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### Ifremer France EvolBiol

Available PhD position at the French Research Institute for Exploitation of the Sea (Ifremer) in collaboration with the Centre for Ecological and Evolutionary Synthesis (CEES), University of Oslo - deadline April 1st.

The French Research Institute for Exploitation of the Sea (Ifremer) and the Centre for Ecological and Evolutionary Synthesis (CEES) proposes a doctoral scholarship to University candidates or engineers with a Master degree or equivalent. The scholarships are attributable for a period of 3 years, out of which approximately 18 months are to be spent at each of the two institutions. This research position is offered within one of the 29 themes proposed by Ifremer (see below) and is titled "Effects of the color of environmental noise on the persistence of marine exploited populations: a comparative approach among various ecosystems" (number 14). The procedure for application and a brief description of the thesis project is given below. For further information, please contact Nils Chr. STENSETH (n.c.stenseth@bio.uio.no or Jean-Marc FROMENTIN (Jean.Marc.Fromentin@ifremer.fr).

These scholarships are attributable for a period of max-

imum 3 years following a yearly evaluation of the results. They are obtainable by students who prepare their thesis in one of Ifremer's laboratories or in one of the laboratories of the collaborative Universities of Ifremer.

The proposed research subjects should correspond to one of the themes that are prioritized by the establishment and contribute to this research. The subjects and their corresponding scientific goals are indicated in the table that can be found at

[www.ifremer.fr/francais/actual/bourses/affiche-bourses-2005.pdf](http://www.ifremer.fr/francais/actual/bourses/affiche-bourses-2005.pdf) .

The scholarship, who corresponds to a monthly payment of 1380 ??? (1820 USD brut - 18 months spent at Sète, France) and from 2930 ??? (3860 USD - 18 months spent in Oslo, Norway) (not cumulative with other scholarships), are obtainable after an evaluation of the application from the Commission of scholarships at Ifremer. It is planned that 12 subjects for co-financed thesis and that the subjects in totality will be financed at Ifremer. The partners of Ifremer are territorial collectives, research institutes, industrial enterprises, professional organizations etc...

An application including a detailed CV and a letter of motivation must be sent to Nils Christian Stenseth (n.c.stenseth@bio.uio.no) before March 25th (preferably before).

The research projects are to be constituted in collaboration with the scientific correspondents, and the final

application including the papers are to be sent in 4 copies to Ifremer before April 8th 2005.

Description of research theme number 14: Effects of the color of environmental noise on the persistence of marine exploited populations: a comparative approach among various ecosystems.

Reception laboratories

??? Ifremer-IRD, Centre de Recherche Ahlieutique Méditerranéen et Tropical, BP 171, 34203 Sète Cedex, France ??? CEES, Dept. of Biology, University of Oslo, P.O. box 1050, Blindern, 0316 Oslo, Norway. See web page: <http://www.cees.no/> Duration: 3 years

Objectives and Originality:

The objectives of the study are to: (i) determine the properties of the marine physical environments of several exploited populations, using environmental databases such as COADS and (ii) model the variability in abundance of marine populations and evaluate the importance of environmental impacts. The approach will be data-oriented and will be mainly based on time series analyses.

The originality of this work will be related to the systematic description of the environmental stochasticity of different ecosystems (e.g., continental shelves versus open ocean) of various oceans (cold to temperate or tropical seas). The originality will also be within its extensive comparative approach, i.e., among various environments and species of various trophic levels (i.e., top predator versus small pelagic). The purpose of such extensive comparison work would be to answer to the following key questions:

??? Do all marine environments exhibit similar reddened noise (in reference to Vasseur & Yodzis 2004)?  
 ??? Can we characterise similarities/differences among key marine systems? ??? What are the different effects of diverse environmental noises on exploited marine populations? ??? Do all the populations transform or integrate similarly the signature of environmental and climate noise? ??? What is the importance of life history traits, trophic level, and area in the response of the populations? ??? How can fisheries impact on population modify population responses to environmental noise?

Such a topic is very broad and needs to be restricted to a given set

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## InstZool London EvolBiol

### NERC Funded PhD Studentships 2005

Applications are invited from graduates or final year students who have, or expect to have a First or Upper Second Class Honours Degree in a relevant subject, for projects based at the Institute of Zoology. The studentships will be available from October 2005. Full funding of £12,000 pa (outside London) or £14,000 pa (within London) + Fees is available to UK students, EU students are eligible for fees only.

A list of available projects is given below. For more information please click on the project titles. The Institute will award approximately 2 studentships from this list. For more information regarding the applications please contact the appropriate IoZ supervisor.

To apply for one of the awards, please send a cover letter and CV and the names and full contact details of two referees. Please state clearly in your cover letter which project you are applying for.

Send your application to the principal IoZ supervisor by the 11th March 2005.

NERC PhD Studentship in Biodiversity and Macroecology Institute of Zoology, Zoological Society of London Title of project: Sexual selection and extinction in birds Supervisors: Dr Peter Bennett (Institute of Zoology, principal supervisor), Dr John Ewen (Institute of Zoology, second supervisor), Prof Ian Owens (Department of Biology, Imperial, University supervisor). Project aims: Does sexual selection drive extinction? If so, how does it operate? Does the evolution of extravagant or exaggerated traits heighten extinction risk due to the costs of producing and maintaining them, or does sexual selection result in another form of specialisation, dooming species to extinction in the face of rapid anthropogenic change? These questions are highly controversial, with some current theory and evidence providing support for the role of sexual selection in extinction, while other studies reject the argument. Much of this confusion arises because different studies use different indices of the intensity of sexual selection, and different phylogenetic, ecological and geographical scales of analysis. This study will attempt to resolve this confusion by performing a series of new tests of how sexual selection might influence extinction risk in birds. Specifically by - i) examining variation

on a global scale, within major realms, in hotspots of threatened species, and in detail within the avian clade - the honeyeaters Meliphagidae; and ii) by developing a range of detailed indices of the intensity of sexual selection appropriate to the scale of analysis. For further details, contact Peter Bennett <people/bennett.htm> (Tel: 020 7449 6673; E-mail: peter.bennett@ioz.ac.uk <mailto:peter.bennett@ioz.ac.uk> ).

NERC PhD Studentship in Behavioural and Evolutionary Ecology Institute of Zoology, Zoological Society of London Title of project: Kin discrimination in the multiple-queen ant *Leptothorax acervorum* Supervisors: Dr Andrew Bourke (Institute of Zoology, principal supervisor), Dr Seirian Sumner (Institute of Zoology, second supervisor), Dr William Foster (Department of Zoology, University of Cambridge, University supervisor). Project aims and methods: Kin selection theory predicts favourable treatment of relatives (kin discrimination) in social groups, but whether this occurs is controversial. In social insects, early studies failed to find unequivocal within-colony kin discrimination [e.g. 1], but more recent work suggests that it exists [2]. However, no study has demonstrated clear within-colony kin discrimination in favour of sexuals (queens and males), which is the critical prediction. Confirming or refuting this prediction would therefore represent a major advance in our understanding of a fundamental evolutionary theory. Using the multiple-queen (polygynous) ant *Leptothorax acervorum* as a model system, this studentship will test the hypothesis of within-colony kin discrimination favouring related sexuals.

*L. acervorum* represents an excellent system for this work because it is common, easily collected in the field, and readily kept and observed in captivity. In addition, previous work led by the principal supervisor has established seven polymorphic microsatellite loci for *L. acervorum* and provided extensive knowledge of colony kin structure and demography, as well as queen and worker behaviour [e.g. 3-8]. We therefore know that related queens in polygynous colonies share reproduction, with the result that workers tend adult queens and sexual larvae of differing relatedness to themselves. This provides a natural context for the evolution of within-colony kin discrimination. The student will perform a series of laboratory experiments involving behavioural observations, controlled manipulations and microsatellite genotyping to test the hypothesis of within-colony kin discrimination.

The student will receive training in evolutionary biology, behavioural

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## MaxPlanckBerlin ComputationalBiol

The International Max Planck Research School for Computational Biology and Scientific Computing is a joint graduate program of the Free University of Berlin and the Max Planck Institute for Molecular Genetics, Berlin.

Applications are invited for a PhD program in the fields of Computational Biology and Scientific Computing. The PhD program is designed as a 3-year program starting in October. Scientific research will be accompanied by an interdisciplinary training in English with the main focus on formal sciences. Applicants to the PhD program should have a Master's degree or diploma in bioinformatics or scientific computing. Students with a degree in life sciences or theoretical sciences will also be accepted, if they are able to show profound knowledge in the complementary field. Students with a Bachelor degree that have the necessary background in Bioinformatics or Scientific Computing can apply for a 2-semester grant for a preparatory program. They can attend one of the two Master programs offered by the Free University and have the chance to join the PhD program thereafter.

PhD fellowships are funded with approximately 975 Euros (or BATIIa/2 level) and fellowships for Master students with approximately 715 Euros per month.

For further details and application procedure see <http://www.imprs-cbsc.mpg.de> A poster can be downloaded from <http://www.imprs-cbsc.mpg.de/-download/poster2005.pdf> CLOSING FOR APPLICATIONS: April 1st, 2005.

Contact: Hannes Luz c/o Max Planck Institute for Molecular Genetics | Tel: +49 30 8413 - 1154 Computational Molecular Biology | Fax: +49 30 8413 - 1152 Ihnestrass 73 | Email: [luz@molgen.mpg.de](mailto:luz@molgen.mpg.de) D-14195 Berlin, Germany | [www.imprs-cbsc.mpg.de](http://www.imprs-cbsc.mpg.de) hannes luz <[luz@molgen.mpg.de](mailto:luz@molgen.mpg.de)>

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## OxfordU LateralTransfer

Oxford University: Protozoan Molecular Evolution 3 year NERC-funded DPhil position supervised by Professor T. Cavalier-Smith FRS in the Department of Zoology Starting 1 October 2005. Open to UK citizens and to EU residents. Please apply very soon.

THE PROJECT: Evolution, gene discovery, and lateral gene transfer in the ecologically most important soil Protozoa: Cercozoa

A major advance in understanding eukaryote evolution during the past 3 years has been the recognition that protozoa belonging to the phylum Cercozoa (established only in 1998 by Cavalier-Smith), together with Foraminifera and Radiolaria, constitute Rhizaria, one of five major supergroups forming the eukaryote evolutionary tree. Understanding the evolution, physiology, and ecology of this major branch of the tree of life is severely limited by the complete absence of any genome project for it. To help fill this major gap the student would sequence thousands of genes from cDNA libraries of about five phylogenetically ill-resolved and ecologically diverse cercozoan classes, and analyse them bioinformatically and phylogenetically. Cercozoa, as the only culturable rhizarians, are the best rhizarian targets for gene discovery by large-scale cDNA sequencing.

BACKGROUND Thirteen protozoan phyla with very distinctive body plans are now recognised, but only three or four play really major roles in all habitats (Amoebozoa, Ciliophora, Cercozoa, and to a lesser extent Euglenozoa). Recent work using environmental rRNA library screening and intensive culturing of the latter two phyla in my laboratory has shown that Cercozoa comprise thousands of species, many belonging to previously undetected major clades. Cercozoa now has 10 classes, representing huge morphological diversity, including testate, filose, and reticulate amoebae, flagellates, algae, and organisms previously classified as heliozoa, radiolaria, and even fungi. High levels of cercozoan diversity have been found in most environments sampled; some appear to be restricted to marine environments, others to non-marine, while some strains appear to flourish in both. In many microbial communities Cercozoa appear to be among the most abundant predators. They commonly eat bacteria and unicellular fungi, but are also known to digest larger organ-

isms, and the phylum includes at least two parasitic classes. Some unicellular strains can form large, reticulate, multinucleate plasmodia, the function of which is unclear. It is thus probably the most diverse but least studied of all protozoan phyla and thus the scope for exciting novel discoveries is immense. There is already an extensive EST project under way in a Canadian Laboratory for Bigelowiella, the best-studied representative of the only photosynthetic (exclusively marine) class (Chlorarachnea) in the phylum, which retained the plastid and miniaturised nucleus of an engulfed green alga. Our new project would be the first major and broad molecular study of any heterotrophic rhizarians. Our lab provides an excellent environment for this research as there would be a second student and a postdoctoral researcher (David Bass) also working on Cercozoan evolution and ecology, with much opportunity for exchange of ideas and mutual help.

AIMS 1. To quantitate gene transfer from food bacteria into cercozoan genomes (about 1% in Amoebozoa).

2. Discover genes associated with different aspects of the diverse lifestyles exhibited by Cercozoa.

3. Determine whether these heterotrophs have any genes supporting the theory of a photosynthetic ancestry of all Cercozoa.

4. Construct multigene trees to settle the evolutionary relationship of the major classes of Cercozoa and to test the theory that Rhizaria are sisters of excavates.

5. To follow up one or more of the likely unexpected discoveries of the sequencing projects in accordance with the student's developing interests and preferences using whatever methods are most appropriate.

REFERENCES Cavalier-Smith, T. & Chao, E. E. (2003). Phylogeny and classification of phylum Cercozoa (Protozoa). *Protist* 154, 341-358. Cavalier-Smith, T. (2003). Protist phylogeny and the high-level classification of Protozoa. *Eur. J. Protistol.* 39, 338-348. Bass, D. & Cavalier-Smith, T. (2004). Phylum-specific environmental DNA analysis reveals remarkably high global biodiversity of Cercozoa (Protozoa). *Int. J. Syst. Evol. Microbiol.* 54, 2393-2404. Nikolaev, S. I., C. Berney, et al. (2004). "The twilight of Heliozoa and rise of Rhizaria, an emerging supergroup of amoeboid eukaryotes." *Proc. Natl Acad. Sci. U S A* 101: 8066-8071.

Applicants should have a strong interest in bioinformatics and computer analysis of sequence data, as this forms the core of the project. An interest also in one or more of molecular evolution, microbial/protozoan ecology, biodiversity or biochemistry would be an advantage. Students interested in other aspects of



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## OxfordU LateralTransfer 2

Evolution, gene discovery, and lateral gene transfer in the ecologically most important soil Protozoa: Cercozoa

This notice of a graduate position was recently posted with incomplete application procedure details - the url of the graduate prospectus was missing. A summary of the project is re-stated below, along with the amended instructions. Apologies for this.

A major very recent advance in understanding eukaryote evolution has been the recognition that protozoa belonging to the phylum Cercozoa (established only in 1998 by Cavalier-Smith), together with Foraminifera and Radiolaria, constitute Rhizaria, one of five major supergroups forming the eukaryote evolutionary tree. Understanding the evolution, physiology, and ecology of this major branch of the tree of life is severely limited by the complete absence of any genome project for it. To fill this major gap the student would do high-throughput sequencing of thousands of genes from C-DNA libraries of ~5 phylogenetically ill-resolved and ecologically diverse cercozoan classes, and analyse them bioinformatically and phylogenetically. Cercozoa, as the only culturable rhizarians, are the best rhizarian targets for gene discovery by large-scale cDNA sequencing.

ENQUIRIES TO: Professor T. Cavalier-Smith FRS.  
EMAIL: [tom.cavalier-smith@zoo.ox.ac.uk](mailto:tom.cavalier-smith@zoo.ox.ac.uk)

APPLICATION PROCEDURE General information, application instructions, and application closing dates are given in the University of Oxford Graduate Prospectus (<http://www.admin.ox.ac.uk/gsp>). For entry in October 2005, complete applications must arrive by 18 March 2005 (3rd gathered field).

David Bass <[david.bass@st-catherines.oxford.ac.uk](mailto:david.bass@st-catherines.oxford.ac.uk)>

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## OxfordU LateralTransfer 3

Oxford University: Protozoan Molecular Evolution 3 year NERC-funded DPhil (=PhD) studentship supervised by Professor T. Cavalier-Smith FRS in the Department of Zoology, starting 1 October 2005. Open to UK citizens and to EU residents having or about to obtain a good first degree in an appropriate biological or biochemical field.

Please apply very soon.

THE PROJECT: Biodiversity, population structure, and ecology of sarcomonad Cercozoa (Protozoa) This project is on the environmental adaptiveness of different genotypes of soil protozoa and the related question whether they are mostly sexual or mostly asexual. Cercozoa, established only in 1998 by Cavalier-Smith, is quantitatively the most abundant phylum of soil protozoa, as they include filose testate amoebae, numerous groups of zooflagellates (phagotrophic heterotrophic flagellates) naked reticulose amoebae and many organisms that are both flagellate and amoeboid (e.g. sarcomonads); the latter two body types especially seem to be particularly characteristic of and adaptively suited to living in soil and sediments. This project will focus on sarcomonad zooflagellates (heteromitids and Cercomonas), as they are the most widespread and abundant phagotrophic flagellates in soil, where they are major predators on bacteria, and easy to grow in the lab; they also occur widely in freshwater and some Cercomonas are marine. Molecular methods will be used to pioneer study of the ecology and population structure of specific genetic lineages of sarcomonads, primarily in soil, and to clarify their systematics and evolution more generally. The primary focus of this project is the role of sarcomonads in soil community ecology - in particular to provide the first evidence for the adaptiveness of individual genotypes for phagotrophic predatory soil protozoa.

The student will use rDNA sequencing, quantitative PCR, and DNA hybridization to study the qualitative and quantitative distribution of different selected Cercomonas ribotypes among habitats, through the seasons, and across environmental gradients, and for selected subclades expand the ribotype database and seek correlations with morphology. S/he will also do large-scale chaperone Hsp90 gene sequencing for cultures of the most abundant ribotypes of Heteromita, Bodomor-



pha and Cercomonas to determine whether they are haploid or diploid and whether they are sexual or asexual. If they are sexual the 18S rRNA and Hsp90 sequences of closely related genotypes can be used to define biological species boundaries and will provide genetic tools for comparing the ecology of sister species. The student will make use of our numerous existing cultures of Cercomonas, add to them considerably, and generate many more for heteromitids. BACKGROUND Soil and aquatic sediment ecosystems centrally involve decomposer food webs in which microbes are of major importance for biogeochemical cycles and where protozoa are the dominant consumers of bacteria. Of the 13 protozoan phyla with very distinctive body plans now recognised, only three or four play really major roles in all habitats (Amoebozoa, Ciliophora, Cercozoa, and to a lesser extent Euglenozoa). Recent work using environmental rRNA library screening and intensive culturing of the latter two phyla in my laboratory has shown that Cercozoa comprise thousands of species, many belonging to previously undetected major clades. Cercozoa now has 10 classes, representing huge morphological diversity, including testate, filose, and reticulate amoebae, flagellates, algae, and organisms previously classified as heliozoa, radiolaria, and even fungi; one of these, the sarcomonads, consists primarily of biciliate flagellates that glide on surfaces and can often form a wide variety of pseudopods during feeding. High levels of cercozoan diversity have been found in most environments sampled; some appear to be restricted to marine environments, others to non-marine, while some strains appear to flourish in both. In many microbial communities Cercozoa appear to be among the most abundant predators. They commonly eat bacteria and unicellular fungi, but are also known to digest larger organisms, and the phylum includes at least two parasitic classes. Some unicellular strains can form large, reticulate, multinucleate plasmodia, the function of which is unclear. It is thus probably the most diverse but least studied of all protozoan phyla and thus the scope for exciting novel discoveries is immense. Our recent molecular phylogenetic studies provided tools that now make detailed study of their ecology possible for the first time despite their taxonomy still being relatively chaotic and very ill-developed. Our lab provides an excellent environment for this research as there would be a second student and a postdoctoral researcher (David Bass) also working on Cercozoan evolution and ecology, with much opportunity for exchange of ideas and

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## Stockholm PlantEvolSyst

Three PhD studentships in Plant evolution / Plant Systematics are available at the Department of Botany at Stockholm University

Applications are welcome until April 1, 2005 To: Prefekten Botaniska institutionen Stockholms universitet SE-10691 Stockholm Sweden

Two of these studentships are connected to ongoing projects at the Bergius Foundation of the Royal Swedish Academy of Sciences:

1. Evolution within Ixoroideae (Rubiaceae) and 2. Allopolyploidy within Potentilleae (Rosaceae) and its relevance for diversity and evolution

More info: [http://www.bergianska.se/-index\\_forskning.php?vidare=forskning\\_doktorander.html](http://www.bergianska.se/-index_forskning.php?vidare=forskning_doktorander.html)

Also see: <http://www.botan.su.se/> Torsten Eriksson Bergius Foundation Department of Botany SE-10691 Stockholm

Torsten Eriksson <Torsten.Eriksson@bergianska.se>

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## UCanterbury EvolAnimalCommunication

Ph.D. Scholarship in Animal Communication at the University of Canterbury

We are seeking a Ph.D. student to study mechanisms of social communication in archaic New Zealand frogs (genus *Leiopelma*). These frogs are "living fossils" that have remained virtually unchanged over the past 200 million years and never evolved bioacoustic signalling systems. *Leiopelma* are extremely long-lived, do not stray far from small home ranges, and repeatedly interact with the same individuals. These conditions foster the formation of complex social networks, which might be structured through chemical signalling. The project takes an integrative approach and makes use of microsatellite analyses to investigate genetic relatedness, chemical methods to characterise the signals, and field studies to examine how communication occurs in

natural populations. For further background, see Behavioral Ecology 15 (1): 88-93 (2004).

The scholarship is supported for three years by the Marsden Fund (Royal Society of New Zealand) and includes a \$19,000/year tax-free stipend, full international tuition/fees, and generous support for research expenses.

The University of Canterbury has a strong programme in behaviour, ecology, and evolution, as well as excellent facilities in chemistry and molecular genetics. The programme is directed by Bruce Waldman (School of Biological Sciences) and John Blunt (Department of Chemistry).

The deadline for applications is 15 April 2005. For further information, please contact us. To apply, send your Curriculum Vitae, a letter detailing your experience and career goals, and contact details for three referees to:

Dr Bruce Waldman School of Biological Sciences University of Canterbury Private Bag 4800 Christchurch New Zealand

Voice: +64 3 364 2066 FAX: +64 3 364 2590 Web: [www.biol.canterbury.ac.nz](http://www.biol.canterbury.ac.nz) Email: Bruce.Waldman@canterbury.ac.nz

Bruce Waldman <bruce.waldman@canterbury.ac.nz>

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## UGroningen EcolEvol

International Top Master's Programme in Ecology and Evolution

The Centre for Ecological and Evolutionary Studies at the University of Groningen (Netherlands) offers a new Master's programme in ecology and evolution. This "Top Master's Programme Evolutionary Biology" provides an intense training in modern research techniques and is therefore an optimal preparation for a subsequent PhD programme. In order to guarantee an excellent teacher-student ratio, the number of positions is limited to 15. The programme is highly selective and aimed at the brightest and most ambitious students from all over the world. All students admitted will receive a scholarship for the two-year Top Master's programme and potentially an additional four-year scholarship for a subsequent Ph.D. programme. The deadline for application is 15 April 2005. For more information visit [www.rug.nl/biol/evobio](http://www.rug.nl/biol/evobio) or contact

Franz J. Weissing Professor of Theoretical Biology Centre for Ecological and Evolutionary Studies University of Groningen Kerklaan 30 9751 NN Haren The Netherlands tel: +31-50-363-2131 fax: +31-50-363-3400 email: [f.j.weissing@rug.nl](mailto:f.j.weissing@rug.nl) URL: [www.rug.nl/biol/-theobio](http://www.rug.nl/biol/-theobio) Franjo Weissing <F.J.Weissing@biol.rug.nl>

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## ULausanne 2 SocialEvol

PhDs in social evolution

Two PhD positions are available to study social evolution in insects at the Department of Ecology and Evolution, University of Lausanne, Switzerland.

Our group studies the structure, function and evolution of insect societies. We are particularly interested in the causes and consequences of social structure variation in ants. The PhD positions are part of a new project in which we propose to study the link between social structure and dispersal, as well as the impact of social structure variation on the resolution of genetic conflicts among colony members. The project will involve a combination of field experiments, laboratory experiments and genetic analyses (microsatellites, SNPs and mtDNA sequencing). The primary model system will be *Formica selysi*, with possible extensions to other insect species.

The two PhD studentships are funded by the Swiss National Science Foundation for a period of 3 years. The Department of Ecology and Evolution in Lausanne provides a lively and stimulating environment for research. It harbours vigorous research programs in behaviour, ecology and evolution, and has excellent facilities for molecular genetics and genomics.

For more information on the department, research groups and publications, please look at: [http://www.unil.ch/dee/page5090\\_en.html](http://www.unil.ch/dee/page5090_en.html) [http://www.unil.ch/dee/page7000\\_en.html](http://www.unil.ch/dee/page7000_en.html) <http://www.unil.ch/dee/page9051.html> Information and applications:

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[Michel.Chapuisat@unil.ch](mailto:Michel.Chapuisat@unil.ch)

## ULeicester EvolImmunology

Research council funded PhD studentship Opening a blackbox in evolutionary immunology. Parasites are ubiquitous and affect a wide array of host characteristics at all levels of biological organization. Consequently, understanding their relationships has important ramifications for a variety of scientific fields.

The interaction between the bumblebee and its trypanosomal gut parasite *Crithidia bombi* has become one of the central models for the study of the evolutionary ecology of immune systems 2. However, so far this system has been considered as a black box. For our understanding of the system to develop, more must be known about the specifics of the host parasite relationship.

This studentship will delve into the mechanisms of their interactions. What is the actual pathology of *C. bombi*? Its fitness effects on bumblebees are well known 3, 4 but what tissues or processes are actually damaged? On the host side, many details are now known about the insect immune system<sup>5</sup>, but what components of this system are used by the bumblebee to defend against this gut parasite 6? And what is the basis of the well-known specificity between different strains of *Crithidia* and individual bumblebee colonies<sup>2</sup>.

Previous studies have shown that *C. bombi* can artificially infect *Drosophila*<sup>7</sup>. One exciting possible research direction is to use the candidate gene approach<sup>8</sup> to transfer knowledge from this artificial system into *C. bombi*'s natural host, the bumblebee.

Many parasites, including important species that affect humans and livestock, must survive the harsh environment of insect guts to complete their life-cycle. Hence, understanding how insects protect themselves against such parasites has immediate practical implications.

At a minimum, applicants should have or expect to receive an upper second class honours degree in biology or a related discipline. Send your CV (including names of academic referees) and a one page statement on why you feel this project is right for you directly to Eamonn Mallon (ebm3@le.ac.uk <mailto:ebm3@le.ac.uk>, [www.le.ac.uk/bl/ebm3/homepage.html](http://www.le.ac.uk/bl/ebm3/homepage.html) <<http://www.le.ac.uk/bl/ebm3/homepage.html>> ). The deadline for applications is 10th of May 2005 with the studentship starting September/October.

- 1 Lipa, J.J. and Triggiani, O. (1980) *Acta Protozoologica* 27, 287-290
- 2 Schmid-Hempel, P. (2001) *Naturwissenschaften* 88, 147-158
- 3 Brown, M.J.F., Loosli, R. and Schmid-Hempel, P. (2000) *Oikos* 91, 421-427
- 4 Brown, M.J.F., Schmid-Hempel, R. and Schmid-Hempel, P. (2003) *Journal of Animal Ecology* 72, 994-1002
- 5 Leclerc, V. and Reichhart, J.-M. (2004) *Immunol Rev* 198, 59-71
- 6 Brown, M.J.F., Moret, Y. and Schmid-Hempel, P. (2003) *Parasitology* 126, 253-260
- 7 Boulanger, N. et al. (2001) *Insect Biochemistry and Molecular Biology* 31, 129-137
- 8 Fitzpatrick, M.J. et al. (2005) *Trends in Ecology & Evolution* 20, 96-104

Dr. Eamonn Mallon Room 217 Department of Biology  
University of Leicester University Road Leicester LE1  
7RH UK Telephone: 0116 2523482 Fax: 0116 2523330

Eamonn Mallon <ebm3@leicester.ac.uk>

## UMunich EvolFuncGenomics

PhD Student Position - Evolutionary/Functional Genomics

A PhD student position is available in the laboratory of John Parsch at the University of Munich (LMU). The position is part of a project funded by the German Science Foundation (DFG) to study the evolutionary and functional genomics of *Drosophila* gene expression. The work will be primarily experimental and will include microarray analyses and the generation of transgenic *Drosophila*. Applicants should have a master's degree or equivalent in biology or a related field. In addition, previous laboratory experience in molecular biology and/or *Drosophila* genetics is desired. The University of Munich has a strong, interactive group in evolutionary biology, including theoreticians and experimentalists working on both plant and animal systems. We have an international group and the everyday working language is English. The department of biology is housed in the new, state-of-the-art BioCenter on the University of Munich High-Tech campus. More information is available on the web at:



<http://www.zi.biologie.uni-muenchen.de/institute/zi/-abt/evolutionsbiologie>

Interested candidates should send a CV, statement of research experience, and contact information of two potential referees per email to:

parsch@zi.biologie.uni-muenchen.de

Applications will be reviewed beginning May 1, 2005.

The University of Munich is an Equal Opportunity/Affirmative Action Employer and has an affirmative action policy for the disabled.

Prof. Dr. John Parsch Department of Biology II University of Munich Grosshaderner Str. 2 82152 Planegg-Martinsried Germany

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### UOslo EvolMycology

PhD position in evolutionary biology (mycology) at the Department of Biology, University of Oslo, Norway.

A 3-year PhD position in evolutionary biology (mycology) is currently being offered at the Dep. of Biology, University of Oslo, Norway (<<http://www.biologi.uio.no/>>[www.biologi.uio.no](http://www.biologi.uio.no/)). The position relates to the research project "Evolution of mating type and vegetative incompatibility genes in fungi: The dry rot fungus *Serpula lacrymans* as a model species". The project is a collaboration between researcher at the University of Oslo and at the Agricultural University of Uppsala, Sweden. The project is funded by the Research Council of Norway and the PhD position will be based at the University of Oslo, Norway.

The research project to which the position is linked includes evolutionary, phylogeographic and population genetic studies of fungi using the basidiomycete *Serpula lacrymans* and allied taxa as model organisms. One important aim is to explore evolutionary processes that influence the mating and vegetative incompatibility systems in fungi. Studies within the project will include a combination of molecular laboratory work and culturing of fungi, in addition to some field work. The PhD plan of the appointed candidate will be affected by the candidate's interests and competence within these fields and there will be considerable scope for the student to develop their own interests. Knowledge of the Norwegian language is not required.

Qualifications of importance in assessing candidates include:

- Motivation - Educational background - Practice with basic molecular techniques (PCR, DNA sequencing, etc.) - Experience in culturing fungi (or other microorganisms) - Good knowledge in evolutionary biology - Ability to work both independently and in a group - Experience in presenting scientific material - written and oral

The decision on whom to appoint will essentially consider the applicants' potential for conducting a successful PhD project of high quality. Short-listed candidates will likely be interviewed. Deadline for the receipt of applications is March 30. The starting date is flexible. The position is for three years within which the candidate appointed is expected to complete her/his PhD. The monthly starting salary is approx. EUR 2900.

For more information contact: PhD Håvard Kausrud, E-mail: [haavarka@bio.uio.no](mailto:haavarka@bio.uio.no)

Application: Please submit three copies of: A letter describing your research interest and skills, CV, a copy of master thesis or equivalent, and contact information for three references to: The Faculty of Mathematics and Natural Sciences, v/Bente Schjoldager, P.O.Box 1032 Blindern, 0315 OSLO, NORWAY

[haavarka@bio.uio.no](mailto:haavarka@bio.uio.no) [haavarka@bio.uio.no](mailto:haavarka@bio.uio.no)

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### UOxford CercozoaEvol

Evolution, gene discovery, and lateral gene transfer in the ecologically most important soil Protozoa: Cercozoa

3 year NERC-funded DPhil (=PhD) studentship supervised by Professor T. Cavalier-Smith FRS in the Department of Zoology, starting 1 October 2005.

RE-POSTING: EXTENDED DEADLINE - NOW 27 MAY 2005.

A major very recent advance in understanding eukaryote evolution has been the recognition that protozoa belonging to the phylum Cercozoa (established only in 1998 by Cavalier-Smith), together with Foraminifera and Radiolaria, constitute Rhizaria, one of five major supergroups forming the eukaryote evolutionary tree. Understanding the evolution, physiology, and ecology of this major branch of the tree of life is severely limited by the complete absence of any genome project for it. To fill this major gap the student would do high-throughput sequencing of thousands of genes from C-DNA libraries of ~5 phylogenetically ill-resolved and

ecologically diverse cercozoan classes, and analyse them bioinformatically and phylogenetically. Cercozoa, as the only culturable rhizarians, are the best rhizarian targets for gene discovery by large-scale cDNA sequencing.

Aims:

1. Quantitate gene transfer from food bacteria into cercozoan genomes (~1% expected).
2. Discover genes associated with diverse cercozoan lifestyles.
3. Determine whether these heterotrophs have any genes supporting the theory of a photosynthetic ancestry for Cercozoa.
4. Construct multigene trees to settle evolutionary relationship among major classes of Cercozoa and test the theory that Rhizaria are sisters of excavate protozoa.
5. Follow up unexpected serendipitous discoveries of the C-DNA sequencing in accordance with the student's interests

General information, application instructions and application closing dates are given in the University of Oxford Graduate Prospectus ([www.admin.ox.ac.uk/gsp](http://www.admin.ox.ac.uk/gsp)). For entry in October 2005, applications must arrive by May 27th 2005, the closing date of the fourth 'gathered field'.

For more information about the project contact Professor Thomas Cavalier-Smith FRS, Department of Zoology, University of Oxford, South Parks Road, Oxford OX1 3PS, UK. E-mail: [tom.cavalier-smith@zoo.ox.ac.uk](mailto:tom.cavalier-smith@zoo.ox.ac.uk), or contact the Graduate Office: Tel: +44 (0)1865 271286; fax: +44 (0)1865 310447.

Please inform Professor Cavalier-Smith directly if you are planning to submit an application, even if you have no specific queries about the project itself.

Open to UK citizens and to EU residents having or about to obtain a good first degree in an appropriate biological or biochemical field. For non-UK residents NERC can pay fees only, not living expenses. The University of Oxford is an Equal Opportunities Employer.

REFERENCES: Cavalier-Smith, T. (2003). Protist phylogeny and the high-level classification of Protozoa. *Eur. J. Protistol.* 39, 338-348. Cavalier-Smith, T. & Chao, E. E. (2003). Phylogeny and classification of phylum Cercozoa (Protozoa). *Protist* 154, 341-358. Bass, D. & Cavalier-Smith, T. (2004). Phylum-specific environmental DNA analysis reveals remarkably high global biodiversity of Cercozoa (Protozoa). *Int. J. Syst. Evol. Microbiol.* 54, 2393-2404.

David Bass <[david.bass@st-catherines.oxford.ac.uk](mailto:david.bass@st-catherines.oxford.ac.uk)>

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## UOxford CercozoaEvol 2

Biodiversity, sex, and ecology of sarcomonad Cercozoa (Protozoa)

3 year NERC-funded DPhil (=PhD) studentship supervised by Professor T. Cavalier-Smith FRS in the Department of Zoology, starting 1 October 2005.

RE-POSTING: EXTENDED DEADLINE - NOW 27 MAY 2005.

Cercozoa (established by Cavalier-Smith, 1998), the most abundant phylum of soil protozoa, includes numerous zooflagellates and amoebae with long thin pseudopods adapted to creeping around soil particles. This project focuses on heteromitids and Cercomonas, the most widespread and abundant phagotrophic flagellates in soil, where they are major predators on bacteria, and easy to grow in the lab. Chaperone Hsp90 genes will be sequenced for cultures of the most abundant ribotypes of Heteromita, Bodomorpha, and Cercomonas to determine whether they are haploid or diploid and by seeking intragenic recombination determine whether they are sexual or asexual. If they are sexual the 18S rRNA and Hsp90 sequences of closely related genotypes will be used to define biological species boundaries and provide genetic tools for comparing the ecology of sister species. The student will use our numerous existing cultures of Cercomonas, add to them considerably, and generate many more for heteromitids. The environmental adaptiveness of different rRNA genotypes will be studied by rDNA sequencing, quantitative PCR, and DNA hybridization to study the qualitative and quantitative distribution of different selected Cercomonas ribotypes among habitats, through the seasons, and across environmental gradients, and for selected subclades expand the ribotype database and seek correlations with morphology.

General information, application instructions and application closing dates are given in the University of Oxford Graduate Prospectus ([www.admin.ox.ac.uk/gsp](http://www.admin.ox.ac.uk/gsp)). For entry in October 2005, applications must arrive by May 27th 2005, the closing date of the fourth 'gathered field'.

For more information about the project contact Professor Thomas Cavalier-Smith FRS, Department of Zoology, University of Oxford, South Parks Road, Oxford OX1 3PS, UK. E-mail: [tom.cavalier-smith@zoo.ox.ac.uk](mailto:tom.cavalier-smith@zoo.ox.ac.uk)

smith@zoo.ox.ac.uk, or contact the Graduate Office:  
Tel: +44 (0)1865 271286; fax: +44 (0)1865 310447.

Please inform Professor Cavalier-Smith directly if you are planning to submit an application, even if you have no specific queries about the project itself.

Open to UK citizens and to EU residents having or about to obtain a good first degree in an appropriate biological or biochemical field. For non-UK residents NERC can pay fees only, not living expenses. The University of Oxford is an Equal Opportunities Employer.

REFERENCES: Cavalier-Smith, T. & Chao, E. E. (2003). Phylogeny and classification of phylum Cercozoa (Protozoa). *Protist* 154, 341-358. Cavalier-Smith, T. (2003). Protist phylogeny and the high-level classification of Protozoa. *Eur. J. Protistol.* 39, 338-348. Bass, D. & Cavalier-Smith, T. (2004). Phylum-specific environmental DNA analysis reveals remarkably high global biodiversity of Cercozoa (Protozoa). *Int. J. Syst. Evol. Microbiol.* 54, 2393-2404.

David Bass <david.bass@st-catherines.oxford.ac.uk>

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## UTromso EvolSperm

### Position

A four-year PhD-position in evolutionary biology is open from approximately 1st of Mai at the University of Tromsø, Norway. Applicants must document knowledge about Evolutionary Biology equivalent to master level and should have experience from field-work in Behavioral Ecology. Applicants must also be willing to acquire knowledge about new methodology in cell-biology and immunology, and documented knowledge from these areas is an advantage. Specific knowledge about sperm cells is also an advantage, but not obligatory.

### Project description

Mutations in the male germ-line are common and in highly monogamous species males may benefit from selecting against own, mutated sperm. This will, in turn, reduce a male's chance of fertilizing, but, on the other hand, prevent loss of DNA order down the family line. The importance of sperm selection by the male will be related to the intensity of sperm competition. That is, in species with high levels of sperm competition male selection against own sperm will impose high fitness costs and therefore be selected against. Conse-

quently, a lowered control of mutated sperm could explain the increased mutations rates - originating from the male germ-line - documented to co-occur with increased sperm competition. Identification of mutated sperm cells are most likely conducted by the immune system, which also surveys other somatic cells, and antibody coating of sperm cells are commonly observed in male vertebrates. The evolutionary framework outlined may explain some puzzling biological paradoxes, such as: why should the male, but not the female germ-line be non-self, why should stress and sex hormones be immunosuppressive and why do we observe the enormous sperm redundancy.

### Practicalities

Application dead-line is 7th of April.

25% of the work-load (equivalent to 1 year) will be teaching in Life History Evolution.

Applications should include five copies of confirmed documents, including CV, and three copies of publications and manuscripts. These should be sent to:

Anne H Institute for Biology University for Biology 9037  
Tromsø Norway Anne.Hoydal@ib.uit.no

Or

Ivar Folstad Ivar.Folstad@ib.uit.no

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## Uppsala EvReprSystems

PhD-student position in Evolutionary Genetics Department of Evolution, Genomics and Systematics, Evolutionary Biology Centre, Uppsala University, Sweden

We seek a highly motivated individual interested in pursuing a PhD degree in Evolutionary Genetics within a newly started research program on the evolution of reproductive systems in fungi.

Project description The differences in reproductive behaviour of organisms greatly affect patterns of genetic variation, and therefore the responses of populations to natural selection and other factors of evolution. Discovering why and how these characters evolve poses some of the most challenging problems in evolutionary biology. *Neurospora* is a eukaryote model system exceptionally suited as a subject for studies of the evolution of reproductive systems. The species of the genus exhibit the range of reproductive behaviour seen throughout fungi: obligately outbreeding, selfing, and a mixture of the two. This PhD-project aims at 1) identifying

genes and genetic mechanisms important for outcrossing in *Neurospora*, and investigating the evolutionary fate of these characters in selfing lineages; 2) Identifying trade offs in energy allocation as a potential driving force in the evolution of selfing taxa from their outbreeding ancestors.

The project will involve using molecular techniques such as DNA sequencing, quantitative PCR and whole genome microarrays, as well as statistical analyses. Although the general area of the work is already defined, there will be considerable scope for the student to develop their own interests and to influence the emphasis of their project within the broad area specified. The announced position is planned for four years. Requirements Applicants should possess a BSc or MSc degree in evolutionary genetics, microbiology, ecology, population genetics, or a related field, and should have a strong interest in using molecular methods to study key questions in ecology and evolution. General microbiology and molecular biology laboratory skills are a plus. Application Please submit your CV, a letter describing your research interest and skills, a copy of master thesis or equivalent, and contact information for two references to Hanna Johannesson (Hanna.Johannesson@ebc.uu.se), Department of Evolution, Genomics and Systematics, EBC, Norbyvägen 18D, SE 752 36 Uppsala, Sweden. The position remains open until a suitable candidate has been found.

The Evolutionary Biology Centre offers a superb interdisciplinary working environment located at the heart of Uppsala. Uppsala is located 40 minutes north of Stockholm by train, 20 minutes from Stockholms international airport.

Hanna Johannesson <Hanna.Johannesson@ebc.uu.se>

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### YorkU EvolGenomics

I am seeking graduate students interested in evolutionary and population genomics to join my lab in September 2005. Research in the lab is focused on the study of plant genome evolution and molecular population genetics. We are particularly interested in understanding the forces driving genome evolution, and in testing the role of natural selection at the genome level. Potential research projects include 1) investigating the effects of polyploidy on the evolution of transposable elements, 2) testing for the effects of gene expression level on molecular evolution, and 3) distinguishing the effects

of demographic history and positive Darwinian selection on patterns of genetic diversity. Research projects range from primarily lab-based collection and analysis of DNA sequence diversity data, to theoretical modeling and computer-based analysis of genome sequences. Further information about research in the lab can be found at <http://www.yorku.ca/stephenw> and information on York University's Biology graduate program can be found at <http://www.biol.yorku.ca/grad/>. Interested students are asked to submit a CV, a copy of academic transcripts and contact information for three references to [stephenw@yorku.ca](mailto:stephenw@yorku.ca) by April 15, 2005.

Stephen I Wright, PhD Assistant Professor Department of Biology York University 4700 Keele St. Toronto, ON Canada M3J 1P3 Phone: (416) 736-2100 ext. 20213 Fax: (416) 736-5698 –

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### ZurichETH EvolBiol

PhD position in Evolutionary Biology

A 3-years PhD position is available in the group of Ecology and Evolution at the ETH in Zurich, Switzerland. We are looking for a motivated and independent student who is interested in fundamental aspects of evolutionary biology and is willing to employ modern molecular techniques.

The research project focuses on evolutionary aspects of phenotypic variation. We are interested in genetic and non-genetic sources of phenotypic variation and in how natural selection acts on these sources. The work will be primarily experimental, using evolution experiments with bacteria and viruses as well as genetic tools.

This work will contribute to an exciting new field at the interface between evolutionary biology and other biological disciplines, including molecular biology, bio-engineering, microbiology and systems biology. Candidates from any biological background are welcome to apply.

A Masters or equivalent is required. The ETH offers an international and stimulating research environment, with English as the official working language. Please send your application or informal requests for further information to Martin Ackermann ([Martin.Ackermann@env.ethz.ch](mailto:Martin.Ackermann@env.ethz.ch)). See also <http://www.eco.ethz.ch/portraits/ackermann/> Martin Ackermann Ecology & Evolution ETH Zentrum NW Clausiusstrasse 25 8092 Zuerich Switzerland Tel.: +41 1 63

26928 Fax: +41 1 63 21271 [www.eco.ethz.ch](http://www.eco.ethz.ch)


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### FloridaMusNatHist Bioinformatics

Although this job description was not written as such, it could be filled by a qualified postdoc interested in bioinformatics.

The Florida Museum of Natural History is currently recruiting an IT Expert that is responsible for the development of a biodiversity inventory tracking system. This project, called BioCorder, is funded for three years by the National Science Foundation (<http://www.flmn.h.ufl.edu/biocorder/>). This programmer will work with other BioCorder biologists, programmers, and the Museum IT staff to develop a PHP/MySQL database infrastructure for bioinformatics. This database combines locally stored bioinformatics data (e.g., specimens, DNA sequences, images, etc.) with data stored in publicly available distributed databases (e.g., GenBank, PubMed, Ubio, ITIS, etc.) using a common user portal.

Experience with Perl, PHP, MySQL, Unix admin, Web Services, and database design is essential. A degree in Computer Science, Biology or Bioinformatics, or equivalent and 2 years work experience is preferred. Position requires the ability to communicate complex computer

science concepts to non-computer scientists, as well as excellent writing skills.

To view application instructions and complete an online resume, please visit ([www.hr.ufl.edu/job/default.htm](http://www.hr.ufl.edu/job/default.htm)). Reference number for this vacancy is 32035, or you may search for title, IT Expert-FLMNH Mammals. Please apply by 3/24/05. If an accommodation due to a disability is needed to apply for this position, please call (352) 392-4621, or the Florida Relay System at (800) 955-8771 (TDD). An Equal Opportunity Institution.

If you have further questions regarding the position, please feel free to e-mail, [dreed@flmn.h.ufl.edu](mailto:dreed@flmn.h.ufl.edu).

Best Regards, David Reed

David L. Reed, Assistant Curator of Mammals Florida Museum of Natural History University of Florida Dickinson Hall, Museum Rd & Newell Dr. Gainesville, FL 32611 (352) 392-1721 ext. 220 (voice) (352) 846-0287 (fax) e-mail: [dreed@flmn.h.ufl.edu](mailto:dreed@flmn.h.ufl.edu) <http://www.flmn.h.ufl.edu/mammals/>

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