



International Society for Neuroethology

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International Society for Neuroethology
P.O. Box 1897
Lawrence, KS 66044, USA
Website: <http://neuroethology.org/>

PHONE: +1-785-843-1235
(or 1-800-627-0629 Ext. 233)
FAX: +1-785-843-1274
E-mail: isn@allenpress.com

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ISN Officers

President: Peter Narins, Department of Integrative Biology and Physiology, 621 Charles E. Young Drive South, Box 951606, Los Angeles, CA 90095-1606 USA
PHONE: +1-310-825-0265 FAX: +1-310-206-3987
E-mail: pnarins@ucla.edu

Treasurer: Karen Mesce, Department of Entomology and Graduate Program in Neuroscience, University of Minnesota, 219 Hodson Hall, 1980 Folwell Avenue, Saint Paul, MN 55108 USA
PHONE: +1-612-624-3734 FAX: +1-612-625-5299
E-mail: mesce001@umn.edu

Secretary: Susan Fahrbach, Department of Biology, Wake Forest University, Box 7325, Winston-Salem, NC 27109 USA
PHONE: +1-336-758-5980 FAX: +1-336-758-6008
E-mail: fahrbach@wfu.edu

Past-President: Alison Mercer, Department of Zoology, University of Otago, P.O. Box 56, Dunedin, NZ
PHONE: +64 3 479 7961 FAX: +64 3 479 7584
E-mail: alison.mercer@otago.ac.nz

President-Elect: Catharine Rankin, Department of Psychology, Kenny Room 3525 – 2136 West Mall, University of British Columbia, Vancouver, BC Canada V6T 1Z4
PHONE: +1-604-822-5449 FAX: +1-604-822-7299
E-mail: crankin@psych.ubc.ca

THIS ISSUE INCLUDES

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Early career columns will return in 2015!



Our peripatetic President, Peter Narins, eye-to-eye with a phyllomedusan treefrog in Arataï, French Guiana.

Photo: W. Hödl.

The Prez Says

Peter Narins
President of the ISN

Dear ISN Members,

Welcome to my first column as your new president!
As you know, I assumed the office near the end of

ICN2014 in Sapporo. By all accounts, it was a spectacular Congress. What makes a Congress spectacular? First and foremost – high quality science in the form of exciting plenary lectures, interesting, cutting-edge symposia on timely and/or controversial topics, and a wide variety of novel results in poster format. These were all evident in Japan! The Sapporo Convention Center provided three large comfortable meeting rooms and an ample, well-lit space for poster presentations. The Congress's success was clearly the result of the incredibly hard work over several years by the Local Organizing Committee headed by **Yoshitaka (Yoshi) Oka**, assisted by **Toshiya Matsushima**, **Makoto Mizunami** and their colleagues. It is difficult to imagine the long, hard hours of work needed to put on such a Congress, and the attention to detail that is necessary to carry it off as flawlessly as they did.

Of course, the quality of any congress is only as high as the quality of the science presented, and for that, we must thank the Chairs of the Program Committee, **Heather Eisthen** (Michigan State University) and **Masashi Kawasaki** (University of Virginia), and their entire committee for assembling a truly remarkable set of talks, symposia and posters. By the way, **Paul Katz** has written a beautiful review of ICN2014 that I highly recommend titled: **The Golden Age of Comparative Neuroethology on Display in Japan**. This comprehensive review appeared online (free access) on October 23, 2014, in the journal *Brain, Behavior and Evolution*. The link is: <http://www.karger.com/Article/FullText/367885>.

For those members who were unable to attend ICN2014, or don't know where Sapporo is located, here is a map from the ISN website that should be of help: As you can see, Sapporo is located on the northern island of Hokkaido. It is the capital of Hokkaido Prefecture, and is Japan's 5th largest city.



Since the Congress ended, your Executive Committee and Council have been working behind the scenes to ensure that the elections for the next set of officers were carried out in a timely manner. Many thanks to **Joyce Lancaster** not only for organizing the ballots and tallying the votes, but for all the administrative details to which she pays the utmost attention. All of the new officers look forward to continuing to work with Joyce to

achieve a smooth transition between administrations. The names of the newly-elected officers, Council Members, and Early Career Investigator representatives may all be found on the recently updated ISN website: (<http://www.neuroethology.org/ebusisne/HOME.aspx>). And a heartfelt thank you goes to **Paul Katz** (Past-Past-President) for monitoring the ISN website, and for all his suggestions on how to keep it relevant and user-friendly. I would like to encourage all our members to visit the website frequently and suggest changes at: <http://www.neuroethology.org/ebusisne/ABOUTISN/ContactPage.aspx>.

Huge thanks to **Karen Mesce** and **Susan Fahrback** (our Treasurer and Secretary, respectively) for their insightful thoughts on how to run a scientific society efficiently and creatively, as well for all they do in managing the nuts and bolts of the Society on an everyday basis. And finally, I wish to thank **Alison Mercer** (Past-President) for providing those absolutely wonderful footsteps in which I will do my best to follow. However, as you all probably have guessed, Alison is a very hard act to follow. During her tenure as President, she not only brought incalculable professionalism to the Office of the President, but she led with an authority and a style that was collegial, never overbearing and invariably fostered immense good will among all of her fellow officers. Moreover, she brought early career folk onto Council, giving them a voice for the first time – and of course the establishment of the Konishi Neuroethology Research Grants was another of her important accomplishments. Thank you Alison for all of your hard work and for just being you!

Now I would like to welcome **Catharine Rankin**, our new President-Elect, who will take over the reins at the ICN2016 in Montevideo. Catharine is a long-time member of the ISN and is already up to speed with the running of the Society. Welcome, Catharine!



President-Elect Catharine Rankin, Department of Psychology, University of British Columbia

And now to the future. Uruguay is the site of our next Congress and the Chairs of the Local Organizing Committee, **Ana Silva** and **Jose Luis Peña**, and their

colleagues have been hard at work since ICN2012 in College Park securing the Congress venue, hotel rooms and group discounts, and dealing with the professionals in Montevideo to ensure a smooth registration process and timely publication of the meeting abstracts. The ICN2016 in Uruguay promises to be another outstanding gathering of neuroethologists from all over the world. And make sure while you are there to visit the **Mercado del Puerto**, a converted classic railway station, for a delicious lunch or dinner and experience the best of Montevideo's superb atmosphere (see my photo immediately below)!



Of course, as is our ISN tradition, we always welcome your comments, suggestions and ideas for how to improve our Society. You can send me an e-mail directly at pnarins@ucla.edu and I shall try and answer you as quickly as possible. As we approach the end of 2014, I wish you all a Happy Holiday Season and hope you have a chance to enjoy the company of your families and friends.

With best wishes,

Peter



The 2016 Congress will be held in Montevideo, Uruguay, March 29 through April 3, 2016, at the Radisson Montevideo Victoria Plaza Hotel.

ISN CHANNEL ON YOUTUBE

Have you heard the fish choir? If not, it's time to visit

<http://www.youtube.com/neuroethology>



GORDON RESEARCH CONFERENCE ON NEUROETHOLOGY 2015

Renaissance Tuscany Il Ciocco Resort
Lucca (Barga), Italy
June 28th to July 3rd 2015

The Future is Now: Innovative Concepts in Neuroethology and New Technologies



Co-Chairs Karen Mesce and Eric Warrant have supplied the following background information for the 2015 GRC. Members of the ISN are strongly encouraged to participate in this exciting meeting.

Every life form on our planet is the product of countless millions of years of biological evolution. Each species of plant, animal, and microorganism has been uniquely fashioned by the forces of natural selection, allowing them to become optimally adapted to the endless variety of habitats and lifestyles they collectively possess. This optimization invariably results from the evolution of structural and physiological specialisations that uniquely match plants and animals to the specific lives they lead, maximizing their chances of survival and reproduction. From a human perspective, these specialisations often appear remarkable. Not only do they allow organisms to solve difficult physical problems – such as to withstand extreme heat or cold, to overcome the forces of gravity to fly or to navigate without error across enormous distances – they are also highly energy efficient, adaptable, and robust, allowing organisms to cope with unexpected (and unpredictable) deviations in normal environmental conditions. Such qualities are particularly desirable in robotics, where for decades engineers have strived to

create fully autonomous machines that can perform faultlessly in the absence of human intervention.

Not surprisingly, the quest to understand the biological principles that exquisitely adapt organisms to their environments and which allow them to solve complex problems has led to unexpected insights into how similar problems can be solved technologically. These biological principles often turn out to be refreshingly simple, even ingenious, when viewed from a human perspective, making them readily transferrable to man-made devices. This mimicry of biology – known more broadly as biomimetics – has already led to a great number of technological innovations, from Velcro (inspired by the adhesive properties of burdock seed capsules) to convection-based air conditioning systems in skyscrapers (inspired by the nest ventilation system of the African fungus-growing termite).

Recent advances in neuroethological research are revealing how animals sense their constantly changing environments and use this information to control complex behaviors, such as flight and navigating over enormous distances. The principles we are uncovering showcase the enormous sophistication of natural sensors and actuators, the properties of which will be highly desirable features of future autonomous vehicles and robots. The **Gordon Research Conference on Neuroethology 2015** aims to combine cutting-edge research in neuroethology with the world's leading research in biomimetics and neuromorphic engineering, allowing an unparalleled forum for biologists and engineers to inspire and learn from each other in a small and collegial environment. Each session of the conference is designed to present the leading research in neuroethology with the latest advances in the fields of biorobotics and biomimetics, with the aim of inspiring the leading researchers of both fields. The conference program will include sessions on animal and machine flight, olfaction by animals and robots, and animal and machine navigation. In addition, there will be several other sessions dealing with the evolution of brains, current biomimetics and advances in technology, neural plasticity, emerging new sensory modalities and computational neurobiology.

Preliminary Program of GRC Speakers and Themes
contact Karen Mesce or Eric Warrant for updates

Biomimetics and New Technologies

Discussion Leader: **Roy Ritzmann** (Case Western Reserve University, USA)

Barbara Mazzolai (Italian Institute of Technology, Italy) *Robotics inspired by soft-bodied animals and plants*

Joseph Ayers (Northeastern University, USA)
Biomimetic robotics (robotic lobsters and bees)

Animal and Machine Flight

Discussion Leaders: **Marie Dacke** and **Emily Baird** (University of Lund, Sweden)

Mark Frye, (UCLA, USA) *Multi-modal control of insect flight*

Tom Daniel (University of Washington, USA)
Biomechanics and sensory control of insect flight

Graham Taylor (University of Oxford, UK)
Biomechanics and sensory control of bird flight

Dario Floreano (EPFL Lausanne, Switzerland)
Bio-inspired flying robots

Innovations in Computational Neuroscience

Discussion Leaders: TBA

Adrienne Fairhall (University of Washington, USA)
Adaptive coding and the algorithms underpinning neural processing of naturalistic stimuli

Ron Calabrese (Emory University, USA) *The neural control of the heart in leeches*

Animal Olfaction and Olfactory Guidance in Robots

Discussion Leader: **John Hildebrand** (University of Arizona, USA)

Cori Bargmann (The Rockefeller University, USA)
*Olfaction in the simple nervous system of *C. elegans**

Robyn Hudson (University of Mexico, Mexico)
Olfactory imprinting

Ryohei Kanzaki (University of Tokyo, Japan)
Insect olfaction and olfactory robotic guidance systems

Tim Pierce (University of Leicester, UK) *Artificial noses and bio-inspired machine olfaction*

Plasticity and circuits

Discussion Leader: TBA

Catharine Rankin (University of British Columbia, Canada) *Learning and memory in *C. elegans**

David Glanzmann (UCLA, USA) *Cellular mechanisms of memory acquisition, retention and loss*

Better than Fiction: Novel Mechanisms for Signaling and Sensing

Discussion Leader: **Justin Marshall** (University of Queensland, Australia)

Sönke Johnsen (Duke University, USA) *Camouflage and signaling in the deep sea*

Roger Hanlon (Woods Hole, USA) *Camouflage in cephalopods*

Dan-Eric Nilsson (University of Lund, Sweden) *Eye design and visual ecology in deep-sea squid*

Daniel Robert (University of Bristol, UK) *The novel electrical sense of bees*



Innovative Concepts in Evolution and Development

Discussion Leader: **Jessica Fox** (Case Western Reserve University, USA)

Nicholas Strausfeld (University of Arizona, USA) *The evolution of the arthropod brain and the fossil record*

Harvey Karten (UCSD, USA) TBA

Navigation by Animals and Robots

Discussion Leaders: **Paul Graham** and **Andrew**

Philippide (University of Sussex, UK)

Jochen Zeil (ANU, Australia) *Homing and navigation in insects*

Henrik Mouritsen (The University of Oldenburg, Germany) *The sensory basis of long-distance migration in birds*

Nachum Ulanovsky (Weizmann Institute, Israel) *The representation of 3D space in navigating bats*

Barbara Webb (University of Edinburgh, UK) *Models of animal navigation and bio-inspired robotics*

The Neuroethology of Higher Brain Functions (TBA)

The **Gordon Research Seminar (GRS)** is a platform for graduate students and postdocs to present their work and to network prior to the main GRC. The theme of the 2015 Neuroethology GRS is **In the Light of Evolution: Technology and the Evolutionary Approach**. This meeting will focus on evolution as both a biological and a technological process where each informs the other to generate new approaches and novel insights. It will feature the work of grad students and postdocs whose research spans disciplines, research techniques, and phyla. All attendees will present posters, and some will be selected to deliver 20-minute talks in presentation sessions chaired by **Jessica Fox**, Assistant Professor at Case Western University, and **Benjamin de Bivort**, Assistant Professor at Harvard University. They will provide insight from their research experience investigating the neurobiological mechanisms of sensory processing and motor behavior using modern genetic, behavioral, and electrophysiological approaches. The GRS will also include a mentorship session, featuring Professor **John Hildebrand**, Regents Professor of Neuroscience at The University of Arizona and Foreign Secretary of the U.S. National Academy of Sciences. The GRS takes place on June 27-28th.

WANT TO ATTEND? PRACTICAL INFORMATION FOR THE GRC & GRS

1. View the day-by-day schedule and apply via the Gordon Research Conference website (<http://www.grc.org/programs.aspx?id=14578>).
2. The Neuroethology Gordon Conference welcomes all interested attendees. Registration will close only when the site capacity is exceeded.
3. If you are a graduate student or postdoc, you will need to register separately for both the GRC and the GRS.
4. Only invited speakers give talks, but all participants in the GRC and GRS are welcome to present posters.
5. Graduate students may apply for ISN Heiligenberg Student Travel Awards to defray the costs of travel to Italy.
6. Additional funds may be available to support participation of early career investigators.
7. Two words of advice for first-time GRC/GRS participants: 1. Pay attention to the bus information on the GRC site, as the GRC bus is likely the best way to get from the Pisa Airport to the conference site
2. You are expected to stay for the entire meeting.
8. Bringing a guest? Note that accompanying persons who wish to stay at the conference site are required to register in advance with the GRC.



Mark your calendars! The site for the 2018 International Congress of Neuroethology has been selected. **Brisbane, Australia** is our destination. If you missed the presentation of the proposal at the Sapporo Congress, you can download the slideshow from the ISN website.

**HOLIDAY READING SUGGESTION:
VOLUME 3 IN THE NATURAL HISTORY OF
THE CRUSTACEA SERIES: NEURAL
SYSTEMS & CONTROL OF BEHAVIOR,
EDITED BY CHARLES DERBY AND
MARTIN THIEL**

An all-star line-up of authors has combined to produce a reference work of lasting value. ISN Secretary Susan Fahrback, the author of the following review, recommends that you ask your library to purchase this outstanding contribution to the crustacean neurobiology literature. Or, better yet, use this book as the basis of a graduate seminar in crustacean neuroethology.

I still remember my insect systematics professor's declaration on the first day of class that crustaceans *might* be the insects of the sea. But we then quickly moved on to take the then-conventional approach of focusing on the Uniramia (hexapods and myriapods), leaving behind for good the insects of the sea and their maritime realm. As an insect neurobiologist, I therefore felt justified completely ignoring the crustacean literature. Today, the molecular evidence argues in favor of nesting the insects within the crustaceans. My professor was right – and ahead of his time – and I was foolish. Fortunately, membership in the International Society of Neuroethology has vouchsafed me the late-in-life pleasure of dipping into the new-to-me but robust and fully mature literature of crustacean neuroscience.

The recently published volume edited by ISN member **Charles Derby** (Georgia State University, USA) and **Martin Thiel** (Universidad Católica del Norte, Chile) promises to provide pleasurable reading for the long winter nights that lie ahead in the northern hemisphere winter. Twenty carefully edited chapters have been prepared by internationally recognized experts with the goal of providing a synoptic view of contemporary crustacean neurobiology. The chapters are substantial, well-illustrated, and supported by extensive reference sections. The subject chapters are framed by a thoughtful introduction by the editors that gives a bit of the history of crustacean neuroscience and a concluding chapter by **Bruce Johnson, Robert Wyttenbach, and Ronald Hoy** that offers practical suggestions on how to use crustaceans for teaching neuroscience. The chapters in-between provide thorough coverage of crustacean neuroanatomy, sensory biology and sensory ecology, locomotor control, behavior, and learning and memory. Many of the chapter authors are current ISN members: **Thomas W. Cronin, Kathryn D. Feller, Ronald Harris-Warrick, Jan Hemmi, Jens Herberholz, Daniel Tomsic, Jochen Zeil, and ISN Fellow Eve Marder**. The result is a striking infusion of the neuroethological perspective (a focus on

the neural basis of natural behavior) throughout the entire book.

I still have many chapters left to savor, but I began by selecting a chapter on a topic I know almost nothing about: Biological Rhythms and their Neural Basis in Crustaceans (Chapter 16, by **María Luisa Fanjul-Moles** of the Universidad Nacional Autónoma de México). The author masterfully introduces the topic by distinguishing among circadian, ultradian, and infradian rhythms. A careful review of observed phenomena is followed by a summary of studies focused on a reductionistic analysis of underlying neural mechanisms. The chapter concludes with a summary schematic representation of the possible anatomical distribution of circadian pacemakers and relevant photoreceptors in the crayfish. Some of the features of this system are similar to those observed in insects (for example, neuropeptides such as PDH appear to link together some of the different pacemakers), but many key questions remain unanswered, including the relationship between the retina and the caudal photoreceptor, a light-sensitive interneuron. I am confident that any member of the ISN would find most, if not all, of the chapters in this book equally instructive. I also think that this book could provide a sturdy platform for a semester-long graduate seminar. Those who teach the topics of animal sensory systems, animal behavior, and neuroethology will find copious instructive examples to include in their lectures.

The book is beautifully and cleanly produced, printed on fine paper in an attractive font. A central color insert highlights figures that depend on color for information transmission. My only complaint is that ISN members in my age group on up will likely find the font a little bit too small for comfort, especially in the figure legends. If you are not an early career investigator, you might want to break out your magnifier before you settle down to enjoy a chapter or two.

Derby C, Thiel M (Editors) Nervous Systems and Control of Behavior. Volume 3 in the series The Natural History of the Crustacea. Oxford University Press. 2014. 564 pp. ISBN 978-0-19-979171-2.

