



# International Society for Neuroethology

Newsletter  
November 2009

**International Society for Neuroethology**  
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**Next ISN Congress:** Salamanca, Spain, 4-7 August 2010. Local organizer: Alberto Ferrús, Instituto Cajal, C.S.I.C., Avenida Dr. Arce 37, E-28002 Madrid, Spain. Tel: +34-1-585-4739; Fax: +34-1-585-4754; [aferrus@cajal.csic.es](mailto:aferrus@cajal.csic.es)

## THIS ISSUE INCLUDES

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## The International Congress of Neuroethology is Moving to a Two Year Rotation

### Paul Katz ([pkatz@gsu.edu](mailto:pkatz@gsu.edu))

President-Elect of the Society for Neuroethology  
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We are all excited about the upcoming International Congress of Neuroethology, which will be held in Salamanca, Spain in August 2010. Members of the International Society for Neuroscience have repeatedly stated that the Congress is their favorite conference. It is viewed as the most important product of the Society. In the past, the Congress has been held only once every three years. There are a number of problems that have been identified with this interval, which I will detail below.

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To remedy those problems, the Executive Committee of the Society decided to move to a two year rotation. We will meet every even numbered year starting with Salamanca in 2010. The 2012 the Congress will be held in College Park, Maryland. We are now soliciting proposals for the 2014 Congress.

Holding the Congress just every three years had a number of unwanted side effects. It limited the accessibility of the Congress; if the Congress was held on one continent, it would be a minimum another 6 years before it would back on that continent. This hindered the ability of students with restricted resources to attend. Furthermore, it severely hampered our ability to hold the Congress outside of North America and Europe where there are fewer members. By holding the Congress more often, we hope that we can bring the conference to more places and thus increase the participation in the Society.

The Executive Committee concluded that it was important for our coherence as an organization to meet more than once every three years. Because this is the major event sponsored by the ISN, annual membership in the Society fluctuates in a three year cycle, falling off dramatically in non-Congress years. This suggests that the reason people renew their membership is because of the Congress. To stabilize the membership numbers, we have instituted a new dues policy whereby it is less expensive to join for two years at a time.

A side effect of holding the meeting every two years instead of every three years is that according to our bylaws, we need to hold elections for officers and councilors in meeting years. The Executive Committee decided that Secretary, Treasurer, and Council members should be eligible for re-election in order to maintain continuity. However, the President should be limited to a single term in office. This still means that the President serves for six years on the Executive Committee (two years as President-Elect, two years as President, and two more years as Past-President). Shortening the term for President is viewed as a positive feature because it will involve more people in the running of the ISN.

Concern has been expressed that the meeting might be smaller if we hold it every other year or that we won't be able to find hosts. I expect that the opposite will prove to be true. Two people have already contacted me about potentially hosting the next Congress. Furthermore, smaller societies such as The Society for Behavioral Neuroscience hold their meetings every other year and have a loyal following. I think it's important that we increase our sense of having a closely knit Society by increasing the frequency with which we come together face-to-face.

Because of the urgency of planning the 2012 meeting, the Executive Committee approved a proposal by Art Popper to host the Congress in College Park Maryland. The reservations for the facilities have already been made. Art will give a brief presentation about the site during the business meeting in Salamanca.

We are now ready to solicit proposals for the 2014 International Congress of Neuroethology. Please keep in mind that the conference generally attracts between 500 and 700 people. Therefore, one basic requirement is that there be a lecture hall large enough to accommodate this many people. If you are interested in hosting the Congress, please put together a proposal and send it to me ([pkatz@gsu.edu](mailto:pkatz@gsu.edu)) for pre-approval. Proposals should include the following information:

- Host information
  - Name and contact information of host
  - List of faculty, students and staff who will work as local organizing committee
  - Availability of local support from home institution, local sources, government sources (Note that the Program committee will be responsible for writing grants, but if there is local support available to offset costs, this is very helpful)
  - An estimate of registration fees (if possible)
- Proposed Dates for Congress (give a number of choices if possible)
- Meeting Venue information. This can include the following if available:
  - Location
  - Rooms available with seating
  - Poster room locations
  - Facilities for meals
  - Off-site availability of food
  - Internet services
  - Projection services
  - Childcare services
- Housing information. This can include the following if available:
  - Estimate of the number of rooms/beds for students and/or faculty at the meeting site, if limited
  - List of local hotels
  - Approximate cost of housing
  - Location relative to meeting site
- Transportation information
  - Current airline prices from: New York, Los Angeles, Chicago, Atlanta, London, Berlin, Tokyo, Sydney, Buenos Aires (this is just to compare relative costs – Do a Travelocity Search)
  - Cost of transportation from nearest international airport to meeting site
  - Transportation at meeting site (if applicable)
- Local attractions and/or possible day trips.

If your university or local convention center regularly hosts meetings of this size, then there may be a professional conference organizer who can assist you in gathering this information. The deadline for submitting the proposal is June 15, 2010.

Prospective hosts who receive pre-approval will give a 10-minute presentation at the Salamanca Congress in August detailing the advantages of their venue. The decision about

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where to hold the 2014 Congress will not be made by the attendees at the 2012 Congress because that will bias the result against those who could not attend. So, we will take an on-line poll after the Congress. The proposals will be available for everyone to see. After the selection of the site is made, the Executive committee will appoint two program chairs who will assemble a program committee to determine the content of the Congress.

With these changes, we are looking forward to a more vibrant and active Society. Thank you for your continued support.

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## The Optic Tectum: A Model Neural System for Comparative Neuroethology

**Rebecca G. Markham** ([rmarkham@mail.utexas.edu](mailto:rmarkham@mail.utexas.edu))

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Neuroethology is the scientific investigation of how brain participates in the ongoing interaction between organism and natural environment. Because space is part and parcel of the natural environment, spatial orientation and navigation are inherently neuroethological topics. Multimodal (both multisensory and sensorimotor) spatial maps are exquisitely represented in different ways, in multiple brain regions with different functions for different organisms. A wonderful case of a highly conserved spatial brain region possessing organization that readily elucidates the morphological constraints of the organism, along with the type of environment in which it conducts its daily (or nightly) business is the superior colliculus in mammals, or in all other species, the optic tectum. I will use the latter term, because it is the most commonly used across species.

Generally speaking, the optic tectum is responsible for object detection, orientation, and goal-oriented motion in three-dimensional (3D) space. In primates this customarily translates into the coordinated movement of the eyes and head toward an object. Other species-specific examples illustrate the neuroethological splendor of the optic tectum. Megabats tend to eat fruit or flower nectar, requiring a developed visual system for proper plant detection, and have a strongly developed visual region in the optic tectum. In contrast, microbats like to eat moths at night, and emit broad field ultrasonic vocalizations to detect moth wing beats as rhythmic modulations in the vocal echo. Not surprisingly, microbat tectal function is mostly auditory, and tectal microstimulation elicits aural orienting movements, such as directional changes in the head and pinnae (Valentine, Sinha, & Moss, 2002). What is remarkable about microbat tectal stimulation is not the elicitation of directional changes, as they are demonstrated in other animals.

Rather, it is the unusual elicitation of vocalizations. Here, vocal behavior in this particular animal group is co-opted into a brain area responsible for spatial detection, rather than remaining restricted to neural regions specific to vocal communication.

Sharks also show promise for unearthing unique tectum-relevant neuroethological features. For many organisms, tectal and forebrain size are inversely related. Teleosts have a relatively small forebrain, and a decent tectum; for dolphins and primates, the telencephalon is quite large and complex, and the tectum is insignificant. Some sharks are unique in that both tectum and telencephalon are small in relation to whole brain size. Is this owed to their heavier reliance on non-directional odor plume gradients (Gardiner & Atema, 2007), in conjunction with more dependence on electrical rather than visual multisensory spatial cues for foraging? Perhaps these sharks spend less time chasing dexterous fishes around, and more time preying upon slower, wounded animals, or filter feeding. All told, it may be that for sharks, using multiple spatial sensory cues to pinpoint and persistently update the location of prey is a low priority.

Speculative musings aside, it seems a relatively regular finding that larger tecta confer acumen in detecting and updating object location in three-dimensional space from a range of distances, using multisensory spatial cues. The barn owl and chicken possess voluminous tecta relative to whole brain, and these animals show remarkable dexterity in either soaring through mid-air to capture moving prey (Bergan et al., 2005), or plucking moving prey out of mid-air. Both behaviors require a quickly updating high-resolution map of 3D space to compensate for simultaneous movement of prey and predator. By comparison, parakeets have a smaller tectum, and eat only fruit and seeds. Here, one might suspect the parakeet is less spatial. It is more probable, however, that the parakeet's larger forebrain compensates for some tectal function, similar to that observed in some other altricial species, e.g., primate ocular vergence. This notion is further supported (albeit tentatively) by a consideration of quail and pigeon tectal size and function, and foraging behavior. Like parakeets, pigeons and quail aren't known prey catchers, yet their tectum-whole brain size ratio resembles that of the chicken. Pigeons do use their tecta to assess the closeness of looming objects for collision avoidance (Wu et al., 2005). Similarly, quail are deft fliers in dense brush to avoid predation, and when flying in their natural ecology show split-second collision avoidance behaviors. As avid fliers, parakeets probably avoid collisions like pigeons and quail; yet parakeets solve the problem in a different neurodevelopmental manner (Striedter & Charvet, 2008). Although, healthy skepticism does raise the question of whether researchers have asked parakeets, pigeons, and quail to catch moving prey.

It is clear that there is much known about the optic tectum from a neuroethological perspective, yet questions remain. Further comparative work with animals possessing unique morphological characteristics in unusual ecological niches, such as the potentially less spatial shark and the echolocating

dolphin, will further our understanding of this remarkable brain region. The chameleon is another candidate organism for more detailed neuroethological analysis of the tectum, as it can move each eye completely independently, thusly allowing it to choose to engage in monocular or binocular vision on a whim – two forms of vision that also affect tectal organization and function.

Further neural system integration is also necessary for a thorough grasp of how animals grapple with space. The optic tectum is not the only brain area responsible for spatial orientation and navigation. The hippocampus plays a substantial role in these behaviors as well. Few studies directly address this issue (but see Cooper, Miya, & Mizumori, 1998). Whereas the tectum is responsible for detection and goal-directed behavior in a Cartesian coordinate system, grid cells in the parahippocampal medial entorhinal cortex topographically represent spatial *recognition* in a 3D hexagonal map. How does the tectal multimodal space map coordinate with that of the hippocampus? In mammals, it is likely that secondary sensory and association cortices mediate observed and expected spatial inputs between tectum and hippocampus, respectively. How this might be accomplished across time – in more or less familiar environments – would be a noteworthy experimental pursuit, especially in light of the extensive existing knowledge about the two separate neural systems.



Photo of Ruby, pet chicken of the author. Ruby regularly demonstrates untrained eye-beak coordination when catching flying moths and fireflies.

Photo of Ruby, pet chicken of the author. Ruby regularly demonstrates untrained eye-beak coordination when catching flying moths and fireflies.

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## Extract from Memoirs

**Adrian Horridge** ([horridge@netspeed.com.au](mailto:horridge@netspeed.com.au))

Emeritus Professor  
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When I graduated in Cambridge in 1949, an offer of a PhD studentship arrived. This would support me for three years to do research on a topic of my own choice. When I turned up at the lab, not knowing exactly what to expect, I went to the chief technician's office and was given a key to a room on the second floor – and that's all I got. The room was quite empty.

As a research student in Cambridge in those days, if you showed the inclination to do so, you stood on your own feet, then you walked or preferably ran. I was well prepared by the closure of my school in wartime, but it was a complete contrast from the process of stuffing undergraduates with facts. You found your own topic yourself, and somebody who would nominally supervise you, then searched the literature. Self initiative and self reliance was the key to success, and one had to pay one's own travel and small expenses out of a small student grant. You had to collect your apparatus, which you either built yourself or scrounged from somebody who had just finished, or some other member of staff who had got some stuff in his cupboard, and you collected things from the chemical cupboards in the corridor, the workshop and the electronics workshop. So, having assembled everything you thought you needed, you might start some experiments. This arrangement suited my skills and work habits.

I had no decided topic and hoped to find a novel winner, so I went down to the Plymouth laboratory of the Marine Biological Association of Great Britain, which in those days was an independent body that was funded by the government. I had noticed the possibilities of this place while on a two-week class in Marine Biology during 2<sup>nd</sup> year. This laboratory had two good-sized ships with which it explored the western fringes of Europe, the Atlantic Shelf and the English Channel, kept an eye on fisheries and ocean productivity, and supplied marine animals to the universities. The great advantage was that the lab was filled with enthusiastic and experienced researchers on interesting animals, and they were willing to talk shop all day.

I simply walked in and said I hoped to stay a while. Freddie Russell, the Director allowed me to work there, supposedly on the Cambridge University table. He advised me to stay at the Geakery. This was a large old house on the edge of Plymouth Hoe, close to the laboratory. It was owned by Miss Geake, the daughter of a naval Captain, long gone, who ran her establishment with the help of two other spinsters. Meals were plain and very prompt. There was porridge for breakfast and sausages with potatoes for supper. The ancient bath was made of mahogany, with a heavy lid to keep the water warm. For the first two nights when I arrived the house was full, so I shared a large double bed with a New Zealander, John Morton, later professor of Zoology at Auckland. The house was cold and John wore long red flannel pants under his pyjamas and trousers, a practice he said was common to all Kiwi students. In the laboratory I discovered that in the 1920s, Berrill, a Canadian zoologist, had studied the regeneration of the head of a marine worm, *Sabella*, until the whole worm eventually came back to normal. He left behind a bottle full of partially regenerated tube worms. I thought that if I could look at the problem again, using electrophysiological techniques, I could follow the process of regeneration of the nervous system.



In the marine laboratory there was a Polish professor, J. S. Alexandrowicz, who had been Dean of the Medical School of Lwów, then during the war had fought with the Polish army,

joined the Russian Medical Core, escaped through Iran, and then been landed in England, but was unable to return home. With Zawarzin, Orlov, Zachwilichowski and many others, he came from a strong Slavic school that worked with methylene blue, and in 1932 had published a classical study of the neuron innervation of the crab heart, which was exploited for micro-electrode recording by Ted Bullock and Hagiwara after the war. Carl Pantin had found Alex a job as a gardener in Cambridge, then a place was found for him to continue his pre-war work in Plymouth, where he produced a remarkable series of papers on neurons in various invertebrates, mainly crustaceans. I owe him a great debt.

When I arrived, he was staining – with methylene blue and other rather nice methods – the structure of the stretch receptors of the crustaceans. Methylene blue staining is very much an art, with lots of tricks in the technique. He taught me very well how to handle the staining of neurons in invertebrate animals, with crabs, *Squilla*, polychaetes and starfish, and showed me the literature in the extensive library. The first essential for picking a research problem was to know the literature so well that the gaps were obvious. Most of the best literature was in German, which I read but never learned to speak properly. Unfortunately, not a single neuron in *Sabella* would stain with methylene blue.

Back in Cambridge, I happened to go on my motorbike to explore the lagoons at Brancaster Staithe, on the Norfolk coast, and by chance collected some of the jellyfish *Aurelia*. (Lord) Victor Rothschild had just purchased some fancy new microscopes out of his own private money, so back in the zoology lab I was able to use a phase-contrast microscope for the first time to look at transparent jellyfish tissue. The large nerve fibres of jellyfish are completely transparent but stand out clearly in the living state under phase contrast. A very lucky break, I thought, and decided to try to record from them. That was how I became an electrophysiologist.

The neurons grow as the jellyfish grows, so large specimens had to be found. One difficulty was that jellyfish are seasonal and difficult to transport. I quickly checked the literature, discovering that nothing much had been done on jellyfish nerves since Romanes' great work in 1876, and a few studies by Emil Bozler, working at Naples before he had to flee from the Nazis to Columbus, Ohio. It was just a matter of grabbing the opportunity to work on large living neurons in a new preparation.

In those days the experiments had to be designed so that they were simple and cheap. I spent the whole of the next 12 months building electronic equipment and finally recorded from snails and worms that had some giant fibres. I first built a power pack, then a multivibrator stimulator, then a DC amplifier that gave me enormous trouble because it was totally unstable. I got hold of a radar oscilloscope, which had a blue screen and a fast time base that produced circles on the screen, but I changed the tube, time base and amplifiers inside, so I had a new oscilloscope with a slow time base and a green screen that gave a long fluorescence. I had help from several people in all this unfamiliar work. The Zoology lab had an excellent workshop with large machines and plenty of metal sheet, flats and rod. But more important, there was a workshop

assistant, Mr Groombridge, who would provide materials and show students how to use the tools, and there was a staff member, Raef Brown, who was full of encouragement and design ideas.

In the basement Raef had a heap of useful surplus wartime equipment to give away. There was also an electronics technician who made equipment for the staff, but not for students, who had to make their own with his advice. There was also a good physiology lab across the road – Hodgkin and his assistants – and I got lots of enthusiastic instruction from Willie Rushton about how to make microelectrodes. John Pringle let me copy details of his set-up, and I inherited a huge wooden camera from Pumphrey, who left in 1948.

I looked at lots of animals and recorded nerve impulses in snails, leeches and others that had accessible nerves. Once you've made all the equipment and discovered the little details of exactly how to do the experiments, you become more confident. One result was that later whenever my students had a problem in the lab I was able to solve it.

When spring came, all the equipment was taken on the train to Largs in Scotland and then by ferry to the marine laboratory at Millport on the Clyde. There I successfully recorded the nerve impulse from jellyfish and photographed the synapses in the living state. While there, I was able to show the results to James Gray and Victor Rothschild, who were in Millport for the sea urchin larvae and in Scotland for the salmon fishing. No doubt that is why I was awarded a research fellowship at St John's College in 1952, and so was assured of a scientific career.



Adrian Horridge's new book "What does the honeybee see?" is now online for free personal use.

The work is featured on the ANU EPress front page, at <http://epress.anu.edu.au/> but it also has a unique URL: [http://epress.anu.edu.au/honeybee\\_citation.html](http://epress.anu.edu.au/honeybee_citation.html) Printed copies can be ordered.

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## Neuroethology in Ecuador: the Establishment of a New Research Organization.

**Katherine Aldas Saltos, Winfried Wojtenek**

We thank the ISN for its support of Neuroethology and Neuroscience in Ecuador. We are in the process of developing a non-governmental organization in Ecuador called "Environmental Neuroscience". The primary goal of this organization

is to promote and support research in the tropics. One project sponsored by the new organization is research on the effects of phytochemicals derived from the tropical Solanacea family on the nervous system. We have been working on this project with two groups: students from the Engineering in Biotechnology program from the Escuela Politecnica del Ejercito (ESPE) and the Medical program from Universidad San Francisco de Quito (USFQ).



*Our experimental set up includes an aquarium with 7 l water. We adjusted the water conductivity around 2000 microsiemens, measured the temperature during experimentation by a thermometer with an electronic display. Eigenmannias EOD signals were amplified with Radio Shack mini amplifiers and recording done with CREATIVE, Panasonic audio devices. Changes of water temperature were established by a small kitchen cooking devices below the aquarium.*

The introduction of neuroscience in Ecuador was greatly aided by courses, talks and presentations by scientists like, Harold Zakond, John Nicholls, Jack Macmahon, Elaine del Bell, Walter Stühmer, Timothy de Voogdt and field excursions with Winfried Wojtenek, Tom Small, Alfredo Luna and Katherine Aldas Saltos. The students from ESPE developed individual projects that have produced many interesting results. The students received the best exposure possible to neuroethology from the most prominent scientists in the field and walked away with a clear understanding of the benefits of studying Neuroscience. Students from USFQ wrote projects and developed them related to pharmacology. As a result, one student from the ESPE participated in the International Brain Research Organization (IBRO) conference in Manaus, and a second student is writing his thesis on the effects of the Solanacea family compounds in Eigenmannia.



*Eigenmannia cf virescens were from a small stream in El Eno. This little village from the Ecuadorian Amazon basin provided a nice opportunity collecting Eigenmannias.*

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Building on this success, we will work further with Eigenmannia as a bio assay for environmental contaminants. Students of Engineering in Biotechnology will continue to study the effects of the secondary compounds from Ecuadorian plants on the behavior of weak electric fish.

The students will then look at the neuronal aspects behind the changes in behavior. Finally, we are looking for further funding opportunities and collaborators to continue our work in this biologically diverse country.

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## Heiligenberg Student Travel Awards 2010

**Daniel Tomsic ([tomsic@fbmc.fcen.uba.ar](mailto:tomsic@fbmc.fcen.uba.ar))**

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Travel Awards are available for students to attend the Ninth International Congress of Neuroethology in Salamanca, Spain in 2010. These awards will be up to \$700 to help pay costs of travel, registration and housing for the conference. Applicants must be registered graduate students at a university, and must plan on presenting their work at the conference. To be eligible for a Travel Award a student/post doc must be the first (presenting) author on an abstract and both the trainee and the mentor must be members of the International Society for Neuroethology. Priorities will be given to applicants who have demonstrated academic excellence and research potential as evidenced by the abstract of the work to be presented and the recommendation letters. Applicants with demonstrated financial needs also will be considered for these awards. Awards will be paid after the Congress. The application form is available on the ISN web site. The deadline for application for these Awards is March 31, 2010. The decisions on funding will be announced in April. Complete the application for the HSTA to attend the International Congress of Neuroethology 2010 on the ISN home page and email to Daniel Tomsic [tomsic@fbmc.fcen.uba.ar](mailto:tomsic@fbmc.fcen.uba.ar)

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## Neuroethology needs bloggers

**Zen Faulkes**

Department of Biology  
The University of Texas-Pan American  
<http://doctorzen.net>

A surprising number of people wonder, “Do jellyfish have brains?”

I know this because I wrote a post on jellyfish nervous systems in my blog. This was something that I would have

thought to be fairly esoteric, but it has turned out to be one of my more popular posts of the year.

“Why blog?” is a question that every blogger grapples with at some point. Academics are probably faster to ask and harder to convince that there’s a good answer. Scientists are notoriously busy, and work in systems that reward peer-reviewed publications, successful grants, and precious little else.

For me, blogging offers a chance to reach out to people, both in and out of science, in a way that academic publishing does not offer. I’ve been blogging since 2002, probably long before such things were fashionable, but I really only got serious about it in late 2007. It took time and effort to make regularly, worthwhile posts. Since January of this year, I’ve had almost 7,000 visitors, and the numbers are increasing.

In comparison, I have almost no idea of how many people are reading my academic articles. I expect that it’s much, much less. There are admittedly fewer of research articles than blog posts. Even so, the prospect of reaching people that those technical articles will never reach is an exciting one.

Neuroethology is not a huge field. Our discipline would benefit from having evangelists: people who try to reach and connect with people outside our field. Real scientists can provide a human face to the enterprise and maybe help dispel certain myths about scientists being aloof and disinterested in things outside their own narrow field of research.

I blog at: <http://neurodojo.blogspot.com>



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## Study Section Members Needed

**Paul Katz ([pkatz@gsu.edu](mailto:pkatz@gsu.edu))**

President-Elect of the Society for Neuroethology  
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NIH is looking for senior researchers to serve on study sections. It is important for the field of Neuroethology to have representation on NIH study sections. If you would like to volunteer to serve or if you know a senior experienced colleague who would be willing to volunteer, please send Paul Katz ([pkatz@gsu.edu](mailto:pkatz@gsu.edu)) the following information if you have it:

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Name  
Degree  
Title  
Institution  
Department  
Email Address  
Web Address  
Area of Expertise (key words)  
Study Section or IRG or Panel (if known)  
Recent Funding Source(s)

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## New Membership Dues:

To keep the membership from fluctuating (typically lapsing in non-congress years) and to provide an incentive to register for two years, the executive committee decided that the membership dues should be paid as follows:

Full membership: for two years: \$ 160,- ; annually: \$ 90,-  
Students: for two years: \$ 50,-; annually: \$ 30,-  
For Retired members the dues remain unchanged.

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## Positions available

**Doctoral position available.** For details please visit:

[http://www.personalavd.uu.se/ledigaplatser/2038dorand\\_eng.html](http://www.personalavd.uu.se/ledigaplatser/2038dorand_eng.html)

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<http://www.neuro.uu.se/forskning/forskargrupp.html?id=64>

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## Postdoctoral position in invertebrate neuroscience at the University of Maryland

Our lab combines traditional and novel research technologies to investigate neural mechanisms underlying social behavior, decision-making processes and behavioral choice in crayfish (<http://www.bsos.umd.edu/psyc/Herberholz/Research.html>).

This NSF-funded position for a postdoctoral associate is available for two years with the possibility of extension. A degree of PhD or equivalent doctoral degree (in a relevant discipline)

and previous experience with behavioral analysis and neuro-physiological methods is desirable. Expertise with structural or functional Magnetic Resonance Imaging is preferred but not required.

The lab is located on the beautiful College Park campus, the flagship campus of the University System of Maryland, in close proximity to Washington, D.C., a major center of cultural, intellectual and social activity.

Applicants should send a CV, statement of past and future research interests, and names and contact information of three referees to Jens Herberholz, Assistant Professor, Department of Psychology, University of Maryland, College Park 20742, USA, or by email to [jherberholz@psyc.umd.edu](mailto:jherberholz@psyc.umd.edu). Feel free to contact me for more information on this position.

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FLORIDA INTERNATIONAL UNIVERSITY,  
Department of Biological Sciences

Neurobiologist - Rank Open, Tenure Track. Candidates should study fundamental questions of nervous system function, ideally integrating physiological and molecular methods. The person hired will teach a graduate neurobiology course and one course in the department's undergraduate curriculum (e.g., neuroscience, comparative physiology, general biology, cell biology, genetics), will supervise doctoral students, and must develop a strong, extramurally funded research program. Ph.D. & postdoctoral experience required. The department has 3000 undergraduate majors, 80 doctoral students, and 42 faculty ([www.fiu.edu/~biology](http://www.fiu.edu/~biology)). Review of applications will begin 1 Dec 2009 and the position will remain open until filled. Send (one PDF by email is preferred) CV, research & teaching statements, contact info for three references, and three representative reprints to: Philip Stoddard <[stoddard@fiu.edu](mailto:stoddard@fiu.edu)>, Chair Neurobiologist Search, Dept. Biological Sciences, FIU, 11200 SW 8th St, Miami FL 33199 USA Florida International University is an Equal Opportunity Educator and Employer.

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