

Treasurer: Philipp Zerbe



Research interests: functional genomics, metabolomics, biochemical and genetic approaches to investigate the biosynthesis, regulation and function of specialized terpenoid metabolites in bioenergy, food and medicinal plants with the goal to develop resources for crop optimization and natural product engineering.

Editor-in-Chief, Phytochemistry Reviews: Reinhard Jetter



Research interests: Reinhard Jetter's research group is studying the surface waxes of various model plants and crops, spanning a wide range of metabolites from fatty acid derivatives to terpenoids, phenolics and polyketides. Current projects focus on the chemical analysis of the complex wax mixtures and the characterization of key enzymes involved in their formation.



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

## 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@gmail.com](mailto:psnatreasurer@gmail.com). Please make check or money order payable to the Phytochemical Society of North America.

Credit Card Payment: Paying membership dues online via credit card has now been established. Please select the link from the PSNA homepage to pay by credit card. A paypal account is NOT required but will expedite the process. If using a paypal account, send directly to [psnatreasurer@gmail.com](mailto:psnatreasurer@gmail.com)

Advance Payment: It is now possible to pay dues in advance. If you wish to take advantage of this feature, please indicate above the years for which you would like to pay in advance.

Dues schedule:                      Regular member - \$60.00 per year  
                                                 Student member - \$30.00 per year

Return this statement along with your payment to:

Philip Zerbe, Ph.D.  
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College of Biological Sciences  
University of California, Davis  
605 Hutchison Drive, Davis, CA 95616  
Phone: 530-754-9652  
[pzerbe@ucdavis.edu](mailto:pzerbe@ucdavis.edu)

Name (Dr., Mr., Mrs., Ms.):

Mailing Address: Line 1:

Line 2:

City: State/Province: Zip/Postal Code:

Phone: Fax:

E-Mail: