



DARWIN INITIATIVE

APPLICATION FOR DARWIN SCHOLARSHIP PROGRAMME 2005

Please read the Guidance Notes before completing this form. Give a full answer to each section; applications will be considered on the basis of information submitted on this form. Please note the additional information requirements (CVs and letters of support as detailed in the Guidance for Applicants). Whilst this form is to be submitted by the host institution the proposed Scholar should be fully involved in development of the proposal.

Submit by 18 March 2005

1. Contact Details

Ref. (Defra/ECTF only):

Name and address of UK applicant organisation

Department of Biological Anthropology, University of Cambridge, Downing Street, Cambridge, UK, CB2 3DZ
and
Nature Heritage, London, 2nd Floor, 145-157 St. John Street, London EC1V 4PY, UK

2. Darwin Scholar. A one page CV must be enclosed.

Name and official address of proposed Darwin Scholar

Cristóbal Briceño U, Universidad de los Lagos, Osorno, Chile

3. Project summary (no more than 100 words)

TITLE: Capacity building in molecular genetics and immunology for biodiversity conservation in Chile.

ABSTRACT: The DI-funded project *Conserving the critically endangered Darwin's fox on Chiloé Island, Chile* has successfully conducted active research and conservation of Darwin's fox on Chiloé Island in 2002-2005. Local NGOs will continue to actively pursue applied conservation. The scholarship aims to provide training and capacity building in areas where Chile requires further assistance. Capacity will be built in molecular screening and immunology and the scholar will actively disseminated knowledge in Chile. Training will develop and apply molecular screening of loci involved in immunocompetence. The model species is the will use Darwin's fox and the methodology will assist further conservation planning (translocations and captive breeding).

4. Principals in Project. Please give the details of the individuals from the UK host organisations (and other institutions if relevant) who would be directly involved in supervising/working with the Darwin Scholar. A 1 page CV on each must be enclosed.

Details	Main UK expert	Other UK expert	Other UK expert	Other UK expert
Surname	Dr Knapp	Dr Funk		
Forename(s)	Leslie	Stephan Michael		
Post held	Lecturer	Director		
Institution (if different to above)	University of Cambridge	Nature Heritage Ltd		
Department	Department of Biological Anthropology	Conservation Biology		
Telephone				
Fax		N/A		
Email				

5. Describe briefly the aims, activities and achievements of the UK applicant organisation. (Large institutions please note that this should describe your unit or department)

<p><u>University of Cambridge</u> Dr. Knapp will serve as the laboratory supervisor on this project. She has extensive experience in the identification and analysis of vertebrate MHC class I and II loci. In the Department of Biological Anthropology, she currently directs the research of 5 full-time PhD students and 2 post-doctoral researchers. A Laboratory Technician is also employed by the Department to maintain equipment and inventory levels for laboratory supplies and to perform a research laboratory tasks, including assisting students working in the molecular genetics lab. Students and visitors conducting research with Dr. Knapp are exposed to a wide range of laboratory experiences and training opportunities. As they develop skills and confidence in the lab, they are encouraged to work independently. Monthly lab meetings are scheduled to discuss new developments in the lab and to provide students and visitors with the opportunity to discuss their data with other researchers in the lab. Local collaborators and postgraduate students in other Departments (e.g., Pathology and Zoology), as well as international visiting researchers, also participate in the lab meetings. These interactions provide students and visitors with opportunities to learn from senior researchers from other departments and institutions, to gain knowledge about ongoing collaborative projects and to investigate future research opportunities in the field. Journal club meetings with members of this and other departments provide a forum for students and faculty to discuss and critically evaluate published research. Whenever possible, students are encouraged to present their research findings in seminars held within other University departments such as Genetics, Pathology and Zoology. Additionally, Dr. Knapp maintains a continual presence in the lab and is regularly available in her office nearby. Overall, training in molecular genetics is designed to develop independent and creative scholars who will be prepared to pursue a career in either research or academia.</p> <p><u>Nature Heritage Ltd:</u> Dr Funk is the project leader of DI project 11-013 (Conserving the critically endangered Darwin's fox on Chiloé Island, Chile). The project was hosted by the Institute of Zoology, ZSL, till 31 January 2005. Nature Heritage Ltd was commissioned to complete the project between 1 February and 30 April 2005, and was specifically founded by Dr Funk for this purpose. Nature Heritage is company limited by shares, which promotes the worldwide conservation of biodiversity by promoting applied research, capacity building, outreach, and technical and logistic support. Although registered as a company, Nature Heritage supervises students on a non-profit basis. Dr Funk currently directs the research of 6 full-time PhD students, which are registered at UK and European universities (University of Edinburgh, University of Canterbury, University College of London, Vienna University). He has extensive experience in conservation biology, conservation genetics and epidemiology. He has published numerous papers in peer-reviewed journals and has co-edited a reference book on Carnivore Conservation.</p>

6. Describe briefly the aims, activities and achievements of the proposed Darwin Scholar's organisation. (Large institutions please note that this should describe your unit or department)

<p>Universidad de Los Lagos (ULA) is the largest academic institution in southern Chile and the closest to Chiloé Island and has been project partner of DI project 11-013 since 2002. It has a small, but recognised group of researchers that focuses its research on natural resources, both terrestrial and aquatic. Since 1996 ULA has a Master of Science program on management of natural resources. The scholar will closely collaborate with the Laboratory of Genetics, directed by Dr. Gonzalo Gajardo, a renowned expert in studies conducted on local vertebrate and invertebrate species. He will be responsible for the molecular and genetic analysis in Chile.</p> <p>Chile is rich in biodiversity but poor in resources and capacity. Chilean biological diversity and genetic resources are under threat by introduction of exotic species (e.g. salmon farming, threatening native fish species) and introduction of diseases (e.g. canine distemper virus, threatening the endangered Darwin's fox on Chiloé island and the carnivore community on the Chilean mainland). The DI project 11-013 has acted as catalyst for the conservation of biological diversity and endemic species in Chile. It has equipped the genetic laboratory at Universidad de los Lagos and has built local capacity in field ecology, epidemiology, GIS analysis and conservation genetics. However, students and staff require further teaching in the rapidly evolving techniques in conservation genetics and immunology.</p>

7. Describe briefly the proposed Darwin Scholar's current role within their organisation.

C. Briceño has been employed via Universidad de los Lagos as project co-ordinator of the DI project 11-013. Veterinarian by training, he is responsible for animal capture, animal welfare, health-screening and serology of Darwin's foxes and domestic dogs. As project co-ordinator, he supervises field work in ecology and general logistics. During the first two years of the project, he has received intensive training in epidemiology and introductory training in GIS and conservation genetics at the Institute of Zoology, London. During the third year (2004/5) he has started to train Chilean and South American veterinary students in capture, sedation and sampling methods in wildlife carnivore species. He has demonstrated to be an excellent teacher, capable to build and expand local capacity. In particular, he is the ideal candidate to provide capacity building not only for university students, but also for government organizations (e.g. SAG, the Chilean equivalent of DEFRA) and NGOs such as Bosque Modelo.

DI project 11-013 has built local expertise and capacity. After the end of the project, the main host country partner, Prof. Jiménez, will continue to build capacity, but this will address mainly university students. Sadly, there are currently no funds available at Universidad de los Lagos or elsewhere in Chile to support capacity building in the area of molecular genetics and immunology. C. Briceño will have plenty opportunities to work as a veterinarian in small-animal practices, but this would remove his vital expertise from active conservation of the Chilean biodiversity. A DI scholarship would not only further training and work expertise of C. Briceño in these fields vital for sustainable use and conservation of biodiversity, but would also assure that the gained training and expertise will directly foster training of university students, government institutions and NGOs active in conservation. Further, he will disseminate widely the information and knowledge gained during the DI project 11-013 and the Scholarship.

8. Provide a concept note on the Darwin Scholarship. This should include:

- a clear outline of the aim and objectives of the Scholarship
- the programme of work, including key milestones through the duration of the Scholarship and their timing
- the role of the UK applicant organisation, and others where relevant (including contacts)
- where appropriate, how the Scholarships will contribute towards sustainable development or sustainable livelihoods

INTRODUCTION: The DI-funded project *Conserving the critically endangered Darwin's fox on Chiloé Island, Chile (#11-013)* has conducted active research and conservation of Darwin's fox (*Pseudalopex fulvipes*) on Chiloé Island between 2002 and 2005. The project achieved so far:

- collection of essential baseline data on the distribution and density of foxes on Chiloé island, on disease threats by domestic dogs, population genetic structure, and human attitudes to conservation of foxes and Chiloé's biodiversity
- building local capacity in conservation biology, conservation genetics and epidemiology,
- establishing local infrastructure (wildlife laboratory, field stations, laboratory for genetics), and
- raising local awareness and enthusiasm for conservation on Chiloé Island.

Currently, the project summarizes the data collected and is devising conservation strategies. The project has successfully implemented exit strategies, which assure that research and conservation of the fox will continue after the end of the project. During a recent symposium in the capital of Chiloé (Castro, February 2005), two local NGOs, Bosque Modelo and Fundación Senda Darwin, have pledged not only to continue but to intensify public education and active conservation. The project identified four topics, which require further research, training and dissemination.

- (#1) Management of domestic dogs and their diseases. Over 75% of domestic dogs are free-roaming, are under no veterinary surveillance and pose a serious threat to human health by transmission of zoonotic disease and to biodiversity by introducing disease to foxes and other species, and by direct interference with endangered wildlife such as foxes and pudus. Intensified public awareness campaigns and the development and implementation of a management plan are urgently required.
- (#2) Molecular screening of genes involved in immune competence and resistance to diseases. Genetic screening could not confirm any genetic variability at mitochondrial DNA and microsatellite loci, thus identifying Darwin's foxes a species with extremely low genetic variability. We have screened one locus, involved in immune competence and resistance to diseases, namely the MHC locus DRbeta. Published data on mitochondrial DNA suggest that there is higher genetic variability in the tiny continental population of Nahuelbuta. This raises the possibility, that MHC variability is higher in Nahuelbuta. Translocation of foxes from Nahuelbuta to Chiloé island might increase immunocompetence, which might increase the likelihood that Chiloé's fox population will survive the introduction of canine distemper virus, which has led to local extinction in immunological naïve populations of Channel island foxes. Before the feasibility of translocations as a management strategy can be assessed, molecular screening at MHC loci is urgently required.
- (#3) Capacity building in molecular methods. Training courses held as part of project #11-013 has identified the urgent need for expertise. This will aid Chile to assess its rich genetic biodiversity and the impacts of introduction of exotic species (e.g. salmon) and disease.
- (#4) Establishment of a captive breeding population. This requires genetic screening, but all but one genetic markers tested so far are not variable. One MHC locus (see above) has been identified to be variable. Further loci need to be identified to allow genetic monitoring of free-ranging and captive foxes.

AIMS: The scholarship aims primarily at capacity building in molecular screening and immunology (see #2 above). Training will produce data on MHC variability in free-ranging foxes (see #3 above) and a baseline methodology for the assessment of future population management strategies by translocation (#3) and captive breeding (#4). The scholar will disseminate the benefits of the scholarship on return to Chile. During dissemination, awareness for management of domestic dogs (see #1 above) will be raised using outreach materials produced by project 11-013.

WORK PLAN and KEY MILESTONES:

Sept – October 2005: Trapping of foxes in Nahuelbuta National Park. Train 5 to 10 Chilean veterinary students in the field, in capture, sedation and sampling methods in wildlife carnivore species. Disseminate outreach materials to dog owners. Milestones: (1) Five foxes captured and sampled, (2) five to 10 Chilean students trained, (3) outreach materials disseminated to at least 40 dog owners in the vicinity of the National Park and to shops in all villages near the National Park.

November 2005 – January 2006: Training in advanced methodologies of molecular immunology and molecular genetics: cloning, screening methods (TGGE), sequencing. Preparation of a course manual for Chilean students in Spanish on these techniques. Milestone: (4) Course manual prepared.

February 2006: All samples from Nahuelbuta National Park screened for the MHC locus DRbeta, 16 microsatellite loci and two mitochondrial DNA loci used during project 11-013.

March – May 2006: Developing screening methodology for at least one additional MHC locus (DQalpha) using cloning, sequencing and TGGE. Screening of all samples from Nahuelbuta National Park and 40 samples from Chiloé, collected during project 11-013. Milestones: (5) Screening methodology developed for one MHC locus, (6) all samples from Nahuelbuta National Park and 40 samples from Chiloé screened.

June 2006: Analysis of results. Milestone: (7) Manuscript prepared for circulation to the two supervisors.

July – August 2006: Knowledge transfer to Chile. Milestones: (8) Organise a practical workshop on conservation genetics and conservation immunology at Universidad de los Lagos, Osorno. (9) Organise a conference on conservation genetics and conservation immunology at the Faculty of Veterinary Sciences of Universidad de Chile, Santiago, for Chilean Veterinary and Biology students. (10) Organise a workshop for SAG personnel and CONAF park rangers into monitoring techniques, epidemiology and rehabilitation of wildlife species. (11) Two short interviews in one or two local radio stations. (12) One press release..

Role of the UK applicant organisation: Supervision in field and laboratory work (see section 5).

9. Legacy. Provide information on how the Darwin Scholar will utilise, promote and disseminate the benefits of the Scholarship on return to his/her home country. Will a strategy be developed during the Scholarship to ensure this is achieved?

The Darwin Scholar has received intensive training in epidemiology and introductory training in GIS and conservation genetics at the Institute of Zoology, London, during the first two years of the DI project 11-013. The Darwin Scholar, through this Scholarship, will receive in-depth academic and practical training in molecular genetics and immunology, in order to improve his skills. This will allow the scholar to play a pivotal role in conservation in his country.

The scholarship will use UK expertise (Dr Knapp and Dr Funk, see above). The scholar will receive high-quality scientific training in modern molecular technologies in molecular genetics and immunology, which has not been used in Chile for conservation, and will transfer knowledge of to Chile. The proposed Darwin Scholar will promote the continuation of the conservation of Chile's biological diversity through this study maintaining the liaison with host governmental and non governmental organisations such as SAG (Chile's Livestock and Agriculture Bureau), CONAF (Chile's Bureau in charge of National Parks administration), Universidad de los Lagos, Universidad de Chile and Bosque Modelo (NGO).

Dissemination will be through two workshops, one conference, one-to-one training in the field and, and raising public awareness as outlined in section 8.

10. How will the Scholarship assist the Scholar's organisation and/or local communities and/or home country in working towards the objectives (or implementation) of the Convention on Biological Diversity? References to the Convention should be specific, for example, by referring to articles, cross-cutting or thematic issues¹.

Through the co-operative support from both, English and Chilean institutions (article 5 and 18.1), the Scholarship will allow the continuation of research and conservation of the endangered Darwin's Fox by research in the field of molecular genetics and immunology, capacity building and raising of awareness for conservation. The proposed scholarship will promote a high-quality scientific programme and support training and education using facilities at Cambridge University and expertise at Cambridge University and Nature Heritage. Such facilities and expertise are not available in the host country as stated in the CBD in article 12 (a and c). In this respect, the Scholarship will help to identify conservation threats for the species through the work in the field (article 7.c) and will promote the protection in its habitat (article 8.d) through diffusion and close contact with governmental, local communities and Chilean academic institutions (article 13.a).

Recognising the importance of article 15.1. Export of biological samples to the UK for analysis will follow national legislation and CITES authorisation (Darwin's foxes are listed in CITES II). The proposed scholar will conduct the analyses in Cambridge following article 15.6.

Through the proposed conference and workshops for students, workshops for governmental institutions and NGOs, and meetings with local communities, the scholar aims to strengthen national capability and development, as suggested in article 18 (2 and 4). This and the publication in a scientific journal will achieve wide dissemination and exchange of information (Article 17).

Finally, the Darwin's Fox is an endemic species and is almost exclusively restricted to an island, which makes it to be highly vulnerable to extinction risk (article 20.7).

11. What collaboration has there been with the Darwin Scholar to date in developing the proposal and what collaboration is planned for the duration of the Scholarship? Where relevant, describe any consultation or collaboration by the proposed Scholar within his/her own country.

C. Briceño was employed by the DI project 11-013 as veterinarian and project co-ordinator. Early on, he developed own initiatives to (a) further his own training and (b) to disseminate his own expertise. During 2004/5, he keenly developed the application for a scholarship. To this end, C. Briceño contacted and received support from Universidad de los Lagos (Prof G. Gajardo – letter of support attached), SAG (Mt M. Stutzin, director for conservation; Chile's Livestock and Agriculture Bureau), and the Veterinary Faculty of Universidad de Chile.

Collaboration is planned for the duration of the Scholarship in form of intensive supervision by Dr Knapp (Cambridge University) and Dr Funk (Nature Heritage) as outlined above. The training courses and dissemination activities described in sections 8 and 9 will be planned in collaboration with all institutions involved.

12. Provide details of the Darwin Initiative project that the proposed Scholar was involved in, including his/her role in that project and any ongoing involvement.

Conserving the critically endangered Darwin's fox on Chiloé Island, Chile (11-013). The Darwin's fox (*Pseudalopex fulvipes*) is critically endangered and is considered the species with the highest extinction risk in Chile. Aside from limited ecological studies, no information on population structure and conservation threats posed by the increasing sympatric domestic dog population exists. UK experts in population ecology, genetics and disease epidemiology (Institute of Zoology) will train, act as consultants, and collaborate with Chilean scientists (Universidad Los Lagos) and conservation organisations (Senda Darwin Foundation, Bosque Modelo Chiloé, Comunidad Ahuenco) to collect essential baseline data, to devise conservation strategies, to develop expertise - which in turn will facilitate local capacity required for conservation of Chile's biodiversity - and to raise local awareness and enthusiasm for conservation on Chiloé Island.

C. Briceño has been employed via Universidad de los Lagos as project co-ordinator of the DI project 11-013 (details in section 7).

¹ Refer to the Guidance Notes for Applicants for further information

13. Duration of the Scholarship: what is the intended start and finish date.

1 September 2005 to 31 August 2006

14. Where will the Darwin Scholar be based? Please be specific with organisational details and dates (where more than one location).

Sept – October 2005: Field work in Chile for animal capture and training of students by the scholar (Chiloé Island and Nahuelbuta)

November 2005 to Mai 2006: Cambridge University. Training of scholar

July to August 2006: Osorno and Santiago, Chile. Dissemination and training by scholar.

15. Financial Aspects.

Scholar payment			
London: £1200/month	Number of months 0	2005/6 £	2006/7 £
UK (outside London): £1000/month	Number of months 8	£	£
Overseas location £800/month*	Number of months 4	£	£
Host Organisations' costs			
UK: £200/month	Number of months 8	2005/6 £	2006/7 £
Overseas location: £200/month*	Number of months 4	£	£
A. Total Scholar & Host Organisation Costs		£	£

Actual travel costs		
Return airfare. <i>Details</i> Osorno-Santiago-London	2005/6 £	2006/7 £0
Travel to/from airports. <i>Details</i> £20 Chile, £40 in the UK	£	£
Visas etc. <i>Details</i> None	£0	£0
B. Total Scholarship Travel Costs (Actual costs up to £2000 will be paid)	£	£

TOTAL SCHOLARSHIP COSTS (A + B)	£	£
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16. Other sources of funding: provide details and amounts

Salary in kind for Dr Knapp at Cambridge University. Bench fees and laboratory consumables in kind at Cambridge University (approx £

Salary in kind for Dr Funk at Nature Heritage.

* Figures available from Darwin@defra.gsi.gov.uk

FCO NOTIFICATION

Please check the box if you think that there are sensitivities that the Foreign and Commonwealth Office will need to be aware of should they want to publicise details of the Darwin Scholarship and the resultant work in the UK or the Darwin Scholar's home country

CERTIFICATION

I certify that, to the best of our knowledge and belief, the statements made by us in this application are true and the information provided is correct. I am aware that this application form will form the basis of the project schedule should this application be successful.

I enclose a copy of the organisation's most recent audited accounts and annual report, CVs for project principals and letters of support.

Name (block capitals)	Dr L Knapp
Position in the organisation	

Signed

Date:

Please return completed form to The Edinburgh Centre for Tropical Forests (ECTF) by 18 March 2005 by email to darwin-applications@ectf-ed.org.uk. Where it is not possible to send the full application in electronic form (for example if signed references are not available electronically), a hard copy of the full application should also be sent to ECTF, Darwin Applications Unit, Pentlands Science Park, Bush Loan, Penicuik, Edinburgh EH26 OPH.