TERPNET 2023

The 15th International Meeting on the Biosynthesis, Function, and Synthetic Biology of Isoprenoids

Conference Program

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Welcome Message

Dear colleagues and friends,

On behalf of TERPNET 2023, we are pleased to welcome you to UC Davis for the 15th International Meeting on the Biosynthesis, Function and Synthetic Biology of Isoprenoids. TERPNET is an international affiliation of researchers working on all aspects of terpenoids and isoprenoids including biosynthesis, biological activities, industrial applications and more. While TERPNET meetings usually take place every two years, we opted against a virtual meeting during the pandemic. We are delighted to bring the community together again this year at UC Davis!

The scientific program of TERPNET 2023 is organized in 12 sessions covering the following topics:

- Terpenoid biosynthesis – scaffold formation
- Terpenoid biosynthesis – functional modifications
- Terpenoid biosynthesis – structure & computational chemistry
- Terpenoid chemical diversity and evolution
- Transport, storage and release of terpenoids
- Regulation of precursor pathways
- Regulation of terpene biosynthesis
- Terpenoids in plant development
- Terpenoids in chemical ecology
- Synthetic biology & metabolic engineering of terpenoids
- Organic synthesis of terpenoids
- Terpenoid industrial applications

This range of session topics from fundamental to applied research is a testimony of the diversity, vivacity and relevance of this research field. Isoprenoids find great attention in academia and industry alike.

The participation in TERPNET meetings is highly international and this edition is no exception as we welcome participants from around the globe. The 2023 meeting takes place at the UC Davis campus near to the city of Davis, a small college town in California famous for its welcoming community, its farmer's market, and the ever-present use of bicycles as a favorite mode of transport. The lectures and presentations will be given in our new green-design California Hall accommodating nearly 600 students. We are particularly grateful to the members of the TERPNET executive committee, the session chairs, and our student volunteers of TERPNET 2023 for the preparation of the conference. We would also like to express our gratitude to the organizations listed below that provided financial support.

We hope you will enjoy the conference and your stay in Davis, California.

Reuben Peters
Philipp Zerbe
Dean Tantillo

Thank you to our Sponsors!

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UCDAVIS DEPARTMENT OF CHEMISTRY

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Program Overview

Invited Speakers

Keynote Speaker

Jay Keasling (University of California-Berkeley, USA)

Invited Speakers

Johan Andersen-Ranberg (University of Copenhagen, Denmark)
Harro Bouwmeester (University of Amsterdam, The Netherlands)
Robin Buell (University of Georgia, USA)
Immo Burkhardt (University of California-San Diego, USA)
Feng Chen (University of Tennessee, USA)
Xiao-Ya Chen (Chinese Academy of Sciences, China)
Fang-Hua Chu (National Taiwan University, Taiwan)
Alain Goossens (VIB, Belgium)
Michael Gutensohn (West Virginia University, USA)
Mark Lange (University of Washington, USA)
Sibongile Mafu (University of Massachusetts-Amherst, USA)
Tom Maimone (University of California-Berkley, USA)
Dan Major (Bar-Ilan University, Israel)
Colleen McMahan (USDA Agricultural Research Station, Albany, USA)
Hosea Nelson (California Institute of Technology, USA)
Kazunori Okada (University of Tokyo, Japan)
Michael Phillips (University of Toronto, Canada)
Dae-Kyun Ro (University of Calgary, Canada)
Jeffery Rudolf (University of Florida, USA)
Michel Schalk (DSM-Firmenich, Switzerland)
Thomas Sharkey (Michigan State University, USA)
Dean Tantillo (UC Davis, USA)
Dorothea Tholl (Virginia Tech, USA)
Li Tian (University of California-Davis, USA)
Kira Tiedge (University of Groningen, The Netherlands)
Alain Tissier (Leipniz Institute for Plant Biochemistry, Germany)
Claudia Vickers (Queensland University of Technology, Australia)

Program Overview

Monday, July 31st, 2023

4:00-5:30 PM	**Opening Session** Welcome messages Keynote lecture by Prof. Jay Keasling (UC Berkeley)
5:30-8:00 PM	**Welcome Reception**

Tuesday, August 1st ,2023

8:00-10:00 AM	**Session I** Terpenoid biosynthesis – structural & computational chemistry
10:00-10:30 AM	**Coffee Break**
10:30 AM - 12:30 PM	**Session II** Terpenoid biosynthesis – functional modifications
12:30-1:30 PM	**Lunch Break**
1:30-3:40 PM	**Session III** Terpenoid chemical diversity and evolution
3:40-4:00 PM	**Coffee Break**
4:00-6:00 PM	**Poster Session I** (odd numbers)

Program Overview

The 15th International Meeting on Biosynthesis, Function, and Synthetic Biology of Isoprenoids
TERPNET 2023
7/31-8/4, 2023 | UC Davis

Wednesday, August 2nd ,2023

8:00-10:00 AM	**Session IV** Transport, storage and release of terpenoids
10:00-10:30 AM	**Coffee Break**
10:30 AM-12:30 PM	**Session V** Regulation of precursor pathways
12:30-1:30 PM	**Lunch Break**
12:30-1:30 PM	**Student Career Panel**
1:30-3:10 PM	**Session VI** Organic synthesis of terpenoids
3:10-4:00 PM	**Coffee Break**
4:00-6:00 PM	**Poster Session II** (even numbers)

Thursday, August 3rd ,2023

8:00-10:10 AM	**Session VII** Synthetic biology and metabolic engineering of terpenoids
10:10-10:30 AM	**Coffee Break**
10:30 AM-12:30 PM	**Session VIII** Terpenoid industrial applications
12:30-7:00 PM	**Free Afternoon**
12:30 PM	TERPNET 2023 Group Photo
12:30-1:30 PM	TERPNET Executive Committee Meeting
7:00-10:00 PM	**Banquet Dinner**

Program Overview

Friday, August 4th 2023

8:00-9:40 AM	**Session IX** Regulation of terpene biosynthesis
9:40-10:00 AM	**Coffee Break**
10:00 AM-12:10 PM	**Session X** Terpenoids in chemical ecology
12:10-1:00 PM	**Lunch Break**
1:00-3:00 PM	**Session XI** Terpenoid biosynthesis – scaffold formation
3:00-3:30 PM	**Coffee Break**
3:30-4:30 PM	**Session XII** Terpenoids in plant development
4:30 PM	**Closing Remarks**

General Information

TERPNET 2023 organization
Reuben Peters (Iowa State University, USA)
Philipp Zerbe (UC Davis, USA)
Dean Tantillo (UC Davis, USA)

Chairs of TERPNET 2019
Jonathan Gershenzon (Max Planck Institute for Chemical Ecology, Germany)
Michael Gutensohn (West Virginia State University, USA)
Mark Lange (Washington State University, USA)
Andrew Muchlinski (Firmenich, USA)
Reuben Peters (Iowa State University, USA)
Cody Pitts (UC Davis, USA)
Dae-Kyun Ro (University of Calgary, Canada)
Thomas Sharkey (Michigan State University, USA)
Dean Tantillo (UC Davis, USA)
Alain Tissier (Leipniz Institute for Plant Biochemistry, Germany)
Claudia Vickers (Eden Brew, Australia)
Philipp Zerbe (UC Davis, USA)

TERPNET Student Volunteers
Ian Anderson (UC Davis)
Anna Cowie (UC Davis)
Janessa Destremps (UC Davis)
Yiling Feng (ISU)
Alex Gueorguieva (UC Davis)
Mary Madera (UC Davis)
Mary Price (UC Davis)
Ahmed Raslan (ISU)
Alicia Ross (UC Davis)
Mark Schmidt-Dannert (ISU)
Gabby Wyatt (UC Davis)

TERPNET Executive Committee
Claudia Vickers, Ikuro Abe, Thomas Bach, Joerg Bohlmann, Albert Boronat, Harro Bouwmeester, Joe Chappell, Xiao-Ya Chen, Natalia Doudareva, Jonathan Gershenzon, Bjoern Hamberger , Andrea Hemmerlin, Angelos Kanellis, Werner Kross, Toshiya Muranaka, Joe Noel, Sarah O'Connor, Anne Osbourn, Xiaoquan Qi, Dorothea Tholl, Alain Tissier, Pamela Weathers, Reuben Peters

General Information

Conference venue (see also locations maps)

UC Davis
California Hall, room 1110
California Ave
Davis, CA 95616

Conference registration desk

The conference registration is situated at the California Hall lobby as follows:

Monday, July 31st 2023	02:00 pm – 07:00 pm
Tuesday, August 1st 2023	07:30 am – 06:00 pm
Wednesday, August 2nd 2023	07:30 am – 04:00 pm
Thursday, August 3rd 2023	07:30 am – 12:00 pm
Friday, August 4th 2023	07:30 am – 04:00 pm

You can contact the conference office on site either by sending a message to: events@ucdavis.edu

Name tags

Each participant will receive an individual, non-transferable name tag upon check-in at the registration desk. This name tag will be the official conference pass. Please wear it at all times in order to gain entry to the meeting room.

Technical support

There is no speakers' preview room, and presentations will not be delivered to the lounge area. Please come to the lecture hall in good time before your session starts. All presentations shall be based on PowerPoint. The projectors project in 4:3 format. Please bring your presentation in the adequate version on a flash drive. You may also upload your presentation to the TERPNET2023 Google Drive.

General Information

Poster exhibition

Posters are displayed at the California Hall Lobby. The poster boards are marked with numbers referring to those in the program. Please note that the maximal size for a poster is 4x4 feet. Materials for putting up the posters will be provided. There will be two poster sessions, at which each presenter is asked to be available for discussion. Please refer to the scientific program for further details. Please remove all posters after the poster session on Wednesday as the poster boards need to be returned by Thursday morning.

Accompanying exhibition | Catering

The accompanying exhibition of our industry partners is located in the California Hall lobby all day throughout the conference. Please reach out to them to express our appreciation of the financial support and discuss their technologies and products. Food and beverages will be served at the California Hall lobby as well. Please see the program overview for details on the coffee and lunch breaks.

Getting here

UC Davis is located near two international airports, Sacramento International (SMF) and San Francisco International (SFO). Depending on where you are coming from, you will likely fly into one of these airports and then take ground transportation to Davis or Sacramento. From both airports Lyft and Uber services are available. Additionally, the Davis Airporter (https://www.davisairporter.com/) provides service to Davis. If you are driving to the meeting, UC Davis is located at the intersection of Interstate 80 and State Route 113. From either direction, watch out for the UC Davis exits.

Parking & transport

Parking is available on all UC Davis parking lots and parking garages. The parking lots nearest to the conference venue are Lot#25 (off La Rue Rd) and Lot#15 (off Russell Blvd). Parking fees can be paid using the ParkMobile App (https://parkmobile.io/) with the parking zone indicated in front of the parking spots. Alternatively, there are many Lyft and Uber drivers available in Davis to get to and from the venue. Bus services are also available throughout Davis with the main Memorial Union bus station located in walking distance to California Hall.

Tourist information & Housing

There are several hotels available on campus and in Davis that are in walking or a short drive distance to the conference venue (see below).
Campus map: LINK
Hyatt (campus & Davis): LINK
Best Western (Davis): LINK
Aggie Inn (Davis): LINK
Hilton (Davis (Davis): LINK
La Quinta Inn (Davis): LINK

Visitor Information for Davis and the region is available at:
https://www.visitdavis.org/
https://www.cityofdavis.org/visitors

Internet Access

Please use our UC Davis **UCD-Guest** portal to access the Wifi.

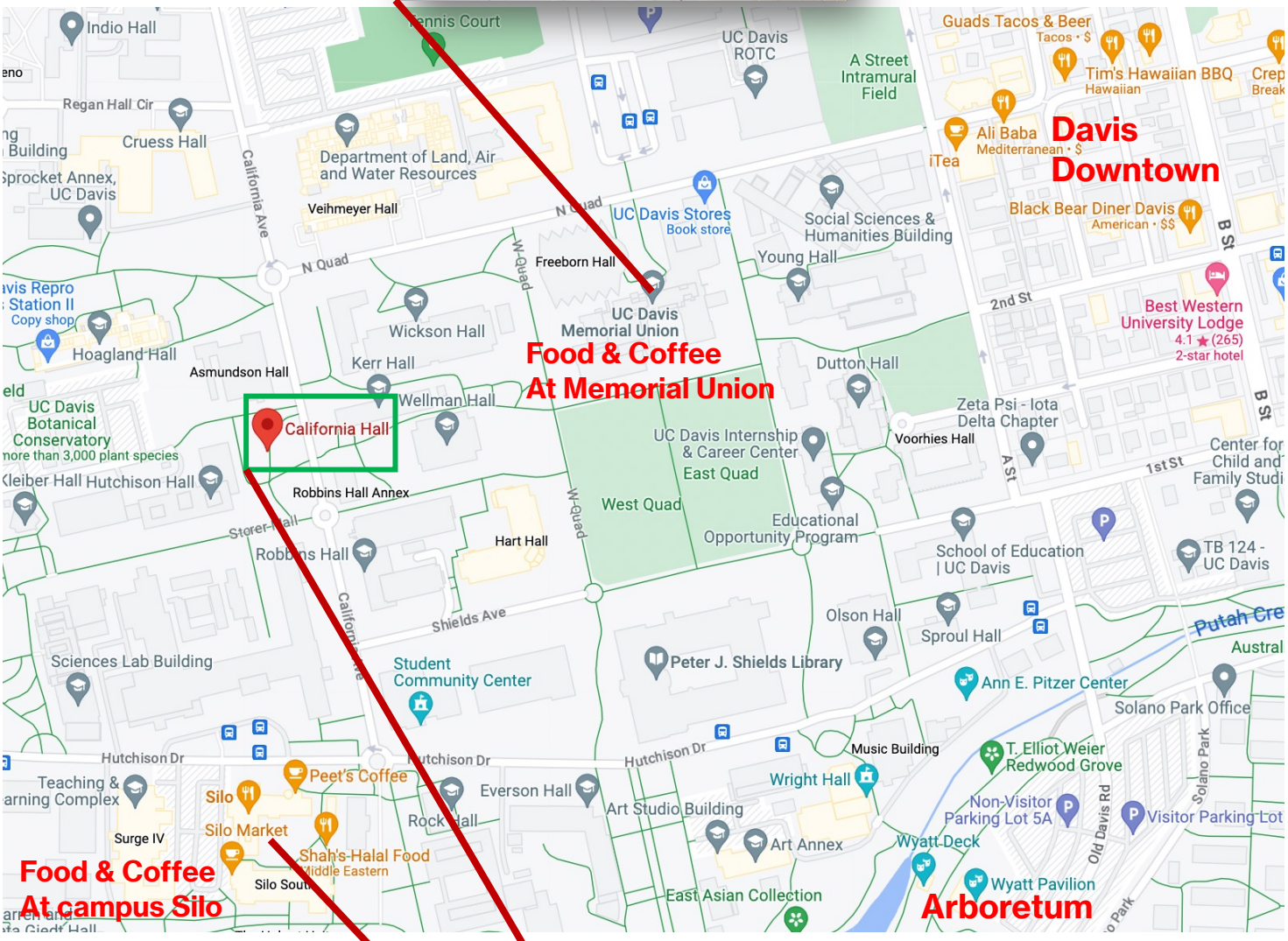
Create a UCD-Guest Account

1.Open the available wireless network list on your computer or device.
2.Choose **UCD-Guest**.
3.If available for your OS, select **Connect Automatically**.
4.Click **Connect**.
5.The UCD-Guest Registration/Login page should open automatically. If it does not, open a web browser and navigate to a website - this should make it appear.
6.Click on **Create a UCD-Guest Account**.
7.Enter your name, a valid mobile phone number (one that can accept text messages), and a valid email address.
Note: *If you do not have a mobile phone number that can accept text messages, you can leave the phone number field blank and the password will be emailed to your email address.*
8.Read and accept the **terms of use**.
9.Click **Register**.
After the above steps are completed, the system will send both a text message and an email to the contacts you provided with your username and password information. In all cases, your username will be your full email address and the password is a series of 8 digits.

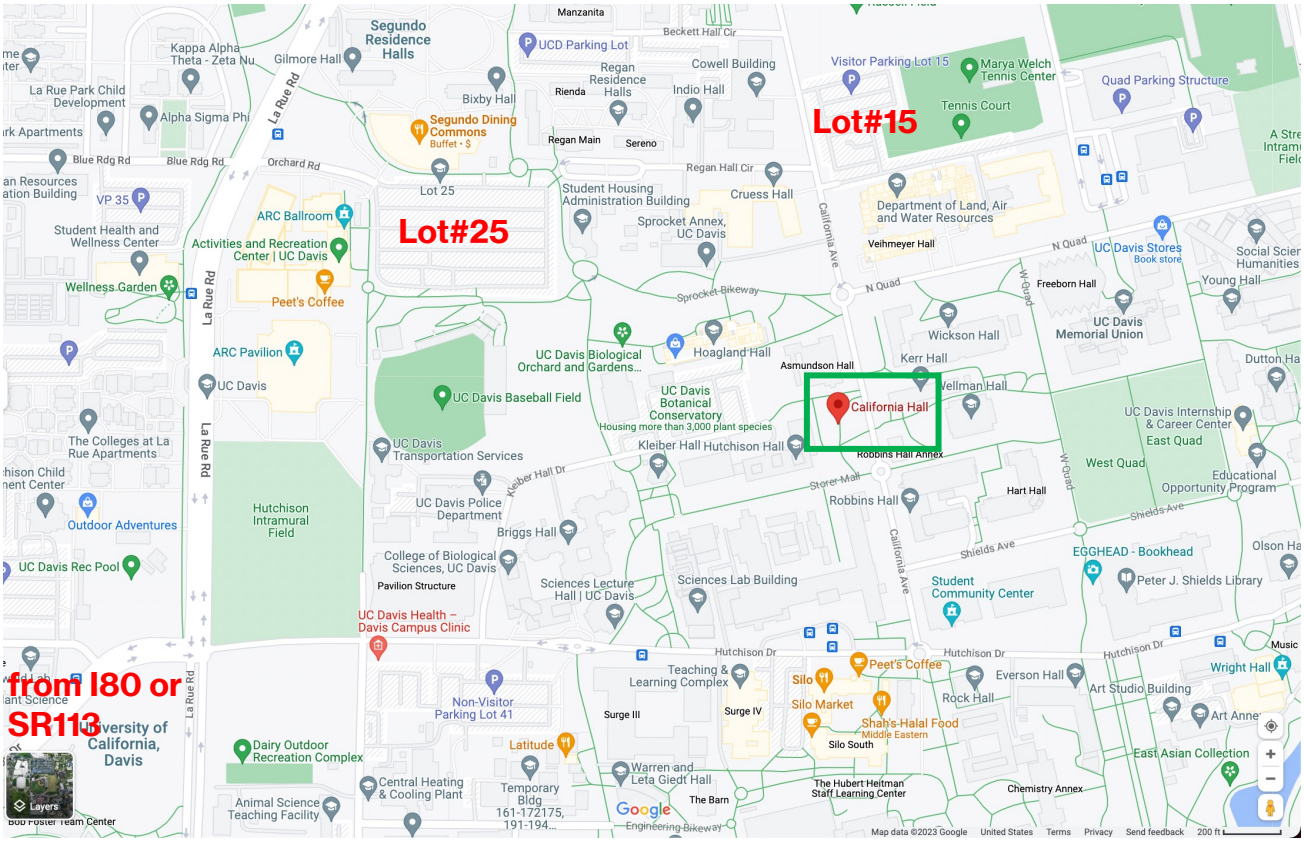
Connect to UCD-Guest

1.Open the available wireless network list on your computer or device.
2.Choose **UCD-Guest**.
3.If available for your OS, select **Connect Automatically**.
4.Click **Connect**.
5.The UCD-Guest Registration/Login page should open automatically. If it does not, open a web browser and navigate to a website - this should it appear.
6.Choose **Login with an existing account**.
7.Enter your UCD-Guest username (the email address used to create the UCD-Guest account).
8.Enter your UCD-Guest password (the 8 digit password you received via text message or email when creating your UCD-Guest account).
9.Click **Login**. Please note that it may take some time for the login process to complete when connecting for the first time.

Location Maps



Location Maps



Direction links to California Hall:

[From Hyatt Hotel (Old Davis Road)]

[From Madrone Hall (Tercero Residence Hall)]

[From Aggie Inn (Davis)]

[From Best Western University Lodge (Davis)]

[From Vine Inn (Davis)]

Monday, July 31st 2023

Opening Session	
4:00 PM	**Welcome & Introduction** Reuben Peters | Iowa State University Philipp Zerbe | UC Davis Dean Tantillo | UC Davis
4:20 PM	**Welcome addresses** Mark Winey | UC Davis Dean, College of Biological Sciences David Goodin | UC Davis Chair, Department of Chemistry
4:30 PM	**Opening Keynote** *OS-T1: Production of supply-limited natural product therapeutics using engineered yeast.* **Jay Keasling** | UC Berkley
5:30-8:00 PM	**Welcome Reception at the California Hall lounge**

Tuesday, August 1st 2023

Session I: Terpenoid biosynthesis – Structure & Computational Chemistry
Chair: Dean Tantillo | UC Davis

8:00 AM *SI-IT1: Contributions of Quantum Chemistry to Understanding of Terpene Biosynthesis.*
Dean Tantillo | UC Davis

8:30 AM *SI-IT2: From Basic Understanding to Design of Terpene Synthases using Multistate Multiscale Modeling*
Dan Major | Bar-Ilan University

9:00 AM *SI-ST1: Lessons Learned from Computational Modeling of Terpene Mechanisms*
Ian Torrence | UC Davis

9:20 AM *SI-ST2: Automatic Detection and Characterization of Terpene synthases via Machine Learning.*
Raman Samusevich | Czech Technical University in Prague

9:40 AM *SI-ST3: Structural basis of short-chain cis-prenyltransferase from plants.*
Satoshi Yamashita | Kanazawa University

10:00-10:30 AM **Coffee Break**

Session II: Terpenoid biosynthesis – Functional Modifications
Chair: Alain Tissier | Leipniz Institute for Plant Biochemistry

10:30 AM *SII-IT1: P450 catalyzed methyl shift in diterpenoid biosynthesis and the production of triptonide*
Johan Andersen-Ranberg | University of Copenhagen

11:00 AM *SII-IT2: Dissecting gene-metabolite relationships in the legume terpenome.*
Sibongile Mafu | University of Massachusetts-Amherst

11:30 AM *SII-ST1: Diversity of diterpenoid metabolism in monocot crops*
Philipp Zerbe | UC Davis

11:50 AM *SII-ST2: Biosynthesis of the volatile iridoid dolichodial through cryptic acylation in cat thyme (Teucrium marum).*
Samuel Smit | University of York

12:10 PM *SII-ST3: Subfamilies in Lamiaceae containing CYP76BK orthologues can catalyze the formation of furan and lactone containing clerodanes.*
Nicolas Schlecht | Michigan State University

12:30-1:30 PM **Lunch Break**

Tuesday, August 1st 2023

Session III: Terpenoid Chemical Diversity and Evolution
Chair: Mark Lange | Washington State University

1:30 PM	*SIII-IT1: Use of complementary single cell omics to elucidate specialized metabolism in Catharanthus roseus.* **Robin Buell** | University of Georgia
2:00 PM	*SIII-IT2: Origin and evolution of terpene synthase genes in land plants* **Feng Chen** | University of Tennessee
2:30 PM	*SIII-IT3: Terpene Biosynthesis in Octocorals* **Immo Burkhardt** | UC San Diego
3:00 PM	*SIII-ST1: Widespread biosynthesis of 16-carbon terpenoids in bacteria.* **Sotirios Kampranis** | University of Copenhagen
3:20 PM	*SIII-ST2: A bipartite biosynthetic gene cluster reveals convergent evolution of monoterpenoid pathway enzymes in the mint family.* **Benjamin Lichman** | University of York
3:40-4:00 PM	**Coffee Break**
4:00-6:00 PM	**Poster Session I** (odd numbers)

PS-1	**Functional iridoid synthases from three Nepeta species with differing iridoid profiles** Neda Aničić | University of Belgrade
PS-3	**Uncovering the tissue-specific regulation of iridoid biosynthesis in two chemodiverse Nepeta species: integration of transcriptomics and metabolomics data** Dragana Metakalo | University of Belgrade
PS-5	**Mining of cytochrome P450 genes for taiwaniaquinoid synthesis in *Taiwania cryptomerioides*** Chong-Yao Hong | National Taiwan University
PS-7	**Diversity of Diterpenoid Biosynthetic Genes in Rice** Yiling Feng | Iowa State University
PS-9	**Functional characterization and potential applications of levopimaradiene synthase gene from *Calocedrus formosana*** Yin-Yu Cheng | National Taiwan University

4:00-6:00 PM **Poster Session I** (odd numbers)

PS-11	**Structure-Function Analysis of Key Enzymes in Taxol Biosynthesis** Gloria-Alexandra Gueorguieva | UC Davis
PS-13	**Investigating the role of *cis*-prenyltransferases in determining natural rubber polymer length in rubber producing plants** Kayla Dias | University of Calgary
PS-15	**Evolving Catalytic Specificity and Efficiencies within Triterpene Synthases** Bhanuchandar Nellore | University of Kentucky
PS-17	**Repeated use of amino acid switches to alter product outcome in class II diterpene cyclases** Ahmed Raslan | Iowa State University
PS-19	**Understanding Dynamic Mismatching on a Diterpenoid Surface** Alicia Ross | UC Davis
PS-21	**Combining metabolomic and transcriptomic approaches to decipher the diversity of iridoids within the genus Nepeta (fam. Lamiaceae)** Danijela Mišić | University of Belgrade
PS-23	**Investigating the chemical defenses of wild mungbean that confer resistance to *Spodoptera litura*** Hieng-Ming Ting | National Taiwan University
PS-25	**Sniffing out the evolutionary origins of terpene pheromone biosynthesis in the Asian lady beetle, *Harmonia axyridis*** Zarley Rebholz | Virginia Tech
PS-27	**An in vivo gene amplification system for high level expression in *Saccharomyces cerevisiae*.** Bingyin Peng | Queensland University of Technology

Wednesday, August 2nd 2023

Session IV: Transport, Storage and Release of Terpenoids
Chair: Michael Gutensohn | West Virginia State University

8:00 AM — *SIV-IT1: Metabolic arms race between a plant and a pathogen: the case of barley diterpenoids and the fungal pathogen Bipolaris sorikiniana*
Alain Tissier | Leipniz Institute for Plant Biochemistry

8:30 AM — *SIV-IT2: Toward a unified model for sequence, structure, and function of plant monoterpene synthases*
Mark Lange | Washington State University

9:00 AM — *SIV-ST1: Volatile terpenoid communication in plants relies on a karrikin-like signaling pathway.*
Natalia Dudareva | Purdue University

9:30 AM — *SIV-ST2: Quantifying Passive Terpenoid Permeation Across Lipid Bilayers with Molecular Simulation*
Josh Vermass | Michigan State University

10:00-10:30 AM — **Coffee Break**

Session V: Regulation of Precursor Pathways
Chair: Thomas Sharkey | Michigan State University

10:30 AM — *SV-IT1: Natural and synthetic sources of substrate for the chloroplast methylerythritol phosphate pathway*
Michael Phillips | University of Toronto

11:00 AM — *SV-IT2: Regulatory mechanisms of the methyl erythritol pathway discovered during isoprene research*
Thomas Sharkey | Michigan State University

11:30 AM — *SV-ST1: Enzymology of the archaeal mevalonate pathway: Phosphomevalonate dehydratase has an oxygen-sensitive iron-sulfur cluster in its active site*
Hisashi Hemmi | Nagoya University

11:50 AM — *SV-ST2: MEP pathway products allosterically promote monomerization of deoxy-D-xylulose-5-phosphate synthase to feedback-regulate their supply*
Jordi Perez-Gil | Queensland University of Technology

12:10 PM — *SV-ST3: A cytosolic bifunctional G/FPPS1 evolved in Rosaceae provides MVA-derived precursors for geraniol, germacrene D and dihydro-β-ionol biosynthesis in rose flowers*
Benoît Boachon | CNRS

12:30-1:30 PM — **Lunch Break & Student Career Panel**

Graduate students & postdocs, please join us for a panel discussion with peers from academia, government and industry

Wednesday, August 2nd 2023

Session VI: Organic synthesis of terpenoids
Chair: Cody Pitts | UC Davis

1:30 PM	*SVI-IT1: TBD* **Hosea Nelson** | California Institute of Technology
2:00 PM	*SVI-IT2: Synthetic Studies and Applications of Complex Terpenes* **Tom Maimone** | UC Berkeley
2:30 PM	*SVI-ST1: Development of a C–C bond cleavage/vinylation/Mizoroki–Heck cascade reaction and application to the total synthesis of 14- and 15-hydroxypatchoulol* **Christina Na** | UC Berkeley
2:50 PM	*SVI-ST2: TBD* **Name** | Affiliation
3:10-4:00 PM	**Coffee Break**
4:00-6:00 PM	**Poster Session II** (even numbers)

PS-2	**Deciphering regulatory mechanisms associated with conserved gene clusters for diterpenoid phytoalexin biosynthesis in gramineous plants** Youming Liu | University of Tokyo
PS-4	**Protein engineering, purification and characterization of a regulatory protein for *cis*-prenyltransferase from plant** Taro Yanai | Kanazawa University
PS-6	**Characterization of Cytochrome P450 Monooxygenases and the Biosynthesis of Switchgrass Diterpenoids** Gabrielle Wyatt | UC Davis
PS-8	**In vitro reconstitution of core components of the rubber synthesis machinery based on a cell-free translation system.** Fu Kuroiwa | Saitama University
PS-10	**Discovery and mechanistic analysis of the biosynthesis of the unusual diterpenoid bioproduct, grindelic acid in species of gumweed** Anna Cowie | UC Davis

4:00-6:00 PM	**Poster Session II** (even numbers)
PS-12	**Natural Products for Legume Defense: Investigating Terpene Metabolism in *Medicago truncatula*** Hannah Hendrickson | University of Massachusetts-Amherst
PS-14	**CRISPR/Cas9 mediated knockout of β-amyrin synthase 1 for the reduction of saponins in yellow field pea** Susan Roth | University of Calgary
PS-16	**Redesigning diterpene synthases with the TerDockin computational approach** Mark Schmidt-Dannert | Iowa State University
PS-18	**Structural and functional importance of the C-terminal conserved region of neryl diphosphate synthase from tomato** Riki Imaizumi | Kanazawa University
PS-20	**Non-canonical C17 terpene biosynthesis in bacteria** Nancy Magnus | University of Tennessee
PS-22	**Discovery of aroma producing terpene synthases in strawberry** Mary Madera | UC Davis
PS-24	**Multi-omics data integration reveals the role of strigolactones in the interaction between tomato and its root microbiome under nitrogen deficiency** Davar Abedini | University of Amsterdam
PS-26	**Production of terpenes in Marchantia polymorpha oil body cells** Edith Forestier | University of Cambridge

Thursday, August 3rd 2023

Session VII: Synthetic Biology & Metabolic Engineering of Terpenoids
Chair: Andrew Muchlinski | DSM-Firmenich

8:00 AM	*SVII-IT1: Synthetic biology tools to control carbon flux for isoprenoid metabolic engineering* **Claudia Vickers** | Queensland University of Technology
8:30 AM	*SVII-IT2: Advancing the biosynthetic mechanism of natural rubber by CRISPR/Cas9-enabled mutagenesis in cis-prenyltransferase in lettuce* **Dae-Kyun Ro** | University of Calgary
9:00 AM	*SVII-IT3: Unraveling carotenoid metabolism and harnessing provitamin A biofortification in wheat to ensure food security* **Li Tian** | UC Davis
9:30 AM	*SVII-ST1: Engineering metabolically versatile microbial host Pseudomonas putida for a sustainable aviation fuel (SAF) precursor isoprenol production* **Taek Soon Lee** | LNBL, Berkeley
9:50 AM	*SVII-ST2: Dissecting biosynthetic pathways to bioactive diterpenoids in Euphorbia peplus using gene discovery, virus-induced gene silencing and gamma-ray mutagenesis* **Tomasz Czechowski** | University of York
10:10-10:30 AM	**Coffee Break**

Session VIII: Terpenoid Industrial Applications
Chair: Claudia Vickers | Queensland University of Technology

10:30 AM	*SVIII-IT1: Natural rubber biosynthesis and engineering in Parthenium argentatum (guayule)* **Colleen McMahan** | USDA-ARS, Albany
11:00 AM	*SVIII-IT2: New Biosynthetic pathways to Produce Precursors of Fragrance Ingredients* **Michel Schalk** | DSM-Firmenich
11:30 AM	*SVIII-ST1: Potential of triterpenoid saponins as bio-pesticides against herbivore insect pest* **Søren Bak** | University of Copenhagen
11:50 AM	*SVIII-ST2: Hydrogenated Catmint Oil – what was old is new again* **David Hallahan** | Entomol Products LLC
12:10 PM	*SVIII-ST3: Reinventing Chemical Manufacturing Using Biotechnology: Manus Bio Approach* **Joe Shaw** | Manus Bio

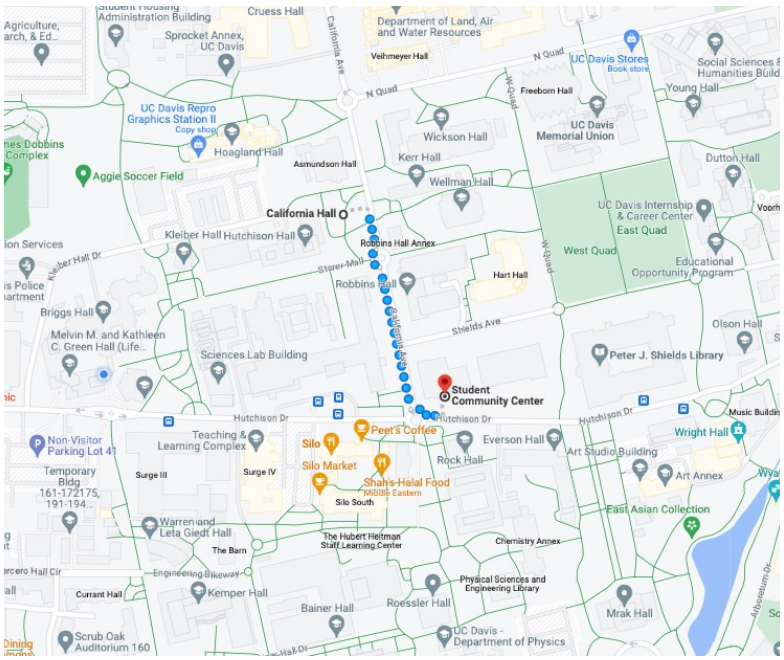
Thursday, August 3rd 2023

12:30-7:00 PM	**Free afternoon**
12:30 PM	TERPNET 2023 Group Photo outside California Hall
12:30-1:30 PM	TERPNET Executive Committee meeting Lecture room

Please enjoy a free afternoon. Davis downtown is a short walk away and offers various restaurants and cafes. If you would like to relax a bit in nature, you might enjoy the Arboretum on campus or the numerous parks in and around campus and Davis. For avid hikers, the Putah Creek trail, and the Blueridge and Homestead trails are a ~15-30 min drive away (please bring plenty of water!). For the wine lovers, please feel free to explore some of our local wineries and Tasting Rooms (for example: Matchbook Wines, Cork It Again, Great Bear Vineyards). Also, the Napa and Sonoma valleys are a ~90 min drive from campus. Please ask us and our student volunteers for more information on any of these and other activities.

7:00-10:00 PM	**Banquet Dinner**

Our banquet dinner will be hosted at the Student Community Center a ~5 min walk down California Avenue from the conference venue. Please ask us or our student volunteers for directions or if you have any other questions.



Friday, August 4th 2023

Session IX: Regulation of Terpene Biosynthesis
Chair: Dae-Kyun Ro | University of Calgary

8:00 AM	*SIX-IT1: Fate of diterpenoid phytoalexins: from induced biosynthesis to degradation* **Kazunori Okada** | University of Tokyo
8:30 AM	*SIX-IT2: Spatiotemporal transcriptional regulation of triterpene biosynthesis in Arabidopsis roots* **Alain Goossens** | Ghent University
9:00 AM	*SIX-ST1: PRISE enzymes play a key role in the multi-step citronellol biosynthetic pathway in pelargonium* **Camille Bihanic** | Universite Jean Monnet-CNRS)
9:20 AM	*SIX-ST2: Root terpenoids: The hidden part of plant defense in the case of Medicago truncatula and the root pathogen Aphanomyces euteiches* **Esther Harding** | Leipniz Institute for Plant Biochemistry

9:40-10:00 AM **Coffee Break**

Session X: Terpenoids in Chemical Ecology
Chair: Reuben Peters | Iowa State University

10:00 AM	*SX-IT1: Regulation of the cannabinoid and terpene metabolic network in industrial hemp (Cannabis sativa) under biotic stress* **Michael Gutensohn** | West Virginia State University
10:30 AM	*SX-IT2: Exploring (di)terpenoid diversity for sustainable crop production* **Kira Tiedge** | University of Groningen
11:00 AM	*SV-IT3: It happened more than once: Evolution of terpene semiochemical biosynthesis in insects* **Dorothea Tholl** | Virginia Tech University
11:30 AM	*SX-ST1: The repeated loss of a terpene floral scent in the spiral gingers* **Kathy Darragh** | UC Davis
11:50 PM	*SX-ST2: Why terpene defenses in plants are frequently present as mixtures* **Jonathan Gershenzon** | MPI for Chemical Ecology

12:10-1:00 PM **Lunch Break**

Scientific Program

Friday, August 4th 2023

Session XI: Terpenoid biosynthesis – Scaffold Formation
Chair: Philipp Zerbe | UC Davis

1:00 PM	*SXI-IT1: Genome Mining for Novel Terpene Scaffolds in Bacteria* **Jeffery Rudolf** | University of Florida
1:30 PM	*SXI-IT3: Evolution of terpene synthase genes in Cupressaceae endemic species of Taiwan* **Fang-Hua Chu** | National Taiwan University
2:00 PM	*SXI-ST1: Tomato/Potato or Eggplant? Deciphering the Stereodivergent Production of Steroidal Glycoalkaloids in the Solanaceae Family* **Adam Jozwiak** | Weizmann Institute
2:20 PM	*SXI-ST2: Messing with motifs: Trippin' on acid* **Reuben Peters** | Iowa State University
SXI-ST2:	*SXI-ST3: Parallel Evolution of Cannabinoid Biosynthesis* **Paula Berman** | Weizman Institute

3:00-3:30 PM **Coffee Break**

Session XII: Terpenoids in Plant Development
Chair: Jonathan Gershenzon | MPI for Chemical Ecology

3:30 PM	*SXII-IT1: The growth-type associated biosynthesis of diterpenoids in East Asian Salvia species* **Xia-Ya Chen** | Shanghai Tech University
4:00 PM	*SXII-IT2: Terpenoids with dual functions. Strigolactones regulate plant development and signal beneficial microbes in the rhizosphere* **Harro Bouwmeester** | University of Amsterdam

4:30 PM **Closing Remarks**

PS-3: Uncovering the tissue-specific regulation of iridoid biosynthesis in two chemodiverse Nepeta species: integration of transcriptomics and metabolomics data

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The genus Nepeta is characterized by a fascinating diversity of iridoid compounds. Some species within the genus are characterized by the presence of both iridoid glycosides (IGs) and iridoid aglycones (IAs), while others produce exclusively IGs, or completely lack iridoids. The absence of certain iridoids does not necessarily imply the absence of gene transcripts dedicated to the particular steps of their biosynthetic pathway. Studying the biosynthetic pathways of iridoids in chemodiverse Nepeta species, while taking into account tissue-specific profiles of metabolites and relevant genes expression, may give us further insight into the mechanisms of regulation of the biosynthesis of these compounds. In this work we performed a comparative transcriptomic analysis of glandular trichomes and abraded leaves of Nepeta rtanjensis, an IAs- and IGs –rich species, and of IGs-producing N. grandiflora. The results of this analysis provided us with very informative data that can be used for parallel study of iridoid-related biosynthetic genes (BGs) and transcription factors (TFs) of the two chemodiverse taxa. On the other hand, differentially expressed genes in the investigated tissues, enabled us to generate a list of candidate genes for yet unelucidated steps of the iridoid metabolic pathway. These results combined with state-of-the-art metabolomics data bring us closer to understanding the molecular background of iridoid diversity within the genus Nepeta, and point to the factors involved in the regulation of the two distinct branches of the iridoid biosynthetic pathway, leading to either IGs or IAs.

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