



# Meeting Program

*All times are in North America Pacific Time (Vancouver / San Francisco / Tijuana)*

## **AGENDA SUMMARY**

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|---------------------|---|
| July 25 (Sunday)    | Opening/plenary session   |
| July 26 (Monday)    | Symposium 1: New advances in integrated <i>omics</i> and phytochemistry research<br>PSNA Member's Meeting<br>Symposium 2: Chemistry and biochemistry of therapeutic plants            |
| July 27 (Tuesday)   | Symposium 3: Chemical ecology<br>Early Career Researcher Workshop<br>Symposium 4: Natural products discovery, synthesis, and biosynthesis in the <i>omics</i> era<br>Poster session 1 |
| July 28 (Wednesday) | Symposium 5: Breakthrough approaches in elucidating phytochemical biosynthesis<br>PSNA's Young Members Trivia Game<br>Symposium 6: Evolution of plant specialized metabolism          |
| July 29 (Thursday)  | Symposium 7: Enzymology and organization of plant metabolism<br>Symposium 8: Phytochemistry of the forest, the far north, and underutilized plants<br>Poster session 2                |
| July 30 (Friday)    | Symposium 9: Biochemistry and production of high-value phytochemicals<br>Symposium 10: Synthetic biology and metabolic engineering of plant metabolism<br>Closing                     |

## JULY 25 (SUNDAY)

<b>July 25 (Sunday)</b> <b>Afternoon</b>	<b>Opening/plenary session</b> <b>Chair: Soheil Mahmoud</b> ( <i>University of British Columbia, Canada</i> )
15:00–15:30	<b>1. Soheil Mahmoud</b> – Chair, PSNA 2021 Local Organization Committee <b>2. Philip Barker</b> – Associate Vice-President & Vice-Principal, Research, UBC <b>3. Argelia Lorence</b> – President, Phytochemical Society of North America
15:30–16:45	<b>Plenary speaker: Natalia Dudareva</b> ( <i>Purdue University, USA</i> ) Plant volatile emission: Beyond the traditional view

## JULY 26 (MONDAY)

<b>July 26 (Monday)</b> <b>Morning</b>	<b>Symposium 1: New advances in integrated omics and phytochemistry research</b> <b>Chair: Dorothea Tholl</b> ( <i>Virginia Polytechnic Institute and State University, USA</i> )
9:00–9:50	<b>Keynote speaker: Lloyd Sumner</b> ( <i>University of Missouri, Columbia, USA</i> ) Advances in phytochemistry achieved through integrated metabolomics
9:50–10:00	[short break]
10:00–10:25	<b>Benjamin Lichman</b> ( <i>University of York, UK</i> ) Omics approaches to unravel complex alkaloid biosynthesis in <i>Daphniphyllum</i>
10:25–10:50	<b>Gerald F. Schneider</b> ( <i>Utah State University, USA</i> ) Comparative metabolomics of fruits and leaves in a hyper diverse lineage suggests fruits are a key incubator of phytochemical diversification
10:50–11:00	[short break]
11:00–11:25	<b>Evangelos Tatsis</b> ( <i>Center for Excellence in Molecular Plant Sciences, China</i> ) The genome of medicinal plant <i>Scutellaria barbata</i> and the evolution of clerodane pathway
11:25–11:30	<b>Lovely Mae F. Lawas</b> ( <i>Auburn University, USA</i> ) <u>Flash talk</u> : Unravelling iridoid production in blueberry: using omics to investigate plant natural products for human health
11:30–11:35	<b>Radin Sadre</b> ( <i>Michigan State University, USA</i> ) <u>Flash talk</u> : The beautiful lady's secret: Untargeted metabolomics uncovers the roles of cytochromes P450 in a pseudotropine-dependent branch of modified tropane alkaloid biosynthesis
11:35–11:40	<b>Jeffrey Simpson</b> ( <i>Purdue University, USA</i> ) <u>Flash talk</u> : Application of genome wide association in <i>Arabidopsis</i> leads to the functional classification of a new BAHD acyltransferase

<b>July 26 (Monday)</b> <b>Noon</b>	<b>Phytochemical Society of North America's Member's Meeting</b>
12:00–13:00	<b>PSNA Member's Meeting</b> (open to all)

<b>July 26 (Monday)</b> <b>Afternoon</b>	<b>Symposium 2: Chemistry and biochemistry of therapeutic plants</b> <b>Chair: Susan Murch</b> ( <i>University of British Columbia, Canada</i> )
13:30–14:20	<b>Keynote speaker: Paula N. Brown</b> ( <i>British Columbia Institute of Technology, Canada</i> ) Green machine or tropical breeze: What's in a name when talking cannabis chemistry & research
14:20–14:30	[short break]

- 14:30–14:55 **Peyman Azhdary** (*University of British Columbia, Canada*)  
Application of molecularly imprinted polymers as recognition elements in a liquid-phase electrochemical sensor for selective detection of a psychoactive substance,  $\Delta^9$ -tetrahydrocannabinol (THC)
- 14:55–15:20 **Sandra Irmisch** (*University of British Columbia, Canada*)  
A novel anti-diabetic compound from plants: Biosynthesis, gene discovery, and metabolic engineering of montbretin A
- 15:20–15:30 **[short break]**
- 15:30–15:55 **Adam Clapp** (*California State University, Sacramento, USA*)  
Elucidating the Taxol biosynthetic pathway and engineering taxadiene synthase for improved product specificity
- 15:55–16:00 **Eszter Sas** (*University of Montreal, Canada*)  
Flash talk: Untargeted metabolite assessment reveals biorefinery opportunities from wastewater treatment using willow phytoremediation
- 16:00–16:05 **Rocio Esmeralda Hernández-Rubio** (*Universidad Autónoma de San Luis Potosí, Mexico*)  
Flash talk: *Alternanthera flava* prevents acute liver damage induced by CCl<sub>4</sub> in rat
- 16:05–16:10 **Alison Edge** (*Brock University, Canada*)  
Flash talk: Completion of the vindoline and catharanthine pathways in *Catharanthus roseus* facilitates characterization of MIA pathways in *Ochrosia elliptica*

## JULY 27 (TUESDAY)

July 27 (Tuesday)	
Morning	Symposium 3: Chemical ecology
Chair: Dharendra Kumar ( <i>East Tennessee State University, USA</i> )	
9:00–9:50	<b>Keynote speaker: Reuben J. Peters</b> ( <i>Iowa State University, USA</i> ) Digging into rice diterpenoid biosynthesis
9:50–10:00	<b>[short break]</b>
10:00–10:25	<b>Arthur Neish Award recipient: Heejin Yoo</b> ( <i>Oklahoma State University, USA</i> ) Uncovering regulatory mechanisms of salicylic acid biosynthesis for plant immunity in <i>Arabidopsis</i> and Brassicaceae oilseed crops
10:25–10:50	<b>Dorothea Tholl</b> ( <i>Virginia Polytechnic Institute and State University, USA</i> ) Above and belowground dynamics of terpene volatiles in switchgrass
10:50–11:00	<b>[short break]</b>
11:00–11:25	<b>John Jelesko</b> ( <i>Virginia Polytechnic Institute and State University, USA</i> ) The enigmatic nature of poison ivy urushiol chemical ecology
11:25–11:30	<b>Abraham J. Koo</b> ( <i>University of Missouri, Columbia, USA</i> ) <u>Flash talk</u> : Differential regulation of the ribosomal association of mRNA transcripts in an <i>Arabidopsis</i> mutant defective in jasmonate-dependent wound response
11:30–11:35	<b>Jacob Walsh</b> ( <i>University of Western Ontario, Canada</i> ) <u>Flash talk</u> : Synthesis of deoxynivalenol metabolites for use as analytical standards
July 27 (Tuesday)	
Noon	Early Career Researcher Workshop with Monica Borghi, Ellaine De Guzman and Haejin Kim
11:45–12:45	<b>Monica Borghi</b> ( <i>Assistant Professor – Utah State University, USA</i> ) <b>Ellaine De Guzman</b> ( <i>Journal Specialist – Frontiers in Plant Science</i> ) <b>Haejin Kim</b> ( <i>Genome Editing Scientist – Pairwise Plants</i> )

<b>July 27 (Tuesday)</b> <b>Afternoon</b>	<b>Symposium 4: Natural products discovery, synthesis, and biosynthesis in the omics era</b> <b>Chair: Peter Constabel (University of Victoria, Canada)</b>
13:30–13:55	<b>Arthur Neish Award recipient: Soon Goo Lee (University of North Carolina, Wilmington, USA)</b> Bitter and sweet: Molecular basis for branched steviol glucoside biosynthesis
13:55–14:20	<b>Craig A. Schenck (Michigan State University, USA)</b> Production of structurally diverse acylsugars through rapid screening of a promiscuous, yet specific, <i>Nicotiana acuminata</i> acylsugar pathway
14:20–14:30	[short break]
14:30–14:55	<b>Isabel Desgagné-Penix (University of Quebec, Trois-Rivières, Canada)</b> Cloning and characterization of norbelladine synthase and noroxomaritidine reductase, catalyzing the first key steps in Amaryllidaceae alkaloid metabolism
14:55–15:20	<b>Elizabeth Mahood (Cornell University, USA)</b> Leveraging integrative omics analyses for stress-responsive metabolic pathway elucidation in <i>Brachypodium</i>

<b>July 27 (Tuesday)</b> <b>Evening</b>	<b>Poster session 1</b>
15:30–17:00	Concurrent presentations of odd-numbered posters

## JULY 28 (WEDNESDAY)

<b>July 28 (Wednesday)</b> <b>Morning</b>	<b>Symposium 5: Breakthrough approaches in elucidating phytochemical biosynthesis</b> <b>Chair: Thu-Thuy Dang (University of British Columbia, Canada)</b>
9:00–9:50	<b>Keynote speaker: Sarah E. O'Connor (Max-Planck Institute of Chemical Ecology, Germany)</b> Harnessing the chemistry of plant natural product biosynthesis
9:50–10:00	[short break]
10:00–10:25	<b>PSNA TPJ Young Investigator Award recipient: Lucas Busta (University of Minnesota, USA)</b> A co-opted steroid synthesis gene, maintained in sorghum but not maize, is associated with a divergence in leaf wax chemistry
10:25–10:50	<b>Nishat S. Islam (University of Western Ontario, Canada)</b> Postharvest darkening of seed coat and proanthocyanidin biosynthesis in pinto bean
10:50–11:00	[short break]
11:00–11:25	<b>B. Mark Lange (Washington State University, USA)</b> Mathematical models of plant metabolism: Awesome research tools for everything from gene discovery to complex network analysis
11:25–11:30	<b>Lira Palmer (Max-Planck Institute of Chemical Ecology, Germany)</b> <u>Flash talk</u> : Development of an <i>in vivo</i> method in <i>Nepeta cataria</i> (catnip) to characterize the biosynthetic pathway behind nepetalactone stereoisomer production
11:30–11:35	<b>Hannah Parks (Michigan State University, USA)</b> <u>Flash talk</u> : Expanding the tropane alkaloid metabolic network: Metabolite discovery in <i>Atropa belladonna</i>
11:35–11:40	<b>Radesh P. Nattamai Malli (Brock University, Canada)</b> <u>Flash talk</u> : <i>De novo</i> genome assembly, annotation and characterization of the essential oil plant <i>Lavandula angustifolia</i> (lavender)

<b>July 28 (Wednesday)</b>	<b>PSNA's Young Members Trivia Game</b>
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**Noon**

12:00–13:00 PSNA's Young Members Trivia Game

**July 28 (Wednesday) Symposium 6: Evolution of plant specialized metabolism**

**Afternoon** Chair: **Jetter Reinhard** (*University of British Columbia, Canada*)

13:30–14:20 **Keynote speaker: Jing-Ke Weng** (*Massachusetts Institute of Technology, USA*)  
Mechanistic basis for metabolic evolution in plants

14:20–14:30 [short break]

14:30–14:55 **Yulin Sun** (*University of British Columbia, Canada*)  
Unravelling the biosynthesis of the very-long-chain  $\beta$ -diketones sealing barley (*Hordeum vulgare*) surfaces: A polyketide synthase condensing non-canonical substrates

14:55–15:20 **Jeff Y. Chen** (*University of Toronto, Canada*)  
Divergence of very-long-chain fatty acid substrate specificity in a recently duplicated gene cluster of poplar  $\beta$ -ketoacyl-CoA synthases

15:20–15:30 [short break]

15:30–15:55 **Narayanan Srividya** (*Washington State University, USA*)  
What determines if monoterpene synthases produce monocyclic or bicyclic products? An excursion into structure-function relationships

15:55–16:00 **Praveen Khatri** (*University of Western Ontario, Canada*)  
Flash talk: Genome-wide identification of cytochrome P450 monooxygenases provide insight into their role in partial resistance against *Phytophthora sojae* in soybean (*Glycine max*)

16:00–16:05 **Lars Kruse** (*University of British Columbia, Canada*)  
Flash talk: Large-scale comparative genomics and biochemical analyses reveal ancestral promiscuity as a driver of functional diversification of BAHD acyltransferases in plants

16:05–16:10 **Sonia Ehi-Eromosele** (*University of Toronto, Canada*)  
Flash talk: Is the Entner-Doudoroff pathway functional in higher plants?

**JULY 29 (THURSDAY)****July 29 (Thursday) Symposium 7: Enzymology and organization of plant metabolism**

**Morning** Chair: **Bjoern Hamberger** (*Michigan State University, USA*)

9:00–9:25 **Arthur Neish Award recipient: Nitzan Shabek** (*University of California, Davis, USA*)  
Structural insights into strigolactone signaling regulation by the ubiquitin system

9:25–9:50 **Kristin Roach** (*Iowa State University, USA*)  
Structure-function investigation of class II diterpene cyclases

9:50–10:00 [short break]

10:00–10:25 **Jessica Sinka** (*University of Western Ontario, Canada*)  
Metabolic flux analysis during wound-healing in potato tubers

10:25–10:50 **Paul D. Fiesel** (*Michigan State University, USA*)  
Swapping sugars: The biochemical evolution of eggplant trichome defensive metabolites

10:50–11:00 [short break]

11:00–11:25 **Shu Yu** (*University of California, Davis, USA*)  
Mutant combinations of lycopene  $\epsilon$ -cyclase and  $\beta$ -carotene hydroxylase 2 homoeologs increased  $\beta$ -carotene accumulation in endosperm of tetraploid wheat (*Triticum turgidum* L.) grains

- 11:25–11:30 **Ayeln M. Adal** (*University of British Columbia, Canada*)  
Flash talk: A monoterpene synthase controls bornyl diphosphate biosynthesis from *Lavandula x intermedia*
- 11:30–11:35 **Jedrzej Gozdzik** (*University of British Columbia, Canada*)  
Flash talk: In-depth analysis of unusual very-long-chain ketones found in cuticular waxes of wild-type and mutant Welsh onion (*Allium fistulosum* L.)

**July 29 (Thursday) Afternoon** **Symposium 8: Phytochemistry of the forest, the far north, and underutilized plants**  
**Chair: Dae-Kyun Ro** (*University of Calgary, Canada*)

- 13:30–14:20 **Keynote speaker: Jörg Bohlmann** (*University of British Columbia, Canada*)  
 Oleoresin defenses in conifers: Chemical diversity and limitations under climate change
- 14:20–14:30 **[short break]**
- 14:30–14:55 **Arthur Neish Award recipient: Rebecca Roston** (*University of Nebraska, Lincoln, USA*)  
 Cold tolerance of membranes is a matter of timing and metabolic state – not just a saturation story
- 14:55–15:20 **Matthew E. Bergman** (*University of Toronto, Canada*)  
 Cytosolic geraniol and citronellol biosynthesis mediated by a Nudix hydrolase in *Pelargonium graveolens*

**July 29 (Thursday) Evening** **Poster session 2**

- 15:30–17:00 Concurrent presentations of even-numbered posters

**JULY 30 (FRIDAY)**

**July 30 (Friday) Morning** **Symposium 9: Biochemistry and production of high-value phytochemicals**  
**Chair: Yang Qu** (*University of New Brunswick, Canada*)

- 9:00–9:50 **Keynote speaker: Anastasios Melis** (*University of California, Berkeley, USA*)  
 Plant essential oils production in cyanobacteria
- 9:50–10:00 **[short break]**
- 10:00–10:25 **Courtney P. Leisner** (*Auburn University, USA*)  
 Medicinal genomics: Exploring the diversity of iridoid compounds in blueberry for human health benefits
- 10:25–10:50 **De-Yu Xie** (*North Carolina State University, USA*)  
 Anti-COVID-19 activities of flavan-3-ols in crops
- 10:50–11:00 **[short break]**
- 11:00–11:25 **M. Soledade C. Pedras** (*University of Saskatchewan, Canada*)  
 Tropalexins A and B suggest evolutionary conservation of phytoalexin biosynthetic enzymes in Brassicales
- 11:25–11:30 **Sergio M. Espinoza** (*San Simón University, Bolivia*)  
Flash talk: Proximate analysis and antioxidant capacity of the edible mushroom *Ustilago maydis* (Musuru) grown in creole maize varieties
- 11:30–11:35 **Yue Zhu** (*North Carolina State University, USA*)  
Flash talk: Flavonols and dihydroflavonols inhibit the main protease activity of SARS-CoV-2

**July 30 (Friday)**  
**Afternoon**

**Symposium 10: Synthetic biology and metabolic engineering of plant metabolism**  
**Chair: De-Yu Xie** (*North Carolina State University, USA*)

13:20– 13:30

**Bjoern Hamberger** (*Michigan State University, USA*)  
Awards Session

13:30–14:20

**Keynote speaker: Dae-Kyun Ro** (*University of Calgary, Canada*)  
CRISPR/Cas9 in yeast engineering for producing plant specialized metabolites

14:20–15:10

**Keynote speaker: Vincent Martin** (*Concordia University, Canada*)  
Breakthrough technologies: Synthetic biology and metabolic engineering

15:10–15:20

**[short break]**

15:20–15:45

**Nathan D. Tivendale** (*University of Western Australia, Australia*)  
Analysis of plant enzymes as consumable parts for synthetic biology

15:45–16:10

**Nikola Micic** (*University of Copenhagen, Denmark*)  
Glutathione conjugates: A tool to decipher glutathione transferase functions

16:10–16:20

**Closing Remarks**

**Dorothea Tholl** – (*Virginia Polytechnic Institute and State University, USA*) – *Incoming President, Phytochemical Society of North America*

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