



# International Society for Neuroethology

Newsletter  
March 2004

**International Society for Neuroethology**  
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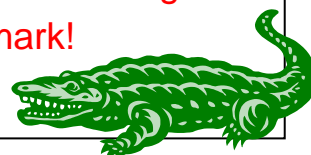
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Coming this August: The 7th Congress of ISN, in Nyborg, Denmark!

*Details inside...*



Nyborg, Denmark, August 8<sup>th</sup> - 13<sup>th</sup> 2004.

## The 7th Congress of the International Society for Neuroethology

### Plenary Speakers

Kentaro Anikawa  
(Yokohama, Japan)

Michael Bate  
(Cambridge, United Kingdom)

Michael Dickinson  
(Pasadena, USA)

Michael Fanselow  
(Los Angeles, USA)

Larry Katz  
(Durham, USA)

Eve Marder  
(Waltham, USA)

Kiisa Nishikawa  
(Flagstaff, USA)

Monika Stengl  
(Marburg, Germany)

### Special Lectures

Ron Hoy  
(Ithaca, USA)

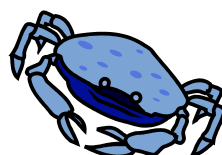
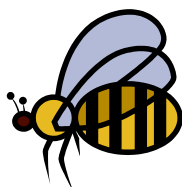
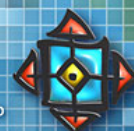
Franz Huber  
(Seewiesen, Germany)



Chair: Sarah Bottjer (Los Angeles, USA) – Vice-Chair: Martin Giurfa (Toulouse, France)  
Chair, Local Organizing Committee: Axel Michelsen (Odense, Denmark)

Information and registration:  
<http://neuro.biology.sdu.dk>

For further information or other questions, please send an e-mail to  
Prof. Dr. Axel Michelsen ([A.Michelsen@biology.sdu.dk](mailto:A.Michelsen@biology.sdu.dk))



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## The ISN President's Column

Albert S. Feng (afeng1@uiuc.edu)  
Univ. of Illinois, Urbana, Illinois, USA

2004 is the year of the 7<sup>th</sup> International Congress for Neuroethology! The dates are August 8 through 13. Mark this down, and get your abstract ready for submission! Congress posters (see page 1) are being distributed to members and can also be downloaded from our website.

**Nyborg Congress.** The Congress organizers have made great strides preparing for the conference. The congress venue is set, and the congress website (<http://neuro.biology.sdu.dk/>) has been posted since the beginning of 2004. You can now register for the Congress and make reservations for rooms at Hotel Nyborg Strand. Please remember that the deadline for abstract submission is **May 1, 2004**, and that for Congress registration and hotel reservation is **June 1, 2004**.

**Travel support.** The Congress organizers recently secured >\$10,000 for travel support for student members and for ISN members from third world countries. Information about the application procedure and qualifications can be found at the congress website under the link "Costs." The application deadline is **April 15, 2004**. To qualify for student support, students must be ISN members. **Please encourage students to join ISN; student membership is now free.**

**Heiligenberg Student Travel Awards.** Student members also are encouraged to apply for *Heiligenberg Student Travel Awards*. At least 6 such awards will be made in 2004. The awards may cover expenses such as travel to and from the conference site, conference registration fee, and/or housing costs up to a total of \$600. Both the student and the student's mentor must be ISN members by the application deadline. Applicants must be registered graduate students at a university, and must plan on presenting their work at the Congress.

Information about these awards can be found at (<http://www.neuroethology.org/membership/awards.php>). To apply, please submit an application (form available at [http://www.neuroethology.org/membership/applications/heiligenberg\\_app.pdf](http://www.neuroethology.org/membership/applications/heiligenberg_app.pdf)) and have two letters of recommendation from ISN members submitted to Mark Konishi by e-mail ([konishim@its.caltech.edu](mailto:konishim@its.caltech.edu)) before **April 15, 2004**.

**Education Subcommittee.** The Executive Committee recently decided to form an Education Subcommittee within the Web Oversight and Education Committee. The Subcommittee will be charged with: (1) soliciting, screening and editing research stories for the *Research Highlights and News* section of the ISN website; (2) highlighting the latest advances in neuroethology for educating the public; (3) identifying educational materials in the field of neuroethology appropriate for classroom teaching at high school, college and graduate school levels. We are delighted that the following people have agreed to serve on this important subcommittee: Harvey Karten (Chair), John Hildebrand (Vice-Chair), Kiyoshi Aoki, Horst Bleckmann, Martin Giurfa, Ron Harris-Warrick, Alison Mercer, Randolph Menzel, Peter Narins, and Carolyn Shumway. Please contact Harvey or any of the committee members when you have exciting research news to be shared with ISN members and the public.

I look forward to seeing you in Nyborg! 

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## Update on the 2004 Congress from the Local Organizer

Axel Michelsen (A.Michelsen@biology.sdu.dk)  
Univ. of Southern Denmark, Odense, Denmark  
Chair, Local Organizing Committee of the 7<sup>th</sup> Congress

The great event of the year is the 7<sup>th</sup> International Congress of Neuroethology, which will be held at Hotel Nyborg Strand, Denmark, from Sunday August 8 to Friday August 13. The Congress website, <http://neuro.biology.sdu.dk>, contains extensive, up-to-date information about the Congress venue, the program, how to get there, local attractions, social events, costs, and how to register. The **deadlines** are:

**April 15:** Applications for support (from students and participants from third world countries)

**May 1:** Submission of abstracts

**June 1:** Registration due

**July 1:** Payment due

During registration it is possible to send a message to the hotel about special requirements (e.g., special diet). The easiest way to save money on accommodations is to share housing, preferably by telling the hotel with whom you wish to share a double room. It is also possible to express an interest in cheaper accommodations; in addition to the standard single and double rooms, a variety of less expensive rooms are available (see the website). The problem for the local organizers

## 2004 INTERNATIONAL CONGRESS OF NEUROETHOLOGY SCHEDULE

Time	Sun, 8 <sup>th</sup>	Monday, 9 <sup>th</sup>	Tuesday, 10 <sup>th</sup>	Wednesday, 11 <sup>th</sup>	Thursday, 12 <sup>th</sup>	Friday, 13 <sup>th</sup>
08:30 am		Plenary Lecture (Nishikawa)	Young Investigator Talks (Ben-Shahar, Leonardo, Poulet & Soares)	Plenary Lecture (Arikawa)	Plenary Lecture (Fanselow)	Plenary Lecture (Marder)
09:30 am		Plenary Lecture (Dickinson)		Plenary Lecture (Katz)	Plenary Lecture (Bate)	Plenary Lecture (Stengl)
10:30 am		Refreshment Break	Refreshment Break	Refreshment Break	Refreshment Break	Refreshment Break
11:00 am		Symposium #1 Symposium #2	Symposium #3 Symposium #4	Symposium #5 Symposium #6	Symposium #7 Symposium #8	Symposium #9 Symposium #10
01:00 pm		Lunch	Lunch	Lunch	Lunch	Lunch
02:00 pm	Registration	Poster Session & Exhibits  Refreshment Break <i>Ad-Hoc Presentations</i>	Poster Session & Exhibits  Refreshment Break <i>Ad-Hoc Presentations</i>	Business Meeting  EXCURSION to Egeskov Castle	Poster Session & Exhibits  Refreshment Break <i>Ad-Hoc Presentations</i>	Departure
06:00 pm		Dinner	Dinner		Farewell Banquet	
08:00 pm	Reception	Scientific Socials	Heiligenberg Lecture (Hoy)		Founder's Lecture (Huber)	

is that there are several categories of cheaper rooms, but only a few in each category (which is the reason why these rooms cannot be ordered directly during registration). These rooms therefore must be distributed by the local organizers among those who indicate an interest. We will try to finish this process and notify the lucky winners before the deadline for payment.

From the program section of the website, it is possible to download guidelines for presentations. Participants are encouraged to study the guidelines carefully in order to make their oral or poster presentations successful. If everyone follows the guidelines, we will have a Congress at which all slides and images are visible from the back of the lecture hall and lecturers will not need to waste time during sessions persuading their laptops to show PowerPoint presentations. 🐼

## Congress Program

ISN members are encouraged to visit the Congress website (<http://neuro.biology.sdu.dk>) for up-to-the-minute listings of speakers and events. The table above shows the overall organization of the meeting. As the newsletter goes to press, the following information is available on sessions and speakers:

### • PLENARY SPEAKERS

**Kiisa Nishikawa** (Northern Arizona Univ., USA) "Neuromuscular control of ballistic movements: model systems, simple questions, new ideas"

**Michael Dickinson** (California Institute of Technology, USA) "The neural control of aerodynamics"

**Kentaro Arikawa** (Yokohama City Univ., Japan) "How do butterflies see colors?"

**Larry Katz** (Duke Univ., USA) "Encoding social signals in mammalian chemosensory systems"

**Michael Fanselow** (Univ. of California, Los Angeles, USA) "The hippocampus and Pavlovian fear conditioning: A rodent model of episodic memory?"

**Michael Bate** (Univ. of Cambridge, UK) "Embryonic origins of movement in *Drosophila*"

**Eve Marder** (Brandeis Univ., USA) "The balance between stability and plasticity in adult and developing networks"

**Monika Stengl** (Univ. of Marburg, Germany) "How the peptide PDF orchestrates circadian oscillators in insects"

**Ron Hoy** (Cornell Univ., USA) Heiligenberg Lecture. "Animal communication signals: the bridge between neuroethology and behavioral ecology"

**Franz Huber** (Max-Planck Institute for Behavioural Physiology, Seewiesen, Germany) Founder's Lecture. "Memories, impressions and experiences from guiding figures in neuroethology"



• **YOUNG INVESTIGATOR AWARDS** (see page 5)

**Yehuda Ben Shahar** (Univ. of Iowa, USA) "A role for a cGMP-dependent protein kinase in honey bee division of labor"

**Anthony Leonardo** (Harvard Univ., USA) "Neuronal ensemble coding of motor control in birdsong"

**James Poulet** (Cambridge Univ., UK) "The cellular basis of corollary discharge inhibition in singing crickets"

**Daphne Soares** (Univ. of Maryland, USA) "Ancient receptors of crocodilians"

• **SYMPOSIA**

**#1 Walking, Running, and Scratching: Central Mechanisms of Limb Coordination.** Organizers: **W. Otto Friesen** (Univ. of Virginia, USA) and **Brian Mulloney** (UC Davis, USA)

Speakers:

**Ole Kiehn** (Karolinska Inst., Stockholm, Sweden) "Physiological and genetic approaches to locomotor circuits in mammals"

**Ari Berkowitz** (Univ. of Oklahoma, USA) "Central control of intralimb and interlimb coordination in a vertebrate model system"

**Ansgar Büschges** (Universität Köln, Germany) "Central pattern generators and the control of multi-jointed limbs in locomotion"

**Keir Pearson** (Univ. of Alberta, Canada) "Short and long term adaptation of the motor pattern for walking in mammals"

**#2 Chemical Cues in Context: How CO<sub>2</sub> and Volatile Organic Compounds Influence Insect-Plant Interactions.** Organizer: **John G. Hildebrand** (Univ. of Arizona, USA)

Speakers:

**Hanna Mustaparta** (NTNU, Trondheim, Norway) "Plant volatiles and the chemosensory tuning of olfactory receptor cells in herbivorous moths"

**Gert Stange** (Australian National Univ., Canberra) "Behavioral and neurophysiological responses of the moth, *Cactoblastis cactorum*, to host volatiles and carbon dioxide"

**Pablo Guerenstein** (Univ. of Arizona, USA) "Carbon dioxide cues from plants: multiple roles in moth-plant interaction and primary processing in the brain"

**Marien de Bruyne** (Freie Universität, Germany) "Carbon dioxide perception in *Drosophila*: The Gr21a gene, receptor neuron excitation and behavior"

**#3 Orchestration of Behavior by Neuromodulators.** Organizers: **Hans-Joachim Pflüger** (Freie Universität, Germany) and **Frederic Libersat** (Ben-Gurion Univ., Israel)

Speakers:

**Einar Heidel** and **Hans-Joachim Pflüger** (Freie Universität, Germany) "Ion currents and excitability of locust octopaminergic neuromodulatory neurons contribute to their specific behavioral roles"

**Lidia Szczupak** (Universidad de Buenos Aires, Argentina) "Orchestration of motor output by chemical and electrical neuromodulation"

**Harold Zakon** (Univ. of Texas, Austin, USA) "Ion channel function, regulation, and evolution: lessons from electric fish"

**Mike Adams** (Univ. of California, Riverside, USA) "Orchestration of ecdysis behavior in flies and moths"

**#4 Neuroethology of Attention.** Organizers: **Hermann Wagner** (Institut für Biologie, Aachen, Germany) and **Cynthia Moss** (Univ. of Maryland, USA)

Speakers:

**Bernhard Gaese** (Univ. of Frankfurt, Germany) "Auditory attention - neural correlates and behavioral significance"

**Kaushik Ghose** (Univ. of Maryland, USA) "Spatial attention drives acoustic behavior in echolocating bats"

**Charles Spence** (Univ. of Oxford, UK) "Crossmodal attention and multisensory integration"

**Stefan Treue** (German Primate Center, Göttingen, Germany) "Influence of attention on visual information processing"

**#5 Seeing on the Move.** Organizers: **Henrik Mouritsen** (Univ. of Oldenburg, Germany) and **Rüdiger Wehner** (Univ. of Zürich, Switzerland)

Speakers:

**Eric Warrant** (Lund Univ., Sweden) "Visual navigation in very dim light"

**Mandayam Srinivasan** (Australia National Univ., Canberra) "Honeybee vision: Seeing and navigating on the move"

**Hanspeter Mallott** (Univ. of Tübingen, Germany) "Finding routes from memory: Acquisition and usage of cognitive maps"

**Henrik Mouritsen** (Univ. of Oldenburg, Germany) "The magnetic sense of birds: a light-dependent chemical compass in the eye?"

**#6 Effects of Experience on the Developing Nervous System.** Organizer: **Catharine Rankin** (Univ. of British Columbia, Vancouver, Canada)

Speakers:

**Kurt Haas** (Univ. of British Columbia, Vancouver, Canada) "How the environment sculpts developing brain circuits - activity-dependent dendritic arbor growth"

**Chinfei Chen** (Harvard Medical School, USA) "The Role of Activity in Synaptic Remodeling"

**Myriam Cayre** (Parc Scientifique de Luminy, Marseille, France) "Environmental enrichment, neurogenesis and learning in an adult insect"

**Catharine Rankin** (Univ. of British Columbia, Vancouver, Canada) "The role of early experience on behavior, development and gene expression in *C. elegans*"

### **#7 Auditory Processing of Vocal Communication Signals: What Happens in Subcortical Structures?**

Organizers: **George D. Pollak** (Univ. of Texas, Austin, USA) and **Christine V. Portfors** (Washington State Univ., USA)

Speakers:

**Sarah Woolley** (Univ. of California, Berkeley, USA)

"Adaptive tuning in the songbird midbrain: what is special about song?"

**George Pollak** (Univ. of Texas at Austin, USA) "The social communication calls of bats and how they are processed in the ascending auditory system"

**Christine Portfors** (Washington State Univ., USA)

"Processing of communication sounds in the auditory midbrain: general mechanisms and species specializations"

**Guenter Ehret** (Univ. of Ulm, Germany) "Representation of communication calls in the mouse auditory midbrain and cortex: from perception to cognition"

### **#8 Neuromorphic Approaches to Neuroethology.**

Organizers: **Barbara Webb** (Univ. of Edinburgh, Scotland) and **Timothy Horiuchi** (Univ. of Maryland, USA)

Speakers:

**Reid Harrison** (Univ. of Utah, USA) "A silicon model of collision detection in flies"

**Shih-Chii Liu** (Univ. of Zurich, Switzerland) "Exploring temporal coding in the cortex with aVLSI spiking neurons and short-term dynamic synapses"

**Robert Full** (Univ. of California, Berkeley, USA) "Bio-inspired robotics vs. physical models of neuromechanical systems"

**Jerome Casas** (Univ. of Tours, France) "Air flow sensing: from physical ecology in the field to nanotech implementation"

### **#9 Temporal Processing in Neural Systems.**

Organizers: **Carl D. Hopkins** (Cornell Univ., USA) and

**Christiane Linster** (Cornell Univ., USA)

Speakers:

**Christiane Linster** and **Carl Hopkins** (Cornell Univ., USA) "An introduction and review of temporal coding and processing in the nervous system: from cellular processes to networks to behavior"

**Frederic Theunissen** (Univ. of California, Berkeley, USA) "Temporal encoding in the nervous system and perspectives on spike coding theory applied to audition"

**Patrick Roberts** (Oregon Health Sciences Institute, USA) "Spike-timing dependent plasticity in adaptive sensory processing"

**Catherine Carr** (Univ. of Maryland, USA) "Evolution of temporal coding"

### **#10 Complex Patterns of Social Behavior: Genes, Neurons & Neuromodulators.**

Organizer: **Klaus**

**Schildberger** (Univ. of Leipzig, Germany)

Speakers:

**Hans Hofmann** (Harvard Univ., USA) "Functional phenomics of neural and behavioral plasticity"

**Erich Jarvis** (Duke Univ., USA) "A window into the molecular biology of singing"

**Paul Stevenson** (Univ. of Leipzig, Germany) "Aggression in crickets: role of biogenic amines & identified neurons"

**Andy Barron** (Univ. of Illinois, USA) "Octopamine modulation of dance communication and division of labour in honey bees"

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## ISN Young Investigator Award Recipients: Ben-Shahar, Leonardo, Poulet and Soares

The Selection Committee has completed the evaluation of 10 outstanding applications for the Young Investigator Awards (YIAs). We extend our congratulations to the following four YIA winners:

**Dr. Yehuda Ben-Shahar**, Howard Hughes Medical Institute, Univ. of Iowa, Iowa City, IA 52242, USA

**Dr. Anthony Leonardo**, Molecular and Cellular Biology, Harvard University, Cambridge, MA 02138, USA

**Dr. James Poulet**, Department of Zoology, Cambridge University, Cambridgeshire CB2 3EJ, United Kingdom

**Dr. Daphne Soares**, Departments of Biology and Neurosciences, University of Maryland, College Park, MD 20742, USA

Each of these awardees will receive a \$1000 award and also give an oral presentation at the YIA Plenary Session on August 10 (see page 3).

Two of the finalists earned Honorary Mentions as they scored almost as high as the above awardees. These are:

**Dr. Jörg Oestreich**, Section of Neurobiology, The University of Texas, Austin, TX 78712, USA

**Dr. David Schulz**, Volen Center, Brandeis University, Waltham, MA 02454, USA

The Selection Committee [Carl Hopkins (Cornell University, USA), Gwen Jacobs (Montana State Univ., USA), Ian Meinertzhagen (Dalhousie Univ., Canada), Harald Wolf (Universität Ulm, Germany), Sarah Bottjer (Univ. of Southern California, USA)] was thoroughly impressed by the caliber of the applicants, and had a very difficult time selecting the winners from such a strong pool of applicants. The Committee unanimously felt that all the applicants deserve our congratulations for making outstanding contributions to the field of neuroethology. We extend our best wishes to these young investigators for continued success in their research.

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## Capranica Award Recipient: Dr. Jörg Oestreich



Jörg Oestreich, 2004 recipient of the Capranica Award

The nominees for the Capranica Foundation's 2003 Award of \$1100 were evaluated by a Selection Committee of Drs. John G. Hildebrand (Univ. of Arizona, USA), Eve Marder (Brandeis Univ., USA), and Masakazu Konishi (California Institute of Technology, USA). The candidates comprised a stellar group

of young neurobehavioral scientists and the competition was quite keen. Each committee member independently reviewed all of the applications and ranked them accordingly. On the basis of the highest cumulative ranked score, Jörg Oestreich was declared the clear winner for his unique study of cellular mechanisms underlying electrocommunication plasticity in weakly electric fish: J. Oestreich and H. H. Zakon "The long-term resetting of a brainstem pacemaker nucleus by synaptic input: a model for sensorimotor adaptation," *Journal of Neuroscience* **22**(18): 8287-8296 (2002). The Committee viewed this paper as a very original and significant contribution to the discipline of neuroethology and it was awarded the following citation:

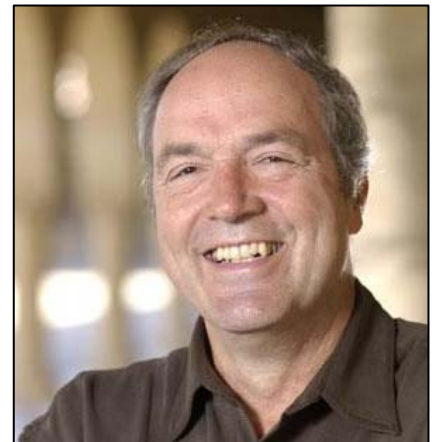
"Oestreich's work is in the true tradition of neuroethology. His doctoral thesis research in Dr. Harold Zakon's laboratory in the Section of Neurobiology at the University of Texas at Austin, USA, focuses on cellular mechanisms underlying behavioral plasticity. The weakly electric fish *Apteronotus leptorhynchus* emits a highly regular electric organ discharge (EOD) that serves for sensing its environment. The fish's electrosensory system is tuned to its EOD frequency. When two conspecific fish with very similar EOD frequencies meet, they "jam" each other's electrosensory function. Reflexively responding to this challenge, one or both of the electric fish transiently shift their EOD frequencies away from one another in what is known as a jamming-avoidance response (JAR). After the two fish separate following the encounter, each of their EOD discharges return to their original resting frequencies. Oestreich asked whether an extended exposure to a jamming stimulus would lead to a long-term adaptation in EOD frequency and, if so, where in the brain does this adaptive change take place. He discovered that prolonged exposure (tens of minutes) to a jamming stimulus causes a resetting of the fish's EOD frequency that persists for up to nine hours, far beyond the duration of the jamming stimulus. Oestreich located the site of the ad-

aptation to the cellular level within the pacemaker nucleus itself, which is the CNS structure responsible for controlling the electric organ discharge frequency, rather than in some other part of the electrosensory or electro-motor systems. He found that prolonged synaptic stimulation of cells in this nucleus leads to an increase in postsynaptic spike rates that persists for hours after the stimulation terminates, constituting a novel mechanism for neuronal memory. Oestreich's elegant work serves as an important experimental model for relating cellular biology of plasticity to sensorimotor behavioral adaptation, not just to electric fish, but to vertebrate neuroethology in general." ♦

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## Prof. Russell Fernald Awarded Rank Prize for Research on Fish Optics

A Rank Prize was awarded to ISN member Prof. R. Fernald (along with R.H.H. Kroeger, M.C.W. Campbell & H.-J. Wagner) in recognition of their work on compensation for chromatic defocus in the lenses of vertebrates. The Rank Prize Funds were established by Lord and Lady Rank in 1972. There are




Russ Fernald, recent recipient of a Rank Prize

two funds — the Nutrition Fund and the Opto-electronics Fund — reflecting the business interests of the late Lord Rank. Prof. Fernald is a faculty member at Stanford University, California, USA.

Dr. Fernald explains the science behind the Prize as follows: "This work began with our research on the question of how animal lenses can grow and still retain good optical properties. Our work on a fish species showed that lens growth is very rapid and, since the lenses are spherical, it is quite difficult to preserve the optical properties during growth. The results of the original work [Fernald, R. D. and S. Wright (1983) Maintenance of optical quality during crystalline lens growth. *Nature* **301**:618-620] showed that the major expected optical error in a spherical lens, spherical aberration, is corrected within the fish lens through a gradient of refractive index. This means the lens is optically like water on the outside ( $n=1.33$ ) and like solid protein ( $n=1.56$ ) in the middle. But there is an additional problem, namely that different colors (e.g., wavelengths of light) focus at slightly different distances from the lens, an aberration known as chromatic aberration. Subsequently, Ronald



Kroeger came to work as a postdoctoral fellow in my laboratory to work on the problem of chromatic aberration. We were joined in collaboration by Melanie Campbell at the University of Waterloo, who used her mathematical expertise to solve the difficult optical problems associated with understanding the function of the spherical lens empirically. Using the African cichlid fish, *Haplochromis burtoni*, as a model system, we discovered that the lens creates three sharp images in monochromatic light. And the images are located at different distances from the lens, leading us to call such lenses multifocal. Well-focused color images are thus created by a single lens, an accomplishment that had been thought to be impossible because of the laws of physics. This solution appears to offer an explanation of why some nocturnal animals have slit pupils. The paper describing this work is: Kroeger, R. H. H., M.C.W. Campbell, R.D. Fernald, and H-J. Wagner (1999) Multifocal lenses compensate for chromatic defocus in vertebrate eyes. *J. Comp Physiol. A* **184**:361-369. 

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## The New Neuroethology.org

Zen Faulkes ([zfaulkes@panam.edu](mailto:zfaulkes@panam.edu))

Univ. Texas - Pan American, USA

Chair, Web Oversight and Education Committee

The first few months of 2004 have been exceptionally productive for the neuroethology.org website. A number of seeds that were planted a long time ago have finally come to fruition. In January, the newly designed ISN website went "live." This overhaul is a particularly satisfying development, because plans to ramp up the society's website were delayed for a time due to the transition in ISN's management firm. Consequently, the Web Oversight and Education Committee (WOEC) was very busy in 2003, but most of that activity was "behind the scenes" and not visible to members.


The bulk of the website overhaul came together over the winter holiday break, with many e-mails zipping through cyberspace between WOEC, the Executive Committee, Albin/Walker Web Design, Allen Management, and other members of ISN committees to make sure everything worked as it ought to. After many opinions were expressed, tweaks made, features added, and bugs squashed, the website went up in February. The positive responses from ISN members have been very gratifying.

Having completed the aesthetic overhaul, the next major goal we're trying to achieve is to ensure that there are new things to view whenever you visit the site. This task should be made easier because this is a Congress year: expect many updates as the meeting comes closer.

In February, we created an online shop through Café Press where it will be possible to buy T-shirts and other paraphernalia. These make great gifts that you can give to non-scientist friends, who can admire the

design of our logo. Profits go to support the Society in efforts such as student travel awards. To visit our Café Press shop, click on the "Merchandise" link on the ISN homepage.

In March, our first technical article (courtesy of member Amir Ayali) was added. Because the task of finding contributors is an important one, a new Education Subcommittee of WOEC, chaired by Harvey Karten, was formed. This committee will be responsible for soliciting articles for the website (see page 2). As website content expands, we plan to have articles run the gamut from specialty technical topics to those geared toward the general public.

We look forward to constantly improving the site. In particular, we are always looking for new photographs of beautiful animals, neurons, and the like for the rotating picture on our homepage. E-mail me if you have questions or comments on the website. 

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## Reminder: Call for Nominations for ISN Officers and Councilors

Malcolm Burrows ([mb135@hermes.cam.ac.uk](mailto:mb135@hermes.cam.ac.uk))

Univ. Cambridge, UK

At the end of the Congress this August, members will be invited to vote to elect a President-Elect, Secretary and Treasurer, who will serve three-year terms, and seven councilors who will serve six-year terms. The Nominating Committee [Malcolm Burrows (chair), Edward Kravitz, Kentaro Arikawa, Darcy Kelley, and Annmarie Surlykke] invites nominations for each of these positions. The current holders of these posts are:

**President-Elect:** Edward Kravitz (to assume the Presidency following the 2004 Congress)

**Secretary:** Janis Weeks


**Treasurer:** Sheryl Coombs

**Councilors who will continue for 3 more years:** Horst Bleckmann, Allison Doupe, Martin Giurfa, Eric Knudsen, Claire Rind, Mandyam Srinivasan, and Harold Zakon.

**Councilors who will retire after the 2004 Congress:** Catherine Carr, Martin Heisenberg, Gwen Jacobs, Ian Meinertzhagen, Alison Mercer, Michael O'Shea, and Harald Wolf.

We would like to achieve a good spread of candidates from the standpoint of gender, geography and research area. The committee is charged with ensuring that: "The slate ordinarily shall have no fewer than two, nor more than three, names for each vacancy. Candidates for President-Elect shall normally come from countries on opposite sides of the Atlantic Ocean in alternate election years. Candidates for Secretary shall normally be from English-speaking countries, and candidates for Treasurer shall normally be from the United States."

The expectation therefore is that our President-Elect should come from a country other than the USA.

Please send nominations, including with the name of the person seconding each nomination, to Malcolm Burrows (mb135@hermes.cam.ac.uk) as soon as possible, and no later than 30 days before the start of the Congress (i.e., **July 9, 2004**). 

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## From Balancing Crabs to Depth Reception and Zero G

Peter J. Fraser (p.fraser@abdn.ac.uk)  
Aberdeen University, Scotland UK

Crustacean models have been at the forefront of our understanding of balancing systems. The finding of a "semicircular canal" system in crabs by David Sandeman and A. Okajima, and independently by myself, in the early 1970s started my fascination for this system. While working toward my Ph.D. in the early 1970s, I had made intracellular recordings and filled a set of giant interneurons in the crab with Procion yellow and cobalt. I decided to look for space constancy, which C.A.G. Wiersma had found in crayfish visual interneurons. I suspended my crab together with recording electrodes from strings. As this swayed back and forth, I could hear an amazingly regular discharge from what turned out to be statocyst interneurons receiving input largely from thread hairs in the statocyst. There was no evidence of space constancy in the visual interneurons running from the crab brain to the thoracic ganglia, but I was able to show that a small set of interneurons each responded to one direction of angular acceleration in a particular plane.

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***I suspended my crab together with recording electrodes from strings. As this swayed back and forth, I could hear an amazingly regular discharge from what turned out to be statocyst interneurons...***

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I had applied to work after my Ph.D. with Sandeman in Adrian Horridge's Department in Canberra, before I read his papers with Okajima. It was immediately clear from his anatomical description of the formation of the crab statocyst into a horizontal canal and a vertical canal oriented between pitch and roll planes, that my equilibrium interneurons mapped angular acceleration in the planes of the canals. Working with him in Canberra, we were able to show better how the interneurons responded optimally in the planes of the vertical or horizontal canals, with input from the thread hairs, and how they responded to linear accelerations (gravity) as well as angular accelerations.

What has followed from the crab system has been the ability to record from the balancing system interneurons while the crab is walking and swimming. It was easy to identify these cells in extracellular records by

their responses to angular accelerations in particular planes, and to see what was happening during locomotion. It was surprising at first to find that the cells fired before the crab moved, and I quickly realized they form a vector-coding network mapped onto the three orthogonal planes of the semicircular canal system. This centrally-driven feedback system drives locomotion and modulates it with the angular acceleration information. Looking around for similar organization in other invertebrates, I decided that the cockroach giant fibre system was a likely candidate to form a similar orthogonal vector coding network and I was first to show that interfering with the cerci unbalanced cockroach flight behaviour [P.J. Fraser (1977) *Nature* **268**: 523-524].

A more recent development was the finding that the crab thread hairs respond to hydrostatic pressure. Before his tragic death in a helicopter crash when flying out to Heron Island, Professor Mike Lavarack had interested me in the problem regarding the nature of the hydrostatic pressure receptor in Crustacea. Hydrostatic pressure is a force per unit area exerted via a fluid (gas or liquid), so it acts all around an object. There was no mystery as to how animals like fish with a gas compartment (the swim bladder) could respond to small changes in hydrostatic pressure. As every school pupil knows from the Gas Laws, a small pressure change will lead to a significant volume change in the gas, which could easily be linked to mechanoreceptors. The problem was that many planktonic animals and fish without swim bladders were known to respond with depth regulatory responses to small pressure changes down to around 5 to 10 mbar (corresponding to 5 to 10 cm of water pressure). Water and hence tissue was considered virtually incompressible, so how a hydrostatic pressure-sensing organ could work was not understood. From ablation studies, there was some evidence implicating statocysts, so I recorded from crab thread hairs in a pressure cooker linked to a compressed air supply and found clear changes in the neural responses. More than a decade later, after proper controls and repeats with nitrogen as well as air to eliminate pO<sub>2</sub> effects, I was able to convince people that the small compressibility of tissue could be adequate to drive mechanoreceptors [P.J. Fraser and A.G. Macdonald (1994) *Nature* **371**:383-384].

The simple piston model proposed treated the 400 µm by 2 µm diameter thread hair as the barrel of a syringe, with the cuticular chorda (which links the hair to two bipolar neurones) being the plunger of the syringe. By further making the cuticle of the hair incompressible, it becomes easy to calculate the volume change inside the hair and thence the displacement of the plunger when, for example, a 1 bar (100 kPa) hydrostatic pressure is applied. Assuming a compressibility of tissue of 44 x 10<sup>-6</sup> per bar, equivalent to seawater, the calculated 17.6 nm is very similar to the value of 17.5 nm for chorda displacement calculated by bending the thread hair 1°, which is non-controversially well above threshold. This allows a simple mechanism of differential compression of tissue and cuticle to explain how a mechanoreceptor





Peter Fraser's students, Mhairi Pollard (left front) and Denis Alferez (center), hanging on in freefall while monitoring crab CNS recordings. Photo courtesy of the European Space Agency.

like the thread hair can respond to steps and cycles of hydrostatic pressure less than 1 bar.

What is not so easy to explain is how semicircular canal afferents in the dogfish isolated vestibular system can also respond to steps and cycles of hydrostatic pressure. There is less of a convenient substrate for the piston model, so the explanation has yet to be found, but the responses are clear [P.J. Fraser and R.L. Sheldermine (2002) *Nature* **415**:495-496]. We further have little information regarding the behavioural relevance of hydrostatic pressure reception in the dogfish, although in other fish and crabs it is used to synchronize locomotor rhythms to tidal cycles. Nor do we know how a sensory system can faithfully follow changes in pressure over normal tidal cycle periods of 12.5 h. There is a whole new sensory time domain to be explored with such long time constant systems.

***The crabs behaved with the quiescent indifference of animals which have been tuned by selection to stay still when marooned by the tide and did not react at all during the zero gravity of freefall or the 1.8 G phases before and after....***

The long-term (several month) recordings from crabs I can now make by implanting Teflon-coated silver wire beside the oesophageal connectives clearly show both tidal rhythmicity in the firing patterns of the equilibrium interneurons, and elevated firing frequencies during bouts of locomotion that underlie the ultradian components. Although the interneurons get direct inputs from thread hairs, there is little direct influence of hydrostatic pressure. However, using spectral analyses it is possible to detect an influence of hydrostatic pressure cycles on the interneurons.

A more unusual application of the long-term recording from crab equilibrium interneurons has been to make recordings from oscillating crabs in free fall during Parabolic Flight. A couple of years ago, I was ap-

proached by some of my students who were interested in entering the European Space Agency Parabolic Flight Campaign. Their project to record from equilibrium interneurons in crabs in free fall was selected and they duly, not without difficulties, went up in ZERO-G (in a modified Airbus flying from Bordeaux in France) with groups of 4 crabs on a motor-driven tilting table. The crabs behaved with the quiescent indifference of animals which have been tuned by selection to stay still when marooned by the tide and did not react at all during the zero gravity of freefall or the 1.8 G phases before and after, when they are hurled upwards or pull up from their fall. Their equilibrium interneurons showed large changes in responses during these phases, although the 22 s period of freefall was inadequate for equilibrium conditions to be attained. The crabs were eventually stripped of their electrodes and driven to Arcachon beach where they were all released. Further details can be found at <http://www.nerc.ac.uk/publications/documents/pe-sum03/space.pdf>

Where is crab balance going now? Well, the recent cloning of *Nanchung*, a gene for a TRPV channel located in the outer segment of *Drosophila* chordotonal organ [J. Kim et al. (2003) *Nature* **424**:81-84], gives a steer to what might be important in the chordotonal organ of the crab. One of the free-falling students, Roberto Araujo, is now hoping to create a cDNA library for the crab so that we can use molecular tools to help better understand mechanoreception and the superimposed angular acceleration reception and hydrostatic pressure reception functions of the thread hairs. Little is known about sensory systems that follow changes over such long periods, and the superposition of the scalar hydrostatic pressure modality on the vector angular acceleration pathways poses some interesting questions.




## Donation Opportunities to ISN

The ISN welcomes financial contributions in support of our mission to advance understanding of the neural basis of animal behavior. Recognizing that our membership is diverse, including members from countries where science is not well funded, and recognizing further that new initiatives are required to advertise our field and to encourage next-generation scientists to participate in our activities, we have established two funds through which individuals may make tax-deductible financial contributions. The funds will be administered by standing and special committees of the ISN whose members are broadly representative of our field. The funds are:

**I. The General Fund.** Used for establishing a base of support to: (i) help maintain and improve our website for the purpose of public education and outreach; and (ii) for special initiatives, e.g., for establishing a speaker's bureau through which members can request funding

from ISN to bring major figures in our field to their home institutions for lectures.

**II. The Student Travel Award Fund.** ISN is committed to the education and advancement of students in the field of neuroethology. This fund will be used to support student participation at national and international meetings relating to neuroethology and for student travel to visit laboratories to learn new techniques.

Donations may be made via the ISN website, <https://timssnet.allenpress.com/ECOMISN/timssnet/donations/donations.cfm>. 

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## 2003 ISN Annual Financial Report

Prepared by Sheryl Coombs, ISN Treasurer  
([scoombs@luc.edu](mailto:scoombs@luc.edu)).

### As of 12/31/03

<b>Total Assets as of 12/31/02:</b>	\$261,728.76
Cash Assets:	\$29,469.82
Investment Assets:	\$238,666.53
<b>Cash Revenues in 2003:</b>	\$25,450.83
Membership Dues:	\$20,325.00
Investment Income (Net)	\$3,726.38
Savings Interest	\$31.15
Donations:	\$1,368.30
Congress	\$0.00
Other	\$0.00
<b>Investment Portfolio: Gain/Loss (Market Value)</b>	
Year to Date	\$22,287.94
Cumulative Since Inception (1994)	\$95,872.50
<b>Expenses in 2003:</b>	(\$27,348.33)
Operating Expenses	(\$22,348.33)
Conference Expenses	(\$5,000.00)
<b>Revenues minus Expenses:</b>	(\$1,897.50)
<b>Total Assets as of 12/31/03:</b>	\$278,392.82
Cash Assets:	\$23,845.94
Investment Assets:	\$254,546.88

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## Meetings and Courses


### Understanding Mushroom Body Function: The Insect Brain as a Model for Basic and Intermediate Levels of Cognitive Functions

The European Science Foundation (ESF) has funded our initiative to organize a symposium in Toulouse in 2004 on the mushroom bodies (MB), a key structure in the insect brain. The meeting has been considered as an ESF trans-committee (multidisciplinary initiative) funded by both the EMRC (European Medical Research Council) and the LESC (European Life, Environmental and Earth Sciences Council). The meeting

will take place in the surroundings of Toulouse between 16 - 18 September, 2004. The organizer and contact is Prof. Dr. Martin Giurfa, Université Paul Sabatier, Toulouse, France, e-mail [giurfa@cict.fr](mailto:giurfa@cict.fr).

The underlying idea is that different excellent research groups exist in Europe that focus on the insect brain as a model to understand basic and intermediate levels of cognitive functions. Despite growing interest in the MB, research in this area remains dispersed. Important European research centers working on insect MB function are located in Berlin, Fribourg, Gif-sur-Yvettes, Madrid, Toulouse and Würzburg, among others. As each of these groups has specific technical and scientific achievements related to the study of the insect brain, the absence of cooperative links within Europe is certainly retarding our understanding of MB function and, more generally, of brain function.

The main objective of the workshop is therefore to explore the possibility of establishing a European cooperative network involving excellent research groups and aimed towards the study of the insect MB and their involvement in different forms of behavioural and neuronal plasticity. The appropriateness of preparing research funding applications for submission to the EU Framework Programme will be discussed.

The workshop will be divided in the following main sections: (1) Anatomy: MB development and organization; (2) Electrophysiological measurement of MB activity; (3) Optophysiological measurements of MB activity; (4) Pharmacology and molecular biology of MB activity; (5) Neurogenetics of MB; (6) Computational neuroscience: modeling MB function. 

### Sensory Ecology: An International Course for Postgraduate Students

The senses of animals are essential for every aspect of daily life. Whether detecting a mate or a prey, escaping the attentions of a predator or simply monitoring the surrounding habitat, an animal's senses are critical to its survival. To respond to the opportunities and dangers of the world quickly and effectively, each species must possess a sensory system that is uniquely optimised to its particular ecology. This "sensory ecology" has driven the remarkable range of sensory systems we find in Nature today.

Now in its second decade, the international postgraduate course *Sensory Ecology* is known throughout the world. The two-week course – which is limited to 30 participants – is organised by the Department of Cell & Organism Biology and the Department of Ecology at the University of Lund, Sweden, and the Department of Crop Science at the Swedish University of Agricultural Sciences. The course is held every other year in October. The world's leading authorities in sensory ecology are invited to Lund to deliver an outstanding program of lectures covering all animal senses. The next course will take place in Lund from October 11-24, 2004, with an application deadline of June 1<sup>st</sup> 2004. Please see the

course web site ([www.biol.lu.se/cellorgbiol/sensecol](http://www.biol.lu.se/cellorgbiol/sensecol)) for application procedures, details of the course content and other practical information, or contact the organisers at [sensory.ecology@cob.lu.se](mailto:sensory.ecology@cob.lu.se). ☎

### Karger Workshop and J.B. Johnston Club 2004 Annual Meeting.

The J.B. Johnston Club (JBJC), an international organization of researchers in comparative and evolutionary neurobiology, will hold its Karger Workshop and annual meeting this year on October 21<sup>st</sup> and 22<sup>nd</sup> in San Diego, California, USA. The Karger workshop (Oct. 21<sup>st</sup>) is being organized by Michael Pritz ([mpritz@iupui.edu](mailto:mpritz@iupui.edu)) and Eduardo Rosa-Molinar ([ed@hpcf.upr.edu](mailto:ed@hpcf.upr.edu)). This year's topic is: 'Hindbrain Evolution, Development, and Organization Revisited' with Robb Krumlauf, Ph.D., as the invited speaker. The symposium will focus on rhombomere development, organization, and evolution. The goal is to bring together scientists of somewhat different backgrounds who have investigated early hindbrain organization from a variety of perspectives and to integrate this developmental information within an evolutionary context.

The JBJC regular meeting (Oct. 22<sup>nd</sup>) will feature short oral presentations in an informal setting. Abstracts for the regular JBJC meeting will be published before the meeting in "Brain, Behavior and Evolution". You must be a member of the J.B. Johnston Club to attend or present, but membership is open to all. For further information, contact Blinda McClelland, JBJC Secretary ([mcclelland@mail.utexas.edu](mailto:mcclelland@mail.utexas.edu)). ☎

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## Book Announcement

den Boer-Visser, Brittijn and Dubbeldam recently published 'A Stereotaxic Atlas of the Brain of the Collared Dove, *Streptopelia decaocto*.' This atlas uses the recently introduced new nomenclature (see <http://www.avianbrain.org>) with cross-references to the old names. For this reason this atlas may be helpful for colleagues who want to become familiar with the new nomenclature. Information about the book is available at [www.shaker.nl/Catalogus/boekencatalogus.asp](http://www.shaker.nl/Catalogus/boekencatalogus.asp) ☎

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## Positions Available

**Postdoctoral Position in social control of physiological change.** Funding is available for interested postdoctoral fellow to study how social environment influences the neural control of reproductive physiology. Ongoing research uses a wide range of research techniques to answer questions about the mechanisms responsible for the transfer of information from social interactions to physiological, cellular and molecular processes. Applicants must have a Ph.D. with experience in

behavior and neurobiology. In particular, knowledge and experience in electrophysiological recording is desirable. Applicants should submit a letter of application, CV, a list of published and unpublished works and copies of representative published papers to: Russ Fernald, Neuroscience Program, Building 420, 450 Serra Mall, Stanford University, Stanford CA 94305, USA. E-mail: [rferald@stanford.edu](mailto:rferald@stanford.edu); tel: 650-725-2460; <http://www.stanford.edu/group/fernaldlab/>. ☎

**Postdoctoral Position in the regulation of electric fish social signals.** Available April 2004 or until filled. Funding is available for a postdoc to participate in the study of how the social environment influences circadian rhythms in the communication signals of electric fish. Ongoing research in the lab involves *in vivo* and *in vitro* approaches to study of behavior and physiology including remote recording of electric communication signals, digital signal processing, non-invasive hormone collection & analysis, cell culture, immunocytochemistry, PCR, and single unit current clamp and voltage clamp electrophysiology. Applicants should have a Ph.D. and experience in one or more of these areas: behavior, neurobiology, physiology, endocrinology or biochemistry. Interest or experience in investigating molecular mechanisms underlying behavioral change is desirable but not necessary. The initial appointment will be for one year, with continuation possible through March 2008. The university campus ([www.fiu.edu](http://www.fiu.edu)) is located halfway between the Everglades and the beach. Ocean breezes keep Miami cooler in summer than Washington, D.C., the winters are heavenly, and the wildlife is amazing. Send CV, a brief statement of research interests, and the names and e-mail addresses of three references to: Prof. Philip Stoddard, Dept. of Biological Sciences, Florida International University, Miami, FL 33199, USA. E-mail: [stoddard@fiu.edu](mailto:stoddard@fiu.edu); tel: 305-348-0378; [www.fiu.edu/~stoddard/lab.html](http://www.fiu.edu/~stoddard/lab.html). ☎

Columbia University, USA, supports a **two year post-doctoral training program** that combines participation in a new undergraduate course, *Frontiers of Science*, with postdoctoral training in research. Information on the program can be found at: <http://www.ccnmtl.columbia.edu/projects/frontiers/index.html>. ☎

**Postdoctoral Position to study rhythm generation in the respiratory network of mice,** in Andrew Tryba's laboratory at Texas Tech University Health Sciences Center, USA. Research topics include: electrophysiological/anatomical characterization of neurons involved in the generation of the respiratory rhythms, hypoxia and neuromodulation, calcium imaging, characterization of ion channels, and synaptic transmission in spontaneously active acute brainstem slice preparations. Recent Ph.D.s with experience in electrophysiology, ideally with patch-clamp experience, please send a statement of research interests, CV and arrange for three letters of recommendation to be sent. Posters at the 2004 Society for Neuroscience meeting will include: 5HT modulation of the respiratory network, neuromodulation



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of irregular breathing in MECP2-mice, Rett Syndrome and epilepsy in humans. Contact: Andrew K. Tryba, Ph.D., or Cindy Hutson, Administrator; E-mail: [andrew.tryba@ttuhsc.edu](mailto:andrew.tryba@ttuhsc.edu); tel. (806) 743-2521; Fax: (806) 743-1512. <http://ramirezlab.uchicago.edu/>. TTUHSC is an Affirmative Action/Equal Opportunity Employer. ♾

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## Material for Future ISN Newsletters

We welcome material for future newsletters in a number of categories. Advertisements for positions are limited to 150 words. Announcements of new books (copyright 2003 or later) *written or edited by ISN members* should include the full citation information (including ISBN) plus a 40-50 word description of the book (note: if an ISN member contributes only a chapter to a book it is not appropriate for inclusion in the newsletter).

We also welcome announcements of courses and future meetings, reports on recent meetings, discussions of research areas or topics of interest to neuroethologists, laboratory profiles, editorials, and memorials. Word limits depend on the type of article. Have an idea for an article that you or someone else would write? Contact the Secretary!

All material must be submitted electronically, preferably as a file attached to an e-mail message. Send

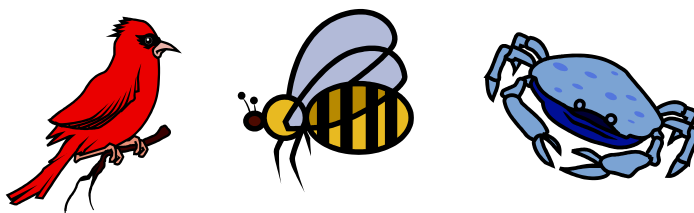
queries or submissions to Janis Weeks ([weeks@uoneuro.uoregon.edu](mailto:weeks@uoneuro.uoregon.edu)). The deadline for the July issue is **June 15, 2004**. ♾

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## Add our Link to Your Website!

Adding a link to ISN (<http://neuroethology.org>) on your website helps to raise our profile in the scientific community. ♾

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