IUSSI 2022

19TH CONGRESS OF THE
INTERNATIONAL UNION FOR THE STUDY OF SOCIAL INSECTS

JULY 3-7, 2022 • SAN DIEGO, CALIFORNIA

CONFERENCE PROGRAM

19th Congress of the International Union for the Study of Social Insects

CONFERENCE PROGRAM

San Diego Marriott Marquis

333 West Harbor Drive
San Diego, CA 92101
619-234-1500

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Table of Contents

International Union for the Study of Social Insects

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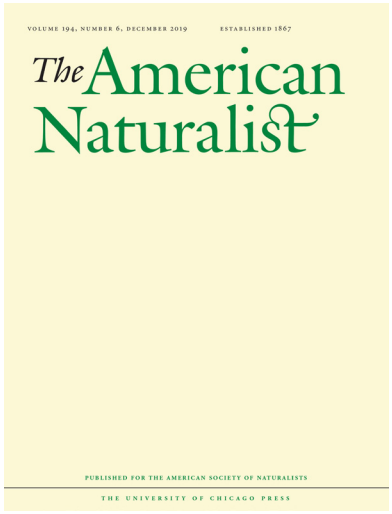
Life science from Chicago

The American Naturalist



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Welcome to IUSSI 2022!

Welcome to the 19th Congress of the International Union for the Study of Social Insects: IUSSI 2022. This year's congress is unique in being our first to meet in hybrid format. That means some of you are attending in person in beautiful San Diego, CA, while others are joining us virtually from cyberspace. The organizing committee has worked to make the programming as rich and accessible as possible to all of you.

We have a variety of online and in-person events planned for this week, as well as a stellar line-up of talks and posters in virtual and in-person sessions. Plenary sessions and select symposia will be live-streamed, and recordings of all presentations will be available on-demand for three months after the congress. Our online programming includes virtual lunches and happy hours. Our in-person events include a festive 4th of July opening reception (with fireworks!), multiple social get-togethers, student networking events, and a closing banquet at the San Diego Natural History Museum. We anticipate that, from wherever you join us, you'll get an exceptionally social (and eusocial) experience.

The world has changed since our wonderful meeting in Brazil 2018, and we recognize more challenges on the horizon. As scientists, we embrace our role in creating and advocating for meaningful change. As social insect researchers, our points of interface with societal issues are diverse. Examples range from applying collective insect behavior as technological and societal models; to documenting ecological impacts of insect decline; to using basic principles of cooperative evolution in support of diversity and inclusion. There are multiple points of interface within and beyond our scientific foci. Our work can and does make a difference – and we are proud to host this opportunity for all of us to once again come together and discuss the next paths forward.

As IUSSI President, I want to offer my most emphatic thanks to the entire committee that has put this Congress together. We collectively wish you an exciting meeting and a wonderful time in San Diego, watching fireworks by the bay and experiencing all that this city and the great state of California have to offer. Welcome!

Jennifer Fewell
President, International Union for the Study of Social Insects

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Exhibitor Listing

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General Meeting Information

In-person events take place in the San Diego Marriott Marquis, unless otherwise noted.
All times shown below are Pacific Daylight Time (PDT). Virtual attendees must adjust for their local time.

Final Program

IUSSI does not assume responsibility for any inconsistencies or errors in the abstracts for contributed paper and poster presentations. We regret any possible omissions, changes and/or additions not reflected in this program.

Speaker Upload Room

All presenters must visit the Upload Room, **Presidio 1**, in the San Diego Marriott Marquis, at least one half day prior to their session time. It is highly recommended that you preview your presentation prior to your presentation to guarantee that it will work properly. Each presentation will be loaded onto a master file for each session. You may use your own computer. However, your fifteen minute time slot does not include time for set up and testing. There will be volunteers and audio visual personnel to assist you and to check you in during the following hours:

Sunday 3 July	12:00 – 15:00
Monday 4 July	10:00 – 13:00
Tuesday 5 July	10:00 – 13:00
Wednesday 6 July	10:00 – 13:00
Thursday 7 July	10:00 – 13:00

Registration Desk

The IUSSI Registration/Information area is located in the San Diego Ballroom Foyer at the San Diego Marriott Marquis. The Registration Desk will be open during the following hours:

Sunday 3 July	15:00 – 18:00
Monday 4 July	07:30 – 16:00
Tuesday 5 July	08:00 – 16:00
Wednesday 6 July	08:00 – 14:00
Thursday 7 July	08:00 – 12:00

Name Badges

For security purposes, delegates are requested to wear name badges at all times during the congress sessions. In case you misplaced or lost your badge, please contact the IUSSI Registration/Information desk.

Message and Job Announcements

A message and employment opportunity bulletin board will be located in the IUSSI Registration/Information area. If you have a message for a colleague, please post it to the message board. The Employment Opportunity board is where attendees can post “Positions Wanted” and learn about “Positions Available.” Interested attendees may schedule interviews in the room set aside for that purpose. See a registration desk attendant for assistance.

Coffee Breaks

Coffee break service is available each day of the meeting. There will be a morning service from 09:30 — 10:00 and an afternoon service from 16:00 — 16:30. The coffee breaks will be located in the San Diego Ballroom.

Gender Neutral Bathrooms

Gender neutral bathrooms are located near Pacific 26, with another near the Grand Ballroom, around the corner from the San Diego Ballroom.

Special Events

In-person events take place in the San Diego Marriott Marquis, unless otherwise noted.
All times shown below are Pacific Daylight Time (PDT). Virtual attendees must adjust for their local time.

Monday 4 July

IUSSI 2022 Social Media Meet Up*

18:00 – 20:00, Poolside

Meet the people behind the usernames at the IUSSI social media meet up! This is a casual gathering for social insect Tweeters and other social media users (or just those interested!). We'll be gathering at the north poolside area of the conference hotel. Stop by any time to connect with some amazing folks. Be sure to follow the official hashtag #IUSSI2022 to stay up to date with the latest conference info.

*The social event was formally known as a Tweet-up.

Opening Reception

20:00 – 23:00, Marina Terrace

We'll start the social events for the conference with a bang on Monday night, which is our opening reception and the Fourth of July (Independence Day). It will be held outdoors on the conference hotel's Marina Terrace from 8:00 to 11:00 pm and will feature snacks, drinks (cash bar), and a prime view of the San Diego fireworks over the water at 9:00. Come mingle with friends old and new as you watch the show. The reception is open to all IUSSI attendees and accompanying family members.

Tuesday 5 July

Lunch & Learn: DEIJ Discussion – Safety for minoritized people in the field

12:45 – 13:45, Torrey Pines 1-2

Wednesday 6 July

Lunch & Learn: How to Find and Write Grants for Early Career Scientists

12:45 – 13:45, Torrey Pines 1-2

Wednesday 6 July

Self-Organized Picnic at the Beach

19:00 – 21:00, Offsite: Coronado Island

After the talks on Wednesday, we'll meet up on a beach at Coronado Island for a self-organized picnic. Bring your own dinner, or grab some takeout from one of the many shops and restaurants at Coronado and join us for an evening on the beach, in the sand or grass.

The ferry to Coronado Island leaves every 30min from the Convention center landing (near the hotel) or every hour from the Broadway landing for a slightly longer excursion.

Thursday 7 July

EntoPOC-IUSSI grant writing workshop

12:15 – 13:15, Torrey Pines 1-2

Interested in applying for scientific grants or fellowships, but don't know how to get started? This workshop will introduce basic tips and tools for grant writing success! In addition, students (undergraduate and graduate) will be provided with information about many of the big fellowship programs, as well as places where they might find lists of smaller grants to fund their work. This workshop is a collaboration between EntoPOC and the IUSSI planning committee; all students are welcome to attend.

Closing banquet

19:00 – 21:00, Offsite: Natural History Museum

To close off the conference we will convene at the San Diego Natural History Museum. IUSSI attendees with banquet tickets will meet at the Museum and enjoy an evening amongst the animals – extinct and extant – of the region. The evening will start at 7 pm and for the first hour we will have an opportunity to peruse the main museum exhibit with drinks and hors d'oeuvres. After that the party will begin on the first floor with a buffet dinner, drinks, and music curated by IUSSI graduate students and postdocs. The museum can be reached by bus in about half an hour or by car in less than 15 minutes. Plentiful free parking is available at Balboa Park.

Section and Committee Meetings

In-person events take place in the San Diego Marriott Marquis, unless otherwise noted.
All times shown below are Pacific Daylight Time (PDT). Virtual attendees must adjust for their local time.

Monday 4 July

North American Section
12:45 – 13:45, Pacific Ballroom 14-15

Central European Section
12:45 – 13:45, Pacific Ballroom 16-17

Northwest European Section
12:45 – 13:45, Pacific Ballroom 21

Australasian Section
12:45 – 13:45, Pacific Ballroom 18-20

Brazilian Section
12:45 – 13:45, Pacific Ballroom 23-24

French-Speaking Section
12:45 – 13:45, Pacific Ballroom 25-26

Tuesday 5 uly

Indian Section
12:45 – 13:45, Pacific Ballroom 14-15

Italian Section
12:45 – 13:45, Pacific Ballroom 16-17

Japanese Section
12:45 – 13:45, Pacific Ballroom 21

African Section
12:45 – 13:45, Pacific Ballroom 18-20

Andean-Carribean Section
12:45 – 13:45, Pacific Ballroom 23-24

International Committee Meeting
18:30 – 20:30, Pacific Ballroom 23-24

Plenary Sessions

In-person events take place in the San Diego Marriott Marquis, unless otherwise noted.
All times shown below are Pacific Daylight Time (PDT). Virtual attendees must adjust for their local time.

Sunday 3 July

Raghavendra Gadagkar
Indian Institute of Science, Bangalore

16:00 – 17:30 • Marina Ballroom

My adventures with *Ropalidia marginata*, an endlessly fascinating tropical primitively eusocial wasp.

I first encountered the Indian paper wasp *Ropalidia marginata* in the summer of 1969 and watched it in awe, albeit with no expertise, over a period of five years. I then observed it with a little bit of expertise but entirely as a hobby during the next five years on the sidelines of my PhD in prokaryotic molecular biology. Since 1979, I have collaborated with a large number of talented students to try to understand everything humanly possible about this most fascinating primitively eusocial tropical insect society. We have discovered behavioural caste differentiation, pre-imaginal caste bias, age polyethism, decentralized self-organization of foraging, nutritional control of caste, meek and docile queens, pheromonal regulation of reproduction, cryptic, pre-designated potential queens, long reproductive queues, a remarkably conflict-free system of queen succession, assured fitness returns for workers and a complex inter-play of conflict and cooperation and of direct and indirect fitness, that shape the social organization and evolution of this endlessly tantalizing species. In this talk I will attempt to give a bird's eye view of the trajectory of our research and hope to convey our love for these wasps and the non-stop excitement we have experienced during this journey.

About the Speaker

Raghavendra Gadagkar is the Year of Science Chair Professor at the Indian Institute of Sciences (IISc). He received his PhD from the IISc, Bangalore, where he has also enjoyed a long career as a Professor. He and his team of passionate students have conducted empirical and theoretical, field and laboratory research for over 40 years to understand the social biology of the Indian paper wasp *Ropalidia marginata*. His publications include the books Survival Strategies, The Social Biology of *Ropalidia marginata*, and Experiments in Animal Behaviour: Cutting-Edge Research at Trifling Cost. He is an International Member of the National Academy of Sciences, USA and the 2021 Distinguished Animal Behaviorist of the Animal Behavior Society.

Plenary Sessions

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Monday 4 July

Fabio Nascimento
Universidade de São Paulo, Ribeirão Preto, Brazil

08:30 – 09:30 • Pacific Ballroom 18-20

Pathways of evolution in wasps: What hormones and pheromones tell us about it

Vespidae wasps are an excellent model to understand how eusociality evolved. From the simple nesting behavior to the advanced chemical communication among nestmates, wasps have been protagonists that many researchers use to solve the puzzles that social insects impose. The Ovarian Ground plan hypothesis and the pleiotropy hormonal hypothesis predict that reproductive behavior is under endocrine regulation and may reflect chemical fertility signaling in both breeders and non-breeders. In this talk I will present recent findings on correlational and experimental studies on how these two complementary hypotheses were tested from solitary, communal to highly eusocial wasps.

About the Speaker

Fabio Nascimento is a Professor of Behavioral Ecology at Universidade de São Paulo, Ribeirão Preto Campus. He received his PhD at Universidade de São Paulo in 2003 and was a postdoctoral fellow at the University of Sheffield (2005) and Boston University (2013). He is interested in caste conflict, chemical communication, and reproduction in social insects. His main focus is understanding how social behavior evolved from simple to complex societies.

Plenary Sessions

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Monday 4 July

Leticia Aviles
University of British Columbia

13:45 – 14:45 • Pacific Ballroom 18-20

Social spiders: Lessons in ecology and evolution

The task of a scientist, even more so than that of an artist, is to chisel away the secrets of nature to reveal the beauty within. Social insects and spiders have served as extraordinary model systems to uncover the forces and processes responsible for group living, cooperation, and the emergence of higher levels of organization. With their strongly subdivided cooperation structures, female-biased sex ratios, unstable colony dynamics, and colony-level selection, social spiders have led us in a journey of discovery through various fields of ecology and evolution — the evolution of female-biased sex ratios in subdivided populations; cooperation and the dynamics of populations; multilevel selection; the short- and long-term consequences of inbreeding, and the ecology of social evolution. In this talk I will give an overview of the lessons that have been revealed to us on these topics through decades of research on these extraordinary organisms.

About the Speaker

Leticia Avilés is a Professor at the Department of Zoology and the Biodiversity Research Centre at the University of British Columbia. Originally from Ecuador, she received her PhD from Harvard University. Drawing inspiration from social spiders, a phylogenetically diverse set of species that have converged in evolving cooperative behavior and highly subdivided population structures, her research addresses the causes and consequences of social evolution. Projects include the ecology and biogeography of social evolution; evolution in metapopulations; short- and long-term consequences of inbreeding; and the role of multilevel selection in evolution. Along with her students and postdocs, she uses a range of tools including fieldwork in temperate and tropical areas, computer simulation and analytical modelling, and behavioral and molecular techniques.

Plenary Sessions

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Tuesday 5 July

Corrie Moreau
Cornell University

08:30 – 09:30 • Pacific Ballroom 18-20

Symbiosis in ants and why broadening our research community is essential for the best social insect science

Ants engage in symbiotic relationships across the tree of life. To understand how these interactions shape the evolution and ecology of ants my lab combines data from several fields including molecular phylogenetics/phylogenomics, comparative genomics, biogeographic range reconstruction, stable isotope analyses, and microbial community sequencing. Comparative phylogenetic analysis and comparative genomics reveal the interconnectedness of ants and plants and that ants diversified after the rise of the angiosperms and how plants and ants evolved specialized structures and habits to maximize these symbiotic interactions. While studies combining stable isotope analysis to infer the trophic ecology of the ants and next-generation sequencing of gut-associated bacteria of ants highlight the importance of this microbiome association in the evolution of herbivory. Microbial contributions to ants are not limited to diet enrichment and we find evidence for their role in cuticle formation. These multiple lines of evidence are illuminating a more complete picture of ant ecology and evolution and providing novel insights into the role that symbiosis plays to promote biological diversity. In addition to biological diversity, we know that we need a diversity of researchers studying social insects. The data and research available about who is likely to participate and persist in science is alarming and without proactive measures we are certain to miss some of the brightest minds contributing to scientific research. I will share what the data show regarding bias and inclusion in the sciences across many axes of human diversity and will end with some recommendations to be more inclusive and equitable as individuals and as a scientific society.

About the Speaker

Corrie Moreau is the Martha N. and John C. Moser Professor of Arthropod Biosystematics and Biodiversity at Cornell University. She received a PhD from Harvard University and was a Miller Postdoctoral Fellow at the University of California, Berkeley. Her research focuses on the evolution and diversification of ants and their symbiotic bacteria. She couples field-based research with molecular and genomic tools to address the origin of species and how co-evolved systems benefit both partners. She pursues questions on the role of biogeography, trait evolution, and symbiosis in shaping macroevolutionary processes to better understand broad-scale evolutionary patterns of life. In addition, she is engaged with efforts to promote science communication and increase diversity in the sciences.

Plenary Sessions

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Tuesday 5 July

Peter Kofi Kwapong
University of Cape Coast, Ghana

13:45 – 14:45 • Pacific Ballroom 18-20

Stingless bees: Tropical and global asset

The stingless bees (Meliponini) are a primarily tropical group of over 500 species. They live in more or less permanent colonies made up of workers (modified females) and usually only one female reproductive, the queen, for each colony. Stingless bees are ecologically, economically and culturally important. They are important as pollinators of many agricultural and natural flowering plants. They have been recorded on over 200 plant families. They are therefore responsible for the sexual reproduction of many vegetables, crops and fruits including herbaceous medicinal plants as well as woody timber plants or trees. In many rural communities, stingless bees are an integral part of the ecosystem providing services of pollination which support many livelihoods. In the global sense, stingless bees could be a great asset for green house pollination. The hive products of stingless bees are known worldwide for their medicinal importance. It is possible that the long term effect of stingless bees could lead to growing back degraded forest through their pollination services leading to climate change mitigation. In this paper, an overview of stingless bees and their roles globally have been highlighted.

About the Speaker

Peter Kofi Kwapong is a Professor of Entomology at the University of Cape Coast. He received his PhD from the University of Reading in 1998. He has published widely on pollination ecology, bee biology and ecology, and he is a founding member of the African Pollinator Initiative and a member of the Global Pollinator Initiative. He is also the Director of the International Stingless Bee Center, which he founded in 2005 to serve as a sanctuary for culturing stingless bees. His honors include the British Council Award for the Most Effective Ambassador of UK Education in 2012 and the University of Cape Coast @50 Award for innovation and creativity. He was the national coordinator of the GEF/UNEP/FAO Global Pollination Project in Ghana.

Plenary Sessions

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Wednesday 6 July

Geraldine Wright
University of Oxford

08:30 – 09:30 • Pacific Ballroom 18-20

Mechanisms of gustatory coding in eusocial bees

Taste is important for allowing animals to make rapid decisions about food quality. Much of what we understand about the sense of taste has arisen in studies of omnivorous animals like rodents and fruit flies. The current models of taste propose that particular taste classes (e.g. salty, sugary, bitter, sour, umami) can be readily discriminated, but that animals do not discriminate compounds within each class. Specialist feeders like bees, however, that feed on nectar and pollen might be expected to have adaptations that permit them to have greater acuity for compounds like sugars that are relevant to their survival. In this talk, I will review what we know about the eusocial bee's sense of taste. My lab has discovered that bees are capable of discriminating among sugar compounds and that they have specialized mechanisms for the perception and encoding of sugar molecules in food. Over several years of research, we have also identified that bees have a limited ability to detect potential toxins in food using their sense of taste. I will discuss the relevance of this research to what we know about what all bees taste in the context of the types of compounds found in floral nectar.

About the Speaker

Geraldine Wright is the Hope Professor of Entomology at the University of Oxford. She originally studied botany at the University of Wyoming and received a DPhil in Zoology from the University of Oxford in 1998. Her lab investigates how bees detect, learn about, and regulate their intake of nutrients and secondary metabolites. Their work has shown that compounds like caffeine found in floral nectar and pollen enhance the learning and memory performance of honeybees. Her lab has also quantified the contribution of nutrients found in pollen to mechanisms of feeding in bees.

Plenary Sessions

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Thursday 7 July

Sylvia Cremer
The Institute of Science and Technology, Austria

08:30 – 09:30 • Pacific Ballroom 18-20

Social immunity: Disease protection of the colony

Social insects are protected against disease by the combination of the individual immune defenses of all colony members and their cooperative actions to reduce the risk of infection and disease transmission, providing social immunity to the colony. Colony members thus contribute jointly to e.g. nest disinfection, pathogen removal or the modulation of the colony's social interaction network. Little is known, however, on how these behavioral changes are triggered in the individual insects and how they interplay to an effective disease control at the colony level. It is also still unexplored, how the drastic reduction of pathogen fitness by social immunity affects pathogen adaptation to withstand not only the physiological immune systems, but also the colony-level defenses of their social hosts. I present the integrated approach we use to understand how social immunity emerges from individual (inter-)actions and how it may shape disease evolution.

About the Speaker

Sylvia Cremer is a Professor at the Institute of Science and Technology Austria. She received her PhD at the University of Regensburg and was a postdoctoral scientist at the University of Copenhagen and a Junior Fellow at the Institute of Advanced Studies in Berlin. She studies individual and social immunity in insect colonies, in particular the cooperative disease defense emerging in superorganismal ant societies. Her work combines behavioral and chemical ecology with evolutionary immunology, to understand common principles of the interplay of individual and collective defenses across biological levels.

Schedule-at-a-Glance

In-person events take place in the San Diego Marriott Marquis, unless otherwise noted.
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Sunday 3 July

PLENARY SESSION	TIME	LOCATION
Keynote Lecture: My adventures with *Ropalidia marginata*, an endlessly fascinating tropical primitively eusocial wasp. Raghavendra Gadagkar	16:00 – 17:30	Marina Ballroom
POSTER SESSION #1	17:30 – 19:00	San Diego Ballroom

Monday 4 July

	TIME	LOCATION
VIRTUAL POSTER SESSION #1	07:00 – 08:15	Pathable
PLENARY SESSIONS		
Plenary Session 1: Pathways of evolution in wasps: What hormones and pheromones tell us about it. Fabio Nascimento	08:30 – 09:30	Pacific Ballroom 18-20
Plenary Session 2: Social spiders: Lessons in ecology and evolution. Leticia Aviles	13:45 – 14:45	Pacific Ballroom 18-20
SYMPOSIA		
Symposium 4: What can we learn from simple insect societies?	10:00 – 16:00	Pacific Ballroom 16-17
Symposium 10: The function of network structure: From genes to ecological communities	10:00 – 16:00	Pacific Ballroom 21
Symposium 16: What makes a successful invader? Exploring how genetics, ecological and behavioral factors contribute to the likelihood of invasion by eusocial species	10:00 – 16:00	Pacific Ballroom 23-24
Symposium 23: Balancing social and ecological information in a changing world	10:00 – 16:00	Pacific Ballroom 14-15
Symposium 28: Developmental plasticity of social insects	10:00 – 16:00	Pacific Ballroom 18-20
Themed session 1: Stressors, sickness, and symbiosis: the pros and cons of group living	10:00 – 12:15	Pacific Ballroom 25-26
Themed session 2: Biogeography of social insects	14:45 – 16:00	Pacific Ballroom 25-26
POSTER SESSION #2	16:30 – 18:00	San Diego Ballroom
SPECIAL EVENTS		
IUSSI 2022 Social Media Meet Up	18:00 – 20:00	Poolside
Opening reception	20:00 – 23:00	Marina Terrace
SECTION MEETINGS		
North American Section	12:45 – 13:45	Pacific Ballroom 14-15
Central European Section	12:45 – 13:45	Pacific Ballroom 16-17
Northwest European Section	12:45 – 13:45	Pacific Ballroom 21
Australasian Section	12:45 – 13:45	Pacific Ballroom 18-20
Brazilian Section	12:45 – 13:45	Pacific Ballroom 23-24
French-Speaking Section	12:45 – 13:45	Pacific Ballroom 25-26

Schedule-at-a-Glance

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Tuesday 5 July

	TIME	LOCATION
VIRTUAL POSTER SESSION #2	07:00 – 08:15	Pathable
PLENARY SESSIONS		
Plenary Session 3: Symbiosis in ants and why broadening our research community is essential for the best social insect science. Corrie Moreau	08:30 – 09:30	Pacific Ballroom 18-20
Plenary Address 4: Stingless bees: Tropical and global asset Peter Kofi Kwapong	13:45 – 14:45	Pacific Ballroom 18-20
SYMPOSIA		
Symposium 21: The benefits of human activity on social insect populations	10:00 – 12:15	Pacific Ballroom 21
Symposium 32: Pleiotropism and neofunctionalization: The varied facets of juvenile hormone in social insect life cycles	10:00 – 12:15	Pacific Ballroom 25-26
Symposium 3: Major transitions revisited: The how, why, and when of social transitions in insects	10:00 – 16:00	Pacific Ballroom 23-24
Symposium 15: The effects of anthropogenic warming and increasing thermal variability on social insects	10:00 – 16:00	Pacific Ballroom 16-17
Symposium 25: Nutritional dimensions in social insect evolution and ecology	10:00 – 16:00	Pacific Ballroom 14-15
Symposium 9: Advances in collective behavior using quantitative behavioral tools	10:15 – 18:30	Pacific Ballroom 18-20
Themed session 3: Individual cognition in social insects	14:45 – 15:30	Pacific Ballroom 25-26
Symposium 12: From signaling to sensing: How pheromones modulate social organization	14:45 – 18:30	Pacific Ballroom 21
Symposium 17: The anthropogenic drivers of social insect invasions	16:30 – 18:30	Pacific Ballroom 23-24
Symposium 22: New frontiers in social insect research: The role of citizen science	16:30 – 18:30	Pacific Ballroom 16-17
Symposium 27: Diversity and evolution of termite breeding systems	16:30 – 18:30	Pacific Ballroom 14-15
Themed session 4: Physiological and genetic mechanisms of the evolution of sociality	16:30 – 18:30	Pacific Ballroom 25-26
SPECIAL EVENT		
Lunch & Learn: DEIJ Discussion – Safety for minoritized people in the field	12:45 – 13:45	Torrey Pines 1-2
SECTION MEETINGS		
Indian Section	12:45 – 13:45	Pacific Ballroom 14-15
Italian Section	12:45 – 13:45	Pacific Ballroom 16-17
Japanese Section	12:45 – 13:45	Pacific Ballroom 21
African Section	12:45 – 13:45	Pacific Ballroom 18-20
Andean-Carribean Section	12:45 – 13:45	Pacific Ballroom 23-24
COMMITTEE MEETING		
International Committee Meeting	18:30 – 20:30	Pacific Ballroom 23-24

Schedule-at-a-Glance

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All times shown below are Pacific Daylight Time (PDT). Virtual attendees must adjust for their local time.

Wednesday 6 July

PLENARY SESSIONS	TIME	LOCATION
Plenary Session 5: Mechanisms of gustatory coding in eusocial bees Geraldine Wright	08:30 – 09:30	Pacific Ballroom 18-20
West-Eberhard Award Lecture: Life advice for wasps Patrick Kennedy	13:45 – 14:45	Pacific Ballroom 18-20
VIRTUAL SESSIONS		
Virtual themed session 1: Evolution and biogeography of social insects	07:00 – 08:15	Pathable
Virtual themed session 2: Chemical communication	07:00 – 08:00	Pathable
Virtual themed session 3: Social organization and division of labor	07:00 – 08:15	Pathable
Virtual themed session 4: Pathogens, parasites, and social immunity	07:00 – 08:15	Pathable
Virtual themed session 5: Biology of pollinators	07:00 – 08:15	Pathable
Symposium 14: The sensory ecology of social insect foraging	07:00 – 08:00	Pathable
SYMPOSIA		
Symposium 7: Sociable arthropods: Broadening conceptions about social insects	10:00 – 12:15	Pacific Ballroom 21
Symposium 8: Guests of social insects	10:00 – 12:15	Pacific Ballroom 25-26
Symposium 14: The sensory ecology of social insect foraging	10:00 – 12:15	Pacific Ballroom 14-15
Symposium 1: Mechanisms of individual life history evolution in the social context	10:00 – 16:00	Pacific Ballroom 23-24
Symposium 26: Biological clocks and social organization	10:00 – 16:00	Pacific Ballroom 16-17
Symposium 20: Protecting pollinators and our food supply: Understanding and managing threats to pollinator health	10:00 – 18:30	Pacific Ballroom 18-20
Symposium 13: Neurobiology of chemosensation	14:45 – 18:30	Pacific Ballroom 21
Symposium 24: The role of individual variation in collective information processing	14:45 – 18:00	Pacific Ballroom 14-15
Symposium 30: The high cost of communal living: Evolution and mechanisms of social immunity in eusocial insects	15:00 – 18:30	Pacific Ballroom 25-26
Symposium 31: My parents made me do it: Epigenetic inheritance in social insects	16:30 – 18:30	Pacific Ballroom 16-17
Special Symposium: Exhibiting social insect research through art and science communication	16:30 – 18:30	Pacific Ballroom 23-24
SPECIAL EVENTS		
Lunch & Learn: How to Find and Write Grants for Early Career Scientists	12:45 – 13:45	Torrey Pines 1-2
Self-Organized Picnic at the Beach	19:00 – 21:00	Offsite, Coronado Island

Schedule-at-a-Glance

In-person events take place in the San Diego Marriott Marquis, unless otherwise noted.
All times shown below are Pacific Daylight Time (PDT). Virtual attendees must adjust for their local time.

Thursday 27 July

	TIME	LOCATION
VIRTUAL POSTER SESSION #3	07:00 – 08:15	Pathable
PLENARY SESSION		
Plenary Session 6: Social immunity: Disease protection of the colony Sylvia Cremer	08:30 – 09:30	Pacific Ballroom 18-20
SYMPOSIA		
Themed session 5: Mechanisms of collective behavior	10:00 – 12:00	Pacific Ballroom 25-26
Symposium 5: Spatial structure and organization within social insect colonies	10:00 – 12:15	Pacific Ballroom 23-24
Symposium 2: Origins & transitions: A model clade approach for social evolution	10:00 – 16:00	Pacific Ballroom 16-17
Symposium 6: Division of labor in social insects: Advancing theory and novel empirical approaches	10:00 – 16:00	Pacific Ballroom 18-20
Symposium 11: Tiny brains pushing the limits: Cognitive abilities of social insects	10:00 – 16:00	Pacific Ballroom 14-15
Symposium 29: Exploring the intricacies of relationships between social insects and microorganisms	10:00 – 15:45	Pacific Ballroom 21
Symposium 19: Impacts of introduced honeybee populations on plant-pollinator mutualisms in non-managed ecosystems	13:45 – 16:00	Pacific Ballroom 23-24
Themed session 6: Evolutionary perspectives on social insects	13:45 – 16:00	Pacific Ballroom 25-26
SPECIAL EVENTS		
EntoPOC-IUSSI grant writing workshop	12:15 – 13:15	Torrey Pines 1-2
Closing banquet	19:00 – 21:00	Offsite, San Diego Natural History Museum

Plenary Session

16:00 – 17:30		Marina Ballroom
16:00	*Raghavendra Gadagkar*	My adventures with *Ropalidia marginata*, an endlessly fascinating tropical primitively eusocial wasp

Poster Session 1

17:30 – 19:00		San Diego Ballroom
P002	*Kenneth Mitchell*	Turtle ant movement and nest choice on modular tree branches
P004	*Nitika Sharma*	A place for everything and everything in its place: Spatial organization of individuals on nests of the primitively eusocial wasp *Ropalidia marginata*
P006	*Isabella Muratore*	Body morphology, neuroanatomy, and transcriptomics of division of labor in agricultural ants
P008	*Smruti Pimplikar*	The role of sensory response thresholds in bumblebee foraging specialization
P010	*Leeah Richardson*	Behavioral and neuromorphological comparisons between bumblebee workers, gynes, and reproductive queens.
P012	*Emma Despland*	Overcoming plant defenses as a driver of group-living in herbivorous insects
P014	*Renee Nowicki*	Cuticular hydrocarbon analysis of social parasitism in southeastern cone ants: Preliminary results
P016	*Paige Caine*	Rescue behavior in *Solenopsis invicta* fire ants
P018	*Michelle Pham*	Reclaiming vacant land for green infrastructure to support urban bee habitat
P020	*Calum Stephenson*	Unpacking a super-integrated mutualism through parallel proteomics of key symbiotic tissues
P022	*Margarita Orlova*	Chain length of exocrine gland components ubiquitously changes with life stage in bumblebee queens
P024	*Christopher Albin-Brooks*	Narrow caste specific hydrocarbon sensitivity in the Nevada dampwood termite *Zootermopsis nevadensis*
P026	*Ronald Brown*	A Developmental Transcriptome of *Polistes fuscatus*
P028	*Morgan Carr-Markell*	Assessing the effects of floral distribution on honey bee recruitment behavior
P030	*Chiazam Nzeako*	Dimensionality of color pattern diversity in facial signals across social paper wasps
P032	*Jun Chen*	Modeling pesticide exposure on honeybee population dynamics with seasonality
P034	*Santiago Meneses*	The nutritional strategies of two closely related *Aphenogaster* ant species with contrasting temperature tolerances
P036	*Peter Nonacs*	The “Traveling Salesman” problem and how ants forage to find food
P038	*Kennedy Omufwoko*	Transcriptomic signatures of caste and seasonality in the socially variable sweat bee, *Lasioglossum baleicum*
P040	*Jesse Huisken*	Social environment and gene expression in a small carpenter bee
P042	*Ida Naughton*	An assemblage-level comparison of genetic diversity between island and mainland ant populations in southern California
P044	*Katherine Fiocca*	Differences in cuticular hydrocarbon profiles reflect caste status in a eusocial paper wasp
P046	*Jacob Sorrentino*	Impacts of the invasive spotted lanternfly on Pennsylvania ant communities
P048	*Ren Weinstock*	Investigating the plasticity of bee social behavior under climate change

P050	*Eli Wyman*	The ontogeny of ground nesting bee observation cages: Early designs and new innovations
P052	*Scott Powell*	How niche expansion and niche subdivision shape the adaptive radiation of the turtle ants
P054	*Jessica Maccaro*	Vulture bee microbiome
P056	*Etya Amsalem*	CO_2 narcosis induces a metabolic shift mediated via juvenile hormone in *Bombus impatiens gynes*
P058	*Awanti Shastri*	Ontogeny of tasks in the colonies of the Asian honeybee, *Apis cerana*.
P060	*Samantha Kennett*	How a new, New York City ant has exploited a novel niche to make it in the city
P064	*Emilia Zoppas de Albuquerque*	Detecting the invisible: Using UCEs to delimit cryptic species in the *Cyphomyrmex rimosus* group (Formicidae: Myrmicinae)
P068	*Matthew Prebus*	The rediscovery and taxonomic demise of *Manica parasitica* (Hymenoptera: Formicidae).
P074	*Rebecca Senft*	Functional role of ant cuticle sculpturing in abrasion resistance
P076	*Purbayan Ghosh*	Cost of brood transport in an Indian ant during relocation
P078	*Blanca Peto*	Varying reproductive rates in *Bombus impatiens*: An evaluation of queen bumble bee reproduction and behavior in early-stage nests
P080	*Kate Hunter*	Investigating the dynamics of bee immune responses and their relationship with social behavior
P082	*Meredith Johnson*	The natural air conditioning of a wild, desert bee in a changing climate
P084	*Xiaohui Guo*	Brood: Worker ratios determine metabolic scaling of seed harvester ant colonies during ontogeny
P094	*Amalie Strange*	Can seeing inspire action? An interactive virtual beehive tour for equitable access to nature
P096	*Ian Butler*	Heteroplasmy in Mexican populations of the ant *Ectatomma ruidum*
P100	*Brendan Hunt*	Direct and indirect effects of a social supergene
P102	*Quinn McFrederick*	The miniature ecosystem of bee brood cells: Interactions among microbes and mesofauna
P104	*Julie Mustard*	Neonicotinoid pesticides affect the ability of honey bees to discriminate between odors and learn a complex task
P106	*Olav Rueppell*	Social regulation of egg size plasticity in the honey bee
P108	*Thomas Webster*	Stable isotope partitioning in *Nosema*-infected honey bees
P112	*Barrett Klein*	Wax, wings, and swarms: Social insects as art media
P114	*Alicja Witwicka*	Dose- and pesticide-specific effects of cholinergic insecticides on gene expression in Bombus terrestris
P116	*Joel Barhorst*	Honeybee viruses in relation to flowers
P118	*Kyle Gray*	First insights into the ant biodiversity of Vanuatu
P120	*Nicole Leitner*	A potential role for neuronal miRNAs in regulating behavioral states associated with division of labor in social bees
P124	*Jian Chen*	Fire ants feed their nestmates with their own venom
P126	*Jayla Marvin*	Viral prevalence of honeybees and small carpenter bees among three different farm landscapes
P132	*Nicholas Nighswander*	Seasonal nutrient fluctuations in termites
P134	*Allyson Dekovich*	Population genetic analyses reveal host specificity and genetically distinct populations of social parasite *Solenopsis daguerrei* (Hymenoptera: Formicidae)

P136	*Molly Cook*	Regulation of vitamin C and B3 intake by the eastern subterranean termite *Reticulitermes flavipes* (Kollar)
P138	*Dennis Melendez*	Emigration dynamics of the clonal raider ant
P140	*Davide Bergamaschi*	Ant diversity in the Santa Catalina Mountains: Revealing patterns and understanding drivers
P142	*Daniela Zarate*	Admixture in Africanized honey bees (*Apis mellifera*) from Panamá to San Diego, California (U.S.A.)
P144	*Michael Gilbert*	Epigenetic signatures that regulate caste plasticity of leafcutter ants
P146	*Kevin L. Haight*	Resistance to reproductive senescence in the totipotent workers of the ant *Harpegnathos saltator*
P148	*Anna Chernyshova*	The brain-gut axis of honey bees: Testing how microbiota affect individual and social behavior
P150	*Miguel Corona*	Decoupling the effects of nutrition, age and behavioral caste on honey bee physiology and immunity
P152	*Tim DeLory*	Recombination rates and the major evolutionary transitions

Virtual Poster Session 1

07:00 – 08:15		Pathable
P059	*Mohammed Mustafa*	Assessment of hygienic and grooming behavior of honeybees, *Apis mellifera* L. against the mite Varroa jacobsoni
P071	*Clement Yatahai Mineo*	Pollination by honey bees and potential benefits on cotton production
P072	*Samuel Beshers*	Tasks and specilaization in social insects
P085	*Suzanne Schmidt*	Do high CO_2 levels help protect *Termitomyces* against antagonists?
P089	*Hironori Sakamoto*	Establishing measures to control invasive alien insect species in Japan
P153	*Nathanael Litlekalsoy*	Can functional genomics help predict the impacts of invasive insects? From genes to communities
P154	*Maité Masciocchi*	Do invasive species encourage the invasion of social wasps in Patagonia?
P155	*Gabriela Castaño Meneses*	Observations on the nest of *Trigona fuscipennis* Friesse 1900, in Quintana Roo, México.
P156	*Rebecca Antaki*	New targets for breeding honey bees for pollination?
P157	*Isabella Fernanda Camargo*	Effects of the pesticide Flupyradifurone on the immune system of the *Melipona scutellaris* bee
P158	*Michelle Liang*	Uncapping behaviour in a *Varroa*-naïve honey bee population
P159	*Cedric Aumont*	Immune gene family diversity across termite phylogeny and sociality
P160	*Tilottama Mazumdar*	Unveiling infection strategies of the entomopathogenic fungus *Metarrhizium anisopliae* in the face of social immunity in the termite *Reticulitermes flavipes*
P161	*Michael Hoban*	Antifungal properties and metabolites of honey bee gut bacteria

Plenary Session

08:30 – 09:30		Pacific Ballroom 18-20
8:30	*Fabio Nascimento*	Pathways of evolution in wasps: What hormones and pheromones tell us about it

13:45 – 14:45		Pacific Ballroom 18-20
13:45	*Leticia Aviles*	Social spiders: Lessons in ecology and evolution

Symposia

10:00 – 16:00		Pacific Ballroom 16-17

Symposium 4: What can we learn from simple insect societies?
Organizers: Abel Bernadou, Romain Libbrecht, Yasukazu Okada

10:00	*Shigeto Dobata*	Quantifying multilevel selection in a male-free, queenless and annual ant species
10:15	*Yuko Ulrich*	Developmental plasticity in the clonal raider ant
10:30	*Martin Coulm*	Molecular basis of the social control of reproduction and behavior in ants
10:45	*Katherine Geist*	A consolidated core genetic toolkit for alternative social phenotypes in simple insect societies

11:00	*Mallory Hagadorn*	Maternal brains: Exploring neuroplasticity associated with egg-laying and brood care in bumble bees
11:15	*Jennifer Livesey*	How important are social dominance hierarchies? Investigating whether bumblebee workers form dominance hierarchies in which rank correlates with reproductive success
11:30	*Priscila K. F. Santos*	Sexual production is regulated by the brood in *Bombus impatiens* colonies
11:45	*Etya Amsalem*	Social behavior and colony trajectory in bumble bees are shaped by the brood
12:00	*Patrick Kennedy*	Inter-colony cooperation in networks of primitively-eusocial wasp colonies
14:45	*Lucas Hearn*	Extreme reproductive skew in a primitively social bee provides insights into the dawn of sociality in insects
15:00	*Anna Friedel*	Challenging the eusocial paradigm
15:15	*Zachary Shaffer*	Efficient allocation of labor maximizes brood development and explains why intermediate-sized groups perform best during colony-founding in the ant, *Pogonomyrmex californicus*
15:30	*Romain Honorio*	Do social interactions mitigate the costs of exposure to pollutant in an insect with family life?
15:45	*Haruka Osaki*	Cannibalistic mating behavior of a subsocial cockroach: Female and male eat the wings of each other

10:00 – 16:00 **Pacific Ballroom 21**

Symposium 10: The function of network structure: From genes to ecological communities

Organizers: Noa Pinter-Wollman, Graham J Thompson, Claire Morandin, Deborah M. Gordon

10:00	*Graham Thompson*	Towards a network-based integration of insect sociobiology
10:15	*Mark Harrison*	Convergent co-expression network structures in two eusocial insects
10:30	*Ian Traniello*	Single-cell dissection of a collective behavior in honey bees
10:45	*Enrico Gavagnin*	The impact of nest topology on social interaction networks in ants
11:00	*Emily Laub*	Social partner choice in paper wasps
11:15	*Nitika Sharma*	A reproductive heir has a central position in multilayer social networks of paper wasps
11:30	*Noa Pinter-Wollman*	The interaction between social and spatial networks
11:45		Discussion
14:45	*Valentin Lecheval*	Studying polydomy as a collective behaviour system
15:00	*Matina Donaldson-Matasci*	The structure and formation of arboreal ant transportation networks
15:15	*Damien Gergonne*	Evolutionary history of a Neotropical soil-feeding termite
15:30	*Kate Borchardt*	Should we practice honey beekeeping in habitat for native plant-bee interaction conservation?
15:45	*Aoife Cantwell-Jones*	Bee trait turnover structures Arctic pollination networks and spatiotemporal functional redundancy

10:00 – 16:00 **Pacific Ballroom 23-24**

Symposium 16: What makes a successful invader? Exploring how genetics, ecological and behavioral factors contribute to the likelihood of invasion by eusocial species

Organizers: Brock Harpur, Margarita López-Uribe, Fabio Manfredini, Benjamin Taylor

10:00	*Eyal Privman*	Evolution of sociobiological traits in invasive fire ants
10:30	*Max Madrzyk*	Colonies of Argentine ants allocate exploratory individuals to where they are ecologically needed
10:45	*Anna Lenhart*	Influence of queen number on survival and gene expression in an invasive ant

11:00	*Thomas Hagan*	Founder effects reduce fitness at the range edge of an expanding invasive bee population
11:15	*Misato Miyakawa*	Evolution and molecular mechanism of multi-locus sex-determination system in ant, *Vollenhovia emeryi*
11:30	*Mohammed "Simo" Errbii*	The genomics of invasiveness: Lessons from the ant *Cardiocondyla obscurior*
11:45	*Pierre Andre Eyer*	Sexually antagonistic selection promotes genetic divergence between males and females in an invasive ant
12:00	*Felipe Pereira da Rocha*	Is functional diversity higher in the bacterial communities of *A. gracilipes* in urban habitats?
14:45	*Brian Whyte*	Body size and cuticular hydrocarbon composition determine desiccation resistance in the invasive Argentine ant (*Linepithema humile*)
15:00	*Beatrice T. Nganso*	Role of a Niemann-Pick type C_2 transcript (Vd40090) in *Varroa*-honey bee interaction
15:30	*Benjamin Taylor*	Giants in America: Population genomics of a newly-established invasive hornet
15:45	*Adriaan Meiborg*	The suppressive potential of a gene drive in populations of invasive social wasps is limited

10:00 – 16:00 **Pacific Ballroom 14-15**

Symposium 23: Balancing social and ecological information in a changing world

Organizers: Chelsea N. Cook, Kaitlin M. Baudier, Floria Mora-Kepfer Uy

10:00	*Jelena Bujan*	Increased acclimation ability accompanies a thermal niche shift of a recent invasion
10:15	*Juliana Calixto*	Is reproductive caste associated with critical thermal limits in desert seed-harvester ants?
10:30	*Carmen da Silva*	Predicting adaptive responses of Australian native bees to climate change
10:45	*Biplabendu Das*	Molecular links between plasticity of the biological clock and polyphenism in ants
11:00	*Franne Kamhi*	Neuroscience of ant foraging and ecological change
11:15	*Ikechukwu Onah*	Trophic networks and nesting site adaptations of *Axestotrigona nigerrima* (Hymenoptera: Apidae) in two contrasting climatic regions of Nigeria
11:30	*Mariano Calvo Martín*	Emergence of collective memory of the American cockroach (*Periplaneta americana*)
11:45	*Kristin Robinson*	Biogeography of thermal performance in the subtropical paper wasp, Mischocyttarus *mexicanus cubicola*
12:00	*Austin Merchant*	Caste- and sex-based differences in brain anatomy in the eastern subterranean termite, *Reticulitermes flavipes*
14:45	*Sanja Hakala*	Biomarkers in a socially exchanged fluid reflect colony maturity, behavior, and distributed metabolism
15:00	*Tyler Murdock*	A comparative study of the relationship between cuticular lipid attributes and water loss in carpenter ants (*Camponotus*)
15:15	*Marco Mancini*	*Hypoponera eduardi* populations in geothermal areas in Southern Iceland. Can they be considered native to the island?
15:30	*Kaitlin Baudier*	Inter-caste metabolic scaling in workers of the stingless bee *Tetragonisca angustula*
15:45	*Léo Clement*	An intrinsic oscillator underlies visual navigation in ants

10:00 – 16:00 **Pacific Ballroom 18-20**

Symposium 28: Developmental plasticity of social insects

Organizers: Eva Schultner, Ehab Abouheif, Jan Oettler

10:00	*Eva Schultner*	Towards a mechanistic understanding of caste polyphenism

10:15	*Ehab Abouheif*	Towards a standard model for caste development and evolution as seen through the ants
10:30	*Buck Trible*	The molecular basis of caste development and evolution in ants
10:45	*Guojie Zhang*	Genetic regulation for the superorganismal caste differentiation in ants
11:00	*Marian Priebe*	Gene duplication facilitates phenotypic innovation in ant castes
11:15	*Christopher Wyatt*	Social complexity, life-history and lineage influence the molecular basis of caste in a major transition in evolution
11:45	*Bitao Qiu*	Predicting queen-worker caste fate with individual genome-wide transcriptome features
12:00	*Romain Libbrecht*	Ontogeny of superorganisms: Social control of queen specialization in ants
14:45	*Chris Smith*	Sexual dimorphism as a facilitator of worker polymorphism
15:00	*Esther van den Bos*	Effects of heat-shocks on sociometry in the invasive ant species *Cardiocondyla obscurior*
15:15	*Érik Plante*	Elucidating the drivers of worker polymorphism variation across the range of a broadly distributed ant species
15:30	*Aleš Buček*	Evolutionary trajectories of mandibular snapping in termite soldier caste
15:45	*Claudineia Pereira Costa*	Maternal effects on brood development in the bumble bee *Bombus impatiens*.

10:00 – 12:15 **Pacific Ballroom 25-26**

Themed session 1: Stressors, sickness, and symbiosis: The pros and cons of group living

10:00	*Quentin Avanzi*	Tolerance and resistance strategies against pathogens in ants: The influence of colonial activity level
10:15	*Enikő Csata*	The importance of nutrition in a host-parasite system
10:30	*Anna Franschitz*	Individual versus social immunity against viral disease in ants
10:45	*Daniel Schläppi*	Attraction to virus-infected food in black garden ants, *Lasius niger* (Hymenoptera: Formicidae)
11:00	*Darren O'Connell*	The influence of multiple stressors on honey bee colony losses
11:15	*Florian Strahodinsky*	Social immunity of ants against nematode infection
11:30	*Tatsuya Inagaki*	Dynamics of gut microbiota in termite during caste differentiation and vertical transmission
11:45	*Laura Miller*	Bacterial phage transfer in *Camponotus floridanus*
12:00	*Raphaella Jackson*	Convergent evolution of a nutritional symbiosis in ants

14:45 – 16:00 **Pacific Ballroom 25-26**

Themed session 2: Biogeography of social insects

14:45	*Jill Oberski*	Historical biogeography of the pyramid ants (Formicidae: Dorymyrmex)
15:00	*Julya Pires Souza*	Cacti associated to termite nests produce more fruits in Brazilian altitude grassland (Campo Rupestre)
15:15	*Daniela Mera-Rodríguez*	Phylogeny of *Myrmecia* bulldog ants: Biogeographic history and the evolution of social parasitism
15:30	*Kyle Gray*	Global biogeography of ant social parasites
15:45	*Jean-Philippe Lessard*	Warm and arid regions of the world are hotspots of superorganism complexity

Poster Session 2

16:30 – 18:00 **San Diego Ballroom**

P001	*Natalia Araujo*	Genomic evolution and transcriptomic modularity in eusocial corbiculate: Adding stingless bees to the big picture
P003	*Takayoshi Kuwabara*	Analysis and exploration of Kenyon cells increased with behavioral evolution in hymenopteran insects
P005	*Peter Xu*	Temporal predictability as a factor in the choice of risk-mitigation strategy for food acquisition
P007	*Colin Lynch*	Do changes in division of labor underlie hypometric metabolic scaling?
P009	*Jumpei Uematsu*	Quantitative estimation of the strength of intra- and interspecific competition in an ant
P011	*Yutaro Koyama*	Colony defense by the first-biting individual in the damp-wood termite *Zootermopsis nevadensis*
P013	*Yasunari Tanaka*	The effect of individual experience on task choice in an ant
P015	*Laura Leger*	The gut-brain microbiome axis in bumble bees
P021	*Fabio Manfredini*	The interplay between viral infections and regulation of foraging behaviour in the honeybee brain
P023	*Ayaka Agarie*	Detecting a selfish genetic element causing the male-biased sex ratio in a termite
P025	*Marielle Postava-Davignon*	Reactions of sympatric *Reticulitermes virginicus* and *Brachyponera chinensis* to fungal diversity
P027	*Claire Allison*	Mass-flowering crops impact the gut bacterial community of stingless bees used for pollination
P029	*Chih-Chi Lee*	Social microbiome and social traits associations in a *Cataglyphis* desert ant
P033	*Hiroyuki Shimoji*	A novel defensive gut symbiont of *Diacamma* cf. *indicum* from Japan
P037	*Takumi Hanada*	Molecular identification and expression analysis of chemosensory genes in the termite antennae
P039	*Lioba Hilsmann*	Effects of conventional and sustainable beekeeping on the behavior and resilience of honeybees
P041	*Kodji Issaya Issaya*	*Apis mellifera* (Hymenoptera: Apidae) and *Gossipium hirsutum* L. (Malvaceae) variety L457 flowers at Meskine (Soudano- Sahelian zone, Cameroon)
P043	*Patrick Kennedy*	Blackmail in the evolution of altruism
P045	*Tristan Klaftenberger*	Macroecological pattern of color in Madacasgar ants
P047	*Luke Leckie*	Care-giving networks in ant colonies under a multi-pathogen threat
P051	*Maria Eduarda Lima Vieira*	Interactions and competition between sympatric colonies of solitary foraging Neotropical ants
P053	*Stephan Lohmar*	Role of reproductive success at different hierarchical levels in the transition toward superorganismality
P055	*Célia Lutrat*	Identification of genes responsible for caste determination in the harvester ant *Messor barbarus*
P057	*Kamiel Debeuckelaere*	One robotic flower field to study them all : A wireless system to assess pollinator foraging
P061	*Anete Pedro Lourenco*	Characterization and expression of immune genes in stingless bees (Apidae: Meliponini)
P063	*Jéferson Pedrosa Santos*	When is it necessary to avoid your enemies? A stingless bee ignores aggressive competitor cues to explore food sources

P065	*Marîlia Maria Silva da Costa*	Taxonomic and functional beta diversity response to forest cover gradient in human-modified landscape
P066	*Karen Robles Lopez*	Hidden treasures in ants' trash: Army ants midden as temporary resources for other ants' species
P067	*Ivelize Tannure-Nascimento*	Cuticular hydrocarbons and caste-linked compounds in neotropical swarm-founding wasps
P069	*Oscar Vaes*	Colony-specific activity becomes more synchronized and decreases with starvation
P070	*Michelle White*	The evolution of queen-worker dimorphism across ants
P073	*Chanpen Chanchao*	The contribution of phenolics to the antioxidant potentials of stingless bee propolis in Thailand
P075	*Maria Cristina Arias*	Comparative transcriptome analysis reveals insights on the molecular basis of cleptobiosis in stingless bees
P077	*Amanda Prato*	Immunological modulation and age polyethism: Task differentiation is more important than age
P079	*Birgit Gessler*	Deciphering the genetic mechanisms for *Varroa* sensitive hygiene (VSH) in *Apis mellifera*
P081	*Akiko Koto*	Social isolation causes short life span through oxidative stress in ants
P083	*Robert Murphy*	Comparative genomics reveals prophylactic and catabolic capabilities of Actinobacteria within the fungus-farming termite symbiosis
P087	*Otavio Silva*	Systematics and evolution of the ant genus *Rogeria* Emery, 1894 (Hymenoptera: Formicidae)
P091	*Linda Sartoris*	Previous pathogen experience modulates sanitary brood care in ants
P093	*Tatsuya Saga*	Increasing genetic diversity among nestmates affects disease resistance in eusocial wasps
P095	*Ameka Myrie*	Social behavior of the coffee berry borer
P097	*Amanda Silva*	Ants on flowers: A meta-analysis on the ecological cost of bodyguard ants to pollination
P099	*Filippo Castellucci*	Ecological plasticity in the myrmecophilic spider genus *Mastigusa*: A phylogenetic approach
P101	*Kazuki Tsuji*	Field testing of the adaptation load theory with an ant community
P103	*Luca Pietro Casacci*	Evolution of vibroacoustic signals in the slave-making ant *Myrmoxenus ravouxi* and its host ants
P105	*Umer Ayyaz Aslam Sheikh*	Spatio-temporal behavior of *Bombus simillimus* (Hymenoptera: Apidae) from Tolipir National Park, Azad Jammu and Kashmir, Pakistan
P107	*Tolobe Djikoloum Fabien*	Acridofaune de la zone urbaine de Yaoundé pendant la grande saison sèche.
P109	*Martin Giurfa*	Visual learning in a virtual reality environment upregulates immediate early gene expression in the mushroom bodies of honey bees
P111	*Arthur Hais*	Microbial communities in butterfly social parasites and their host ants
P113	*Lukas Lindorfer*	Real-time visualization of nest disinfection and its effect on pathogen control in ants
P115	*Catalina Rodriguez Alemany*	The effects of environmental chemical stressors on the Western honey bee's (*Apis mellifera* L.) circadian rhythmicity ontogeny
P117	*Nancy Ellis*	Epigenetic determination of phenotypic plasticity in the buff-tailed bumble bee, *Bombus terrestris*
P119	*Ingrid Fetter Pruneda*	Distribution of an oxytocin/vasopressin-like neuropeptide in ovaries and brains of harvester ants
P121	*Christoph von Beeren*	Diversity, host specificity, and integration strategies of army ant guests
P123	*Marianne Azevedo-Silva*	Investigating the drivers of reproductive success in queens of Neotropical carpenter ants

P127	*Rachael Brown*	Investigating the potential role of vibrational signals in pathogen alarm behaviour in *Lasius niger*
P128	*Ashley Kim*	Effects of artificial light at night (ALAN) on honey bee sleep behavior
P129	*Iago Bueno da Silva*	Oviposition and queen reproductive activity in incipient colonies of *Coptotermes gestroi*
P131	*Llilians Calvo*	Molecular basis of behavioural plasticity
P133	*André De Souza*	Sex recognition does not modulate aggression toward nest intruders in a paper wasp
P135	*Claire Detrain*	A fungus-infected environment is more of a nuisance than a health risk for ant foragers
P137	*Benjamin Dofka*	Caste-specific phenotypes in developing ants and their role in social interactions
P139	*Kokuto Fujiwara*	Identification of doublesex ortholog and its target genes in termites
P141	*Felix Glinka*	How to get most of your ddRad seq run
P143	*Marie Zakardjian*	Exobees, a database of alien solitary bees in the world
P149	*Chinmay Joshi*	Robustness of communication to individual errors; comparing social insect food recruitment systems
P151	*Terry McGlynn*	Safety in fieldwork: Best practices for preventing and responding to harassment in field settings
P153	*Josh Gilligan*	Steps towards implementing a Gene Drive for invasive wasp species
P185	*Cleo Bertelsmeier*	How pests become pets. Invasive species are favored in the global pet trade in ants

Virtual Poster Session 2

07:00 – 08:15		Pathable
P062	*Patrick Piekarski*	Indirect genetic effects of caregivers on offspring growth and development in the clonal raider ant
P162	*Hajime Yaguchi*	Functionalization of vitellogenin genes during the course of eusocial evolution in termites
P163	*Fabrice Savarit*	Worker responsiveness to larval odors is associated with task allocation in ants
P165	*Guangshuo Li*	Insights into the genetic basis of adaptive evolution of *Podaxis* to a termite-associated lifestyle
P166	*Haruka Yamaguchi*	Zooid differentiation in a colonial bryozoan
P167	*Chantal Poteaux*	A case of polydomous nest organization in a monodomous ant
P168	*Tiago Carrijo*	Exploring termite phylogenetic diversity along the Madeira Riverbanks in the Brazilian Amazon Forest
P169	*Luiza Helena Bueno Da Silva*	How is initial colony development related to the mating system of the termite Cornitermes cumulans?
P170	*Ruchira Sen*	A unique colony cycle with biannual alternative founding strategies in an Asian *Polistes*
P171	*Keiko Hamaguchi*	Lifespans of two queen morphs of *Temnothorax spinosior* under experimental condition
P172	*Maria Eugenia Villar*	How does the lack of hibernation affect ant colonies?

Plenary Session

08:30 – 09:30		Pacific Ballroom 18-20
8:30	*Fabio Nascimento*	Pathways of evolution in wasps: What hormones and pheromones tell us about it

13:45 – 14:45		Pacific Ballroom 18-20
13:45	*Leticia Aviles*	Social spiders: Lessons in ecology and evolution

Symposia

10:00 – 12:15		Pacific Ballroom 21

Symposium 21: The benefits of human activity on social insect populations
Organizer: Elizabeth Evesham

10:00	*Marianne Azevedo-Silva*	Landscape genetics in a threatened environment: How relevant to ants is the conservation of cerrado?
10:15	*Jacob Podesta*	Wood ants in the anthropogenic environment: Assessing the drivers and effects of population expansion
10:30	*Antonio Queiroz*	Do ants benefit similarly from Cerrado changes into different agricultural areas?
10:45	*Cristian Klunk*	Effects of climate on ant (Hymenoptera: Formicidae) species evolution and spatial distribution
11:15	*Marion Cordonnier*	Anthropogenic fragmentation does not prevent dispersion of the ant *Temnothorax nigriceps*

11:30	*Abraham Allotey*	Commercial propolis and bee venom harvesting from forest and woodland tree hive for sustainable forest management
11:45	*Mazi Sanda*	Impact of agrochemicals on honey bees health and honey quality in Cameroon
12:00		Discussion

10:00 – 12:15 **Pacific Ballroom 25-26**

Symposium 32: Pleiotropism and neofunctionalization: The varied facets of juvenile hormone in social insect life cycles

Organizers: Klaus Hartfelder, Judith Korb

10:00	*Silu Lin*	Pleiotropic effects of juvenile hormone: Its role in ageing and chemical communication in a termite
10:15	*Kohei Oguchi*	Physiological mechanisms underlying the differentiation of developmentally-terminal castes in termites
10:30	*Karl Glastad*	Hormonal gatekeeping via the blood brain barrier governs worker caste behavior in *C. floridanus*
10:45	*Hans Kelstrup*	Juvenile hormone in vespids beyond *Polistes*: Not what you expected
11:00	*Helena Ferreira*	Juvenile hormone affects behavioural maturation and division of labour in a eusocial Vespine wasp
11:15	*Amanda Prato*	Juvenile hormone affects age polyethism, ovarian status and cuticular hydrocarbon profile in workers of the wasp *Polybia occidentalis*
11:30	*Hagai Y Shpigler*	Juvenile hormone increases metabolic rate and regulates a brain-reproduction tradeoff in bumble bees
11:45	*Zachary Huang*	Do methoprene and CO_2 affect JH titers in worker honey bees?
12:00	*Klaus Hartfelder*	Evidence of positive selection in genes related to gonad phenotype and mating strategy of social bees

10:00 –16:00 **Pacific Ballroom 23-24**

Symposium 3: Major transitions revisited: The how, why, and when of social transitions in insects

Organizers: Seirian Sumner, Amy Toth, Sandra Rehan

10:00	*Andrew Bourke*	Major transitions and the evolution of individuality: Key patterns and principles
10:15	*Cintia Akemi Oi*	Physiology and chemical communication favouring reproductive division of labour in wasps
10:30	*Emeline Favreau*	Genomic insights into major evolutionary transitions to sociality
10:45	*Karen Kapheim*	Mechanisms of life history shifts associated with social evolution in bees
11:00	*Judith Korb*	What makes a major evolutionary transition: Insights from termites
11:15	*Kiyoto Maekawa*	Possible importance of gene duplication for termite social evolution
11:30	*Andrés Quiñones*	The evolution of eusociality from a life-cycle perspective
11:45	*Fernando Noll*	How to assemble multiple queens and make it work: The life story of swarming neotropical wasps
12:00	*Andreia Teixeira*	Shedding light on the remolding of the fecundity/longevity trade-off in bees
14:45	*Juergen Gadau*	Social evolution – Primary polygyny as a transition from kin to non-kin based societies?
15:00	*Aparna Lajmi*	A supergene underlies social polymorphism in the desert ant
15:15	*Hua Yan*	Regulation of extended lifespan in the reproductive caste of ants
15:30	*Peter Nonacs*	The evolution of eusociality is not a major evolutionary transition.
15:45	*Jacobus J. Boomsma*	Domains and major transitions of social evolution

10:00 –16:00 **Pacific Ballroom 16-17**

Symposium 15: The effects of anthropogenic warming and increasing thermal variability on social insects

Organizers: Tali Reiner Brodetzki, Amy Savage, Clint Penick

10:00	*Clint Penick*	Resilience and change after five years of warming: Results from the Duke and Harvard warming experiment on ant diversity
10:15	*Olivia Bates*	Micro- vs. macroclimate: Which predicts better the spread of introduced ants?
10:30	*Quentin Willot*	Thermal death time curves as tools to examine heat-tolerance plasticity and biogeography in ants
10:45	*Melanie Kazenel*	Daily activity timing and physiological tolerances jointly predict native bee population trends under climate change
11:00	*Baptiste Martinet*	Global effects of extreme temperatures on wild bumblebees
11:15	*Laura Jones*	The lower thermal limit of a solitary bee tracks its recent northward range expansion
11:30	*Michael Goodisman*	The effects of climate change on the social structure of *Vespula squamosa* wasp supercolonies
11:45	*Jordan Glass*	Evaporative cooling and reducing heat production allows honey bees to beat the heat when nectar foraging
12:00	*Markus Thamm*	The impact of temperature stress on the octopaminergic system of honeybee flight muscles
14:45	*Meghan Barrett*	Dimorphism in UV-NIR reflectance associated with microclimate use in *Centris pallida* male bees
15:15	*Rémy Perez*	Desert adaptation of two sympatric *Cataglyphis* is based on distinct behavioural and physiological strategies
15:30	*Alann Rathery*	How does temperature drive the colony foundation of *Lasius niger*?
15:45	*Tali Reiner Brodetzki*	Can urbanization drive thermal adaptation in Winter Ants?

10:00 –16:00 **Pacific Ballroom 14-15**

Symposium 25: Nutritional dimensions in social insect evolution and ecology

Organizers: Audrey Dussutour, Lina Pedraza, Enikö Csata

10:00	*Spencer Behmer*	Honey bee diet regulation prioritizes lipids and fatty acids over proteins
10:15	*Pierre Lau*	Assessing pollen nutrient content: A unifying approach for the study of bee nutritional ecology
10:30	*Erin Treanore*	How age, mass and diet in pre-diapause bumble bee queens affect diapause survival and nest founding?
10:45	*Veronika Rau*	Re-moulding of dietary effects on the fecundity / longevity trade-off in a termite species
11:00	*Gaku Tokuda*	Relationship between microbial structure and metabolic activities in the termite, *Neotermes sugioi*
11:15	*Alex Waugh*	Gene regulatory response to the nutritional conditions of overwintering in fire ant gynes
11:30	*Riou Mizuno*	Feeding the prey larvae: Diversity of prey storage behavior in myrmecophagous non-army ant dorylines.
11:45	*Jonathan Shik*	Testing for nutritionally optimized cultivar production in fungus-farming ants
12:00	*Caio Leal-Dutra*	Fungal cultivars altruistically recycle their own cellular contents to provision their leafcutter ant farmers with edible nutritional rewards
14:45	*Nathan Smith*	Macronutrient regulation by the leafcutter ant *Acromyrmex versicolor* is driven by fungus nutritional needs

15:00	*Andrew Burchill*	New methods reveal that *Ectatomma ruidum* ant colonies demonstrate poor macronutrient regulation abilities
15:15	*Sofia Bouchebti*	Social nutrition in hornets: The perpetual exchange of nutrients
15:30	*Eran Levin*	Stable carbon isotope-labeled nutrients as a method for studying nutrition in social insect
15:45	*Yohai Nirenberg*	The spatial flow of nutrients in ant colonies

10:15 –18:30 **Pacific Ballroom 18-20**

Symposium 9: Advances in collective behavior using quantitative behavioral tools

Organizers: Laurent Keller, Tomas Kay, Ebi Antony George, Nitika Sharma, Chris R. Reid, Daniele Carlesso, Michael L. Smith

10:15	*James Crall*	Social modulation of stressor interactions in bumble bee colonies: Insights from automated individual tracking
10:30	*Orit Peleg*	On the mechanics of honeybee swarms: Aggregation, steady-states, and adaptation
10:45	*Nathalie Stroeymeyt*	Two simple movement rules for spatial division of labour in social insects
11:00	*Matthew Hasenjager*	Finding your partner on the dancefloor: Coupled information networks drive honeybee collective foraging
11:15	*Alba Motes Rodrigo*	Examining individual- and stimulus-specific drivers of worker behavioural variation using a non-mimetic robot
11:30	*Orli Snir*	The pupal molting fluid has evolved social functions in ants
11:45	*Supraja Rajagopal*	Individual and social learning of foraging routes in the rock ant *Temnothorax rugatulus*
12:00	*Daniele Carlesso*	An embedded control system in an ant self-assemblage: Ants don't form chains if the cost is too high
14:45	*Isabella Muratore*	Efficiency of army ant bridges in response to multiple challenges
15:00	*Michal Roitman*	Cooperative nest construction by Australian weaver ants
15:15	*Hugo Helder*	Investigating collective behaviour in termite societies
15:30	*Henrique Galante*	Artificial intelligence unlocks accurate consumption rates of small invertebrates
15:45	*Michael Smith*	Imperfect comb construction reveals the architectural abilities of honey bees
16:30	*Ofer Feinerman*	Ant collective navigation in complex environments
16:45	*Tim Landgraf*	Making sense of all the data: Social network factorizations reveal social structures in honeybee colonies
17:00	*Elva Robinson*	Dynamic resource-sharing networks in polydomous wood ants
17:15	*Adriano Alistair Wanderlingh*	The effects of colony size on collective disease defences
17:30	*Theodore Pavlic*	Beyond tracking: Using deep learning to discover novel interactions in biological swarms
17:45	*Louis Pailler*	Reproductive vibration cues affect social organization in termites
18:00	*Lior Baltiansky*	Multi-nutrient regulation in ant colonies: Mechanistic insights from dual-fluorescence imaging
18:15	*Dan Charbonneau*	The role of global integration of local information to respond to novel tasks

14:45 – 15:30 **Pacific Ballroom 25-26**

Themed session 3: Individual cognition in social insects

14:45	*Melanie Bey*	Foe template learning in *Lasius niger* Ants : Trouble in the neighborhood.
15:00	*Nicole DesJardins*	Fungicide exposure reduces learning performance and homing ability in honey bees
15:15	*Jesse Lee Hunt*	Lateralization of Olfaction in *Camponotus floridanus*

14:45 – 18:30 **Pacific Ballroom 21**

Symposium 12: From signaling to sensing: How pheromones modulate social organization

Organizers: Cintia Akemi Oi, Philip Kohlmeier

14:45	*Marah Stoldt*	Molecular and neuronal basis of odorant receptor function in (social) insects
15:00	*Martin Giurfa*	The unsuspected role of honey bee pheromones as cognitive agents
15:15	*Benjamin Andreu*	The search for olfactory receptors tuned to pheromones in the honey bee
15:30	*Jan Šobotník*	Alarm communication predates eusociality in termites
15:45	*David Sillam-Dussès*	Sex pheromone and courtship behavior confusion in two invasive *Coptotermes* termite species
16:30	*Callum Kingwell*	Cryptic alternate chemotypes in a socially variable bee species predict variation in social behavior.
16:45	*Meghan E Moore*	Socially mediated reproductive and nest development in incipient queen bumble bees
17:00	*Christophe Lucas*	Royal protein pheromones in a subterranean termite: Molecular and behavioral screening
17:15	*Nathan Derstine*	Differential gene expression underlying the biosynthesis of Dufour's gland signals in *Bombus impatiens*
17:30	*Jessica Ebie*	Workers respond to queen-specific hydrocarbon profile in the arboreal, polydomous weaver ant, *Oecophylla smaragdina*
17:45	*Florian Menzel*	Ant cuticular hydrocarbons: Do communication and waterproofing interfere with each other?
18:00	*Olav Rueppell*	From hygienic brood signals to a predictive assay of honey bee (*Apis mellifera*) colony health
18:15	*Joshua Gibson*	Behavioral and chemical analysis of Argentine ants (*Linepithema humile*) in the Southeastern United States

16:30 – 18:30 **Pacific Ballroom 23-24**

Symposium 17: The anthropogenic drivers of social insect invasions

Organizers: Jérôme M. W. Gippet, Cleo Bertelsmeier

16:30	*Jacqueline Beggs*	Wasp paradise: What shapes the success of invasive *Vespula*?
16:45	*Cleo Bertelsmeier*	Bridgehead effects and the invasion biogeography of ants
17:00	*Pierre-André Eyer*	Termite invasions in the Anthropocene
17:15	*Aymeric Bonnamour*	The impact of colonial history on ant invasions
17:30	*Kuan-Ling Liu*	Unraveling the population genetic structure of the big-headed ant in the Asia-Pacific region
17:45	*Lucie Aulus*	What are the global bioregions of ants and how does human-mediated dispersal redefine them?
18:00	*Julia Jones*	Investigating the implications of importing non-native and commercially bred bumblebee subspecies

16:30 – 18:30 **Pacific Ballroom 16-17**

Symposium 22: New frontiers in social insect research: The role of citizen science

Organizers: Cristina Castracani, Rob Dunn

16:30	*Andrea Sforzi*	Citizen science: Engaging people in producing knowledge
17:00	*Nadine Chapman*	Plan Bee: Breeding honey bees in Australia

17:15	*Richard Gill*	Leveraging public museum specimens reveals a century of bumblebee trait responses
17:30	*Iona Cunningham-Eurich*	Using citizen science to assess population genetic structure in a social wasp, *Vespula vulgaris*
17:45	*Mathilde Lacombrade*	Morphological and behavioural correlates of the invasion of Asian hornets across Europe
18:00	*Cristina Castracani*	Citizen Science as a useful tool for studying urban biodiversity and human impact: The School of Ants project from United States to Italy
18:15		Discussion

16:30 – 18:30 **Pacific Ballroom 14-15**

Symposium 27: Diversity and evolution of termite breeding systems

Organizers: Kenji Matsuura, Robert

16:30	*Thomas Chouvenc*	The life and death of termite colonies: Demographic changes throughout the decades
16:45	*Barbara Thorne*	Invasive conehead termites Nasutitermes corniger: Successful IPM strategies target an agile and destructive pest
17:00	*Yves Roisin*	Functions of facultative Asexual Queen Succession in inquiline termites
17:15	*Simon Hellemans*	Patterns of population sex ratio across Isoptera
17:30	*Mamoru Takata*	Endogenous factors regulating offspring caste fate and colony-level sex allocation in termites
17:45	*Yao Wu*	Inter-clonal competition over queen succession imposes a cost of parthenogenesis on termite colonies
18:00	*Thomas Bourguignon*	Ancestral sex-role plasticity facilitates the evolution of same-sex sexual behavior
18:15	*Kip Lacy*	Meiotic crossover recombination without loss of heterozygosity in the clonal raider ant

16:30 – 18:30 **Pacific Ballroom 25-26**

Themed session 4: Physiological and genetic mechanisms of the evolution of sociality

16:30	*Yannick Wurm*	Adaptive introgression of a supergene controlling social organisation in fire ant species
16:45	*Sachin Suresh*	Effect of *Wolbachia* on the developmental trajectory in Pharaoh ants
17:15	*Federico López-Osorio*	Evolutionary trajectories of functional alleles in the social supergene of *Solenopsis* fire ants
17:30	*Arthur Weyna*	Hybridization as a queen strategy in queen-larvae conflicts
17:45	*Takao Konishi*	Across-individual metabolism of uric acid based on reproductive division of labor in termites
18:00	*Yue Shi*	The gene regulation response to insemination in the reproductive system of the ant queen and virgin gyne
18:15	*Viviana Di Pietro*	Distinct colony phenotypes caused by diploid male production in *Bombus terrestris*

Plenary Session

08:30 – 09:30 **Pacific Ballroom 18-20**

8:30	*Geraldine Wright*	Mechanisms of gustatory coding in eusocial bees

13:45 – 14:45 **Pacific Ballroom 18-20**

West-Eberhard Award Lecture

13:45	*Patrick Kennedy*	Life advice for wasps

Symposia

07:00 – 08:15 **Pathable**

Virtual themed session 1: Evolution and biogeography of social insects

7:00	*Gyda Fenn-Moltu*	Invasion asymmetry: Origins or opportunities for introduction?
7:15	*Nicholas Saleh*	Experimental disruption of social structure reveals totipotency in the orchid bee, Euglossa dilemma
7:30	*Shota Suenami*	Species-specific traits of gut symbionts *Frischella* associated with different honey bees
7:45	*Barbara van Asch*	Phylogeography of *Macrotermes* termites in Southern Africa: Overview and future prospects
8:00	*Ruan Veldtman*	A wasp for all seasons - increase in genetic diversity frees a trapped invasion

07:00 – 08:00 **Pathable**

Virtual themed session 2: Chemical communication

7:00	*Maria Cristina Lorenzi*	Cuticular hydrocarbons evolve towards increased polymorphism across 20 generations of social wasps
7:15	*Mathew Neidmann*	Nine-exon odorant receptors are enriched in the antennae of the Argentine ant, *Linepithema humile*
7:30	*Amélie Noël*	Full volatolome of honey bee worker brood: From egg to emergence
7:45	*Levona Bodner*	The fellowship of the sting: Colony imprinting and social behavior beyond the phylogenetic boundary

07:00 – 08:15 **Pathable**

Virtual themed session 3: Social organization and division of labor

7:00	*Zach Coto*	Worker polymorphism and brain metabolic scaling in ants
7:15	*Adam Khalife*	Advantages and limits to miniaturization in worker ants
7:30	*Mathew Pekora*	Task allocations and their relationships between nursing, eating, and resting in honeybee nurses
7:45	*Diane Wiernasz*	The ontogeny of selection on genetic diversity in harvester ants
8:00	*Ehud Fonio*	Obstacle clearing during cooperative transport by ants.

07:00 – 08:15 **Pathable**

Virtual themed session 4: Pathogens, parasites, and social immunity

7:00	*Esmaeil Amiri*	Comparing the castes: Dynamics of virus infection and immune response reaction in workers and queens
7:15	*Erika H Dawson*	Disease signalling in ant social immunity
7:30	*Erik Frank*	Infection signaling and antimicrobial wound care in a predatory ant
7:45	*Fanny Mondet*	Chemical detection triggers honey bee defence against a destructive parasitic threat
8:00	*Inon Scharf*	Social isolation impairs survival, changes behavior, and downregulates immune response genes in ants

07:00 – 08:15 **Pathable**

Virtual themed session 5: Biology of pollinators

7:00	*Léna Barascou*	Tracking daily flight activity and bee losses at the colony level to better assess the risk posed by pesticide exposure to honeybees
7:15	*Jennifer Jandt*	The impact of a complex environment on bumble bee colony development and pollination efficacy
7:30	*James Makinson*	Top End *Tetragonula*: An Australian pollinator and the management implications of its cryptic species
7:45	*Rhonda Thygesen*	The blueberries and the bees: Assessing honey bee health stressors using proteomics
8:00	*Nadia Tsvetkov*	The effects of neonicotinoids on honey bee cognition and brain proteome.

07:00 – 08:00 **Pathable**

Symposium 14: The sensory ecology of social insect foraging

Organizers: Sara Leonhardt, Johannes Spaethe, Patrizia d'Ettorre, Anne Leonard

7:00	*Gemma Nydia Villagómez*	Resource intake of stingless bee colonies in a tropical ecosystem in Ecuador
7:15	*Fabian A. Ruedenauer*	Fatty acid perception and regulation in bumble bees
7:30	*Massimo De Agrö*	The invisible world of bees: Visual discrimination of sucrose solution from water without associative learning.
7:45	*Joanna Brebner*	New directions: Bumblebees create new routes without mental rotation, using visual guidance

10:00 – 12:15 **Pacific Ballroom 14-15**

Symposium 14: The sensory ecology of social insect foraging

Organizers: Sara Leonhardt, Johannes Spaethe, Patrizia d'Ettorre, Anne Leonard

10:00	*Anne Leonard*	Sensory ecology of pollination and anthropogenic change
10:15	*Shawn Mahoney*	Active sensation in honeybees: How learning affects antenna scanning behavior in *Apis mellifera*
10:30	*Bhavana Penmetcha*	Effect of compound eyes on ocellar spatial vision in Australian bull-ants
10:45	*Yuki Mitaka*	Identification of an aggregation pheromone in a termite
11:00	*Raphael Jeanson*	Synchronized oscillations during collective hunting in social spiders
11:15	*Margaux Jossart*	Influence of a facultative endosymbiont on the ant-aphid mutualism

11:30	*Blanca M. Guillén*	Tissue- and caste-related expression of gustatory receptor genes in the bumble bee *Bombus impatiens*
11:45	*Natalie Fischer*	Exploring the molecular mechanisms associated with bumble bee (*Bombus bifarius*) foraging behaviors
12:00		Discussion

10:00 – 12:15 **Pacific Ballroom 21**

Symposium 7: Sociable arthropods: Broadening conceptions about social insects

Organizers: Miriam Richards, Javier Quezada-Euan, Joël Meunier

10:00	*Joel Meunier*	The social life of the European earwig
10:15	*Don Miller*	Sociable clones: Dynamics of *Tamalia* gall aphids and their inquilines
10:30	*Madeleine Ostwald*	The wildest housing market: Nesting ecology as a context for social evolution in facultatively social carpenter bees (*Xylocopa sonorina*)
10:45	*José Javier G. Quezada-Euán*	Female body size variation and its relationship with reproductive investment and social status in a facultative social orchid bee (Hymenoptera: Euglossini)
11:00	*Sandra Rehan*	Subsociality and maternal manipulation in *Ceratina* small carpenter bees
11:15	*Miriam Richards*	Independent origins of sociality suggest communal nesting in early stages of apid social evolution
11:30	*Simon Tierney*	Casteless societies: Selective freeways and parsimonious solutions to group living
11:45	*Emilie Mauduit*	Influence of social context on the expression of plasticity in spiderlings
12:00	*Adam Smith*	The benefits of sociality vary seasonally in the tropical, facultatively eusocial bee *Megalopta*.

10:00 – 12:15 **Pacific Ballroom 25-26**

Symposium 8: Guests of social insects

Organizers: David Nash, Og DeSouza

10:00	*Joseph Parker*	The persistence and fidelity of ant-myrmecophile symbioses
10:15	*Christoph von Beeren*	Diversity, host specificity, and integration strategies of army ant guests
10:30	*Thomas Parmentier*	Specialization in behavior, chemical deception and the microbiome along a gradient of host specificity in myrmecophilous silverfish.
10:45	*Juliane Hartke*	When the guests won't leave – mutualism as a driver of speciation?
11:00	*Hannah Wolmuth-Gordon*	Timing is critical! The timing of exposure determines a parasite's spread
11:15	*Nobuaki Mizumoto*	The evolution of termite nests promoted the invasion by termitophilous rove beetles
11:30	*David Nash*	Ant mimicry by mymecophiles: When should we expect it and when not?
11:45	*Og DeSouza*	The hows and whys of termitophily
12:00		Discussion

10:00 – 16:00 **Pacific Ballroom 23-24**

Symposium 1: Mechanisms of individual life history evolution in the social context

Organizers: Olav Rueppell, Judith Korb, Juergen Heinze

10:00	*Barbara Feldmeyer*	Why and how do social insect queens get it all: Long life and high fecundity?
10:15	*Robert Hanus*	Telomerase and extraordinary longevity of termite kings and queens
10:30	*Sarah Kocher*	Isolation disrupts social interactions and destabilizes brain development in bumblebees

10:45	*Luisa Maria Jaimes Nino*	"Continuusparity": Late-life fitness gains and reproductive death in *Cardiocondyla obscurior* ants
11:00	*Susanne Foitzik*	Parasite manipulation causing extreme lifespan extension in cestode-infected ants
11:15	*Rebecca Clark*	Plasticity of energetic savings during nest initiation in the harvester ant *Pogonomyrmex californicus*
11:30	*Lina Pedraza*	The influence of ant species' life-history traits in the consumption of macronutrients
11:45	*Lewis Revely*	The diversity of social complexity in termites
12:00	*Blaine Cole*	The ageless queen: Negative senescence and the renewable soma in harvester ants
14:45	*Alexander Walton*	Egg heads: Gene manipulation confirms vitellogenin regulates aggression in *Polistes fuscatus* wasps
15:00	*Martin Quque*	Are eusocial insects a true exception to the aging mechanisms?
15:15	*Sruthi Unnikrishnan*	Conserved hormonal and molecular mechanisms underlying behavioural maturation in open- and cavity-nesting honey bees
15:30	*Serge Aron*	Sperm competition increases sperm production and viability in *Cataglyphis* desert ants
15:45		Discussion

10:00 – 16:00 **Pacific Ballroom 16-17**

Symposium 26: Biological clocks and social organization

Organizers: Tugrul Giray, Jose Luis Agosto Rivera, Manuel Giannoni Guzman

10:00	*Katharina Beer*	Timing matters – circadian clock development of social honey bees and solitary mason bees
10:15	*Darrell Moore*	Day-to-day plasticity in the circadian time memory behavior of honey bees: Functional insights
10:30	*Ada Eban-Rothschild*	Social and neuronal modulation of sleep and huddling behavior in mice
10:45	*Ryan Oliver*	The molecular underpinnings of socially regulated plasticity in circadian rhythms of two social bees with differing levels of social complexity
11:00	*Olivia H. Cox*	Gene expression changes underlying photoperiodic plasticity in the suprachiasmatic nucleus
11:15	*Mehmet Döke*	Foraging and circadian rhythms of a guild of three carpenter bees
11:30	*Maria de la Paz Fernandez*	An anatomical and systems level characterization of the *Drosophila* circadian clock network connection
11:45	*Eddie Pérez Claudio*	Circadian Dynamics: A novel easy to use tool for rhythm analysis
12:00	*Sofia Melendez Cartagena*	Relationship between inter-individual variation in circadian rhythm and sociality in Halictid bees
14:45	*Remi Megret*	Large scale pollinator monitoring using video: Opportunities and challenges
15:00	*Avishek Dolai*	The masking effect of rain and predation pressure on foraging rhythm of Asian weaver ant
15:15	*Grant Doering*	Synchronized locomotion improves spatial accessibility in ant colonies
15:30	*Manuel A. Giannoni Guzmán*	Circadian control of temperature inside overwintering honey bee colonies in a temperate region
15:45	*Yilmaz Berk Koru*	The role of gut microbes in the onset of circadian rhythms in the honey bee

10:00 – 18:30 **Pacific Ballroom 18-20**

Symposium 20: Protecting pollinators and our food supply: Understanding and managing threats to pollinator health

Organizers: Jon Harrison, Karen Kapheim, Hongmei Li-Byarlay, Jay Evans

10:00	*Kirsten Traynor*	Pesticides in pollen: Real-world exposure in stored pollen of *Apis mellifera*
10:15	*Julia Fine*	Maternal exposure to insect growth disruptors affects honey bee reproductive behaviors and and changes in the ovarian proteome
10:30	*Jessica Cole*	Investigating wildflowers as a route of pesticide exposure to bees
10:45	*Walter Farina*	Glyphosate exposure in honeybee colonies: Effects on brood and social implications
11:00	*Adrian Fisher II*	A widely used mito-toxic fungicide negatively affects honey bee (*Apis mellifera*) hemolymph protein levels and ontogeny
11:15	*Liliana Fischer*	The novel insecticide flupyradifurone impairs collective brood care in bumble bee microcolonies
11:30	*Harry Siviter*	Does the novel pesticide flupyradifurone have sub-lethal effects on non-Apis bees?
11:45	*Isabella Fernanda Camargo*	Toxicity of Clothianidin pesticide in the development of bees larvae *Scaptotrigona postica*
12:00	*Nigel Raine*	Muddying the waters? The risks of exposure to pesticide residues in soil for bees
14:45	*Michael Garratt*	Pesticide and pathogen effects on pollinators: Implications for crop pollination and food production
15:00	*Briann Dorin*	Wild bee conservation in vineyards - an interdisciplinary approach
15:15	*Tereza Giannini*	Impact of climate change on Eastern Amazon native bees and possible consequences on food production
15:30	*Gaurav Singh*	Spatial and temporal distribution of stingless bees in mango orchards, and its effect on fruit set
15:45	*Margarita López-Uribe*	Crop widespread cultivation facilitates rapid population growth and regional adaptation in an oligolectic bee pollinator
16:30	*Mark Brown*	Parasites, pathogens, and pesticides: Impacts on bumblebee health
16:45	*Allyson Ray*	Evidence of decreased virulence of a major viral variant in isolated, mite-surviving honey bees
17:00	*Yves Le Conte*	*Varroa* resistant honey bees: Keys for the understanding of balanced host-parasite relationship
17:15	*Boris Baer*	Innate immune responses as effective parasite defences in honey bees
17:30	*Kimberly Przybyla*	Effects of heat stress on mating behavior and colony development in bumblebees
17:45	*Marla Spivak*	Honey bee social immunity and beekeeping
18:00		Discussion

14:45 – 18:30 **Pacific Ballroom 21**

Symposium 13: Neurobiology of chemosensation

Organizers: Daniel Kronauer, Patrizia d'Ett

14:45	*Silke Sachse*	Dissecting olfactory processing and plasticity in the fly brain
15:00	*C. Giovanni Galizia*	The coding of alarm pheromone in the honeybee *Apis mellifera*
15:15	*Julie Carcaud*	Pheromonal information processing in the honey bee brain
15:30	*Julia Mariette*	Functional study of the queen pheromone receptor OR11 in honey bees (within the genus *Apis*)
15:45	*Michael Sheehan*	Genomic insights into chemosenory evolution in paper wasps

16:30	*Antoine Couto*	Evolution of an olfactory subsystem in Hymenoptera: A potential springboard towards eusociality
16:45	*Juergen Liebig*	Discrimination of cuticular hydrocarbons at the behavioral and receptor level
17:00	*Lindsey Lopes*	Neuroanatomical tools for circuit neuroscience in the clonal raider ant
17:15	*Dominic Frank*	The organization of the early olfactory system in the clonal raider ant
17:30	*Daniel Parviz Hejazi Pastor*	Afferent neurons in sensory organs of Ooceraea biroi larvae: A chemosensory circuit?
17:45	*Baptiste Piqueret*	Ants as olfactory bio-detectors of tumour in patient-derived xenograft mice
18:00	*Jordan Smith*	Taste and task: Gustation and division of labor in ants
18:15	*Qian Sun*	Molecular characterization and expression variation of *Orco* in the Formosan subterranean termite

14:45 – 18:00 **Pacific Ballroom 14-15**

Symposium 24: The role of individual variation in collective information processing

Organizers: Yun Kang, M. Gabriela Navas-Zuloaga, Chelsea Cook

14:45	*Helen McCreery*	Hysteresis stabilizes dynamic control of self-assembled, living army ant bridges
15:00	*Xiaohui Guo*	Decoding alarm signal propagation of seed-harvester ants using automated movement tracking and supervised machine learning
15:15	*Maria Gabriela Navas Zuloaga*	From individual phenotypes to collective behavior in honey-bee foragers: A mathematical model
15:30	*Oscar Vaes*	Colonial activity level and its relationship to individual behavior during a food recruitment process
15:45	*Daniel Knebel*	Group composition and network structure in the clonal raider ant
16:30	*Dee Ruttenberg*	How does the presence of a queen transform the social network of a bumblebee colony
16:45	*Haolin Zeng*	Experimental dissection of behavioral induction of a major social transition in an ant
17:00	*Volker Nehring*	Lean workers are more mobile: The physiology of polyethism in leaf-cutting ants
17:15	*Mélissa Haouzi*	Age- and caste-related changes in the pheromone gland chemical composition of the Asian hornet
17:30	*Nicole Andreoli*	Do ants perceive the content of the fluid they receive during trophallaxis?
17:45		Discussion

15:00 – 18:30 **Pacific Ballroom 25-26**

Symposium 30: The high cost of communal living: Evolution and mechanisms of social immunity in eusocial insects

Organizers: Juliana Rangel, James Nieh, Amy Geffre, Edward Vargo, Jordan Twombly Ellis

15:00	*James Nieh*	Immune priming of honey bees protects against a major microsporidian pathogen
15:15	*Alessandro Cini*	Induced organizational immunity in honeybees facing the ectoparasite *Varroa destructor*
15:30	*Margarita Orlova*	*Vairimorpha* infection in the maternal colony decreases diapause survival in bumble bee gynes
15:45	*Victoria Blanchard*	Corpse management in bumblebee colonies
16:30	*Dino McMahon*	The evolution of individual and social immunity in termites
16:45	*Mark Bulmer*	Brief interactions with an ally limit fatal infection
17:00	*Michael Simone-Finstrom*	Social homeostasis in honey bees is supported by resin use
17:15	*Maggie Shanahan*	Propolis collection and social immunity in the stingless bee *Scaptotrigona mexicana*

17:30	*Fabio Manfredini*	Multilevel manipulation of the host social phenotype operated by *Strepsiptera* parasites in wasps
17:45	*Jordan Twombly Ellis*	Determining the mechanism of honey bee (*Apis mellifera*) premature self-removal behavior
18:00	*Juliana Rangel*	Optimizing macronutrient ratios in the honey bee (*Apis mellifera*) diet to offset the impacts of pathogen infection
18:15	*Kate Ihle*	Social apoptosis in the western honey bee

16:30 – 18:30 **Pacific Ballroom 16-17**

Symposium 31: My parents made me do it: Epigenetic inheritance in social insects
Organizers: Christina Grozinger, Ben Oldroyd

16:30	*Benjamin Oldroyd*	Caste, development, behavior, conflict and evolution of social insects; What's epigenetics got to do with it?
16:45	*Hollie Marshall*	Epigenetic mechanisms of genomic imprinting in bumblebees.
17:00	*Sean Bresnahan*	piRNAs and intragenomic conflict in honey bees
17:15	*Hongmei Li-Byarlay*	Search for the epigenomic mechanisms of paternal inheritance of aggression in honeybees
17:30	*Clare Rittschof*	Developmental effects on defensive behaviors in honey bees
17:45	*Daniel Kronauer*	The elusive role of DNA methylation in social insects
18:00	*Carlos Cardoso Júnior*	A long non-coding RNA is key to the evolution of insect eusociality
18:15	*Kenji Matsuura*	Genomic imprinting and social evolution in termites

16:30 – 18:30 **Pacific Ballroom 23-24**

Special Symposium: Exhibiting social insect research through art and science communication
Organizer: Peter Marting

16:30	*Kirsten Traynor*	Engaging pollinator enthusiasts
16:45	*Barrett Klein*	A planet in peril and the insect muse
17:00	*Peter Marting*	Exhibiting nest thermoregulation through light-up sculpture, macro footage, and live ants on display
17:15	*Miles Maxcer*	Uncovering the undergrowth: Promoting accessibility in the communication of social insect science
17:30	*Clint Penick*	What do a zebra, tiger, and harvester ant have in common?
18:00	*Elva Robinson*	Ants challenge gender norms and heteronormativity in pre-school children's literature: A board book project
18:15	*Adrian Smith*	The stories we can tell & why they matter: Communicating insect research through online media

Virtual Poster Session 3

07:00 – 08:15		Pathable
P049	*Ruyan Li*	Functional study on an uncharacterized gene involved in caste differentiation in the pharaoh ant, *Monomorium pharaonis*
P122	*Maxxum Fioriti*	Transcriptomic analysis of caste transition and aging in the ponerine ant, *Harpegnathos saltator*
P173	*Manish Pathak*	Challenging ants to overcome a narrow nest entrance – a platform to examine cognitive ability
P174	*Masaru Hojo*	Cognitive control in trail-following ant foragers
P175	*Hiroki Kohno*	Functional analyses of *mKast* by producing knocked-out worker honey bees using CRISPR/Cas9
P176	*Taylor Hart*	Functional imaging of odor-evoked calcium responses in the clonal raider ant antennal lobes
P177	*Tetsu Morimoto*	The effects of colony size on pheromone trail foraging in an ant.
P178	*Nadhira Afiani Ramadhanty*	The effect of individual responses to trail pheromones on collective foraging behavior in an ant
P179	*Akane Yoshida*	Histological and genetic differences during development of sterile caste in ant *Pheidole megacephala*
P180	*Anna Cressman*	Impacts and mechanism of CO_2 narcosis in bumble bees: Narcosis depends on dose, caste and mating status and is not induced by anoxia
P181	*Cristian Klunk*	Mandible shape and biting performance in ants (Hymenoptera: Formicidae)
P182	*Tomoko Sakiyama*	Ant joining one-way trails go against the flow when entering the trail at a right angle
P183	*Erik Frank*	Social wound care and amputations in the genus *Camponotus*

Plenary Session

08:30 – 09:30		Pacific Ballroom 18-20
8:30	*Sylvia Cremer*	Social immunity: Disease protection of the colony

Symposia

10:00 – 12:00		Pacific Ballroom 25-26
Themed session 5: Mechanisms of collective behavior		
10:00	*Tabea Heckenthaler*	Connecting cooperative transport by ants with the physics of active swimmers
10:15	*Colin Lynch*	Balancing within- and among-group replicates in designing experiments: Social insect research examples
10:30	*Vanessa Menges*	Behavioural variation in social insects: How seasons shape personality traits
10:45	*Atanu Chatterjee*	Cognitive perspectives on ant cooperative transport of large flexible objects
11:00	*Stefan Popp*	Searching ants combine systematic meandering and correlated random walks at different spatial scales

11:15	*Chris Reid*	Decoding the behavioural rules of ant self-assembly, and how engineering might benefit.
11:30	*Joseph Palmer*	Forage site distributions quantify collective foraging in honey bee colonies
11:45	*Olivia M. Bernauer*	Division of foraging behavior: Adapting social indices to quantitatively assess pollination service

10:00 – 12:15 **Pacific Ballroom 23-24**

Symposium 5: Spatial structure and organization within social insect colonies

Organizers: Matina Donaldson-Matasci, Elva Robinson, Scott Powell

10:00	*Benjamin Adams*	Exploring the nest networks of polydomous ants in the highly constrained arboreal environment
10:15	*Deborah M. Gordon*	The dynamics of the trail networks of the arboreal turtle ant, *Cephalotes goniodontus*
10:30	*Claire Detrain*	The number of nest entrances is a key factor of collective foraging in ants.
10:45	*Sean O'Fallon*	Harvester ant nest architecture is more strongly affected by intrinsic than extrinsic factors
11:00	*Peter Marting*	Honey bees shift their 3D nest building techniques to compensate for repeated structural disruption
11:15	*Hoon Kang*	Intrinsic and extrinsic sources of variation in the hidden nest architecture of the ant, *Pheidole pilifera*
11:30	*Christina Kwapich*	Arrangment and function of resin and lichen caches in ant nests
11:45	*Andrea Perna*	Building and inhabiting a chaotic space: The arboreal nests of nasute termites
12:00		Discussion

10:00 – 16:00 **Pacific Ballroom 16-17**

Symposium 2: Origins & transitions: A model clade approach for social evolution

Organizers: Rajendhran Rajakumar, Arjuna Rajakumar

10:00	*Evan Economo*	The ant genus *Strumigenys* as a model clade for illuminating the mechanisms of diversification
10:15	*Seirian Sumner*	Slow and steady wins the race: How the genomics of wasps hold the secrets to sociality
10:30	*Adria LeBoeuf*	Evolution of trophallaxis rewires colony life through the establishment of a shared metabolism
10:45	*Arjuna Rajakumar*	Eco-Evo-devo of the ant germline: A model clade perspective for major evolutionary transitions
11:00	*Beryl Jones*	Convergent selection on hormone signaling shaped social evolution in bees
11:15	*Brendon Boudinot*	Paleosociobiology: Fossil evidence for evolution of eusociality in ants
11:30	*Gaurav Agavekar*	A model clade approach to understanding the genomic landscape underlying phenotypic convergence
11:45	*Marie-Pierre Meurville*	Unraveling trophallaxis evolution through machine learning and phylogenetic comparative methods
12:00		Discussion
13:45	*Timothy Linksvayer*	Genomic signatures of the repeated evolution of social complexity in ants
14:00	*Jessica Purcell*	Turnover in the function and mode of action in a conserved social supergene
14:15	*Sara Helms Cahan*	Genetic inference of queen behavioral diversification in the ant *Veromessor pergandei*

14:30	*Michael Mikát*	Phylogeny and social evolution of *Ceratina* small carpenter bees
14:45	*Chao Tong*	Genomic signature of convergent transitions to social life in arthropods
15:00	*Louis Bell-Roberts*	Large colonies and multiple mating facilitate the evolution of worker caste diversity in ants
15:15	*Steven Messer*	Evolution of social parasitism in *Nylanderia* crazy ants
15:30	*Elizabeth Clifton*	Evolution of termite defenses
15:45		Discussion

10:00 – 16:00 **Pacific Ballroom 18-20**

Symposium 6: Division of labor in social insects: Advancing theory and novel empirical approaches
Organizers: Ricarda Scheiner, Guy Bloch Samuel Beshers, Sean O'Donnell

10:00	*Laurent Keller*	Mechanisms and consequences of division of labour
10:15	*Guy Bloch*	Social and molecular regulation of body size related division of labor in a bumble bee
10:30	*Felix Schilcher*	Novel insights into the nurse-forager transition of the Western honeybee
10:45	*Amy Toth*	Nutritional inequalities within societies structure social insect division of labor
11:00	*Daniel Elsner*	Nutrition and division of labor
11:15	*Hollis Woodard*	Behavioral ontogeny of maternal care in an annually eusocial insect
11:30	*Alexander Paul*	Age polyethism in brood piling behavior in the clonal raider ant
11:45	*Ebi Antony George*	Beyond response thresholds - the role of probability and intensity in honey bee recruitment
12:00	*Samuel Beshers*	The theory of division of labor in social insects
13:45	*Kevin Loope*	Five decades of misunderstanding in the social Hymenoptera: A meta-analysis of Michener's paradox
14:00	*Chelsea Cook*	Social interactions facilitate collective thermoregulatory fanning behavior in honey bees
14:15	*Sang-Bin Lee*	Foraging workers in the Formosan subterranean termite
14:30	*Evan Kelemen*	The effect of diversity on system performance: Body size variation in bumble bee colonies
14:45	*Tomas Kay*	Social network position defines phenotypic variation among worker ants
15:00	*Abel Bernadou*	Use and investment in metapleural gland secretions in a clonal ant
15:15	*Matteo Negroni*	Metabolic division of labor within superorganismal *Camponotus floridanus* ant colonies
15:30	*Jon Harrison*	Social synergies: Mechanisms allowing economies of scale in social insects
15:45		Discussion

10:00 – 16:00 **Pacific Ballroom 14-15**

Symposium 11: Tiny brains pushing the limits: Cognitive abilities of social insects
Organizers: Juergen Liebig, Elizabeth Tibbetts

10:00	*Felicity Muth*	Comparative cognition in bumblebees
10:15	*Anna Dornhaus*	Are bees Bayesian? How to find out what the world is really like, and the cost of data collection
10:30	*Takao Sasaki*	Empirical and theoretical investigation of associative learning in ant colonies
10:45	*Samadi Galpayage Dona*	Do bumblebees play?
11:00	*Rafael da Silva*	Intra and interspecific egg recognition in *Mischocyttarus cerberus*

11:15	*Christopher Jernigan*	Unraveling the neurophysiological underpinnings of visual identity recognition in a paper wasp
11:30	*Laure-Anne Poissonnier*	Cognitive bias in insects: Male attractiveness is subjective in *Drosophila*
11:45	*Charlotte Doussot*	Where to go next? Combination of guidance systems during foraging by bumblebees.
12:00	*Snigdha Mukhopadhyay*	Recruitment by visually-impaired individuals during relocation in an Indian ant
13:45	*Catherine Tait*	Brainy vs. brawny: Neural, not body, energetics shape cognitive abilities in social bees
14:00	*Craig Perl*	Social evolution and brain metabolic rate of harvester ants
14:15	*Frank Azorsa*	Diet, social complexity, and brain evolution in predatory ants
14:30	*Mathieu Lihoreau*	Bees with larger heads have higher olfactory learning and memory performance
14:45	*Tomer Czaczkes*	Bundling and segregation affects “liking”, but not “wanting”, in ants
15:00	*Patrizia d'Ettorre*	Inter-individual variation in cognitive abilities of ants
15:15	*Tomer Gilad*	The contribution of search drive and light to maze-solving in *Cataglyphis niger*
15:30	*Aurore Avargues-Weber*	Numerosity categorization by parity in an insect
15:45	*Benjamin Taylor*	Measurement of nest cavity area by the rock ant (*Temnothorax rugatulus*)

10:00 – 16:00 **Pacific Ballroom 21**

Symposium 29: Exploring the intricacies of relationships between social insects and microorganisms

Organizers: Marielle Postava-Davignon, Tatsuya Inagaki, Hiroyuki Shimoji

10:00	*Edward Vargo*	Soil-borne microbes in nests of a subterranean termite and their effects on colony founding success
10:15	*Elizabeth Cash*	Argentine ant trail pheromone exhibits antimicrobial effects on bacteria and fungi
10:30	*Blake Bringhurst*	Consequences of horizontal fungal exchange on the bacterial microbiome of fungus-gardening ants and their fungal symbionts
10:45	*Igor Siedlecki*	Mycobiota of *Formica polyctena* ants’ infrabuccal pellets - hidden diversity
11:00	*Nicolas Schröder*	Global comparative analysis of virome composition in ants
11:15	*Anindita Brahma*	Larger colonies harbor more viruses
11:30	*Anna Prokhorova*	Function of the termite *Nasutitermes takasagoensis* gut microbiota inferred from complete bacterial genomes
11:45	*Nanna Hjort Vidkjaer*	Gut metabolomes of fungus-farming termites
12:00	*Tereza Beránková*	The evolution of prokaryotic CAZymes in the termite gut
13:45	*Shantanu Shukla*	Microbial symbionts and social interactions facilitate carrion preservation by burying beetles
14:00	*Janina Rinke*	Recurrent horizontal gene transfer from bacteria into ants
14:15	*Alejandra Gambos*	Beneficial microbes and social behavior in harvester ants *Pogonomyrmex* spp
14:30	*Joanito Liberti*	The gut microbiota affects the social network of honeybees
14:45	*Cassondra Vernier*	Gut microbiome changes are associated with behavioral maturation in the honey bee, *Apis mellifera*
15:00	*Monika Yordanova*	Effects of microbial supplementation on pesticide induced mortality in honey bee larvae
15:15	*Tobin Hammer*	Microbiome assembly and maintenance over the lifespan of bumble bee workers
15:30	*Federico Ronchetti*	Bacterial gut microbiome of aculeate brood parasites: Diversity, specialization and overlap with their aculeate hosts

13:45 – 16:00 **Pacific Ballroom 23-24**

Symposium 19: Impacts of introduced honeybee populations on plant-pollinator mutualisms in non-managed ecosystems

Organizers: Keng-Lou James Hung, Diane Thomson, Joshua Kohn, David Holway

13:45	*Keng-Lou James Hung*	Global, community- and species-level impacts of introduced honey bees on plant-pollinator mutualisms
14:00	*Clare Aslan*	The impact of introduced honey bees on pollination mutualisms in Hawaii
14:15	*Ainhoa Magrach*	Honeybee spillover effects on wild plants and pollinators
14:30	*Maureen Page*	Honey bee introductions displace native bees and decrease pollination of a native wildflower
14:45	*Diane Thomson*	Fire in California scrub reduces honeybees but benefits *Bombus* and their preferred floral resources
15:00	*Dillon Travis*	Non-native honey bees (*A. mellifera*) decrease the fitness of native plants in Southern California
15:15	*Fairo Dzekashu*	Impact of Global change on plant-bee interaction networks on two mountain slopes in Kenya
15:30	*Jane Macharia*	Managed bees as pollinators and vectors of bio control agent against grey mold disease in strawberry
15:45	*LouisAllan Okwaro*	Coexistence of mitochondrial haplotypes and hybridization of nuclear genomes in the honeybees of Comoros islands

13:45 – 16:00 **Pacific Ballroom 25-26**

Themed session 6: Evolutionary perspectives on social insects

13:45	*Matthew Preebus*	Mito-nuclear discordance in the *Temnothorax longispinosus* species group (Hymenoptera: Formicidae): Testing for hybridization between social parasites and their hosts
14:00	*Jignasha Rana*	Phylogenomics reveal complex patterns of species production in the turtle ant adaptive radiation
14:15	*Enrico Schifani*	Integrative taxonomy suggests a role of mimicry in the diversification of Palearctic *Colobopsis* ants
14:30	*David Holway*	Ongoing recovery of native ants after landscape-scale removal of the Argentine ant from Santa Cruz Island, California
14:45	*Rodolfo da Silva Probst*	Evolutionary déjà vu: Extreme convergence in an ant-plant association revealed by UCE phylogenomics
15:00	*Tracy Audisio*	Genome evolution in termites
15:15	*Joel Vizueta*	The Global Ant Genomics Alliance (GAGA): Towards a phylogenomic understanding of ant social evolution
15:30	*Chloe Jelley*	Aggression and correlated traits across ant lineages
15:45	*Roman Meneghini*	Are *Pheidole pilifera* majors winter seed-millers?

Author Index

G

H

I

J

K

L

M

Author Index

N

O

P

Q

R

S

T

U

V

W

X

Y

Z

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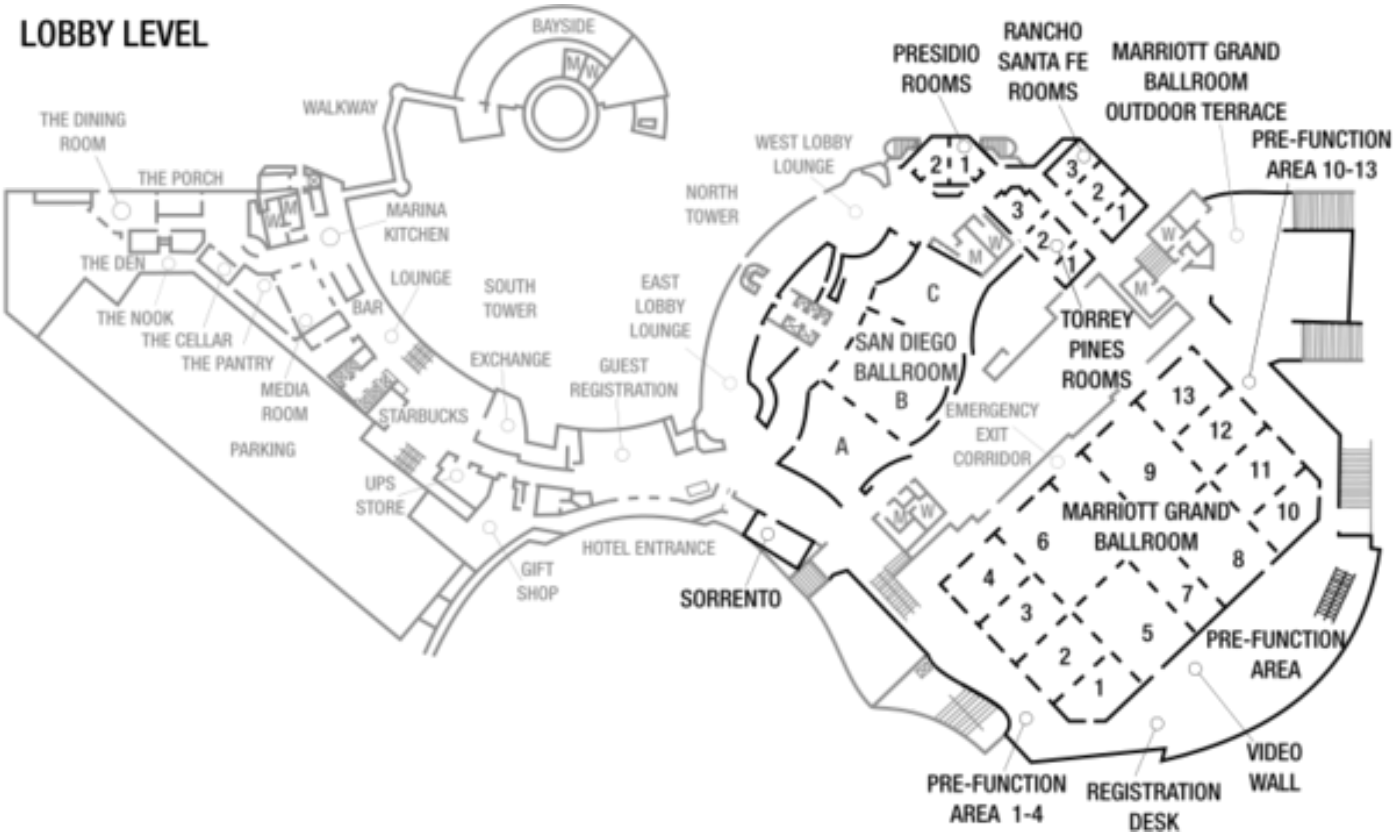

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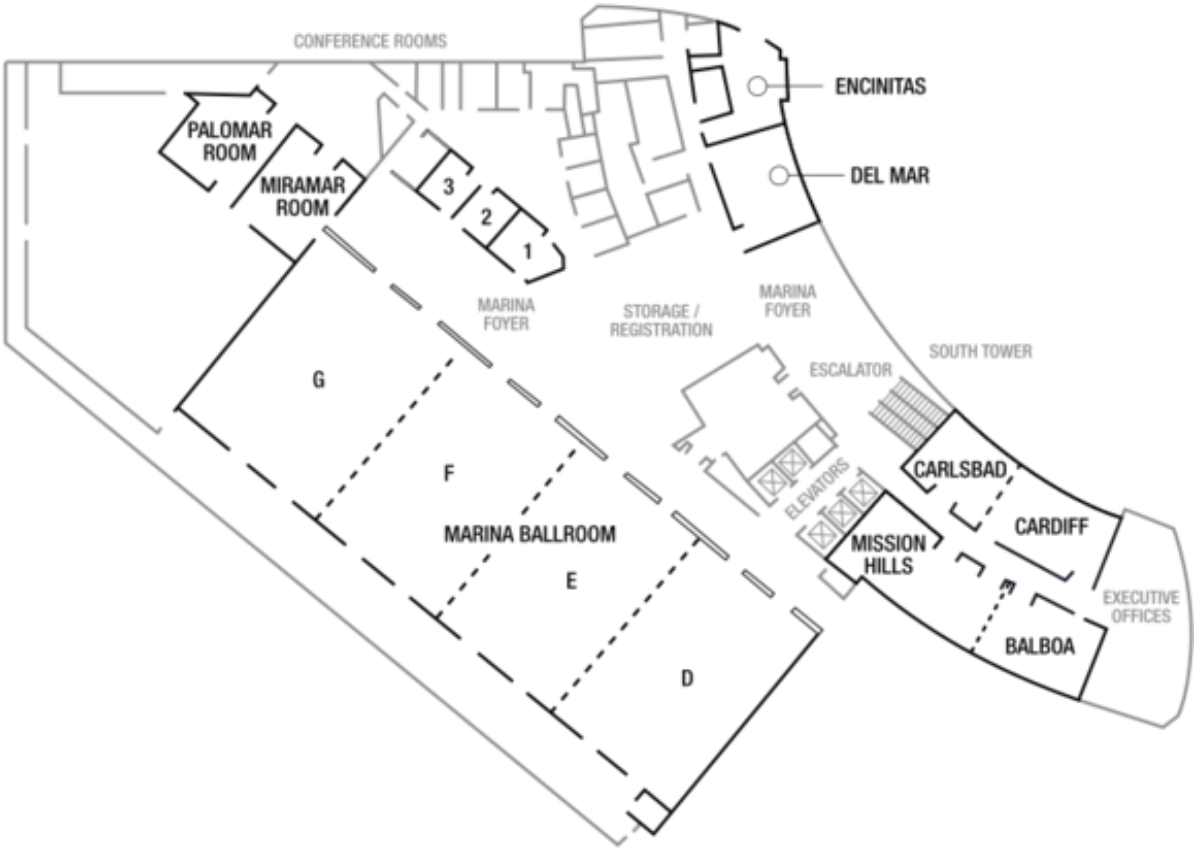

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