

# HNW2014

Hokkaido Neuroethology Workshops 2014

Satellite to 2014 ICN / JSCPB



July 26-27th

Hokkaido Univ., Sapporo, Japan

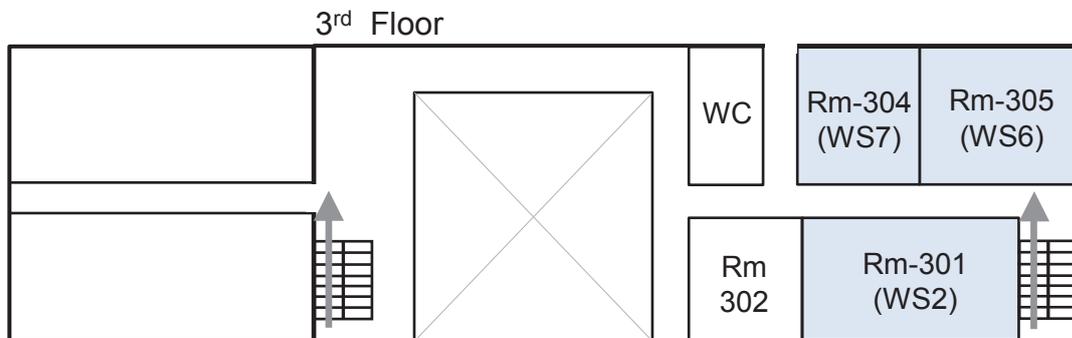
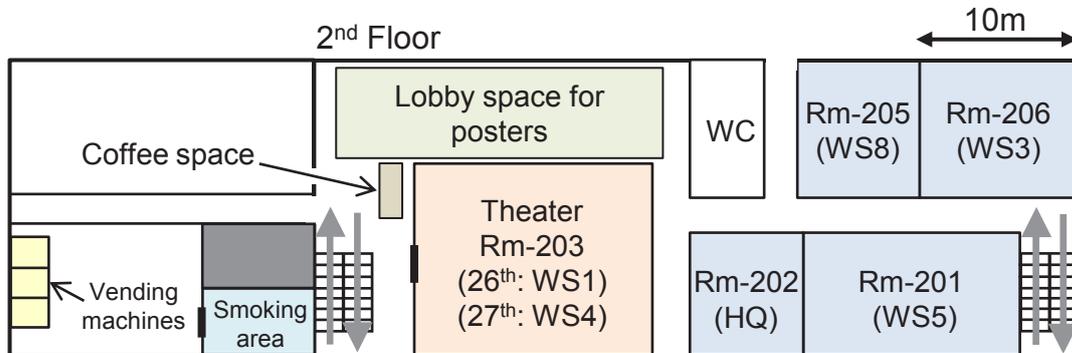
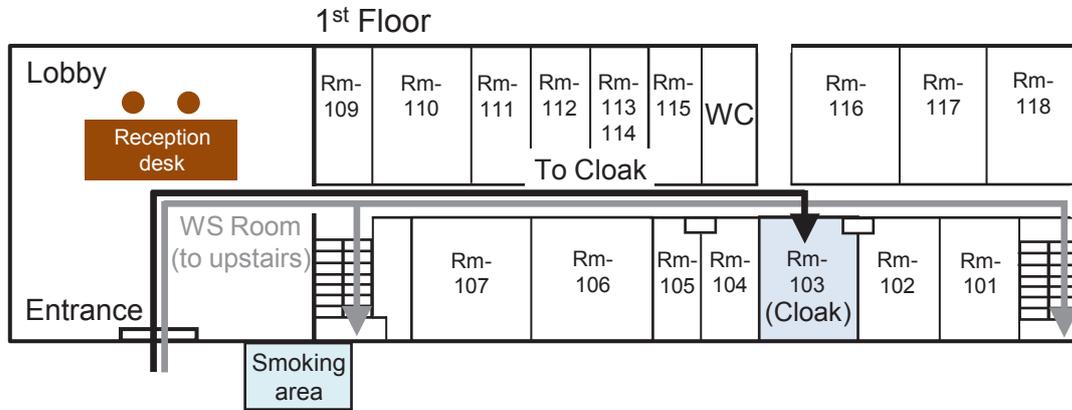


# HNW 2014 Program and Schedule

	July 26 (Sat)	July 27 (Sun)						
Time	<b>WS1</b> <b>Room 203</b> (Birdsong and imprinting)	<b>WS2</b> <b>Room 301</b> (Amphibian Neuroethology Workshop)	<b>WS3</b> <b>Room 206</b> (Dynamic analysis of biosonar and predator-prey interactions)	<b>WS4</b> <b>Room 203</b> (Small brains, bright minds: Learning and memory in invertebrates)	<b>WS5</b> <b>Room 201</b> (Ethology, neuroscience and genetics in crickets: How can they meet?)	<b>WS6</b> <b>Room 305</b> (Evolution of social cognitive ability based on neural coding of fictive and other's outcomes)	<b>WS7</b> <b>Room 304</b> (Insect Dorsal Ocelli)	<b>WS8</b> <b>Room 205</b> (Neurological insight of behavioral control by parasites or symbiosis)
8:00 –		Reception	Reception	Reception	Reception	Reception	Reception	
9:00 –	Reception			Intro to session I (9:30 – 9:45)	Opening remarks (9:30 – 9:40)		Opening remarks (9:00 – 9:05)	
9:30 –		Patric Vaelli (9:45 – 10:10)	Ying Liu (9:40 – 10:10)			Catharine Rankin (9:05 – 9:35)	Rohini Balakrishnan (9:15 – 9:45)	Peter J Simmons (9:00 – 9:40)
10:00 –		Lauren O'Connell (10:10 – 10:35)	Philip Caspers (10:10 – 10:40)			George Kemenes (9:35 – 10:05)	Matthias Hennig (9:45 – 10:15)	Joshua P van Kleef (9:40 – 10:00)
10:00 –	Put up posters (10:00 – 11:00)	Coffee break	Coffee break	Ken Lukowiak (10:05 – 10:35)	Coffee break & poster session (10:15 – 11:00)	Michael Platt (10:00 – 10:40)	Travis L Massey (10:00 – 10:20)	Reception
10:30 –		Intro to session II (10:45 – 11:00)		Coffee break			Coffee break	
11:00 –	Welcome & intro (11:00 – 11:05)	Ikkyu Aihara (11:00 – 11:25)	James A. Simmons (10:55 – 11:25)	Etsuro Ito (10:50 – 11:20)	Paul Stevenson (11:00 – 11:30)	Shinya Yamamoto (11:20 – 12:00)	Holger Krapp (10:40 – 11:20)	
11:30 –	Poster session (11:05 – 12:00)			Peter Narins (11:25 – 11:50)			David Glanzman (11:20 – 11:50)	
12:00 –	Tatsuo Okubo (12:00 – 12:20)	Andrea Simmons (11:50 – 12:15)	Lunch	Avy Susswein (11:50 – 12:20)	Lunch & poster session (12:00 – 13:30)	Jochen Zeil (11:40 – 12:00)	General discussion (12:00 – 12:30)	
12:00 –	Kosuke Watanabe (12:20 – 12:40)			Yukiko Ogura (12:40 – 13:00)				
12:30 –	Lunch	Lunch	Lunch	Lunch	Lunch	Lunch	Lunch	Opening remarks (13:00 – 13:10)
13:00 –								Daiki Goto (13:30 – 14:00)
13:30 –	Lunch	Intro to Session III (14:00 – 14:15)	Annemarie Surlykke (14:00 – 14:30)	Randolf Menzel (13:50 – 14:20)	Fernando Locatelli (14:20 – 14:50)	Kenji Tomioka (14:30 – 15:00)	Raquel Loreto (13:50 – 14:30)	
14:00 –				Johan Bolhuis (14:00 – 14:40)			Coffee break	
14:30 –	Kazuo Okanoya (14:40 – 15:20)	Jakob Christensen-Dalsgaard (14:40 – 15:05)	Darlene R. Ketten (14:45 – 15:15)	Coffee break	Ryuichi Okada (15:05 – 15:35)	Coffee break	Shuji Shigenobu (14:50 – 15:30)	
15:00 –		Molly Womack (14:15 – 14:40)	Melville Wohlgemuth (15:15 – 15:45)	Coffee break			Taro Mito (15:30 – 16:00)	
15:00 –	Alister Nicol (15:20 – 16:00)	Intro to Session IV (15:15 – 15:30)	Melville Wohlgemuth (15:15 – 15:45)	Ryuichi Okada (15:05 – 15:35)	Aike Guo (15:35 – 16:05)	Cassandra Extavour (16:00 – 16:30)	Masaru K Hojo (15:30 – 16:00)	
15:30 –		William Mowrey (15:30 – 15:55)	Coffee break	Makoto Mizunami (16:05 – 16:35)			Takuya Sato (16:00 – 16:30)	
16:00 –	Coffee break (16:00 – 16:30)	Erik Zornik (15:55 – 16:20)	Miwa Sumiya (16:00 – 16:30)	Makoto Mizunami (16:05 – 16:35)	Forum discussion (16:30 – 18:00)		Follow-up discussion (16:30 – 17:00)	
16:30 –		Emma Coddington (16:20 – 16:55)	Kloepper, Laura N. (16:30 – 17:00)	Poster session (16:40 – 17:50)				
17:00 –	Shinji Yamaguchi (16:50 – 17:10)	General discussion & Closing remarks (16:55 – 17:30)	General discussion (17:00 – 17:30)	Poster session (16:40 – 17:50)	Forum discussion (16:30 – 18:00)			
17:00 –	Naoya Aoki (17:10 – 17:30)							
17:30 –	General Discussion (17:30 – 18:00)							
18:00 –								

# Venue:

Building #5, Faculty of Science



# Welcome

Welcome to NHW2014, the Hokkaido Neuroethology Workshops 2014. This is one of the satellite events to the main body of the congress, 2014 ICN / JSCPB. A total of over 110 scientists will join us in 8 workshops on July 26 (SAT) - 27 (SUN). We hope that all of you enjoy science and the beautiful summer in Sapporo.

We would express our sincere gratitude to the *Faculty of Science* of Hokkaido University for providing us financial supports and encouragements. These workshops are hosted by faculty staffs, post-docs, graduate / undergraduate students belonging to *Laboratories of Behavioral Neurobiology* in the *Department of Biological Sciences*.

HNW2014 Organizers: Toshiya Matsushima, Hitoshi Aonuma, Makoto Mizunami

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## General Information

### Reception desk

On arrival at the venue, visit us at the reception desk at the entrance lobby of the Faculty of Science Building (#2/#5). Take your nametag and program booklet. The desk is open throughout the day during 9:00-18:00 (26<sup>th</sup> SAT) and 8:00-18:00 (27<sup>th</sup> SUN).

### Cloakroom

Baggage storage is available in 9:00-18:30 (26<sup>th</sup> SAT) and 8:00-18:30 (27<sup>th</sup> SUN) at Rm103 (ground = 1<sup>st</sup> floor) of the Building # 5. Keep valuables with you at all times. If you find the room is closed, please visit the reception desk.

### Smoking

Smoking is prohibited except otherwise designated.

### Internet access

WiFi service is available at the venue (Building #5, 2<sup>nd</sup> and 3<sup>rd</sup> floors). ID and password will be announced at the reception desk.

### Food/drink and Lunch

Light snacks and drinks will be served at the lobby of the 2<sup>nd</sup> floor. For lunch, participants are advised to go to COOP (Cooperative Association of the University Students) cafeteria in the campus. The central cafeteria “Chu-oh Shoku-doh” is just in 50 m of the venue (see the map in page 6). You can also take away snacks, drinks or lunch boxes (“Bento” or a Japanese lunch package) at a shop upstairs of the cafeteria.

### Contact information

Email: [hnw2014@mail.sci.hokudai.ac.jp](mailto:hnw2014@mail.sci.hokudai.ac.jp)

## For Workshop Organizers

Please visit us at our HQ on the 2<sup>nd</sup> floor (Rm-202) well before the starting time of your workshop. We will instruct you how to use the facilities such as video projector, screen, illumination and microphones. We expect each organizer to manage all about her/his workshop including the time schedules. In particular, be punctual about the closing time, and report us before you leave. For any inquiries, contact us by mail or visit us at the HQ.

## For Speakers and Poster Presenters

### Oral presentation

Oral presenters are expected to use their own computers (Windows or Mac) for video projections. Speakers are advised to connect their PC by themselves, as assisting PC operators are not available. Please be sure that your presentation works before your session. A green laser pointer can be used.



### Electric outlet

Type A outlets supply 100 volts AC in Japan; 50 Hz in eastern Japan (Tokyo – Sapporo), and 60 Hz in the west (Nagoya – Osaka). Do not forget to bring a converter / connector for your AC adaptor, if necessary.



### Video connector and Monitor splitter

Connect your PC to video projector with D-sub 15 pin connectors. No other video connectors can be used. Bring appropriate converter if necessary.

### Poster Presentation Guidelines

Poster sessions will be held in the lobby space at the 2<sup>nd</sup> floor.

Poster dimensions: Max size of poster is W1800 mm x H1500 mm. Pins will be available.

Velcro and adhesive tape are not suitable.

### Tips for color-blind audience

Please be conscientious of any audience members who may be color blind.

Instructions are available at:

<http://jfly.iam.u-tokyo.ac.jp/color/index.html>

<http://office.microsoft.com/en-us/powerpoint-help/choose-the-right-colors-for-your-powerpoint-presentation-HA001012072.aspx>

## Travel Information

### From the NEW CHITOSE AIRPORT (新千歳空港)

#### **By Train**

We strongly recommend JR (Japan Railway) Rapid Service Trains from the Airport to the Sapporo (札幌) Station that connect in 40 min at every 15 min. The tickets are available on site at the JR station office: Adult 1,070 yen / Child 540 yen. Seat reservation ticket costs you additional 300 yen.

#### **By Bus**

Airport Limousine bus (the Chuo Bus / Hokuto Kotsu Bus) brings you to the Sapporo Station and the Downtown area nearby in approximately 70 min. Fare: Adult 1,030 yen / Child 520 yen. Tickets are available at the bus counter of the Arrival Lobby of the Airport. You may directly go to your hotel, drop off your baggage, and go to the venue in Hokkaido University.

### From the SAPPORO STATION (札幌駅)

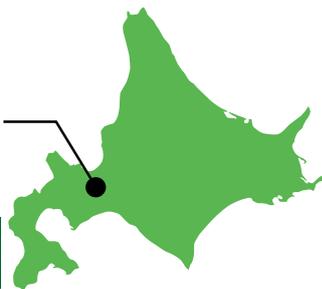
#### **By Walking (15 min)**

The main gate of the campus is within a 5-min flat walk (see the map in the next page) from the North Exit of the JR station. The campus is located north-west of the station. From the main gate, you walk another 10 min in the campus to reach the venue, Building #5 of the Faculty of Science, located at the west of the University Museum.

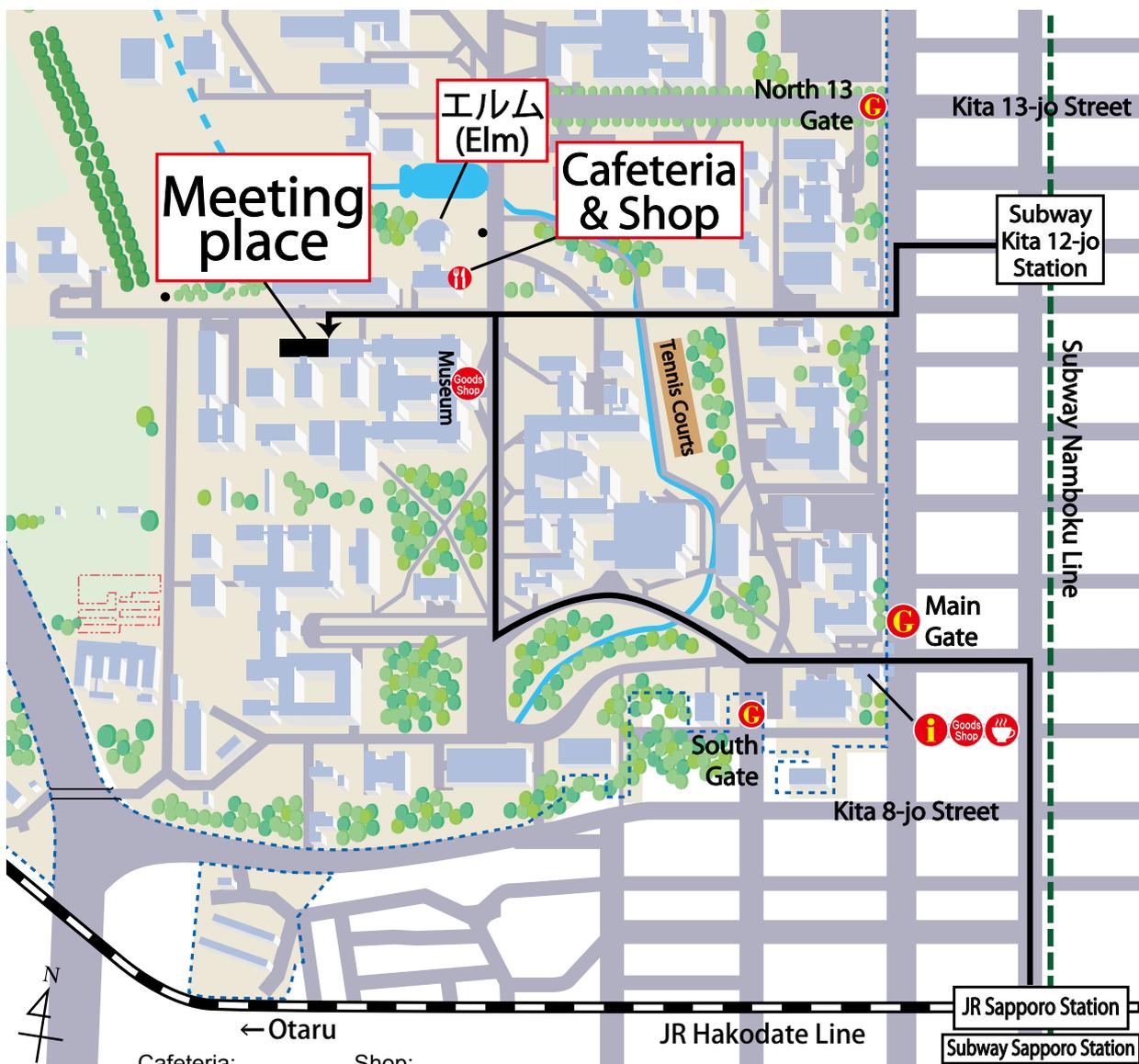
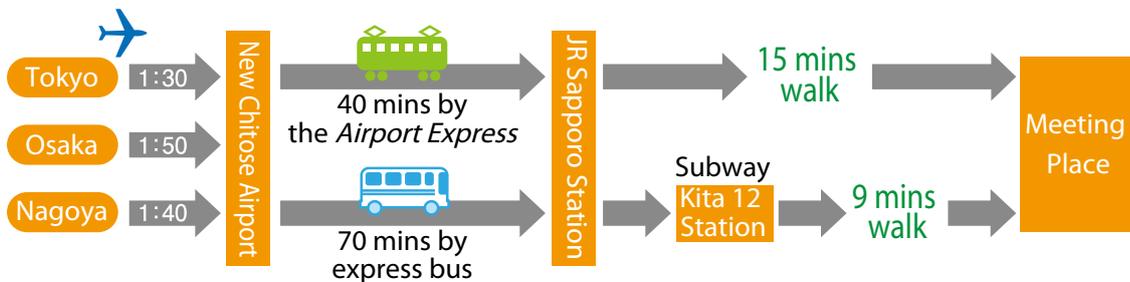
#### **By Taxi (5 min)**

Catch a taxi at the North Exit of the Station. Tell the driver for “RIGAKUBU” (Faculty of Science Bldg of the Hokkaido University), or show him/her the map on the next page. Taxi fare is around 700 yen.

Sapporo



## Getting to Hokkaido Univ. Sapporo Campus



← Otaru

Cafeteria:	Shop:
Sat: 11:00-19:00	Sat: 9:00-19:30
Sun: 11:00-15:00	Sun: 10:00-16:00

# Program

## **WS1. Birdsong and imprinting (11:00-18:00, Room 203, July 26th)**

**Organized by \*Brian McCabe (Univ Cambridge, UK), \*\*Johan Bolhuis (Univ Utrecht, Netherlands) and \*\*\*Kazuo Okanoya (Univ Tokyo, Japan).**

**\*bjm1@cam.ac.uk; \*\*J.J.Bolhuis@uu.nl; \*\*\*cokanoya@mail.ecc.u-tokyo.ac.jp**

The workshop is designed to stimulate discussion of behavioural imprinting and birdsong across multiple levels of analysis - behavioural through molecular - with the aim of identifying fundamental features of early learning.

### **Schedule:**

10:00-11:00 Put up posters.

11:00-11:05 **Brian McCabe** (Univ Cambridge, UK)

Welcome and introduction.

11:05-12:00 Poster session

12:00-12:20 **Tatsuo Okubo** and Michael S Fee (MIT, USA)

Splitting of a neural sequence underlies song learning in juvenile birds.

12:20-12:40 **Kosuke Watanabe** and Toshiya Matsushima (Hokkaido Univ, Japan)

Study of risk sensitivity and social dominance in Java sparrows.

12:40-13:00 **Yukiko Ogura**, Quihong Xin and Toshiya Matsushima (Hokkaido Univ, Japan)

Involvement of substantia nigra but not the dopaminergic neurons in social facilitation of foraging efforts in domestic chicks.

Lunch

14:00-14:40 **Johan Bolhuis** (Univ Utrecht, Netherlands)

Brain mechanisms of birdsong memory: In search of the template.

14:40-15:20 **Kazuo Okanoya**, Miki Takahashi, Hiroko Kagawa and Kenta Suzuki (Univ Tokyo, Japan)

Factors affecting constraints in song learning.

15:20-16:00 **Alister Nicol** (Univ Cambridge, UK)

Visual imprinting: learning, consolidation and sleep in memory formation.

Coffee Break

16:30-16:50 **Gervasio Batista**<sup>1</sup>, M Costa-Mattioli<sup>2</sup> and J L Pena<sup>1</sup> (<sup>1</sup>Albert Einstein Coll, USA; <sup>2</sup>Baylor College of Medicine, USA)

Auditory imprinting in chickens: role of PKR and thyroid hormones.

16:50-17:10 **Shinji Yamaguchi**, Naoya Aoki and Koichi J Homma (Teikyo Univ, Japan)

Hormonal regulation of the sensitive period for filial imprinting in domestic chicks.

17:10-17:30 **Naoya Aoki**, Shinji Yamaguchi and Koichi J Homma (Teikyo Univ, Japan)

Neural circuits of the sensitive period triggered by thyroid hormones in filial imprinting.

17:30-18:00 General Discussion (Chair: Shigeru Watanabe, Keio Univ, Japan)

18:15-20:15 Group Dinner

## Poster Presentations

1. **Ryo Mizuyama** and Toshiya Matsushima (Hokkaido Univ, Japan)

Risk, competition and impulsive choice in domestic chicks.

2. **Gervasio Batista**<sup>1</sup>, M Costa-Mattioli<sup>2</sup> and J L Pena<sup>1</sup> (<sup>1</sup>Albert Einstein Coll, USA; <sup>2</sup>Baylor College of Medicine, USA)

Auditory imprinting in chickens.

3. **Alister U Nicol** and Brian J McCabe (Univ Cambridge, UK)

Transcranial stimulation promotes consolidation of memory.

4. **Chentau Wen** and Toshiya Matsushima (Hokkaido Univ, Japan)

Neurons in medial striatum of domestic chicks may code actual reward and reward prediction to compute prediction error signal.

5. **Rie Suge**<sup>1</sup>, Alister U Nicol<sup>2</sup> and Brian J McCabe<sup>2</sup> (<sup>1</sup>Saitama Medical Univ, Japan; <sup>2</sup>Univ Cambridge, UK)

Fos-like immunoreactivity during sleep in a chick forebrain memory system after filial imprinting.

6. **Momoko Miura** and Toshiya Matsushima (Hokkaido Univ, Japan)

Function of object motion preference in newly hatched domestic chicks: facilitation of imprinting by point-light animation mimicking a walking hen.

7. **Satoko Ono**<sup>1,2,3</sup>, Kazuo Okanoya<sup>1,2,3</sup> and Yoshimasa Seki<sup>1,2,3</sup> (<sup>1</sup>Univ Tokyo, Japan; <sup>2</sup>RIKEN Brain Science Institute, Japan; <sup>3</sup>JST, ERATO, Japan)

Comparison of single-unit selectivity for bird's own song in the primary and secondary

auditory areas in the Bengalese finch forebrain.

8. **Tomoko Mizuhara**<sup>1,2</sup>, Kenta Suzuki<sup>1,2</sup>, Masaki Kato<sup>1</sup> and Kazuo Okanoya<sup>1,2</sup> (<sup>1</sup>RIKEN Brain Science Institute, Japan; <sup>2</sup>Univ Tokyo, Japan)

Comparative study of FoxP2 expression in the brain of the Bengalese finch and its wild ancestor, the white-rumped munia.

## **WS2. Amphibian Neuroethology Workshop (9:00-18:00, Room 301, July 27th)**

**Organized by \*Ian Hall (Columbia Univ, USA), James Carr (Texas Technical Univ, USA) and Hoke Kim (Colorado State Univ, USA).**

**[\\*ich2105@columbia.edu](mailto:*ich2105@columbia.edu)**

### **Schedule:**

- 9:00 – 9:30 Registration and Loading of Talks.
- 9:30 – 9:45 Welcome and Introduction to Session I: Chemical Ecology
- 9:45 – 10:10 **Patric Vaelli**, Michigan State University ([vaellipa@msu.edu](mailto:vaellipa@msu.edu))  
Microbial origins and physiological consequences of tetrodotoxin toxicity in the rough-skinned newt (*Taricha granulosa*)
- 10:10 – 10:35 **Lauren O’Connell**, Harvard University ([aloconnell@fas.harvard.edu](mailto:aloconnell@fas.harvard.edu))  
Dressed to Kill: Chemical ecology of the Little Devil Frog
- 10:35 – 10:45 Break
- 10:45 – 11:00 Introduction to Session II: Auditory System
- 11:00 – 11:25 **Ikkyu Aihara**, Doshisha University ([ikkyu.aihara@gmail.com](mailto:ikkyu.aihara@gmail.com))  
Visualizing Acoustic Preferences of Female Frogs
- 11:25 – 11:50 **Peter Narins**, UCLA ([pnarins@ucla.edu](mailto:pnarins@ucla.edu))  
Long-term Effects of Climate Change on Frog Calls?
- 11:50 – 12:15 **Andrea Simmons**, Brown University ([andrea\\_simmons@brown.edu](mailto:andrea_simmons@brown.edu))  
Neural processing of pressure and particle motion in central auditory pathways of larval bullfrogs
- 12:15 – 2:00 Lunch Break
- 2:00 – 2:15 Introduction to Session III: Evolution
- 2:15 – 2:40 **Molly Womack**, Colorado State University ([mollywo@rams.colostate.edu](mailto:mollywo@rams.colostate.edu))  
Convergent ear loss and regain in bufonids
- 2:40 – 3:05 **Jakob Christensen-Dalsgaard**, University of Southern Denmark  
([jcd@biology.sdu.dk](mailto:jcd@biology.sdu.dk))

Evolution of the amphibian middle ear

- 3:05 – 3:15 Break
- 3:15 – 3:30 Introduction to Session IV: Neural Circuits and Systems
- 3:30 – 3:55 **William Mowrey**, Janelia Farm Research Campus  
([mowreyw@janelia.hhmi.org](mailto:mowreyw@janelia.hhmi.org))  
Biased visuomotor behavior suggests a simple computation underlying amphibian target tracking
- 3:55 – 4:20 **Erik Zornik**, Reed College ([ezornik@reed.edu](mailto:ezornik@reed.edu))  
Neurocircuitry underlying vocal production of the African clawed frog, *Xenopus laevis*
- 4:20 – 4:55 **Emma Coddington**, Willamette University ([ecoddington@willamette.edu](mailto:ecoddington@willamette.edu))  
Coding Context: Neuroendocrine modulation of receptor-mediated endocytosis
- 4:55 – 5:30 General Discussion and Closing

## **WS3. Dynamic analysis of biosonar and predator-prey interactions (9:00-18:00, Room 206, July 27th)**

**Organized by \*Hiroshi Riquimaroux (Doshisha Univ, Japan).**

**[\\*hrikimar@mail.doshisha.ac.jp](mailto:hrikimar@mail.doshisha.ac.jp)**

Echolocation in bats involves dynamic changes in signals, processing, perception, and interaction with targets, including active countermeasures of potential prey. The vulnerability of bats to countermeasures and the counter-countermeasures of bats reveal important aspects of biosonar processing in neuroethologically-motivated studies that are not manifested in studies motivated by conventional auditory questions.

### **Schedule:**

9:30-9:40 **Hiroshi Riquimaroux** (Doshisha Univ., Japan)

Opening remarks

9:40-10:40 **Oral Presentation (1) Chair: James A. Simmons** (Brown Univ., USA)

9:40-10:10 **Ying Liu**, Hongwei Wang and Jiang Feng (Northeast Normal Univ., China)

The dialects and driving force of communication vocalization in greater horseshoe bats, *Rhinolophus ferrumequinum*.

10:10-10:40 **Philip Caspers**, Alexander Leonessa, and Rolf Mueller (Virginia Tech, USA)

Eigenbeam analysis of the diversity in bat biosonar beampatterns

Coffee Break

10:55-11:55 **Oral Presentation (2) Chair: Ikuo Matsuo** (Tohoku Gakuin Univ., Japan)

10:55-11:25 **James A. Simmons** and Michaela Warnecke (Brown Univ., USA)

Structure of wideband FM biosonar imaging.

11:25-11:55 **Rolf Müller**, Yanqing Fu, Anupam K. Gupta, Mittu Pannala (Virginia Tech, USA/ Shandong Univ., China)

Physical and computational models for dynamic sensing behaviors in bat biosonar.

Lunch

13:30-14:30 **Oral Presentation (3) Chair: Hiroshi Riquimaroux** (Doshisha Univ., Japan)

13:30-14:00 **Daiki Goto**, Hana Tsuji, Keiichi Morikawa, Yuto Furusawa, Shizuko Hiryu, Kohta I. Kobayasi and Hiroshi Riquimaroux (Doshisha Univ., Japan)

The ways for CF-FM bats to extract their echolocation signals during flight with multiple conspecifics.

14:00-14:30 **Annemarie Surlykke**, Emil G. Larsen, Nicolaj L. Aaskoven (Univ. of Southern Denmark, Denmark)

Location, location, location: Object memory vs. spatial memory in *Myotis daubentonii*.

Coffee Break

14:45-15:45 **Oral Presentation (4) Chair: Walter Metzner** (UCLA, USA)

14:45-15:15 **Darlene R. Ketten** (Curtin Univ., Australia/ Harvard Med. Sch., Woods Hole Ocean. Inst., USA), James Simmons (Brown Univ., USA), Hiroshi Riquimaroux (Doshisha Univ., Japan)

Inner ear determinants of sensitivity in bats and cetaceans: curvature and inputs.

15:15-15:45 **Melville Wohlgenuth** and Cynthia F. Moss (Johns Hopkins Univ., USA)

Audio-motor activity in the superior colliculus of an echolocating bat engaged in a natural, acoustic orientation task.

Coffee Break

16:00-17:00 **Oral Presentation (5) Chair: Cynthia Moss** (Johns Hopkins Univ., USA)

16:00-16:30 **Miwa Sumiya**, Emyo Fujioka, Ikkyu Aihara, Yoshiaki Watanabe, Hiroshi Riquimaroux, Tetsuo Ohta, and Shizuko Hiryu (Doshisha Univ., Japan)

Acoustic and flight attention of echolocating bats during attacking to multiple target preys in the field.

16:30-17:00 **Laura N. Kloepper** (Brown Univ. and UMass Dartmouth, USA), Jason E.

Gaudette, (Brown Univ. and Naval Undersea Warfare Center, USA), James A.

Simmons, (Brown Univ., USA) and John R. Buck (UMass Dartmouth, USA)

Influence of mouth opening and gape angle on the transmitted signals of big brown bats (*Eptesicus fuscus*).

17:00-17:30 General Discussion

17:30-17:40 **Hiroshi Riquimaroux** (Doshisha Univ., Japan)

Closing Remarks

## **WS4. Small brains, bright minds: Learning and memory in invertebrates (9:00-18:00, Room 203, July 27th)**

**Organized by \*Randolf Menzel (Freie Univ. Berlin, Germany) and \*\*Makoto Mizunami (Hokkaido Univ., Japan).**

**[\\*menzel@neurobiologie.fu-berlin.de](mailto:*menzel@neurobiologie.fu-berlin.de); [\\*\\*mizunami@sci.hokudai.ac.jp](mailto:**mizunami@sci.hokudai.ac.jp)**

Invertebrate nervous systems offer significant advantages for multidisciplinary molecular, cellular, neurophysiological, genetic and behavioral investigations of the mechanisms underlying learning, memory formation and memory retrieval. The workshop is aimed at stimulating discussion on future development of studies on invertebrate learning and memory.

### **Schedule:**

9:00-9:05 **Randolf Menzel** (Freie Univ. Berlin, Germany)

Opening remark

9:05-9:35 **Catharine Rankin** (Univ. British Columbia, Canada)

High throughput phenotypic profiling leads to insights into mechanisms of habituation

in *C. elegans*

9:35-10:05 **George Kemenes** (Univ. Sussex, UK)

Temporal patterns of cellular and molecular changes underlying memory consolidation

in *Lymnaea*.

10:05-10:35 **Ken Lukowiak** (Univ. Calgary, Canada)

Environmentally relevant stressors alter learning, memory formation and forgetting in an invertebrate model system.

Coffee Break

10:50-11:20 **Etsuro Ito** (Tokushima Bunri Univ., Japan)

Insulin and glucose for conditioned taste aversion in *Lymnaea*.

11:20-11:50 **David Glanzman** (UCLA, USA)

Morphological analysis of memory reconsolidation and memory erasure in *Aplysia*.

11:50-12:20 **Avy Susswein** (Bar Ilan Univ., Israel)

Long-term memory is formed by combining 3 factors that each alone blocks memory

formation.

## Lunch

13:20-13:50 **Benny Hochner** (Hebrew Univ., Israel)

The embodied organization of octopus behavior.

13:50-14:20 **Randolf Menzel** (Freie Univ. Berlin, Germany)

Learning related plasticity at the input and output of the mushroom body in the honeybee.

14:20-14:50 **Fernando Locatelli** (Univ. Buenos Aires, Argentina)

Experience dependent tuning in olfactory processing.

## Coffee Break

15:05-15:35 **Ryuichi Okada** (Tokushima Bunri Univ., Japan)

Olfactory learning-related plasticity of the mushroom body neurons in the honeybee.

15:35-16:05 **Aike Guo** (China Acad. Sci., China):

Visual learning in the fruit Fly *Drosophila melanogaster*.

16:05-16:35 **Makoto Mizunami** (Hokkaido Univ., Japan)

Roles of aminergic neurons in memory formation and retrieval in crickets.

16:40-17:50 Poster session

18:00-20:00 Group dinner (Restaurant Elm in Faculty House Trillium, 5min walk from the venue)

## Poster Presentations (Put up posters after 14:00)

1. **Gutnick Tamar**<sup>1,2</sup>, Binyamin Hochner<sup>1</sup> & Michael J Kuba<sup>1,2</sup> (<sup>1</sup>Hebrew Univ., Israel; <sup>2</sup>Max Plank Institute for Brain Research, Germany).

Tactile discrimination learning in intact *Octopus vulgarise* using a two choice maze.

2. Jonas N. Richter<sup>1</sup>, Binyamin Hochner<sup>1</sup> & **Michael J Kuba**<sup>1,2</sup> (<sup>1</sup>Hebrew Univ., Israel; <sup>2</sup>Max Planck Institute for Brain Research, Germany)

Complex Learning and Problem Solving in *Octopus vulgaris*.

3. **Nobuhiro Yamagata**<sup>1,2</sup>, Toshiharu Ichinose<sup>1,2</sup>, Yoshinori Aso<sup>3</sup>, Pierre-Yves Plaçais<sup>4</sup>,

Anja B. Friedrich<sup>2</sup>, Richard Sima<sup>2</sup>, Thomas Preat<sup>4</sup>, Gerald M. Rubin<sup>3</sup> & Hiromu Tanimoto<sup>1,2</sup> (<sup>1</sup>Tohoku Univ., Japan; <sup>2</sup>Max-Planck-Institut für Neurobiologie, Germany; <sup>3</sup>Janelia Farm Research Campus, USA, <sup>4</sup>PSL Research Univ., France)  
Distinct dopamine subsets mediate reward signals for short- and long-term memories.

4. **Thomas Carle**, Rio Horiwaki & Yoshifumi Yamawaki (Kyushu Univ, Japan)

Learning to avoid bitter prey in praying mantis (*Tenodera aridifolia*): not equal chances for every type of prey.

5. **Hidehiro Watanabe**<sup>1</sup>, Hiroshi Nishino<sup>2</sup> & Fumio Yokohari<sup>1</sup>

(<sup>1</sup>Fukuoka Univ., Japan; <sup>2</sup>Hokkaido Univ., Japan)

Temporal activity patterns of two different types of projection neurons revealed by simultaneous intracellular recordings in the cockroach.

6. **Masami Yoshino** (Tokyo Gakugei Univ., Japan)

Intrinsic membrane properties of acutely dissociated Kenyon cells and their modulation by nitric oxide signaling pathway.

7. **Hiroki Ebina** & Makoto Mizunami (Hokkaido Univ., Japan)

Observational learning in crickets.

8. **Kanta Terao**<sup>1</sup>, Yukihiisa Matsumoto<sup>1,2</sup> & Makoto Mizunami<sup>1</sup>

(<sup>1</sup>Hokkaido Univ., Japan; <sup>2</sup>Tokyo Medical and Dental Univ., Japan)

Critical evidence for the prediction error theory in associative learning.

9. **Yoshitaka Hamanaka** & Makoto Mizunami (Hokkaido Univ., Japan)

Dopaminergic neurons in the brain of the cockroach, *Periplaneta americana*.

10. **Ana Turchetti-Maia**<sup>1</sup>, Binyamin Hochner<sup>1</sup> & Tal Shomrat<sup>1,2</sup> (<sup>1</sup>Hebrew Univ, Israel;

<sup>2</sup>Ruppin Academic Center, Israel)

Nitric oxide synthase (NOS) mediates activity-dependent plasticity in an area of the octopus brain involved in learning and memory.

11. Fred Lorenzetti, Mikey Crossley, Souvik Naskar, Michael O'Shea, Paul R. Benjamin & **Ildiko Kemenes** (Univ. Sussex, UK)

The adaptive role of memory lapses after classical conditioning

12. **Ryosuke Yagi** & Nobuaki Tanaka (Hokkaido Univ., Japan)

Convergence of putative multimodal sensory input to the protocerebral areas in *Drosophila*.

## **WS5. Ethology, neuroscience and genetics in crickets: How can they meet? (09:00-18:00, Room 201, July 27th)**

**Organized by \*Gerald Pollack (McGill Univ, Canada), \*\*Berthold Hedwig (Univ Cambridge, UK) and \*\*\*Stefan Schöneich (Univ Cambridge, UK).**

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In crickets a unique wealth of behavioural, physiological, morphological and pharmacological knowledge has been accumulated. The workshop will bring together scientists exploring cricket behaviour and its neural and genetic basis. The forum will discuss current progress in the fields and explore how genetic, molecular biological and neurobiological approaches can be advanced and how they can be combined to study this model system of insect behaviour. By integrating the various cutting edge approaches and by catalysing collaborations among the participants this workshop will further the study of insect behaviour and contribute to Neuroethology.

### **Schedule:**

09:00-09:15 **Sumihare Noji** (Univ Tokushima, Japan) and **Berthold Hedwig** (Univ Cambridge, UK)

Opening remarks

09:15-09:45 **Rohini Balakrishnan** (Indian Inst of Science, India)

From biophysics to behavioural ecology: Acoustic communication in tree crickets

09:45-10:15 **Matthias Hennig** (Humboldt Univ, Germany) and **David Gray** (California State Univ Northridge, USA)

A comparative approach to acoustic pattern recognition in crickets.

Coffee break, posters

11:00-11:30 **Paul Stevenson** (Univ Leipzig, Germany)

Aggression in crickets: Short term neuromodulatory control and potentially inherent traits

11:30-12:00 **Hitoshi Aonuma** (Hokkaido Univ, Japan)

Modeling of group size dependent aggression of male crickets

Lunch, posters

13:30-14:00 **Hiroto Ogawa** (Hokkaido Univ, Japan)

Population coding of directional information of cercal sensory stimulus and wind-elicited locomotion

14:00-14:30 **Stefan Schöneich** (Univ Cambridge, UK)  
Neurobiology of acoustic communication: Neural networks for singing and song pattern recognition in *G. bimaculatus*

14:30-15:00 **Kenji Tomioka** (Okayama Univ, Japan)  
Molecular approach to the circadian clock that controls locomotor rhythms in the cricket *G. bimaculatus*

Coffee break

15:30-16:00 **Taro Mito** (Univ Tokushima, Japan)  
Whole-genome sequencing and targeted genome editing in the cricket *G. bimaculatus*

16:00-16:30 **Cassandra Extavour** (Harvard Univ, USA)  
Functional analysis of genes with both neural and germ line roles in *Gryllus*

16:30-18:00 **Forum discussion**  
Perspectives for cricket genetics and neuroscience - Coordination of research interests

### **Poster Presentations** (Put up posters by 10:15 and remove them by 14:00)

1. **Jacob Pedro**<sup>1,2</sup> & Berthold Hedwig<sup>1</sup> (<sup>1</sup>Univ Cambridge, UK; <sup>2</sup>Champalimaud Centre for the Unknown, Portugal)  
Central pattern generator neurons for species-specific singing in cricket species

2. **Stefan Schöneich** & Berthold Hedwig (Univ Cambridge, UK)  
Neuronal coupling of ventilatory and chirp rhythms in singing field crickets.

3. **Benjamin Navia** & John Stout (Andrews Univ, USA)  
Prothoracic processing of models of male calling songs by female crickets: roles in behavior?

4. **Paule Lefebvre** & Andreas Stumpner (Univ Göttingen, Germany)  
Local neurons in the auditory system of the bush-cricket *Ancistrura nigrovittata*.

5. Hannah Haberkern<sup>1</sup> & **Bethold Hedwig**<sup>2</sup> (<sup>1</sup>Janelia Farms, USA; <sup>2</sup>Univ Cambridge, UK)  
Integration of responses to antennal stimulation and phonotaxis in the walking

cricket

6. **Makoto Someya** & Hiroto Ogawa (Hokkaido Univ, Japan)  
Multisensory integration of auditory and cercal sensory inputs by ascending projection neurons in the cricket.
7. **Matasaburo Fukutomi**, Makoto Someya & Hiroto Ogawa (Hokkaido Univ, Japan)  
Cross-modal effects of auditory stimulus on wind-elicited walking behavior in the cricket, *Gryllus bimaculatus*
8. **Ruriko Mitani** & Hiroto Ogawa (Hokkaido Univ, Japan)  
Input-distribution analysis based on directional selectivity of dendritic Calcium responses in wind-sensitive giant interneurons of the cricket
9. **Noriyasu Ando**, Ryotaro Hashimoto & Ryohei Kanzaki (Univ Tokyo, Japan)  
Visual motion detection in the cricket, *Gryllus bimaculatus*
10. **Yoshifumi Oka**, Noriyasu Ando & Ryohei Kanzaki (Univ Tokyo, Japan)  
Cricket in virtual reality: Use of virtual reality and robots for understanding of vision based navigation in crickets.
11. **Kaveri Rajaraman**<sup>1,2</sup>, Varmsy Godthi<sup>2</sup>, Rudra Pratap<sup>1</sup> & Rohini Balakrishan<sup>1</sup> (<sup>1</sup>Indian Inst of Science, India; <sup>2</sup>Hyderabad Central Univ, India)  
Multimodal duetting in a paleotropical pseudophylline bushcricket.
12. **Lev Shestakov** & Varvara Vedenina (Russian Acad Sci, Russia)  
Broad selectivity for the courtship song in the cricket *Gryllus bimaculatus*
13. **Tim Ostrowski**<sup>1,2</sup> & Andreas Stumpner<sup>1</sup> (<sup>1</sup>Univ Göttingen, Germany; <sup>2</sup>Univ Missouri, USA) Is it beneficial, to record from axons instead of dendrites?
14. **Takayuki Watanabe** & Hitoshi Aonuma (Hokkaido Univ, Japan)  
Development of tools for neurogenetics in the field cricket *Gryllus bimaculatus*.
15. E.J. Sarmiento-Ponce<sup>1</sup>, Taro Mito<sup>2</sup> & **Berthold Hedwig**<sup>1</sup> (<sup>1</sup>Univ Cambridge, UK; <sup>2</sup>Univ Tokushima, Japan)  
Phonotaxis in Wild-type, White-eyed and GFP-white-eyed cricket lines of *Gryllus bimaculatus*
16. **Tasmin Jones** & Cassandra Extavour (Harvard Univ, USA)  
Characterization of molecules involved in neural development in the cricket, *Gryllus bimaculatus*

## **WS6. Evolution of social cognitive ability based on neural coding of fictive and other's outcomes (9:20-12:00, Room 305, July 27th)**

**Organized by \*Kenji Matsumoto (Tamagawa University Brain Science Institute, Japan).**

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When one could lead a positive outcome but actually she/he fails it and encounters a negative outcome, "regret," a kind of negative feeling occurs on the basis of the fictive positive outcome. If an opponent receives the positive outcome at that time, "envy," a negative social emotion rises. To develop cooperative society by overriding envy, positive feelings from equality between self and others should have been evolved. The goal of this workshop is to find a new view about evolution of social cognitive ability on the basis of recent findings about neural coding of fictive outcomes, outcomes to others, and equality between self and others in the prefrontal cortex, which will provide a new trend in neuroethology.

### **Schedule:**

9:20-10:00 **Hiroshi Abe** (National Center of Neurology and Psychiatry, Japan)

Fictive outcomes and the primate prefrontal cortex during an iterative competitive game.

10:00-10:40 **Michael Platt** (Duke University, USA)

Reference frames for social decisions in the primate brain.

10:40-11:20 **Ryuta Aoki** (Japan Society for Promotion of Science, Japan)

How the brain codes social equality in the number of choice options.

11:20-12:00 **Shinya Yamamoto** (Kobe University, Japan)

Chimpanzees' sensitivity to other's outcomes and the evolution of cognition on altruism and reciprocity.

## **WS7. Insect Dorsal Ocelli (9:00am–12:30pm, Room 304, July 27th)**

**Organizer: Joshua van Kleef (University of California Berkeley, USA)**

email: [vankleef@berkeley.edu](mailto:vankleef@berkeley.edu)

Most insects possess three simple eyes, known as the dorsal ocelli, whose role in behavior has fascinated scientists for hundreds of years. Our workshop will examine the latest optical, anatomical, neurophysiological and behavioural clues to the functions of ocelli in a diverse range of insects that includes ants, bees, dragonflies, blowflies, locusts and wasps.

### **Schedule:**

- 8:50–9:00 Welcome
- 9:00–9:40 **Peter J Simmons** (Newcastle Univ., UK)  
Coding and signals for action in the locust ocellar pathway.
- 9:40–10:00 **Joshua P van Kleef**, Travis L Massey, Michel M Maharbiz (Univ. California Berkeley, USA)  
An eye for every occasion: as light levels dwindle locusts switch from compound eyes to ocelli as their source of visual-feedback for roll.
- 10:00–10:20 **Travis L Massey**, Joshua P van Kleef, Kaylee Mann, Michel M Maharbiz (Univ. California Berkeley, USA)  
Ocelli based remote control of insect flight.
- 10:20–10:40 Morning Tea
- 10:40–11:20 **Holger Krapp** (Imperial College London, UK)  
Ocelli in blowflies: speeding up signals in the motion vision pathway.
- 11:20–11:40 **Emily Baird**<sup>1</sup>, Eric Warrant<sup>1</sup>, Klaus Lunau<sup>2</sup> and Willi Ribi<sup>3, 4</sup> (<sup>1</sup>Lund Univ., Sweden; <sup>2</sup>Univ. Düsseldorf, Germany; <sup>3</sup>Australian National Univ., <sup>4</sup>Australia; Private Univ. Liechtenstein)  
The unusual ocellar morphology of the orchid bee.
- 11:40–12:00 **Jochen Zeil**<sup>1</sup>, Willi A Ribi<sup>1, 2</sup>, Ajay Narendra<sup>1</sup> (<sup>1</sup>Australian National Univ., Australia; <sup>2</sup>Private Univ. Liechtenstein, Liechtenstein)  
Insect ocelli: why don't they like us?
- 12:00–12:30 General discussion

## **WS8. Neurological insight of behavioral control by parasites or symbiosis (13:00-18:00, Room 205, July 27th)**

**Organized by \*Takuya Sato (Kobe Univ, Japan), Mamiko Ozaki (Kobe Univ, Japan) and Midori Sakura (Kobe Univ, Japan).**

**[\\*takuya@species.jp](mailto:*takuya@species.jp)**

Parasites and/or symbionts can manipulate host's behavior turning their hosts into servants or vehicles for their genes. Such a manipulation of hosts is not advantageous to the host, but rather to the parasite, a concept known as the extended phenotype of the parasites/symbionts. Researches into such extended phenotypes have provided novel insights into parasite/symbiont -host interaction, that integrate across different biological levels. In this symposium session, we therefore discuss the possible mechanisms of such a host behavioral control by comparing strategies associated with different parasites or symbionts.

### **Schedule:**

13:00-13:10 **Mamiko Ozaki** (Kobe Univ, Japan)

Opening remark

13:10-13:50 **Frederic Libersat** (Ben Gurion Univ, Israel)

Neuroethology of cockroach host zombification by a parasitoid wasp

13:50-14:30 **Raquel Loreto** (Pennsylvania State Univ, USA)

Zombie ants across scales: from continents to brains

Coffee Break (14:30-14:50)

14:50-15:30 **Shuji Shigenobu** (NIBB, Japan)

Genomic revelations of a mutualism: the pea aphid and its obligate bacterial symbiont

15:30-16:00 **Masaru K Hojo** (Kobe Univ, Japan)

Chemical disguise of a butterfly larvae and gustatory synergism in host ants mediating a species-specific symbiosis

16:00-16:30 **Takuya Sato** (Kobe Univ, Japan)

Ecosystem consequences of the extended phenotype mediated by nematomorphs

16:30-17:00 Follow-up discussion

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