



International Society for Neuroethology

Newsletter/June 2015

International Society for Neuroethology

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THIS ISSUE INCLUDES

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The first detection of electric fish (ever!) in the Río Madre de Dios basin of Peru occurred during the 2015 Andean School for Neuroethology. This lucky group of students was led by ISN member and Chair of the ICN2016 Local Organizing Committee, Ana Silva.





The Prez Says

Peter Narins
President of the ISN

Dear ISN Members,

Greetings from California! As you may know, the ISN Executive Committee meeting took place on May 1 in San Diego, California. By all accounts, it was a very exciting meeting because preparations for **ICN2016 in Montevideo** are coming along swimmingly. Between the Program Committee's vision and the Local Organizing Committee's foresight, the Congress promises to be a scientifically outstanding event in an exciting venue!

Presidential Symposium

The ISN is instituting a new feature at our biennial congresses starting with the ICN2016 in Montevideo, Uruguay. The **Presidential Symposium** will consist of six high profile talks, by speakers especially invited by the current ISN President. Each speaker will be selected to represent an area of broad neuroethological interest, a model system with deep neuroethological roots, or a recent novel finding that broadens our understanding of our field. The Presidential Symposium will be the first public event of the Congress. This special symposium will highlight the field of neuroethology for all Congress attendees, including undergraduate and graduate student members, post-doctoral researchers, and seasoned professors alike. By featuring a broad array of timely neuroethological themes, by selecting model systems from invertebrates to vertebrates (including primates), and especially by choosing speakers who are known not only for their superb science but for their remarkable public speaking talent, the field of neuroethology will be displayed in a brilliant light right at the onset of the Congress. Our vision is that the Presidential Symposium shall set the stage and the tone for the entire Congress.

At this point I have asked six people to participate in the PS in Montevideo and delightfully, all six have accepted the invitation! Here are their tentative titles:

1. **Kenneth Catania**, Vanderbilt University
Shocking predatory strike of the electric eel

2. **Stephanie White**, UCLA
Molecular microcircuitry for vocal learning: FoxP2 and beyond
3. **Emanuel Mora**, University of Havana
Bat echolocation vs. moth hearing: Evolution of tactics and countertactics
4. **Mark Bee**, University of Minnesota
Evolutionary perspectives on solving the cocktail party problem: A frog's-ear view
5. **Daniel Robert**, University of Bristol
Detection of floral electrostatic fields by bumblebees
6. **Tetsuro Matsuzawa**, Kyoto University
The evolutionary origins of human cognitive development: Insights from research on chimpanzees

These folks were chosen considering (1) the relevance of their research to modern neuroethology, broadly writ, (2) their ability to deliver an amazing seminar (I have heard all of them), (3) geography, gender, and probability that they would attend the Congress. And finally, they are all younger than me!

Special Lectures and Plenary Lectures

In addition to the Presidential Symposium, the Program Committee, headed by **Martin Giurfa** and **Jose Peña** has selected a stellar slate of Special and Plenary lecturers.

The Walter Heiligenberg Lecture

Dora Angelaki, Baylor College of Medicine
Merging of our senses: Building blocks and canonical computations

The Franz Huber Lecture

Gene Robinson, University of Illinois at Urbana-Champaign
Understanding the relationship between genes, brain and social behavior: Lessons from the honey bee

The eight plenary speakers are:

Anupama Dahanukar, University of California, Riverside
The hungry fly: Taste receptors, circuits and the control of feeding behavior

Richard Benton, University of Lausanne, Switzerland
Olfactory evolution in insects

Suzanna Herculano, Federal University of Rio de Janeiro
Brain diversity in evolution: what changes, what doesn't - and what does it matter?

Hailan Hu, Zhejiang University
Neural mechanisms of social hierarchy

Adam Kepecs, Cold Spring Harbor Laboratory
Decisions under uncertainty: Behavioral and neural mechanisms of confidence judgments

Andreas Nieder, University of Tübingen
Of hairy and feathered primates: Neuroethology of numerical competence in monkeys and crows

Catharine Rankin, University of British Columbia
*Evolving ideas about the functions and mechanisms of habituation based on genetic analyses using *C. elegans**

Daniel Tomsic, University of Buenos Aires
Neurobiology of visually guided behaviors in crabs

Contributed Symposia

There will be twelve stimulating symposia on current topics in neuroethology. These are:

Behavioral & Neural Genomics of Sociality

Organizer: **Rui F. Oliveira**, Gulbenkian Institute of Science, Portugal

Group-living animals have to adjust their behavior to fluctuations in their social environment and this ability is expected to have a major impact on their Darwinian fitness. Therefore, it is expected that behavioral plasticity, rather than fixed behavioral responses, should evolve in complex social systems. Temporal and spatial regulation of gene expression in the nervous system can likely generate extensive behavioral plasticity. Evidence has been accumulating in recent years that substantial variation in gene expression profiles and epigenetic programs (neurogenomic states) underlies different behavioral profiles, from mating to aggression to parental care. This symposium will highlight the latest insights into the neural and genomic mechanisms underlying behavioral plasticity in the social domain.

Speakers: **Hans Hofmann**, University of Texas at Austin, **Constance Scharff**, Free University of Berlin, **Rui F. Oliveira**, Gulbenkian Institute of Science, **Brian Dias**, Emory University

Neural Mechanisms of Spatial Perception and Navigation

Organizer: **Khaleel Razak**, University of California, Riverside

Exciting, innovative research in the past 3-4 years has identified key neural mechanisms that underlie perception of spatial location and head orientation to navigate. The goal of the symposium is to bring together researchers whose work on a range of species (birds, bats and humans) is focused on the question of spatial perception and navigation. Each speaker will present data that span multiple levels of analyses (single cell to cortical maps to

systems) that are primarily guided by observations and quantification of behaviors, both natural and trained. The covered topics will span auditory/vestibular/magnetic mechanisms and therefore will appeal to a broad range of neuroethologists.

Speakers: **David Dickman**, Baylor College of Medicine, **Melville Wohlgemuth**, Johns Hopkins University, **Lutz Wiegrebe**, Ludwig-Maximilians-Universität München, **Khaleel Razak**, University of California, Riverside

Neuronal Mechanisms Underlying Target Detection

Organizers: **Paloma Gonzalez-Bellido**, University of Cambridge & **Karin Nordström**, Uppsala University

When deciding what to do next, the first crucial step is knowing that enough information has been acquired for a reliable assessment of the situation. This process sets up the universal tradeoff between speed and accuracy: by acquiring more information, animals increase the likelihood of choosing the most suitable action, but they also increase the probability of doing so when it is too late. Predation upon small moving animals is a behavior that primes both. How have different predatory species solved this conundrum? What computations and fine-tuning strategies are common among birds, mammals, and insects and which ones are particularly suited for a specific niche and brainpower? The goal of this symposium is to provide an overview of the adaptability of the neural systems involved in target detection and tracking, and the general principles that underlie such performance.

Speakers: **Julie Semmelhack**, Max Planck Institute, Germany, **Catherine Carr**, University of Maryland, **Daniel Zurek**, University of Pittsburgh, **Julieta Sztarker**, University of Buenos Aires

Far from a Feather Brain: Higher Cognitive Functions and their Neural Substrates in Fish

Organizer: **Vera Schluessel**, University of Bonn

Fishes not only comprise the most speciose vertebrate group (about 30,000 species), but also the oldest, with the earliest forms having been on earth for roughly 450 Million years. As in other groups, cognitive functions and related brain structures are likely to have contributed significantly to the evolutionary success of fishes. However, cognitive functions remain poorly studied in fish. In recent years the interest in teleosts and their cognitive skills has begun to increase. Recent studies have applied an array of different approaches and demonstrated that cognitive abilities used by fish in their respective environments extend far beyond of what was formerly believed. These abilities include learning and memory storage, spatial orientation in complex environments, identification and generalization of objects, individual

recognition, co-operation, social learning, mobbing and cheating, and tool use. One of the most striking differences in brain morphology between different groups of vertebrates is the lack of the typical mammalian neocortex organization in fish, amphibians and sauropsids, despite the fact that, from spinal cord to basal ganglia, the vertebrate brain follows a similar plan. It follows, that in the absence of cortex, cognitive abilities must be localized and based in other neural substrates. For some teleosts, selected forebrain areas have been suggested to be analogous and possibly even homologous to mammalian forebrain areas, e.g. there is behavioral evidence that there are teleost pallial regions functionally equivalent to the mammalian hippocampus and basolateral amygdala, despite their different histological organization. Whether these regions represent true homologues in fish, and whether the fish pallium is the homolog to mammalian cortex is still contentious. The symposium will address these questions.

Speakers: **Vera Schluessel**, University of Bonn, **Leonard Maler**, University of Ottawa, **Stefan Schuster**, University of Bayreuth, **Hitoshi Okamoto**, RIKEN, Japan

The Cognitive Approach to Behavior and its Lessons for Neuroscience

Organizer: **Juan Valle Lisboa**, School of Science, Uruguay

The study of human cognition is a growing enterprise that aims to understand information processing by the human brain. This approach has been bolstered by the application of neuroimaging techniques and other biological tools and concepts. Pioneering work of von Frisch, Tinbergen and Lorenz led to the development of modern neuroethology. Yet, despite similar histories and objectives, the human cognitive neuroscience community and animal neuroethology community are somewhat apart from each other. The objective of this symposium is to bring together approaches from these two fields to strengthen the links between them and to build a common foundation for research. We believe that many of the questions that are being asked in the cognitive neuroscience community can be posed in neuroethological animal models and, reciprocally, that models, data and theories that have emerged in cognitive neuroscience can shed light on neuroethological problems. The theme of the proposed symposium is thus cognitive neuroethology.

Speakers: **Elizabeth Brannon**, Duke University, **Andrew Barron**, Macquarie University, **Germund Hesslow**, Lund University, **Charles Randy Gallistel**, Rutgers University

News on the Sensory World of Birds

Organizer: **Christine Köppl**, Carl von Ossietzky University, Germany

Sensory physiology is a perennial, prominent topic in neuroethology as the senses determine what information an animal receives from its environment. This symposium focusses on one particular animal group – birds – which includes many species that provide insightful approach to questions in neuroethology. Multisensory integration shapes and constrains a bird's view of the world and forms the basis of all neural processing that ultimately produces behavioral outcomes. The proposed symposium will emphasize recent work on different senses and aims to update a broad audience on the latest developments in avian sensory neuroscience.

Speakers: **Jeremy Corfield**, University of Alberta, **Henrik Mouritsen**, Carl von Ossietzky University, **Gabrielle Nevitt**, University of California, Davis, **Christine Köppl**, Carl von Ossietzky University

Evolutionary Mechanisms of Sensory Loss and Regain

Organizers: **Jakob Christensen-Dalsgaard**, University of Southern Denmark, and **Kim Hoke**, Colorado State University

Not only the gain but also the loss of sensory reception is informative about how the brain has evolved to most efficiently guide behavior. This symposium will explore the diverse factors that have driven or enabled the loss of sensory structures. The talks will compare ancestral mechanisms of sensation with those in which sensory abilities re-evolved following a sensory reduction. These talks will address the role of constraints, selection, and pleiotropy in the evolution of sensory ability and will integrate across levels of analysis.

Speakers: **Clare Baker**, Cambridge University, **Maude Baldwin**, Harvard University, **Reinhard Lakes-Harlan**, University of Giessen, **Molly Womack**, Colorado State University

Neuroethology of Parallel Olfactory Processing in Insects and Vertebrates

Chairs: **Jean-Christophe Sandoz**, French National Center for Scientific Research, Paris, and **Wolfgang Rössler**, University of Würzburg

Olfaction represents a key sensory modality for most animal species with a crucial role for a wide range of behaviors such as finding food, mating, avoiding predators, etc. However, compared to other sensory modalities, like vision and audition, experimental access to mechanisms of parallel processing in the olfactory modality has been limited for a long time, mainly due to technical constraints. Recently, a number of high-level

studies have demonstrated the existence of parallel olfactory processing across a wide range of animal models, such as rodents, amphibians, fruit flies and honeybees. The symposium will highlight some of these new developments in the study of parallel olfactory processing and coding with the aim of communicating these exciting results to a wide audience in the field of neuroethology.

Speakers: **Silke Sachse**, Max Planck Institute, Germany, **Adi Mizrahi**, Hebrew University, **Martin F. Brill**, Cold Spring Harbor Laboratory, **Julie Carcaud**, University of Paris Descartes, **Ivan Manzini**, University of Göttingen

Comparative View of the Optic Tectum: A Glimpse into the Evolution of Goal-Oriented Behaviors and Attention in Vertebrates

Organizers: **Germán Sumbre**, Ecole Normale Supérieure, France and **Yoram Gutfreund**, Technion, Israel

The vertebrate optic tectum (OT), also known as the superior colliculus (SC) in mammals, is one of the most phylogenetically conserved structures in the brain. It is a complex layered structure, which contains overlapping sensory maps of the external world. It is involved in multimodal saliency detection, attention, and the generation of commands for orienting motor behaviors. The optic tectum is the largest and most complex brain structure in primitive vertebrates (e.g., fish) but its relative size diminishes along evolution. To what extent the functional role of the OT is preserved from fish to humans and how is it shaped by species-specific adaptation? These questions, which will be addressed in the proposed symposium, are of particular interest in light of recent findings demonstrating the important role of the SC in selective attention in primates. The primary objective of the proposed symposium is to explore comparative and evolutionary aspects of the OT within the frame of its relation to behavior.

Speakers: **Germán Sumbre**, Ecole Normale Supérieure, France, **Ronen Segev**, Ben-Gurion University, **Shresh Mysore**, Johns Hopkins University, **Douglas Munoz**, Queen's University, Canada

Sensorimotor Integration in Vocal Production and Learning in Songbirds

Organizer: **Ana Amador**, University of Buenos Aires

Songbirds have become a preferred animal model for studying vocal learning allowing to integrate neural and peripheral recordings with a precisely quantifiable behavior, which is very similar to speech production. Birdsong requires precise coordination between the respiratory system and the vocal organ being an extraordinary example of motor control. This complex task is learned through a delicate process involving

auditory and proprioceptive feedback, being rarely encountered in other vertebrate species. In this symposium we will present a wide perspective of birdsong research, integrating peripheral physiology, central nervous system and biomechanical models for song production. We will also show how computational models for the phonating device can be useful to study the neural basis of motor control. New perspectives and possible models for sensorimotor integration and learning will be discussed in terms of recent results concerning the dynamics of the song system.

Speakers: **Coen P.H. Elemans**, University of Southern Denmark, **Mimi H. Kao**, University of California, San Francisco, **Richard D. Mooney**, Duke University, **Ana Amador**, University of Buenos Aires

A Brain within the Brain: Sensory Integration and Network Logic of the Drosophila Circadian Clock

Organizers: **Fernanda Ceriani**, Leloir Institute, Argentina, and **Joerg Albert**, University College, London

Within the living world, the abstract entity of time manifests itself in numerous ways; ranging, for example, from species-specific developmental times to age-dependent hearing loss. In contrast to its simplest theoretical concept, biological time is not a linear process that perpetually uncoils itself. At a fundamental level, biological time is better viewed as series of repeating spirals, which reflect the recurrence of days and nights, superimposed to the underlying linear process. This fundamental diurnal cycle, which most life on earth is embedded in, not only dictates vast parts of our physiology but it is also actively picked up, and copied, by life itself. To do their job, circadian clocks have to integrate information from multiple sensory inputs, in addition to informing and gating multiple output pathways, e.g. sleep or reproductive behaviors. Using *Drosophila* as a model, progress has been recently made to understand the nature of the sensory input that entrains the biological clock and the network logic that underlies the neuronal computation of biological time and how patterns of gene expression orchestrate behavior.

Speakers: **Ross Harper**, University College London, **Fernanda Ceriani**, Leloir Institute, Argentina, **Emi Nagoshi**, University of Geneva, **John Ewer**, University of Valparaíso, **Charalambos Kyriacou**, University of Leicester

Mirror Neurons in Primates

Organizer: **Pier Francesco Ferrari**, University of Parma

Mirror neurons, described in macaque monkeys over 20 years ago, have been a breakthrough in action-perception theory and the fields of psychology and animal behavior.

The impressive amount of work in the last few years have highlighted the conserved nature of this mechanism, now described in chimpanzees, marmosets and humans. The diversity of methods used to investigate this mechanism and the brain areas in which a similar neural mirroring has been described has raised debate regarding the function and evolutionary origin of mirror neurons. This symposium will bring together scientists who have investigated this mechanism in different species and, through a comparative approach, address the basic properties of the neurons, the underlying neuroanatomical features and hypothesized functions.

Speakers: **Pier Francesco Ferrari**, University of Parma, **Erin Hecht**, Emory University, **Noritaka Ichinohe**, National Institute of Neuroscience Tokyo, **Nathan Fox**, University of Maryland

ISN Awards

The ISN award winners for 2015 have been selected! This year, there were three **Heiligenberg Student Travel Award** winners: **Lena Veit** from the University of Tübingen, Germany, **Anthony Auletta** from the University of Minnesota, USA, and **Olga Dyakova** from Uppsala University, Sweden. Heiligenberg Student Travel Awards are awarded annually to qualified students who wish to present work in the field of neuroethology at national and international scientific meetings. Six awards or more (depending on the availability of funds) are available each year. The awards may cover expenses such as travel to and from the conference site, the conference registration fee, and/or housing costs up to a total of \$700. This year, each of the winners will use the award to attend the **Gordon Research Conference on Neuroethology** in the summer of 2015 in Italy. Congratulations, students!

In addition, the selection committee chose two **Konishi Neuroethology Research Award** winners for 2015. The winners are **Lisa Mangiamele** from Smith College and **Michael Yartsev** from the University of California, Berkeley. The Konishi Neuroethology Research Awards are intended to promote research by early career investigators. Funds awarded can be used to cover any direct research expenses (including travel to a field site) but conference travel, participation in formal workshops or courses, and salaries are excluded. Applications are reviewed on the basis of scientific merit, feasibility of the project, and consistency with the mission of the ISN.

And finally, the last prize for 2015 is the **Capranica Neuroethology Prize**, named in honor of **Robert and Patricia Capranica** to provide an annual cash prize for recognition of outstanding achievement or future promise in the field of neuroethology. The prize consists of \$1,000

is awarded to a promising young investigator who is the author of a paper published on line or in print during the previous calendar year that is judged to be the *most outstanding in terms of scientific significance in the field of neuroethology* on the basis of criteria including: novelty of the scientific discovery, implications for scientific technical advancement, or importance for advancement of knowledge. This year's winner of the Capranica Neuroethology Prize is **Arseny Finkelstein** from the Weizmann Institute of Science, Israel, for his paper published in Nature in January, 2015 titled: *Three-dimensional head-direction coding in the bat brain*, by Arseny Finkelstein, Dori Derdikman, Alon Rubin, Jakob N. Foerster, Liora Las and Nachum Ulanovsky. Congratulations to Arseny and to his supervisor, **Nachum Ulanovsky**! And thanks to the chairs and all the members of the three awards committees who made the selections.

The First Andean School of Neuroethology

In May, 2015, the first **Andean School of Neuroethology** took place in Peru and consisted of 20 international graduate students from Latin America and eight senior researchers from all over the world. The school was organized by **Emanuel Mora** from the University of Havana, Cuba, and **Luis Aguilar** from Universidad Peruana Cayetano Heredia, and was sponsored by IBRO and the ISN. During the first week of the School, which took place at a field station about an hour up the Madre de Dios River from Puerto Maldonado in southeastern Peru, the emphasis was on lectures from the foreign instructors coupled with associated small group field projects. It was clear that the students were enthusiastic, energetic, and driven. As a result, the projects served the dual purpose of reflecting and concretizing the lecture content in a low-level wet tropical forest setting. This natural habitat exhibits high biodiversity but is replete with lessons for the novice field biologist: how to choose a project of the correct scope for the limited time available for the task; how to formulate a testable hypothesis; how to design an experiment under less-than-ideal conditions; how to gather the data so it may be analyzed in a statistically relevant manner etc. Judging from the student feedback, this module was extremely effective. The second week of the School took place in the neurobiological laboratory of Professor Luis Aguilar and others at the Universidad Peruana Cayetano Heredia in Lima. In this module, students performed lab exercises in Neurobiology and Behavior, the Molecular Bases of Memory, Nutrition and Animal Behavior, Fear in Animals and Humans, etc., and had a strong module in Electronics for Neurobiologists in which they each built amplifiers that were then used for recording spikes from a local insect preparation. By all accounts, the students learned a great deal and gave the course a resounding *thumbs up*. In addition to Co-Director

Emanuel Mora, several members of the ISN were among the notable faculty who made the Andean School such a success: **Friedrich Barth, Alison Mercer, Peter Narins, Hans-Joachim Pflüger, and Ana Silva**, who contributed the photo on the first page of this issue.

I would like to take this opportunity to wish all of you a pleasant and productive summer. I look forward to seeing many of you at the **2015 Gordon Research Conference in Barga, Italy**, or perhaps later this year at the **Graduate Summer School in Acoustics Communication in Sørgaard, Denmark**, or the **Biology of the Inner Ear Course at MBL in Woods Hole, Massachusetts**; the **Animal Behavior Meetings in Tucumán, Argentina**; the **Herpetology Meetings in Gramado, Brazil**, or perhaps the **Acoustical Society of America Meeting in Jacksonville, Florida** where there will be a special session honoring the career of one of our former ISN Presidents, **Albert Feng** of the University of Illinois at Urbana-Champaign.

Bon voyage!

Peter Narins

ISN FINANCIAL REPORT FOR 2014

The ISN Treasurer, Karen Mesce, has submitted the following annual report to the ISN President, Executive Committee, Council, and membership.

Total Assets as of 1/1/2014

Cash	139,787.78
Investments	415,524.10

TOTAL \$555,311.88

Cash Revenue

Funds from Company of Biologist	6,579.20
Return of '14 ICN start-up funds	9,192.00*
(* \$808.00 retained for ISN Council Meeting meal)	
Membership Dues	29,010.00
Donations	1,455.00
Interest on cash deposits (US Bank)	22.56
Interest on cash deposits (Schwab)	11.31
TOTAL	\$46,270.07

Investment Revenues for 2014

Investment dividends (reinvested)	7,501.59
Investment capital gain (reinvested)	23,251.76
Investment Gain for 2014	\$30,753.35

TOTAL PORTFOLIO APPRECIATION \$13,405.69

Expenditures

Operating Expenses	19,055.00
Allen Press Renewal Notices	260.29
Konishi Research Awards 3@ \$2,500	7,500.00
Tax filing fees	80.00
2016 ICN Uruguay Seed Money	10,000.00
Bank credit card transaction fees	1,255.73
Total Base Running Costs	\$38,151.02

2014 ICN Conference Costs

(includes IBRO Advanced School, Heiligenberg Student Travel Awards, Plenary Speakers, Konishi Symposium Speakers, Young Investigator Award, Capranica Award, Travel for Allen Press Representative, Plaques and Certificates, Poster Awards, Developing Neuroethology Fund Awards, and ICN Chair and Co-Chair's Travel)

Total Conference Costs \$34,148.48

CASH EXPENDITURES FOR 2014 \$72,299.50

Total Assets as of 12/31/2014

Cash	139,787.78
Investments	415,524.10

END OF YEAR TOTAL \$555,311.88





ANDEAN SCHOOL OF NEUROETHOLOGY

May 10th-24th, 2015. Peru

The School invites students to gain first-hand experience in approaching neuroethological model systems and to interact and network with leaders in neuroethological research.

ORGANIZERS

Emanuel C. Mora Cuba
Luis A. Aguilar Peru

OVERVIEW

1st week: Lectures & Field work
2nd week: Laboratory work

FACULTY

Alison R. Mercer New Zealand
Ana Silva Uruguay
Carlos Angulo Peru
Cristian Pitot Peru
Friedrich Barth Austria
Gabo Mindlin Argentina
Hans-Joachim Pflueger Germany
Juan Bacigalupo Chile
Peter Narins USA
Rey León Peru
Richard Cisneros Peru



The School is intended for Latin American students, with emphasis in the Andean region. A total of 20 students will be selected. Fellowships will be available. The languages for instructions will be English and Spanish.

Contact: cobo.cuan@neuroetologia.org
Application at: www.neuroetologia.org/courses/peru2015






SUMMER READING SUGGESTIONS

The ISN Secretary, Susan Fahrbach, highlights a few papers you may have overlooked in the hustle and bustle of the previous months. She has surely missed many papers (and even books) that have delighted and informed you. Drop her a line (fahrbach@wfu.edu) if you'd like to see a publication that inspired you highlighted in a future newsletter.

1. Why not start with the paper that won the Capranica Award for Arseny Finkelstein and colleagues at the Weizmann Institute of Science in Rehovot, Israel?

Finkelstein A, Derdikman, D, Rubin A, Foerster JN, Las L, Ulanovsky N. (2015) Three-dimensional head-direction coding in the bat brain. Nature 517:159-64.

Recordings of neural activity in the dorsal presubiculum region of the bat brain help build a model of how mammals orient in complex environments. SF's take: a brilliant application of what can be learned by *studying the champion animal*.

2. Are you following the FOXP2 story? Update your understanding with the following paper by Jonathan Heston and Stephanie White.

Heston JB, White SA (2015) Behavior-linked FOXP2 regulation enables zebra finch vocal learning. Journal of Neuroscience 35:2885-2894.

Overexpression of FOXP2 in Area X of the brains of juvenile zebra finches made it harder for these birds to reproduce a song they were learning from a tutor. SF's take: the role of FOXP2 in motor learning related to song remains mysterious, but *the plot thickens*.

3. One reason it's great to be a seasoned scientist (and yes, seasoned is a euphemism for older or senior) is that the studies you dreamed about as a graduate student or talked about with your post doc buddies over a beer often become reality. If you are curious about the genetic changes that supported the evolution of eusociality in insects, at one time or another you've probably wondered what sequencing the genomes of a whole bunch of bee species with varying levels of social complexity would reveal. Done!

Kapheim et al. (2015) Social evolution. Genomic signatures of transitions from solitary to group living. Science 348:1139-43.

A detailed analysis of the genomes of 10 bee species revealed shared patterns of changes in regulatory of gene expression but also lineage-specific social genes. SF's take: It's exciting and gratifying to learn that "*the transition from solitary to group life is associated with an increased capacity for gene regulation.*"

CALL FOR NEUROETHOLOGY COURSE MATERIALS

Do you teach an undergraduate or graduate course in neuroethology? Amplify your impact by sharing your teaching materials with the neuroethology community. Send your syllabus and associated teaching materials to the ISN Secretary (fahrbach@wfu.edu) for inclusion on the ISN website. Another way to reach members is via <https://www.facebook.com/groups/neuroethology/>.

To get the conversation started, Paul Katz has generously shared his own syllabus for Fall 2015 (a work in progress), and suggested two other websites that can provide valuable materials.

From Paul Katz:

<https://sites.google.com/site/gsunethology>

From Carl Hopkins:

<https://courses.cit.cornell.edu/bionb4240/syllabus.htm>

From Mark Nelson:

<http://nelson.beckman.illinois.edu/background.html>



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