



# International Society for Neuroethology

## Newsletter

### November 2007

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**Next ISN Congress:** Salamanca, Spain, in 2010.  
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## THIS ISSUE INCLUDES

- 1 Incoming ISN President's Column
- 3 Outgoing ISN President's Column: Passing the torch
- 4 Electrosensory Systems meeting
- 5 Eve Marder elected to National Academy
- 6 Highlights from the ICN Vancouver
- 8 Protocols in Neuroethology: Martin Giurfa
- 10 2007 ISN Bullock Young Investigators Neuroethology
- 13 A proposed fund to support neuroethology in emerging countries
- 15 Meetings, Job ads, and more

## Incoming ISN President's Column

**Martin Heisenberg** ([heisenberg@biozentrum.uni-wuerzburg.de](mailto:heisenberg@biozentrum.uni-wuerzburg.de)) Theodor-Boveri-Institut für Biowissenschaften der Universität Würzburg, Germany

Dear ISN Members: This is your new president. The past president, Edward Kravitz, handed the office over to me in Vancouver. This is the place in which to thank Ed for all he did for the Society in these three years, and in three years prior, as President-Elect. The Society is in good shape. Ed and his team can be proud of their

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achievements. Having looked into the agenda of the Society for only a few weeks I am most impressed how smoothly and with how much oversight Ed handled things. We all will miss him in this office. I am glad he remains a member of the Executive Committee (EC) for the next three years. We will need his insight and sense of humour.

With the outcome of the elections in September the new crew of ISN officers for the next three years is taking over. I would like to thank those leaving the EC and the Council for the many hours of work they donated to the Society. Albert Feng, the former Past President, will officially step down but kindly agreed to further contribute his experience as an *ad hoc* member of the EC. Paul Katz is the new President-elect. He will take over the presidency in three years and I am delighted that he has already taken the initiative to look into one of the most urgent matters of the Society, which I will address below. The former Secretary, Ian Meinertzhagen, has edited nine informative and interesting Newsletters (including this one) and has also dealt with correspondence and kept minutes of the EC meetings for the Society. He will be followed by Katalin Gothard. The past Treasurer, Peter Narins, who has been supervising the financial wellbeing of the Society, is still figuring out where, financially, the Vancouver Congress has left the Society. He will hand over the accounts and balances to Fred Delcomyn. Fred and Kati will take over at the end of the year. If the Newsletter is the voice of the Society, the web page is its 'face'. Zen Faulkes, together with the secretary, keeps the web page up to date. If the web page is to become a place for exchange among Society members, this will become a rapidly growing endeavour. You are invited to make use of both, the Newsletter and the web page, for your own needs as far as they are related to Neuroethology. Thank you, Zen, for this considerable effort.

John Hildebrand who has continuously served the Society since his presidency (1995 to 1998), is returning to the Council. Catherine Rankin, with all her expertise on having organized the Vancouver congress, remains on board. Sheryl Coombs, the heart and living 'memory' of the society, is now in the Council, and I am very happy that we can keep her as an *ad hoc* member of the EC. In this way she can serve as a link between the Council and the EC. I would like to welcome also the other new members of the Council, Alison R. Mercer, Hans-Joachim Pflueger, Alan Roberts, John Simmers and Daniel Tomsic.

Many of the more practical operations and duties in the Society have been taken over by Linda Hardwick of AM&M, the Society's management company. This has been a friendly, productive cooperation. Thank you.

As a result of its past management and the efforts of the Membership Committee, the Society presently has a sound financial base. It can look back upon a splendid series of tri-annual International Congresses, the last

one in Vancouver still in recent memory, and the next one in 2010 already being planned. (It will be held in Salamanca, Spain, hosted by Alberto Ferrús. He will chair the local organizing committee.)

Yet, the charts show that this bright picture does not necessarily mean a bright future. While enthusiasm about the congresses is unbroken, it has been increasingly difficult to attract new members, the chief resource of the Society. We need to understand better what the members expect of the ISN. Why did you make the decision to support the ISN and what in your opinion would keep members in the Society and attract new ones. In my opinion, neuroethological research is growing, but much of it marches under a different banner, for instance, if genetic model organisms are concerned.

One important purpose of societies is to provide their members with the right professional contacts. As a result, societies can be too narrow, too broad or they may overlap only partially with the professional interests of their members. In the first sentence on our web page "About ISN", Neuroethology is defined as "*the study of how nervous systems generate natural behaviour in animals.*" How well does this definition match your professional interests? It is an old practice of religions as much as societies to point out what distinguishes them from others. These 'others' in our case would be, for instance, Animal Psychology, Behavioural Neuroscience, Ethology or Behavioural Ecology. We are not quite ready to discuss mergers with sister societies but we have started discussions about joint activities. Your input to this issue would be highly welcome.

One continuous issue is the long interval between consecutive congresses. Evidently, the ISN is not just the legal umbrella institution for the congresses. Its purpose is to foster Neuroethology. It is Neuroethology that provides much of the progress in understanding brains, nervous systems and behaviour. It deserves to be supported. It is the centrepiece of Zoology and the Neurosciences.

The ISN has made efforts to support Neuroethology in various ways. As much as its finances allow, the Society awards student travelling fellowships for conferences related to Neuroethology in off-congress years, such as the Gordon Conference in Oxford next summer. It has longstanding plans to initiate a data bank of educational material on the society's web site and hopes to expand its bulletin boards for job offers and other useful information. We would like to have a Journal of Neuroethology, initiate an authoritative textbook and have chapters on this subject in textbooks. These are some of the ideas. Anything to be realized depends upon the actions of our members. Your help is most appreciated and your ideas will find open ears and minds in the Council and EC.

Recently, a group of members led by Willi Honegger has started an initiative to fund Neuroethology programs in emerging countries. Such programs could be an exceptionally effective kind of cultural export, measured by the

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amount of money they require and the value they would bring. The activities of the Society are limited by its financial resources. For instance, wouldn't it be great to have endowed chairs for Neuroethology at universities? We all should be on the look out for sponsors.

Finally, as this is the last Newsletter and President's Column Ian is going to edit: Thank you once again, Ian, for all your efforts collecting contributions and for the appealing products you presented.

To all: Do not miss Kati's first Newsletter in the spring.  
Martin Heisenberg



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## Outgoing ISN President's Column: Passing the Torch

**Edward A. Kravitz** (edward\_kravitz@hms.harvard.edu)  
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We have just had an amazing Congress for which enormous debts of gratitude are due to Barb Beltz, as Chair of the Congress Organizing Committee, Cathy Rankin as Chair of the Local Organizing Committee and host of the Congress, Ron Harris-Warrick and Sten Grillner as Co-Chairs of the Congress Committee, a hard-working Congress Committee, and Chairs and Members of several student, post-doc and young faculty Awards Committees (Mark Konishi, Martin Giurfa, Claire Rind). One cannot leave out Linda Hardwick from our management firm, who actually was in attendance at the Congress making sure that the administrative side of things was under control. I can both breathe a sigh of relief and hand the reins of running our Society to our highly capable next President, Martin Heisenberg. Martin is both a friend and an outstanding scientist, and I welcome him as our new President.

The election during the early Fall generated an outstanding group of people for Martin to work with, and he already is at work on some of the large problems I left behind relating to the future of our Society (well not completely left behind, as I still serve as Past President). I have had the pleasure of working with Al Feng, Ian Meinertzhagen and Peter Narins on the Executive Committee, and as special representative from the Council to the EC, the ever-loyal conscience of our Society, Sheryl Coombs. Being able to continually consult with John Hildebrand also has been important for me, and I even was able to recruit John once again to play an active role in the Society as the Chair of our Membership Committee. Hey all you guys, THANKS!

In a way, mentioning the role that John has served is a good lead in to what I view as some of the unfinished tasks of my tenure as President. A serious problem faced by our Society is a continual erosion of our mem-

ber base, particularly during the non-Congress years. Somehow or other, despite the EC establishing incentives for retaining membership, like the Heiligenberg Awards, and despite an ever more interesting and ever improving newsletter, so capably organized by Ian Meinertzhagen, we keep losing members. As your new President, Martin Heisenberg has already started to work on this problem, by forming a new ad-hoc Committee chaired by the President-elect, Paul Katz. Martin and the Committee need your help in thinking about this essential issue. What can the ISN do for you to induce you to maintain membership in the Society, and hopefully, to eventually increase our member base? By any standards, the dues of our Society are very low (actually free for students if the mentor is a member), so it can't just be the expense of being a member that is the problem. Please contact Martin and/or Paul with suggestions on this important matter.

In general, my message to our greater membership is to GET INVOLVED!! Volunteer to serve on Committees when calls are issued for committee members. Volunteer to serve on Committees even if not officially called on to serve. Email the President or other members of the Executive Committee or the Council with suggestions for how to improve our Society and what it offers to our field. Neuroethology still is a young and growing field and more and more investigators are doing neuroethological research even though they may call themselves neuroscientists, molecular biologists, geneticists or behaviorists. Encourage folks who do not identify themselves as neuroethologists but who are doing relevant research, to join and participate in our Society.

I still feel that a Congress every other year, alternating with the Gordon Conference on Neuroethology, rather than every third year, is important for our future. I know that in this era of diminished research funding, meetings are low on the totem pole of how grant support should be expended. Still, for me, the Congress this year was the most relevant, fun and interesting meeting I went to all year. If I had to choose, I would opt out of all other meetings in order to attend our Congress. Unfortunately when I raised this suggestion in the Newsletter during my tenure as President, there was little or no response to the suggestion. Of the few responses I did receive, all were opposed to the idea of more frequent Congresses. For now then, a triennial Congress remains what our Society sponsors.

To finish, I believe I said this once before in an earlier President's Column, I felt it an honor to serve as the President of the ISN. The wonderful people I had the opportunity to work and to interact with in both formal and informal ways alone, made it well worth whatever effort was involved in serving as your President. I extend a personal welcome to Martin and the new members of the Executive Committee. Please count on my help and support in our continuing efforts to make the ISN a better organization in service to the wonderful field of neuroethology.

## This issue of the Newsletter

Ian A. Meinertzhagen, (iam@dal.ca)

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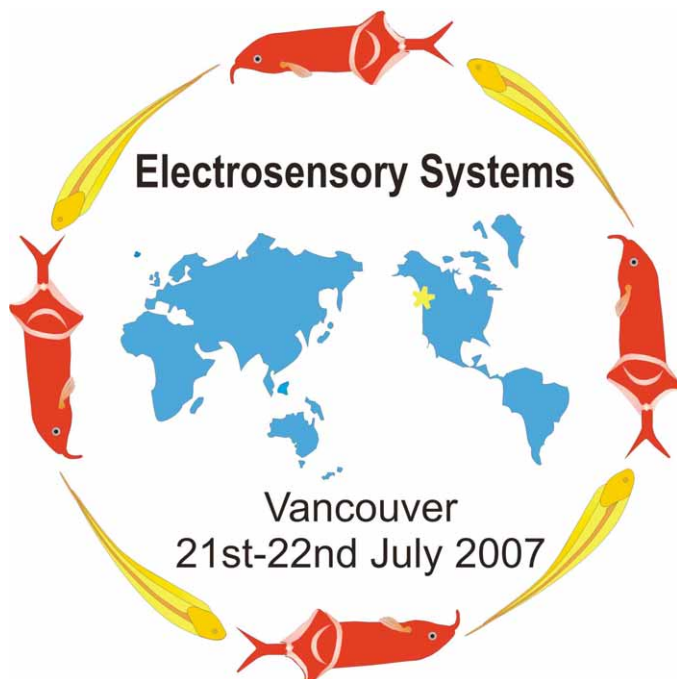
This issue of the Newsletter will be the last one I edit. The next will be under the management of our new Secretary, Katalin M. (Kati) Gothard, from the University of Arizona. I should thank all those who during the last three years have submitted articles for the Newsletter, and those of you who have even read them, as well as apologise to yet others of you who every four months have received my harrying letters soliciting such articles. Please don't think your opportunity has passed. We accept material from members at all career stages, in all areas of neuroethology and from all countries. Effective immediately, however, please send all submissions to Kati, at (kgothard@email.arizona.edu).



## Notes on the 'Electrosensory Systems' Meeting (Vancouver 2007)

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The setting could not have been lovelier or more inviting as electric fish enthusiasts converged on July 21, 2007 at the University of British Columbia campus in Vancouver, Canada, for a two-day satellite meeting at the 8th International Congress of Neuroethology. In the tradition of meeting about every three years (Moller, 2006), nearly one hundred participants came from all over the world, including Asia, Australia, Europe, as well as South and

North America. The meetings, science and logistics, were superbly prepared and organized by Gerhard von der Emde (Bonn), Kirsty Grant (Gif-sur-Yvette), and Jacob Engelmann (Bonn). To the outsider, there were no noticeable glitches! Thanks also to our local organizers and host, UBC, who were ultimately responsible for running a smooth show. The physical space was impeccable, modern and accommodating, but a lot of 'real business' was also conducted over lunch at the University Village.

I came away from all the talks, poster sessions, and discussions with a strong conviction that electric fishes had further cemented their status as champion species to ethologists, behavioral ecologists, evolutionary biologists, neuroscientists, taxonomists, endocrinologists, and computational neuroscientists. The meetings served to renew old acquaintances, forge new ones, initiate collaborative research, and exchange scientific data and personal anecdotes. There were over thirty oral and fifty-five poster presentations whose titles could have been a stand-in for the table of contents of any respectable neuroscience text. The presentations were organized around theories and models of electrosensing, behavior in lab and field, communication, evolution, anatomy, ontogeny, hormones and regeneration, ampullary system, ELL (electrosensory lateral line lobe), and synaptic plasticity. We learned about life histories of our fish, regeneration and neurogenesis, electrosensory imaging, new insights into neural circuitries and processing, hormones and development, and about the most up-to-date applications of molecular techniques in taxonomic research. In short, we have come a long way since H. Lissmann discovered the electrosense (1958) and a first symposium on bioelectrogenesis was held in 1959 in Rio de Janeiro (Chagas and Paes de Carvalho, 1961) focusing almost exclusively on electric organs and bioelectrogenesis.



Curtis Bell in contemplative mood, and with an empty glass, during the dinner at the Electrosensory Systems meeting in Vancouver.

The highlight of our meeting was the festive Banquet with excellent food and wine on Saturday evening honoring Curtis Bell on the occasion of his retirement. In his remarks, Curt paid homage to the founders and trailblazers of our discipline, Hans W. Lissmann, Thomas



Szabo, Theodore Bullock, and Walter Heiligenberg. He relived with us some of the hallmark accomplishments on electrosensory systems that have made work on electric fish so popular in neuroscience. But we learned much more; we got a rare glimpse of Curtis Bell, the human being formed by tragic early personal experiences, a humanist, pacifist and peace activist. There was a clear message to all of us, we can't run microarrays, record from single fibers, trace neural circuitries, or chase fish in the murky waters of Africa and South America without also involving ourselves as global citizens in the affairs that affect our environment, and ultimately our own survival.

Electric fishes and electrosensory systems are as popular now as ever. Research is booming and proliferating as so clearly shown by the large attendance of young investigators. Let's meet again in the not too distant future.

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## Former ISN Council Member Eve Marder Elected to US National Academy

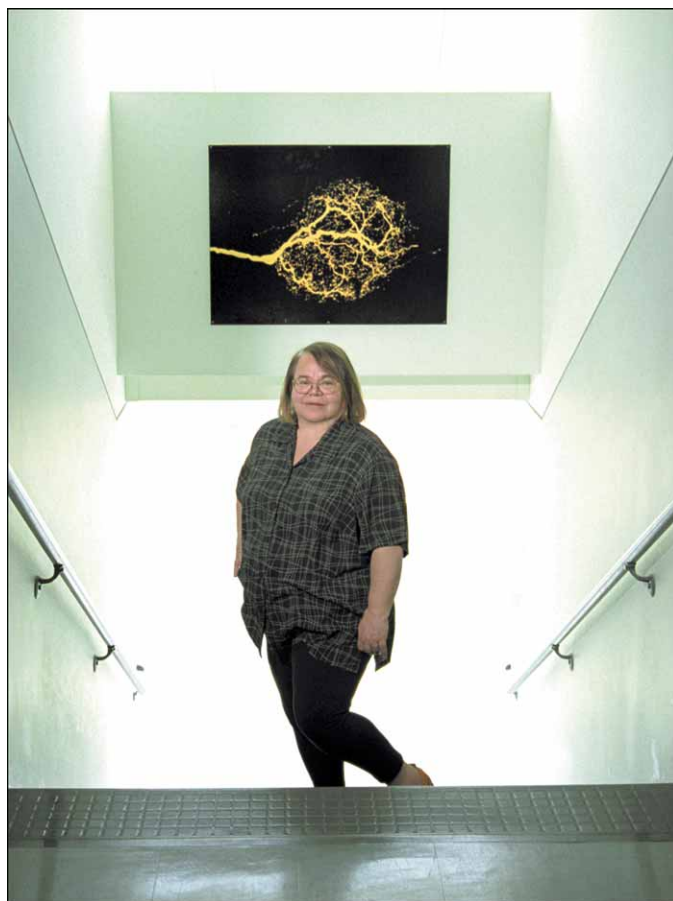
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It is a great pleasure for the Society to acknowledge that one of its former Council members, Eve Marder, was elected to the US National Academy of Sciences (NAS). Eve is the second neuroethologist named by the NAS in its 2007 election. Their decision is based on the "distinguished and continuing achievements in original research" of the 72 new members and 18 foreign associates elected this year to its membership. Membership in the Academy is considered one of the highest honours that can be accorded a U.S. scientist or engineer. With this election, the Academy now comprises a total of 2,025 members.

A president-elect of the Society for Neuroscience and recipient among other awards of the Society's Gerard Prize for lifetime contributions to her field, Eve has pioneered work that focuses on understanding how the

specific functions of, and synaptic interactions between, identified neurons give rise to the properties of neuronal circuits. Much of her work has utilized the model neural circuits in lobsters and crabs of the stomatogastric ganglion, a system of about 30 neurons incorporating two central pattern generators that generate rhythmic movements in the pyloric and gastric mills of the decapod stomach.

Her work has helped enable us to understand this circuit behaviour and how neuromodulators are able to influence it, and has contributed richly to the study of this simple ganglion. The triple research themes of central pattern generators, neuromodulation of synaptic circuits, and identification of the relationship between a system of extensively-studied invertebrate neural circuits and its rhythmic motor outputs, are in fact all themes that penetrate many neuroethological studies.



Eve Marder, Elected Member, National Academy of Sciences

More recently she has undertaken work to understand the limits of variability across individual animals with respect to growth.

"It is a great honor to be elected to National Academy of Sciences, and I am proud to join so many other eminent women and men who have contributed to the progress of science," said Marder, on the occasion of her election.

## HIGHLIGHTS FROM THE 8<sup>TH</sup> ICN VANCOUVER, 2007

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The 8<sup>th</sup> International Congress for Neuroethology held in Vancouver in July was a resounding success. There



Sten Grillner and Al Feng, comparing the sizes of their pieces of cake  
(Photo: Fred Delcomyn)

were over 600 attendees at the meeting. In addition to the scientific content the attendees were able to experience the famed Vancouver rain for the first two days and then wonderful weather for the remainder of the meeting. The trip on Wednesday afternoon to the Vancouver aquarium was delightful and 230 people got to experience the richness of the waters of the Pacific Northwest, an amazing jellyfish display (see photo by Albert Feng)



and a wonderful visit with Beluga whales. For many it was a 'busman's holiday' as some people gravitated towards the animals they study and gazed at them in their tanks! For dinner Wednesday evening more than 200 of us took the fireworks cruise and had a wonderful harbor cruise and dinner followed by ringside seats for some truly amazing fireworks – 30 minutes of a display by Spain for the Celebration of Light – an annual fireworks competition set to music held in Vancouver. Many of the other conference attendees watched from the beaches – here is a great glimpse of what we saw (If the link doesn't work, go to [www.youtube.com](http://www.youtube.com) and search Vancouver fireworks (the best one 2007 HSBC Celebration of Light – Spain) was posted by gtespirit2007) <http://www.youtube.com/watch?v=SNzwPXmvFeo>.

The closing banquet was held at the world famous Museum of Anthropology on the UBC campus, private



UBC Museum of Anthropology (Photo: Fred Delcomyn)

tours of the museum were followed by an outdoor banquet for 300 people with wonderful food and great conversation. It was sad to have the meeting over, however we all look forward to reconvening in 3 years in Spain!

The attendees at ICN had a smörgåsbord of offerings, with 13 plenary lectures, 14 symposia and over 400 posters over the course of the 5-day meeting. Symposia were held in parallel sessions, and so some difficult choices had to be made. These ranged from molecular and cellular sessions, such as Mark Frye's *Molecular Neuroethology in Drosophila*, starring Julie Simpson (HHMI, Janelia Farm Research Campus), Tom Clandinin





**Above:** The ICN Banquet in progress (photo: Andrew Giles). **Below:** Congress banqueters in festive mood. Nearest table: John Hildebrand (back to camera), Cathy Rankin (left), Editor, Editor's friend, Kathryn Kravitz. Other tables: people too numerous to mention (photo: Fred Delcomyn)



(Stanford University), Leslie Vosshall (Rockefeller University) and Claude Desplan (New York University), to the analysis of complex behaviors in monkeys, with Kari Hoffman's *Neural Bases of Natural Behaviors in the Macaque*, featuring Kari (York University), Katalin Gothard (University of Arizona, Tucson), Michael Platt (Duke University) and Michael Graziano (Princeton University). Symposia also examined highly interdisciplinary aspects of neuroethology such as the interactions between steroid hormones, the nervous system and behavior in Marc Tetel's *Novel Mechanisms of Hormone Action in Brain and Behavior*, in which Marc (Wellesley College), Shaila Mani (Baylor College of Medicine), Gregory Ball (Johns Hopkins) and Michael Meaney (McGill University) presented their most up-to-date data and understanding. It is difficult, for lack of space, not to acknowledge all of the wonderful symposia and the dedicated folks who planned and contributed to the sessions. The quality of

the symposia and excitement they generated were phenomenal.

The poster sessions were similarly broad, with sessions ranging from development and evolution, to sensory and motor systems, to communication. During the poster sessions the hall was filled with talk, laughter, food and drink, and attendance happily overflowed the space. Also incredibly well-attended this year were the *ad hoc* presentations on Tuesday afternoon, where among other presentations Paul Katz (President-Elect of ISN) brought us up to date regarding websites for banking various kinds of organism-specific data, such as the neuromics site NeuronBank.org.

The plenary sessions are always well received at every conference, where noted leaders show us the new directions that neuroethology is following into the future. We heard about both cellular and behavioral mechanisms of spatial cognition and navigation in a pair of excellent talks by Susan Healy (University of Edinburgh) and Ken Lohmann (University of North Carolina). Leslie Griffith (Brandeis University) provided clear evidence of the relevance of cellular and molecular biology in her talk about pheromone-mediated learning in *Drosophila*. Sarah Dunlop (U. of Western Australia) showed how a comparative and neuroethological approach can also be applied to clinical problems in her description of recovery after nerve injury. Nino Ramirez (University of Chicago) and Piali Sengupta (Brandeis) presented work on the surprisingly complex neural networks that underlie simple forms of behavior during respiration and thermosensation. Dan-Eric Nilsson (Lund University) gave an evolutionary description of animal vision, with a focus on the complex eyes of box jellyfish. Kazuo Okanoya (Riken University) talked about the neural networks and mechanisms for song complexity in birds, and argued that female choice selects for increased complexity in songs. We also had two excellent evening talks. Al Feng (University of Illinois) gave the Huber Lecture with a very entertaining description of research he has been doing in China on communication among torrent frogs in noisy environments. Eric Knudsen (Stanford) gave the Heiligenberg Lecture, presenting his latest work on plasticity and learning in the barn owl auditory system.

One of the highlights, and indeed the "hit of the conference" this year, was a morning session of talks given by the winners of the Bullock Young Investigator Awards. These prestigious prizes are for outstanding work done by recent Ph.D. graduates. Many of us see this as a real way to look into the future of neuroethology as practiced by our most outstanding young scientists. This year's awards covered a wide spectrum of topics, including the fine structure of synapses in *Drosophila* (Birgit Greiner, Dalhousie University), neuronal mechanisms for ultrasound detection and predator avoidance in crickets (Gary Marsat, University of Ottawa), and rapid actions of steroids to modify social interactions in sound-producing fishes (Luke Ramage-Healy, UCLA).

We thank all the speakers and symposium organizers for all their wonderful talks. It is clear that neuroethology continues to be a lively and vibrant field of research, and we look forward eagerly to the next installment in Salamanca, Spain in 2010!



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## PROTOCOLS IN NEUROETHOLOGY

### Simple experiments for schools: the demonstration of colour vision in honey-bees

**Martin Giurfa**, ([giurfa@cict.fr](mailto:giurfa@cict.fr))

Centre de Recherches sur la Cognition Animale, CNRS - Université Paul Sabatier - Toulouse III - UMR 5169, France

In 1914, Karl von Frisch (who was later to receive a Nobel Prize for his studies, in 1973), published his famous paper "*Farbensinn und Formensinn der Biene*" [1] in which he showed for the first time that honey-bees are endowed with colour vision, being able to discriminate colour stimuli irrespective of intensity differences (i.e. to choose colours based on their chromatic instead of their achromatic properties). This sensory capacity plays a fundamental role in the life of a honey-bee, which has to forage serially on the same flower species as long as the latter provides pollen and/or a nectar reward. In this context, colour allows bees to recognize the appropriate flowers; not surprisingly, therefore, honey-bees exhibit well-developed colour learning and memory capabilities in an appetitive context.

The experiment by which Karl von Frisch showed the existence of colour vision in bees is relatively simple but laden with consequence. Before it, bees were thought to have achromatic vision and to respond only to differences in light intensity. Besides its scientific significance (the first demonstration of colour vision in an invertebrate), this experiment introduced a real revolution in experimental terms: the accurate and controlled measurement of individual performances among bees. To this end, von Frisch established a colour marking method in order to be sure that the bee that was under observation was 'his' bee and not one whose experience was uncontrolled. Because his experiment involved training bees to a colour associated with a reward of sucrose solution, he understood that such learning performance could only be studied at the individual level and not by watching groups of individuals in an uncontrolled way. He therefore decided to mark each trained bee with an identification mark (a spot of colour) on the thorax and/or the abdomen.

The experiment consisted of training bees to visit a feeding site in which they would encounter a feeder on top of a colour cardboard (e.g. blue). Later, once the marked bees had performed enough visits to the feeder associated with the particular colour, they were presented with a test situation in which the coloured cardboard lay in a random array of similar-sized but achromatic cardboard rectangles. These presented several intensities of gray, one of which was similar in intensity to that of the blue colour (Fig. 1). Because the choice of the bees was guided by their colour vision, they always chose the correct blue cardboard, even if its position within the array of test cardboard rectangles was changed. They were therefore paying detecting and responding to the colour and not the achromatic intensity cues.



A simple feeder for honey bee experiments

What follows are the essential steps to be followed to replicate these basic experiments of von Frisch, an exercise that is sure to foster enthusiasm from investigators of any age, from school pupils to senior researchers attracted by the plasticity of honey-bee behaviour.

#### Materials required

The obvious thing to have first is a honey-bee hive in good condition, placed some meters (10 or more) from the experimental site. Having the hive too close is not convenient because the feeding place may be easily overcrowded by unwanted bee visitors.

A feeder providing sucrose solution constitutes the reward used in this experiment (Fig. 2). If you don't have the kind of pneumatic feeder shown in the figure, use a small Petri dish filled with sucrose solution. To avoid the bees falling into the solution you can put a wire mesh on top of it, or cut a thin disc of styrofoam which would float on the solution and into which you could pierce several small holes in order to allow bees to take up the sucrose.

The concentration (weight/weight) of the sucrose solution should be between 30 and 50% depending on how many bees are wanted at the feeder. Higher concentra-



tions (> 50%) are not necessarily better as the higher viscosity may make it difficult for bees to ingest.

In order to mark the bees on the thorax and/or abdomen with a colour spot, thereby allowing easy identification, use acrylic paint (always avoid the use of paints that include solvents, which could damage the cuticle and thus the bees) and a fine paintbrush. Use light colours (white, yellow, etc) as these are more clearly visible from a distance against the bee's dark profile.

Use coloured cardboard sheets that are large enough to be detected from a distance; using squares (as von Frisch did) of 10 x 10 cm would be appropriate. Just one at a time of these cardboard sheets should be coloured while the others should constitute a random array of grey levels. Have in addition dummy feeders prepared for the test in which bees will have to choose among all cardboard sheets.

At least for the tests, you will need to prepare fresh cardboard sheets beforehand. Such fresh stimuli are employed each time to discard any opportunity the bee might have to use scent marks instead of true colour vision for orientation. Another option is to cover the stimuli with a glass or Plexiglas plate that can be washed with alcohol between visits of the bee. Note, however, that this option introduces inaccuracies because glass cuts out some of the ultraviolet components of the spectrum while normal Plexiglas absorbs it, with the result is that an important visual component for bees is eliminated or affected. In the case of normal colour cardboard sheets, which seldom give rise to an important UV reflection, this problem is not so critical; but you should be aware of it in any case.

### Methods

➤ The first step is to **pre-train** the bees to the feeding site. To this end, put the feeder at the hive entrance and wait until the bees find it, climb on it and start to drink the sucrose solution. Use a low concentration (e.g. 25 or 30%). In order to accelerate this process you can use a syringe containing the same solution and you can carefully spread some droplets of sucrose on the entrance platform in order to stimulate the bees.

• **Extremely important: protect yourself while staying at the hive entrance.** Use appropriate beekeeper clothes (especially if you are allergic!), stay always to one side of the hive entrance (avoid blocking the departing-returning flow of bees) and always make slow movements. **It would be reasonable to leave an experienced beekeeper or bee researcher to do this part of the work. Do not use after-shave, perfumes, etc, which can irritate the bees.**

➤ Once the bees are on the feeder, displace the feeder to its next position. You can move them directly to the experimental site and wait for the bees to return by themselves, or move them step-by-step to increase the chances of return. Place the feeder at its end position, close (i.e. 3 to 5 m) to the exact location of your

experimental table. The feeder should stay there to ensure a regular number of bees to be used in the experiment.

- Once the bees are returning regularly to the feeder, mark them individually using acrylic paint (see above). You should then gently capture one of them with a glass vial and bring it to the experimental table where it will be placed on the colour cardboard sheet, displayed horizontally, on which a drop of sucrose solution or a new feeder will be available. The concentration of this solution should be higher (e.g. 50%) than that of the feeder used for pre-training. In this way, the selected bee will switch to the experimental table while the others will keep visiting the low-concentration feeder.
- Wait for the return of your bee. When this happens (first active visit) the **training** can start. The bee should get 3 to 5 rewards on the colour chosen (e.g. 3 to 5 foraging bouts). The blue cardboard sheet will be presented alone on the experimental table but from one visit to the next you should change its spatial location on the table to avoid the possibility that the bee might learn from positional cues.
- Do not forget to wash the glass or Plexiglas plate between visits (see above). If you don't use such a plate, you should definitely change the colour cardboard sheet after the last training visit in order to have fresh stimuli in the tests.
- If you have newcomer bees during the training, chase them away from your experimental table or capture them for later use. **Use only one bee at a time (your marked bee)!**
- The test should come after the last training visit. **No reward should be provided in the tests to avoid further training.** When the experimental bee has left the training site after its last visit, place the grey cardboard sheets and the coloured one building a random matrix of, say 4 x 4, cardboard squares (or more). Thus, the returning bee will have to choose between all the grey alternatives and the coloured one. You can use more than one cardboard sheet displaying the same colour, alternated between the grey ones. You can place on each cardboard square, coloured or not, a dummy, clean feeder in order to promote the landings of the bee. Count precisely the amount of touches (contacts of the cardboard with the legs) and landings of your bee on the cardboard square of your matrix. Limit your counting and the test itself to just one or two minutes in order to avoid the possibility that the bees might learn now that the coloured square is associated with the absence of a reward. **The bee will tell you then whether it chooses the blue cardboard because it sees its colour or confuses it with some grey square presenting a similar intensity. Of course we know already what should be expected in such an experiment....**

- The test can be repeated twice or more changing from one to the next the location of the cardboard squares in order to discard any positional effects. ***Because the test is a non-rewarded visit, you should provide a refreshment training (one rewarded bout would be enough) between successive tests.***
- Repeat the same experiment using different bees and different colours. Testing red colours, for instance, would yield interesting results.

In doing this experiment always keep in mind Karl von Frisch's maxim: "When doing an experiment with your bees, imagine always that you have five specialists watching you carefully and critically around your experimental table. Be therefore as careful and precise as possible!"

And finally, as important as the former statement, enjoy working and discussing the experiment with your students!

[1]: Zool. Jb. Abt. allg. Zool. u. Physiol. 85, 1--182 (1914)




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## Profiles of 2007 ISN Bullock Young Investigators

This issue features profiles of the three outstanding recipients of ISN Bullock Young Investigator Awards given for the 2007 Congress. The awardees, Birgit Greiner (Dalhousie University, Canada), Gary Marsat (University of Ottawa, Canada), and Luke Ramage-Healey (UCLA, USA), each received a \$1000 award and gave an oral presentation during the Bullock YIA Plenary Session at the Vancouver Congress in July, 2007. The ISN congratulates these talented young individuals, who yet again demonstrate, as in previous years, that our field is in secure hands for the future.



### Dr. Birgit Greiner

**Birgit Greiner** ([birgit.greiner@biozentrum.uni-wuerzburg.de](mailto:birgit.greiner@biozentrum.uni-wuerzburg.de))

University of Wuerzburg, Germany

After early biology studies in the lovely University town of Graz, my introduction to the irresistible spell of 'real science' took place in the laboratory of Prof. Friedrich Barth at the University of Vienna. Attending a neuroanatomy course organized by Dr. Sylvia Anton (then visiting Vienna from Lund University, Sweden) opened another important door, by giving me a first glimpse of the artistic beauty hidden within neural networks. Little did I know at that time that my own development of becoming a scientist would not just be intellectually inspiring but also an exciting geographical journey.

With Sylvia Anton's encouragement, Prof. Barth's help and the generous financial support from the Austrian Exchange Service and the Swedish Institute, I had the great chance to perform the experimental part of my Diploma thesis at the Ecology Department in Lund, studying central odour processing in the moth *Agrotis ipsilon*. An investigation of odour detection of plant volatiles in the antennal lobe using intracellular electrophysiology and 3D mapping of the glomerular architecture of the male antennal lobe, resulted in my first publications. This gave me a great introduction to all aspects of science early on. In addition, Prof. Bill Hansson made sure that his lab members also tested their own olfactory system once a year by sampling the famous Swedish fermented Baltic herring called 'Surströmming' (note from the author, do not try this at home!).

In Lund, I was fortunate to meet my future PhD Supervisor (Doktorvater) Prof. Eric Warrant and, as a new member of the Vision Group, I investigated how insect apposition eyes – typically designed for bright light – can be adapted to function at very low light intensities. Luckily, my ideal 'model' was a tropical bee found at the wonderful field station of the Smithsonian Institute (Barro Colorado Island) in Panama (and which needed to be studied during the dry season that coincides with European winters). Besides optimizing photon capture via huge photoreceptors, I discovered widely-branching neurons, only found in the first optic ganglion of nocturnal bees, that are most likely involved in spatial photon pooling. In other words, these neurons have the potential to collect photons from several lenses in order to increase the visual angle, just like we open the aperture of our camera to take a good shot at night. To investigate the three-dimensional arrangement of these neurons within the optic ganglion I first classified them with conventional Golgi staining and then reconstructed their shape and branching pattern via serial electron microscopy (EM). A major source of specialist advice came from the insect anatomy expert Prof. Willi Ribi from the University of Liechtenstein. We decided to combine his regular research visits to the Research School of Biological Sciences, ANU Canberra, with my investigations using their well-equipped EM-Unit facilities. We were thus able to spend a number of very fruitful research months in Canberra.

At my first Neuroethology meeting in Denmark 2004, where I received great feedback (and a poster prize!) for my PhD project, I realised that this branch of researchers not only consists of incredibly smart people with remarkable research projects, but also represents a unique scientific family, especially supportive of young researchers like myself. So I knew I was on the right track.... In Denmark I also had the pleasure to meet Prof. Ian Meinertzhagen, who generously accepted the

responsible role to be my thesis examiner and offered me a post-doc in his lab at Dalhousie University, Halifax. Thus, on the last weekend before Christmas 2005 (a wonderful time of the year to be in candlelit Lund), I successfully defended my thesis, sadly packed my bags but was also very excited about moving soon to Canada.

Not by the most direct route however. I was still waiting for the decisions regarding my fellowship applications, so Dr. Jochen Zeil invited me to come to Canberra as a visiting researcher for three months to study another extremely fascinating insect, the primitive Australian ant *Myrmecia*. Most Australians try to avoid these ants due to their potent sting, but those that look a bit closer are simply amazed by the way these impressive creatures 'watch', follow and eventually attack their observers. Combining field and laboratory work, we discovered that closely related species of these primitive ants show distinct foraging activity windows, which nicely correlate with photoreceptor size. They thus represent an ideal model system for investigating the evolution of visual niche specialisations. In Canberra, I also received the wonderful news that I was awarded an Erwin-Schroedinger postdoctoral fellowship from the FWF Austrian Science Fund as well as an Honorary Killam postdoctoral fellowship from the Killam Trusts for my project at the Meinertzhagen laboratory.



Arriving in Halifax, Canada, felt like opening a new book chapter. Everything was foreign, exciting but also intimidating – especially the tiny, seemingly inconspicuous fruit fly *Drosophila*, which nonetheless had a head start of about 100 years of intense research investigations against me. Well, I decided to start small...incredibly small, in fact, by investigating the macromolecular architecture of photoreceptor synapses using electron microscope tomography. A dream come true for anatomists, as the special tilting of the sample within the electron microscope allows an unmatched specimen resolu-

tion of up to 2 nanometer inside the volume of a single, ultrathin section! For the first time we were able to see that the T-bar ribbon synapse is physically involved in the tethering of synaptic vesicles, as well as resolving the macromolecular substructures of these organelles and the filamentous network surrounding it. This fascinating research brought me not only across the continent to the lab of Prof. Jack McMahan at Stanford, California, where the highly advanced electron microscope has its home, but also to the Neuroethology meeting held in Vancouver this year. I remembered well how impressed I was by the achievements from the excellent Awardees in 2004 and felt incredibly honoured to receive one of this year's ISN Young Investigator Awards. Again, I was greeted by the unique 'scientific family' and the captivating atmosphere of interest, support and inspiration that characterises this meeting. This helped me through my initial nervousness to present our recent tomography results in the form of the Bullock Young Investigator Lecture in front this unique audience of scientists that I admire so much.

My passion for research is to study the interplay of neural systems and sensory-guided behaviour, with a particular focus on the structural architecture of the underlying neuronal networks. Recently my geographical journey has brought me back to Europe (close to my Austrian roots), where I am currently investigating learning and memory in synaptic fly mutants in the laboratory of Prof. Martin Heisenberg at the University of Würzburg, Germany. At the moment the experimenter is probably learning just as intensely at the little subjects ... but that will be another story, hopefully presented at the 9th Neuroethology meeting 2010 in Spain.

I am grateful to many more colleagues and advisors than I was able to mention in this short discourse, not to forget my family and friends outside science, which make sure that I always remain on steady ground.



## Dr. Gary Marsat

Gary Marsat ([gary.marsat@elf.mcgill.ca](mailto:gary.marsat@elf.mcgill.ca))

Faculty of Medicine, University of Ottawa, Ottawa, ON, Canada

### Of crickets and electric fishes

I would like to start with a sentence we came across at this year's ICN during the presentation in homage to Ted Bullock: "Thinking, like virtue, is its own reward". I think many scientists can relate to that; at least I do. As a kid I enjoyed trying to understand my environment, taking apart clocks and telephones, to the great dismay of my parents, or raising snail colonies during summer vacations to touch their eyes, and see them retract less and less as habituation set in. In high school, biology classes gave me a subject of endless complexity, ensuring that I would never get bored studying it: the nervous system. There are many ways to tackle the problem of understanding how the nervous system works and



produces such complex outputs as human behavior. I became most interested in describing how specific neurons transform the signal traveling along a pathway and how they influence other parts of the circuit. Dr. Gerald S. Pollack's research provided ideal opportunities to study this: a relatively "simple" organism -crickets-, rigorous analytical tools, and behaviorally relevant questions.

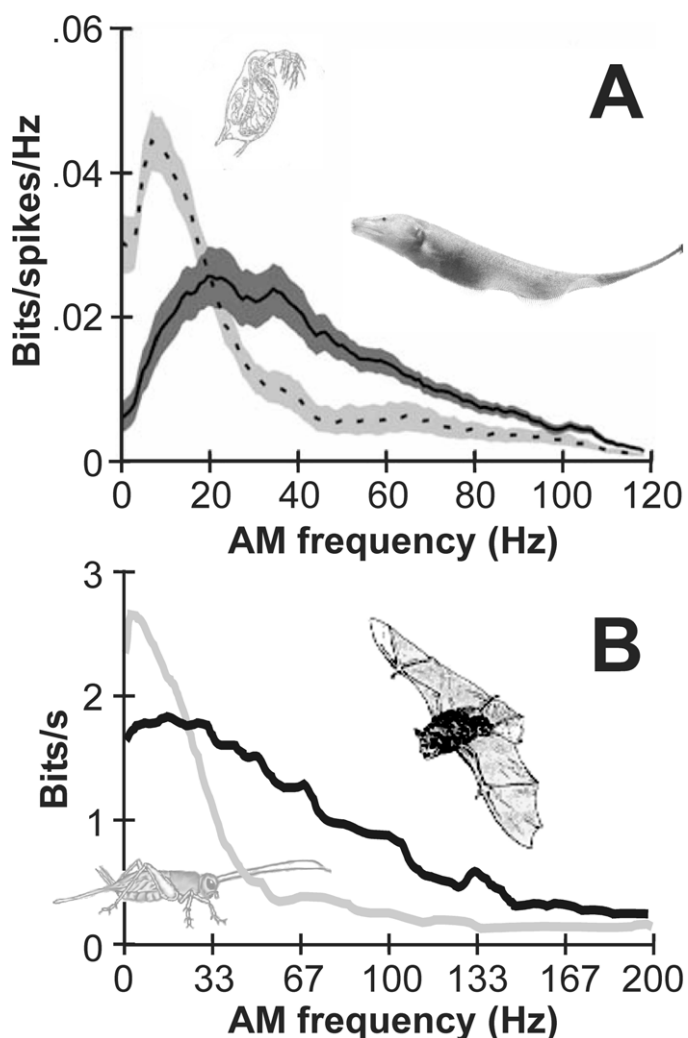
Crickets use auditory signals mainly for two reasons: mate attraction and predator avoidance (i.e. ultrasound avoidance). These signals differ in carrier frequency and in temporal structure. In many sensory systems the properties of the neurons are optimally tuned to encode the structure of behaviorally relevant signals. In the case of crickets, the auditory interneurons are not only most sensitive to the carrier frequency of conspecific songs and bat calls, but we found that they also selectively encode the temporal patterns typical of these signals. Most interestingly, neurons that are involved in processing both types of sound (the ON1 neurons) change their temporal coding properties according to the carrier frequency of the signal, thus displaying a sort of "dual specialization".



Considering the sophisticated properties of these neurons we wondered if this dual specialization is really useful in processing auditory signals. The role of this neuron pair is to provide contralateral inhibition, thus enhancing bilateral contrast and sound localization cues. By independently controlling the sound at the two ears

we showed that the carrier-frequency-specific properties of ON1 are indeed important to maximize its inhibitory impact and therefore its role in bilateral contrast enhancement.

**Figure 1:** Comparison of the dual tuning properties of neurons in electric fish and cricket. **A.** In electric fish the sensory signal can come from a conspecific (black line) and affect receptors over the whole body, or from a prey such as a *Daphnia* (grey line) and affect receptors only on a small portion of the skin. We show here the accuracy with which pyramidal neurons of the centro-lateral segment of the electrosensory lateral line lobe encode the temporal structure of these signals. The data are courtesy of Drs. Chacron, Maler and Bastian; for original data see Chacron MJ, Maler L, Bastian, 2005. *J Neurosci* 25:5521-5532. **B.** Crickets must process conspecific songs which have low carrier frequencies (~4.5 kHz; grey line) and ultrasounds (30 kHz in this case; black line) such as the one produced by insectivorous bats. We show here how the ON1 neurons encode the temporal structure of sounds with these carrier frequencies. For the original data see Marsat G, Pollack GS, 2004. *J Neurophysiol* 92:939-948.



A major difference between the coding of ultrasound and conspecific songs is that ultrasound processing relies on a burst of action potentials whereas the neurons do not show the same bursting properties in response to sounds with conspecific carrier frequencies. Bursts of action potentials are a neural code observed in several sensory systems and organisms. Research on these systems has indicated that bursts signal the occurrence

of specific features of the stimulus. It has been hypothesized that bursts encode behaviorally relevant portions of the stimulus. Our experiments combining neural and behavioral recordings indicate that, in crickets, bursting neurons also function as feature detectors and that the bursts, and only the bursts, trigger behavioral responses.

Along with these years studying auditory processing in crickets I had the privilege to find myself in very stimulating environments: McGill University, the Marine Biological Laboratory in Woods Hole, and of course the Neuroethological community (to name but three). Environments such as these are very important to place our own research in more general context, but it also helps us to get new ideas or to use old ideas in new contexts. For example, some of my experiments on bursting were partly inspired by experiments on electric fish. In fact, the two systems have surprising similarities: some pyramidal neurons of the electric fish also switch their coding properties according to the signal's origin (conspecific or prey in this case, see Figure 1) and they also produce burst in specific contexts. Bursts are used by both systems to signal the occurrence of unexpected transient signals that the animal has to respond to quickly: a prey for electric fish and a predator for crickets. Bursts are an ideal neural code for this purpose because they transmit, in a short time, a clear indication that an event happened. The fact that these two widely different organisms used similar strategies to solve similar problems pushes me to continue seeking general principles underlying nervous systems and, as you might have guessed, I traded my crickets for electric fishes.



## Dr. Luke Remage-Healey

**Luke Remage-Healey** ([healey@ucla.edu](mailto:healey@ucla.edu))

Life Sciences Bldg, University of California, Los Angeles, CA, USA

I knew that research biology was the thing for me soon after I got sprayed by a skunk. I was a bright-eyed undergrad trying to decide between science, music, and Sam Adams as career paths when I luckily fell into the capable hands of Michael Romero. He was an upstart professor at Tufts, and we began working on daily and seasonal hormone rhythms in birds. One morning, I woke up to collect samples at 4:00am when I spooked a family of skunks, and one of them managed to 'get' me. This apparently was a profound event, since I realized that I sincerely wanted to pull it together and collect my data. Working closely with Michael showed me how cool neuroendocrinology was, even in the face of smelly, urban fauna.

For my graduate study I was fortunate to join the lab of Andy Bass, and I began working on sound production in fishes. Together, we discovered that the vocal control circuit in toadfishes is modulated acutely by circulating steroid hormones, indicating that steroids can act as neuromodulators. I was also granted the freedom to design and conduct field experiments with toadfish,

showing that some of these same rapid steroid mechanisms are at work in the fish's natural social-environment. Snorkeling in shark-infested waters (not really, just waters) while conducting playback experiments showed me how just how far from the benchtop studying neuroethology could take me. The culmination of my doctoral experience was at my defense party, when Andy and his energetic wife Midge showed my entire family how we could explore the howling depths of karaoke.



After a lifetime of longing to learn how to surf, I joined Barney Schlinger's lab at UCLA. In the research part of my post-doc, I am again working on birds, but continuing to build on ideas I developed in my Ph.D. Barney is a formidable expert on birds, brain-derived steroids, and the Texas two-step. With his unique expertise, I have pioneered an *in vivo* microdialysis system to monitor changes in neurosteroid levels in awake, freely-interacting songbirds. It has been intellectually rewarding to watch some of my wildest research dreams come to light in my postdoc, and I can't wait to see what is around the next corner. Provided, of course, that it's not another family of skunks.

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## A PROPOSED FUND TO SUPPORT NEUROETHOLOGY PROGRAMS AT UNIVERSITIES IN EMERGING COUNTRIES

**Willi Honegger** ([h.willi.honegger@vanderbilt.edu](mailto:h.willi.honegger@vanderbilt.edu))

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**Karen Mesce** ([mesce001@umn.edu](mailto:mesce001@umn.edu))

Dept. Entomology, University of Minnesota, Saint Paul MN, USA

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Dept. Biological Science, Wellesley College, Wellesley MA, USA

**Albert Feng** ([afeng1@uiuc.edu](mailto:afeng1@uiuc.edu))

Beckman Institute, University of Illinois, Urbana IL, USA

Dear friends and colleagues:

We recently called your attention by a bulk email to the Special Fund Drive for establishing research support to

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enable investigators/students to conduct research in neuroethology in emerging countries. We deeply appreciate the generosity of those (especially students) who have responded to our call and committed to this Drive thus far. By printing this second circular in the Newsletter we hope that those who have been too busy with their obligations would find out about this Drive and listen to the call in your heart. There is nothing grander than helping our colleagues and friends in the third world to pursue research in neuroethology. We hope that you share our belief and pledge support by sending us a response about whether you would be willing to contribute to such a fund and how much you would be willing to provide each year. Every Dollar Matters. We are posting our original letter again, below, along with an inspiring response to our original letter from a colleague from Argentina.

Thank you in advance.

Very truly yours,

Willi Honegger, Karen Mesce, Barb Beltz, Albert Feng



The response reads: I am a senior research associate at the Hildebrand lab (Tucson, AZ, USA), planning to return to a small University in my home country, Argentina. I am absolutely thrilled by the idea!! In my opinion, one of the most important aspects of the plan is the donation of outdated equipment. I was thinking that maybe the donation could be a kind of "friendly loan" instead of a "gift". The donation should help the recipient produce data to then apply for grants. If the recipient gets a reasonable grant as a result of the donation then she/he should pass the donated equipment on to another group (after ISN approval). Donations may have a greater impact if that would be possible. I can pledge a donation of \$15 (sorry I can't pledge more, soon my family will be on a third-world salary).



The original circular read: At the 2007 International Congress of Neuroethology in Vancouver, which was a splendid success and a wonderful meeting, many of you saw and talked with Winfried Wojtenek who holds a faculty position at the San Francisco University in Quito, Ecuador. As you may recall from the business meeting, Winfried offered Quito as the next location for the Congress in 2010. It became evident to several of us that Winfried's efforts to establish a Neuroscience/Neuroethology program at his home university has been fraught with a number of hurdles. For example, he has had limited access to basic equipment used to study the nervous system, e.g. no oscilloscopes, amplifiers, and recorders; he uses old computers and his students have few textbooks. Travel funds for him to attend meetings have come from his own pocket, that is if he does not find a generous benefactor like the ISN, which plans to pay part of his expenses for the Vancouver meeting. Dr. Wojtenek, however, continues to attempt to build a program in Neuroethology, and has been able to

attract several foreign speakers to visit Quito, for example John Nichols who taught his students for a week.

We are writing to you now because Winfried's plight is mirrored by many others at universities in emerging countries. A number of us have heard complaints from our less fortunate colleagues that there is a lack of money for neuroscience-related programs at their home institution, and sometimes corruption at the administrative level results in the neglect of highly motivated and smart young students; they simply do not have the educational opportunities that their more fortunate peers have in developed countries.

At the meeting in Vancouver, several of us discussed that one vital mission of the ISN would be to set up a fund to support deserving Neuroethology Programs at universities in emerging countries. This would require that as many as possible members of the Society pledge a sizable amount of money each year for the next three years. However, any donation will be welcome. What we would like to see is a high percentage of members behind this program, even if it's with only a few dollars behind their name. The success (or failure) of such a fund would be evaluated and discussed at the next meeting in Spain, with the option to continue this fund or not. We are asking you to send us a response about whether you would be willing to contribute to such a fund and how much you would be willing to provide each year (payment would be when ISN dues are paid). In our opinion, a start-up sum of \$10,000 would be sufficient to serve the basic needs of some of our colleagues. The collected money could be deposited in a Savings Account drawing 5% interest. Funds would be dispersed on a competitive basis and over the course of the 3-year period.

Here is what we think the fund may look like:

The fund should be open for all Neuroethology programs in emerging countries. The fund could pay for shipping expenses to send used equipment to groups who are in need. We discussed in Vancouver that many of us have outdated but still functional equipment in our cabinets that we would love to donate. It is now possible to send used equipment (e.g. an oscilloscope) by FEDEX and equipment may be advertised in the ISN letters for groups in need. The fund could support visits by outside speakers who engage in teaching exercises with students in the respective Universities. The fund could also support the travel expenses of PIs involved in Neuroethology Programs if they present information about their research or teaching efforts at their meeting sites. It should also provide money for students to participate at international meetings. The fund could pay for teaching support, including textbooks for classes, CDs or new software programs.

The potential applicant would be judged by a small proposal submitted to the ISN Council and, perhaps, an Award Committee within the Council. The proposal must outline the reason for support and the requested sum.



If you support this initiative, please email us by Mid-October and let us know whether (and if yes, how much) you would be willing to contribute to such a fund - this is not binding, but would provide us an estimate of what we may be able to collect. Please also send us your suggestions about how to improve our plan.

The authors will respond to all the letters in a general statement in the next issue of the Newsletter.

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## **GORDON CONFERENCE ON Genes & Behavior**

**Il Ciocco, Barga, Italy. February  
24-29, 2008**

**Catherine Rankin**

([crankin@psych.ubc.ca](mailto:crankin@psych.ubc.ca)) Brain Research Centre & Department of Psychology, University of British Columbia, Vancouver, Canada

The 2008 Third Genes and Behavior Gordon Research Conference will be held during the week of February 24-29, 2008 in Il Ciocco, Barga, in the beautiful region of Tuscany, Italy. The meeting is being organized by Marla Solowski and David Clayton and promises to be a wonderful experience. Please see the conference website for further information:

<http://www.grc.org/programs.aspx?year=2008&program=genes>

On the website the organizers describe the motivation for the meeting as follows: "Behavioral biology is vibrant and productive but is a fragmented discipline. In one arena, a handful of laboratory-based behaviors and a few model organisms dominate the field of molecular neuroscience and behavioral genetics. In another arena, behavioral ecology focuses on naturally occurring behavior and how it evolves, but pays little attention to the underlying neural and genetic substrates. While it is important that these individual specialties continue to be pursued with vigor, we believe that a deeper understanding of the relationship between genes and behavior will require an active integration of both approaches and perspectives. In the third conference our diverse sets of genetic, molecular, genomic, neurobiological, evolutionary and ecological interests and approaches will merge on the theme of the behavioral phenotype."

The meeting agenda is on the website and you will see many neuroethologists among the list as presenters, discussants and organizers. Check your calendars and see if you can find the time to join us in Italy for this unique meeting! Application deadline is February 3rd and there are still spots open!



## **NEURAL SYSTEMS & BEHAVIOR Course, Marine Biological Laboratory, Woods Hole, USA. June 14 - August 10, 2008**

An intensive eight-week laboratory and lecture course focusing on the neural basis of behavior, from the cellular and synaptic levels to the analysis of complex systems. Intended for graduate students, postdoctoral students, and independent investigators who wish to gain a broad perspective on neural systems and how they produce behavior.

<[http://www.mbl.edu/education/courses/summer/course\\_neural\\_sys.html](http://www.mbl.edu/education/courses/summer/course_neural_sys.html)>

Directors: Paul Katz, Georgia State University and James Knierim, University of Texas Medical School at Houston, USA.

Carol Hamel  
Admissions Coordinator  
Office of Education  
Marine Biological Laboratory  
7 MBL Street  
Woods Hole MA 02543-1015  
508-289-7401 phone  
508-289-7931 fax

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## **Positions Available**

### **Appointment in Evolutionary Ecology at Purdue University**

The Department of Biological Sciences, Purdue University, West Lafayette, IN, USA, invites applications for a tenure-track faculty position in **Evolutionary Ecology**. We seek candidates whose research integrates the fields of ecology and evolution with those of neuroscience, developmental biology, physiology, or comparative genomics. This will be an academic-year appointment at the Assistant Professor level; however, appointment at a higher rank will be considered for qualified applicants. The applicant must have a Ph.D. or equivalent; post-doctoral experience strongly preferred. A well-funded research program and commitment to excellence in teaching is expected. Applications must be submitted **e l e c t r o n i c a l l y** at (<<https://hiring.science.purdue.edu/hiring/login>> <https://hiring.science.purdue.edu/hiring/login>) and should include a *curriculum vitae*, names and addresses of three referees, summary of the candidate's research interests, and a one-page teaching statement. Inquiries should be directed to Prof. Jeffrey Lucas ([jlucas@purdue.edu](mailto:jlucas@purdue.edu)). Review of applications will begin on October 15, 2007, and will continue until a suitable pool of applicants has been identified.

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### **Tenure-track faculty position in Neuroscience, University of Central Arkansas**

The Department of Biology at the University of Central Arkansas invites applications for a tenure-track faculty position in the area of Neuroscience, with preference given to candidates working in neurophysiology. The appointment will be at the Assistant Professor level and will begin on August 15, 2008. Applications are sought from outstanding individuals who value quality teaching and are dedicated to developing an active neuroscience research program involving both undergraduate and Master's level students. The position offers a reduced teaching load initially, dedicated research space, start-up funding, and opportunities for internal as well as external grants.

Teaching responsibilities will include contributions to our freshman and core curriculum along with opportunities to develop additional upper-division and graduate courses that will augment our current programs. Existing courses to be taught include Introduction to Neuroscience (for health science students) and Experimental Neurobiology. Please visit our web site for more details <http://www.uca.edu/biology/>.

The Department of Biology at the University of Central Arkansas has 30 full-time faculty, approximately 625 undergraduate majors and a growing Master's program that currently enrolls 25 graduate students. Shared research space and instrumentation include approved animal facilities, a real-time PCR machine, and modern SEM and confocal microscopes.

Submit cover letter, *curriculum vitae*, statement of teaching philosophy, an outline of research plans indicating where students may participate, and the names and contact information for three references to: Dr. Steven Runge, Department of Biology, University of Central Arkansas, Conway, AR 72035-5003. Ph.D. required. Recent Ph.D.s are encouraged to apply. Review of applications will begin on November 19, 2007 and continue until the position is filled. UCA is an Equal Opportunity/Affirmative Action Employer.

### **Tenure-track position in the Evolution of Complex Phenotypes**

Tenure-track faculty position available in the School of Biological Sciences, University of Nebraska, USA, at ASSISTANT PROFESSOR level, for a person conducting integrative, functional studies on the evolution of complex phenotypes. Research focus should be primarily experimental, although a theoretical component would be welcome. Research on any taxon and level of biological organization, using any approaches. Examples include, but are not limited to, molecular, quantitative-genetic, endocrine, biochemical neurophysiological, and/or systems/genomic approaches to metabolic or cell signaling networks, interactions among cells or organs, or systemic regulators that underlie intraspecific variation in developmental, biochemical, behavioral, or life-history

components of complex phenotypes. This position is part of a developing research cluster in integrative and systems biology at the University of Nebraska. The successful candidate will also be involved in undergraduate and graduate teaching in area of expertise. Applications will be considered until November 5, 2007, or until a suitable candidate is found. A Ph.D. in the life sciences is required and postdoctoral experience is preferred.

Start date January 2009; the position will remain open until a suitable candidate is selected.

To apply, log on to website: <http://employment.unl.edu/> requisition #070765, and complete the faculty/administrative information form and attach *curriculum vitae*; cover letter; statement of research interests and teaching interests and philosophy; representative publications; and names, addresses, and telephone numbers of three references. Arrange for three letters of reference to be sent by November 5, 2007, to: Dr. Alan Kamil, School of Biological Sciences, University of Nebraska-Lincoln, 348 Manter Hall, Lincoln, NE 68588-0118, USA.

This advertisement is as seen in the 28 September issue of *Science*. For questions contact Tony Zera ([azera1@unl.edu](mailto:azera1@unl.edu)) or Larry Harshman ([lharsh@unlserve.unl.edu](mailto:lharsh@unlserve.unl.edu)).

### **Brandeis University -- Postdoctoral Positions in Fly Behavior/Physiology**

Postdoctoral positions are available in the Lab of Leslie Griffith at Brandeis University, USA (<http://www.bio.brandeis.edu/griffithlab/>). The Griffith lab studies the neural and biochemical basis of learning and memory in *Drosophila melanogaster*. The lab works at three different levels: organismal (behavior, genetics); cellular (electrophysiology); and biochemical (CaMKII regulation and substrate phosphorylation). Applicants with experience in any of these areas are encouraged to apply.

Interested applicants should send a CV and the names of three references via email attachment to [griffith@brandeis.edu](mailto:griffith@brandeis.edu).

Leslie C. Griffith, MD PhD  
Professor, Dept. of Biology, MS008  
Brandeis University  
415 South St., Waltham, MA 02454-9110  
tel 781 736 3125  
FAX 781 736 3107  
[griffith@brandeis.edu](mailto:griffith@brandeis.edu)

### **University of Calgary, Canada -- PhD studentship / Post Doctoral position in Evolution of Respiratory Rhythm Generators in Lower Vertebrates**

Applications are invited for positions in a well-funded, innovative laboratory studying the neuronal control of breathing. Our work spans from genes to systems and includes comparative, transgenic and translational ap-

proaches. Using a novel technique to quickly located rhombomeres containing neuronal oscillators controlling ventilation, we seek team members to embark on an ambitious project to map the evolution of the respiratory rhythm generator from fish to mammals.

The laboratory is situated within the HBI, one of North America's leading Neuroscience Institutes, consisting of over 110 faculty members. Calgary is Canada's fastest growing city with a population of over 1 million. At the foot of the Canadian Rockies, it offers a lively and safe urban environment with easy access to a pristine wilderness wonderland.

Applicants must have excellent communication skills, be highly motivated and have a strong desire to do respiratory neuroscience research. Electrophysiologists and molecular biologists are particularly encouraged to apply.

While funding is available, applicants should have an academic record suitable to obtain external funding. Some relocations costs will be provided. To apply, please contact: Dr. Richard J.A. Wilson. E-mail: wilsonr@ucalgary.ca <http://www.ucalgary.ca/~wilsonr/>



## Material for Future ISN Newsletters

The Editor would welcome, indeed wholly depends upon, material for future newsletters to fill the various sections of each issue. Reference to past issues will reveal the scope and style of contributions, the breadth of their variation and the depth of their originality. Material is solicited for meetings, courses, and job opportunities which might include some aspect of neuroethology and therefore be of interest to readers of the Newsletter. Advertisements for positions (faculty or trainees) should generally aim to be not longer than 200 words, or 300 words for multiple jobs advertised in a single submission.

Announcements of new books (copyright 2007 or 2008) *written or edited by ISN members* should include the full citation information (including ISBN) *plus* a 40-50 word description of the book. (Note that books containing chapters contributed by an ISN member are not appropriate for inclusion.) We also welcome announcements of awards to ISN members, and of courses and future meetings, reports on recent meetings, discussions of research areas or topics of interest to neuroethologists, laboratory profiles, and editorials. We also regretfully publish occasional obituaries and memorials. Word limits depend on the type of article.

Material should be submitted no earlier than one month before the next issue (in this case, March, 2008). Have an idea for an article that you or someone else would write? Contact the Secretary prior to submission to determine the length and suitability of material to be submitted. For those who may feel their particular interest (research field, geographical region, chromosomal complement, age group, whether to dress to the left or right, etc) has been under-represented in past Newsletters, please see this as both an invitation and challenge to offset the perceived lack of representation. Remember: the Newsletter represents us all, but an empty Newsletter represents nobody, or worse still, may actually represent nothing. All material must be submitted electronically, preferably as an attached file to an e-mail prepared in MS Word and sent to Kati Gothard, at [kgothard@email.arizona.edu](mailto:kgothard@email.arizona.edu)



## Add our Link to Your Website!

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



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