



Centre for Ecology and Conservation

# Annual Report 2012



# Welcome

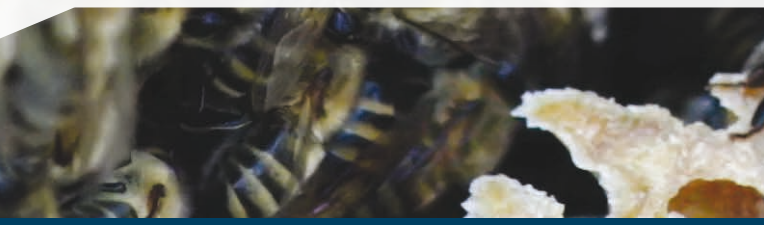


I am very pleased to be able to testify that 2012 was another bumper year in terms of teaching, research, outreach, staff appointment and promotions. One of the major factors contributing to the exceptional 2012 success of the CEC was the outrageous year enjoyed by Brendan Godley. In addition to his conservation prize and promotion (see later in this report), he was also elected to the council of Fauna and Flora International. Truly an *annus mirabilis*. This year we also saw the introduction of a more joined-up structure within the College of Life and Environmental Sciences (CLES) on the Cornwall Campus, bringing the CEC and Geography Cornwall closer together operationally. This has worked well and we hope to streamline operations as we move forward.


Student numbers within the Centre were again very buoyant, both at undergraduate and masters levels, and two of our new programmes had their first student intakes in 2012. Recruitment was tough in the Higher Education sector last year but the CEC continues to do well, and numbers for 2013 look very good. All of our teaching has been helped by the provision of great new teaching spaces on campus, including the wonderfully refurbished CLES teaching laboratory, which opened in the second half of 2012 (thanks Nick Baker – and for the full story see later in the report). In addition to its role in training University of Exeter students, we plan to use this space to engage with local schools and trial some of our ambitious outreach plans. CEC students also continued their excellence in 2012, running great societies, contributing to outreach events, producing first-class science and winning more than their fair share of accolades and prizes. For example, third year student Emma Inzani won the South West Lakes Trust's Conservation Volunteer of the Year award, while Beth Heasman won third prize for her talk at the Mammal Society Student Conference, a great achievement

considering she was the only undergraduate at the conference.

Once again we attracted some amazing new staff, and were joined by Camille Bonneaud, Celine Frere, Shakti Lamba, Alex Thornton, Lena Wilfert and Alastair Wilson, who added strength to each of our major research and teaching themes, and brought a range of new skills, approaches and systems to the Centre. We hope to welcome additional research and teaching staff of a similar calibre in 2013. Leigh Kitto, Stephen Sharpe, Alison Skeats and Drew Wilson joined our Professional Services staff and Gail Reeves was appointed to the post of Assistant College Manager for CLES Cornwall. We were also delighted that both Sarah Hodge and Andy Pye were promoted to Senior Lecturer. In addition, we welcomed a number of colleagues from the Environment and Sustainability Institute (ESI) into CLES Cornwall this year and with the ESI close to fully operational, biological and environmental science in Cornwall is looking very strong.







This strength is reflected in the incredible funding successes for CEC over the last year, including winning external and internal support to increase the student experience and outreach activities. Funders included The Royal Society, NERC and the EU; in total the Centre secured approximately £3.18 million in 2012. In addition to this exceptionally good indicator of our research quality, staff again produced a range of outstanding publications, with work published in journals like *Nature*, *Ecology Letters*, *Molecular Ecology*, *Evolution* and *Proceedings B*. We also expanded our research facilities, adding a new aquatic facility and more general research space, but in spite of this, our growth continues to out-strip supply, something we need to address in 2013. The CEC also witnessed the graduation of five PhD students during 2012. The research and teaching contribution of our PhD students is considerable, and in addition to celebrating their successes and wishing them well once they leave us, we also thank them for helping to make the CEC the vibrant and exciting scientific hub that it is.

We also launched our Athena SWAN drive as part of the University's push to obtain Athena SWAN Silver Awards for its STEM programmes. This has

already yielded results, providing us with clear indicators of the measures we need to put in place to encourage women in science and help retain them through career progressions that currently represent cliff-edges. We have been ably helped in this by a group of staff just beginning their academic careers and there have been notable changes, including a large increase in the number of permanent female academic staff in the Centre. The CEC, as part of CLES Cornwall, has been chosen as the first discipline in the University to apply for the Silver Award, something of which we are very proud.

Here at the start of 2013, it is easy to reflect on 2012 and distinguish the many highlights, but it is also easy to see how the successes of the Centre, and of CLES Cornwall and of the Cornwall Campus as a whole, will continue into the future, especially if we keep investing in great students and staff. To all the staff and students that make up the Centre for Ecology and Conservation, thank you very much for all the work during the last 12 months and here's to the future.

**Professor David Hosken – Centre Director  
University of Exeter, Cornwall Campus**

**“In total the Centre secured approximately £3.18 million of funding in 2012.”**

# Research Highlights

## Predicting lifespan

New research by **Jon Blount** and a team from the University of Glasgow shows that a good indicator of lifespan can be obtained in early life using the length of the telomere caps. These caps protect the ends of the chromosomes and hence the genes that contain the genetic code. Aging occurs as these caps wear out. Longer caps mean longer life. (Published in *Proceedings of the National Academy of Sciences USA*.)

## Predators hunt for a balanced diet

Work led by **John Hunt** and **Kim Jensen**, and a team from the universities of Oxford, Sydney, Aarhus and Massey, has shown that predators select their prey in order to eat a nutritionally balanced diet and give themselves the best chance of producing healthy offspring. The work shows for the first time that predatory animals choose their food on the basis of its nutritional value, rather than just overall calorie content. (Published in *Proceedings of the Royal Society B*.)

## Safeguarding Ascension Island's wildlife

A team led by **Annette Broderick** and **Brendan Godley**, have won Defra Darwin Initiative funding to lead this pioneering conservation project in partnership with the Ascension Island Government. The Centre for Ecology and Conservation team will lead an international partnership, including the Centre for Ecology and Hydrology, Queen Mary University London, the Royal Society for the Protection of Birds, the Royal Botanic Gardens Kew and the University of Lund Sweden, to develop the island's first Biodiversity Action Plan. This will include the first full inventory of all plant and animal species found on the Island.

## Helping family is key for social birds

Work by **Andy Russell** and researchers from the universities of New South Wales and Cambridge has shown that social birds, forgoing breeding to help to raise the offspring of other group members, are far more likely to care for their own close relatives than for more distant kin. The research provides information useful in understanding the origins of cooperation in social species, including humans, and generates new insights into understanding why some individuals cooperate with each other for a common good rather than pursuing their own selfish reproductive agenda. (Published in *Proceedings of the Royal Society B*.)

## Infection within families drives diversity in immunity

Work led by **Mike Boots** with colleagues from the University of Liverpool and Heriot-Watt University, has shown that the increased risk of infection with disease that occurs within related social groups can select for considerable diversity in the level of immunity within the host population. This is a new explanation for the maintenance of diversity in host populations and this diversity is well known to have important implications to the epidemiology, evolution and control of infectious disease. (Published in *Ecology Letters*.)

## Females bias offspring sex-ratio to avoid producing low quality young

A study by **David Hosken** in collaboration with a team from Okayama University has shown that female beetles can adaptively bias the sex-ratio of their offspring. Females do this to offset costs associated with sexual conflict, evolutionary conflicts between males and females, and hence maximise their fitness by producing more high quality young. (Published in *Ecology Letters*.)

## Promiscuous exchange of mimicry adaptations

'Good' species are regarded as those that never inter-breed. However recent work by **Richard ffrench-Constant**, in collaboration with the international *Heliconius* Genome Consortium, has shown that mimetic butterflies of the genus *Heliconius* can in fact swap large sections of their genome between species. This promiscuous exchange occurs in rare matings between species where the traits under selection (mimetic pattern elements) are subject to strong natural selection via bird predation. (Published in *Nature*.)

## Social networking increases fitness in birds

New research carried out by **Nick Royle** and scientists at universities in France and Switzerland reveals the importance of social networking in producing a successful family. Regardless of how big and healthy individual chicks are, what really matters to their chances of surviving and breeding is how siblings in the nest interact with each other, with cooperative families faring best. (Published in *Proceedings of the Royal Society B*.)



Dr Jon Blount investigating lifespan in the laboratory.



Ground beetle on the hunt for a balanced diet.



Dr Annette Broderick at work with turtles.



Helping family is key for social birds (Chestnut-crowned babbler).



Infection within families drives diversity in immunity.



Female beetles can adaptively bias the sex-ratio of their offspring.



*Heliconius melpomene melpomene*.





## Developing new tools for conservation and wildlife management

A team lead by **Dave Hodgson** and **Iain Stott**, along with Stuart Townley from the ESI, has developed new software tools to help prioritise conservation efforts. As well as determining which species need help, it can also be used in pest control and sustainable harvesting. The software, called 'Popdemo' is free to anyone and, although it is based on complex mathematical models, it is easy to use. Popdemo adds to the established 'R' project, which provides free and powerful software, for statistics and modelling, to scientists and environmental groups worldwide. (Published in *Methods in Ecology & Evolution*.)

## New year detox

**Angus Buckling**, with help from **Dave Hodgson**, and **Richard French-Constant** and other researchers from the University's Streatham Campus in Exeter, has won five years of funding from AXA Insurance to apply evolutionary theory to the problem of heavy metal soil contamination. By simply changing the soil pH, the researchers can force soil bacteria to produce decontaminating molecules that detoxify the environment for the whole community. This work has the potential to revolutionize soil detoxification and has special relevance for mining sites.

## One extinction leads to another

When a carnivore becomes extinct, other predatory species could soon follow according to research led by **Frank van Veen**. His study shows how the demise of one carnivore species can indirectly cause another to become extinct and indicates that any extinction can create a ripple effect across a food web, with far-reaching consequences for many other animals. The work adds to growing evidence that a 'single species' approach to conservation, for example in fisheries management, is misguided. Instead the focus needs to be holistic, encompassing species across an entire ecosystem. (Published in *Biology Letters*.)

### CASE STUDY

## Research with Impact: Turtle Conservation

**Annette Broderick** and **Brendan Godley**, two long-time members of the Centre for Ecology and Conservation, lead an international team of conservation biologists working to preserve sea turtle populations around the world.

Their work has driven national and international conservation policy, raised substantial funding for conservation and, importantly, engaged millions of people worldwide. Governments including the UK, Cayman Islands, Cyprus and Gabon, have made use of their research to inform both legislation and management decisions.

The success of the Broderick and Godley team has been amplified by development of open-access animal tracking tools, in partnership with the NGO [seaturtle.org](http://seaturtle.org), resulting in a global tracking-network involving 135 countries, with more than 300 projects tracking animals from 118 species.

The possibility of adopting tracked animals online has engaged millions of people and raised funding for conservation projects worldwide. The turtle projects also form an integral part of the CEC's teaching programme, with students having the opportunity to spend time engaging in a wide range of important conservation ventures, from recording wild-turtle numbers to releasing hatchlings.



Social networking increases fitness in birds.



New software is helping to protect the Sandhill rustic moth.



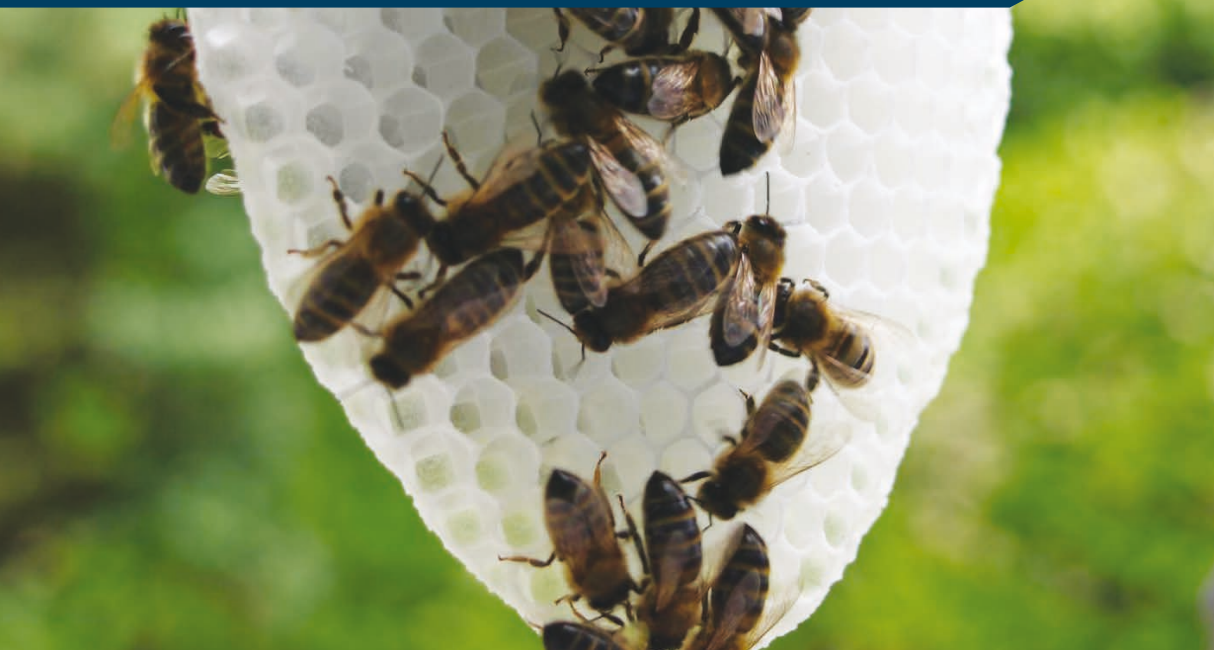
Researching the problem of soil contamination.



Parasitoid wasp attacking aphid attached.



# Student Societies



## Ecosoc

is a society for all students interested in ecology and conservation of wildlife. We run regular and varied events ranging from bird trips to small mammal surveys and dragonfly conservation days. We aim to create opportunities for our members to learn more about the species we have in Cornwall, gain skills in surveying and identification, and promote wildlife conservation to our local community. We work closely with Cornwall's local wildlife groups to enable our members to learn from the experts! Last summer saw the first ever Bioblitz at the Cornwall Campus, a 24 hour event surveying the flora and fauna of our campus to encourage our local community, schools and students to get excited about the species we have on our doorstep. This year we are very pleased to have been awarded funding to set up a long-term moth monitoring project at our local reservoirs. Over the coming months we will be beginning this monitoring alongside local wildlife groups and organising the next big Bioblitz of the Cornwall Campus and our local reservoirs!

## The Bioscience Student Employability Committee (BSEC)

is a student-led committee now in its third year. We aim to encourage students to think about their future careers and for them to find out about how they can get to where they want to be. We organise an annual Careers fair for over 200 students and a weekly seminar series where students can network with the speaker. So far speakers have included people from the BBC Natural History Unit, National Trust, Cornwall Council and even a Polar Explorer. Following our events, students have successfully organised work experience with organisations that have given talks for us.

## The Expedition Society

is one of the most active and exciting societies on campus. During term time, members explore the local landscape by boot and boat, visiting locations not just in Cornwall, but also further afield in Scotland and Wales. Highlights from the last 12 months include a caving trip in the Brecon Beacons, a hiking and kayaking trip in the Lake District and a visit to the RGS Explore event in London. In the summer, students have been setting up

expeditions abroad, with this summer's exciting scientific research expedition in Cambodia, Expedition Samloem 2013, following up the incredibly successful Heart of Borneo Project.

## BeeSoc

started at the beginning of 2011 due to student interest in the recent decline in bee numbers and the introduction of new pests and diseases to the local honey bee populations. We have over 60 members, and secured funding from both the FXU Students' Union and the Exeter Annual Fund. Over the last two years this funding has been used to purchase equipment and set up four hives, and we are now building a state-of-the-art observatory hide using the design skills of Falmouth University students. Successful recent events have included an Introduction to Bee Keeping course with a local bee keeper; free screenings of bee-related films such as "Who Killed the Honeybee?"; and popular research seminars with speakers such as Juliet Osborne and Lena Bayer-Wilfert. After the popularity of wildflower planting workshops involving local schools last spring, similar events will be repeated again this season, along with the usual practical bee keeping sessions, bee-themed social events and solitary bee nest building.

# Athena Swan Charter

**This year the University of Exeter achieved the Athena SWAN Bronze Award, putting progressive policies in place aiming to improve the recruitment, retention and promotion of women in Science, Engineering and Technology (SET).**

Forward thinking policies such as individual mentoring, student and staff networking and more transparency in our promotional process are all important elements in our vision of a completely fair and balanced department in which world class research and teaching can thrive.

This year CLES in Cornwall has gone a step further and will be applying for the Athena SWAN Silver Award.

We have set out an action plan to overcome the obstacles that are in the way of some female scientists progressing into a successful academic career. These include ensuring that all of our staff have the ability to work flexibly around caring for their children, giving women more time to catch up on research after maternity leave and making sure that we have a simple and transparent promotional process.

We believe that a fair and balanced workforce will benefit everyone in our College and attract the very best students and academics from our rich and diverse society.

To find out more about Athena SWAN and to see the many initiatives we are putting in place visit <http://biosciences.exeter.ac.uk/cec/athenaswan>

## Funding Awarded during 2012

The CEC secured many significant grants in 2012, and in what has been a difficult funding year we continued to secure funding from a broad range of providers, including the Natural Environment Research Council (NERC), the Royal Society, the European Union and the Food and Environment Research Agency (FERA).

A brief snap-shot of some highlights from last year include, a Darwin award to Annette Broderick and Brendan Godley to implement a Biodiversity Action plan for the Ascension Islands and a Marie Curie grant to Frank van Veen to study the processes that determine the composition of soil invertebrate communities at different spatial scales. NERC grants were awarded to (amongst others): Mike Cant to study co-operation in mammals; Angus Buckling to study host-parasite co-evolution; Mike Boots to research the evolution of host resistance to parasites; and to Britt Koskella to study spatial patterns of co-evolution. Dave Hodgson and Andy Young and teams secured funds from FERA to work with them on a series of badger projects.

We are also very proud of the fact that we were the only University to receive two grants (in the same category) from the European Research Council – to Stuart Bearhop and Mike Cant (see separate report on this).

## Opening of the Life and Environmental Science Teaching Lab



2012 saw the extension and refurbishment of our state-of-the-art teaching laboratory alongside significant investment in iPad technology that is now fully integrated in to our teaching programmes in the lab, classroom and in the field.

The teaching lab was officially opened in December by broadcaster and naturalist Nick Baker at a launch also attended by teachers from all our local schools. In 2013 we will work closely with teachers to explore future engagement, including how we can support them with teaching, as well as inspire their students to aim for university and future careers in science.



# Science in the Square



**I**n 2012 staff and students from across CLES Cornwall were delighted to take part in Henry Lloyd Falmouth Week for the first time by hosting an ambitious science-expo in Falmouth's Events Square. An estimated 2,000 visitors of all ages attended 'Science in the Square' which was structured around five zones along with interactive presentations on meerkats, bats, bird migration and examining the Earth from space.

A host of hands-on activities in the zones gave the packed audience a chance to use microscopes, make satellites, examine skulls and to come face-to-face with cockroaches, birds of prey and local marine life. Our younger visitors enjoyed

the free bouncy castle, had their faces painted and took part in craft activities inspired by the natural world.

The event was a fantastic opportunity for us to share with local people and holiday-makers the amazing science that is happening here in Cornwall. We were overwhelmed by the number of people who came to the event and by the extremely positive responses we received. This was a chance for us to give something back to the local community that supports us in so many ways and we would like to take this opportunity to thank everyone again who helped make the event a success. We'd also like to thank the organisers of Henri Lloyd Falmouth Week and South West Bars for their invaluable support. Plans are already afoot for Science in the Square 2013!





# Awards and prizes

## Whitley Award

**Joanna Alfaro Shigueto**, a Research Fellow working closely with the Turtle Group, has been awarded the prestigious Whitley Award for inspirational conservation leadership by HRH The Princess Royal (Princess Anne). Originally from Peru, Joanna is a recent graduate of the Centre for Ecology and Conservation and is currently working with CEC colleagues on a project funded by the Darwin Initiative which involves working with fishermen, non-governmental organisations and national fisheries agency in Peru to promote the conservation of marine biodiversity and sustainable fishing.

## European Research Awards

**Stuart Bearhop** and **Michael Cant** both received major research awards in 2012, as the European Research Council awarded them both Consolidator Grants. They are the only two academics in their category to be awarded grants at the same university, bolstering the Centre's international reputation as a cutting-edge research hub.

Stuart's research will track large numbers of migrating geese and will assess for the first time how a wide range of factors impact on them throughout the whole annual cycle. Migration is one of the most dramatic phenomena in nature, and this research will provide a deeper insight and could help shape future management and conservation.

Michael's research will focus on patterns of development in wild banded mongooses. These are excellent study animals because they live in highly social groups in which all group members cooperate to rear offspring. He will examine how care and attention received early in life affect the health of individual mongooses across their lifespan.

## Brendan Godley, a ZSL Award Winner

Every year the Zoological Society of London presents awards for achievement in the field of Conservation and Zoological research. These highly prestigious awards are presented to only absolutely outstanding individuals in the areas covered by the awards. This year Brendan Godley received the 2011 Marsh Award for Marine and Freshwater Conservation in recognition for his world-leading conservation research. This is a tremendous accolade for Brendan and it is wonderful for the CEC and the University of Exeter to be home to such dazzling academics.

Previous winners of Zoological Society prizes at the Centre for Ecology and Conservation include Sam Weber (Thomas Henry Huxley Award and Marsh Prize) and Angus Buckling (Scientific Medal).

## Prize Winners

MSc student **Joanna Hancock** won the Archie Carr Student Award for Best Conservation Poster at the International Sea Turtle Symposium in March.

**Jenni Graham** won Best Poster and **Matt Perkins** was runner-up for Best Student Talk at the FERA Congress in March.

**Andy Robertson** won best talk at the Association for the Study of Animal Behaviour Meeting at Easter.

**Cheryl Mills**, **Andy Robertson** and **Beth Heasman** won 1st, 2nd and 3rd prizes at the Mammal Society Student Conference in June.

**Dr Megan Head** and **Dr Amber Teacher** won 2nd prize in the NESCent Evolution Film Contest, at the Evolution 2012 Congress in July.

**Emma Inzani** won the South West Lakes Trust Conservation Volunteer of the Year.

The following students were awarded prizes at our Graduation ceremony in July:

### Undergraduate:

Dean's Commendations – **Samantha Andrews**, **Elizabeth Heasman**, **Adele Pinnock**

CEC Commendations – **Lee Bassett**, **Frasier Bell**, **Jack Boyle**, **Alan Smith**, **Claire Young**

Oxford University Press Award – **Ben Toulson**

Society of Biology Award – **Adele Pinnock**

ZSL Charles Darwin Award – **Anna Rogers**

### Postgraduate:

Dean's Commendations for exceptional performance – **Michael Hawkes**

*MSc Conservation and Biodiversity 2011/12:*

Best Overall MSc Mark – **Thomas Clay**

Best Overall Research Project Module Mark – **Kimberley Lees**

Outstanding Contribution – **Andrew Collins**

*MSc Evolutionary and Behavioural Ecology 2011/12:*

Best Overall MSc Mark AND Best Overall Research Project Module Mark – **Michael Hawkes**

Outstanding Research Project – **Sarah Lane**

*MSc Applied Ecology 2011/12:*

Outstanding Contribution – **Sarah Ive** and **Frank McCall**

### Congratulations to the following CEC students who were awarded PhDs in 2012:

**Joanna Alfaro Shigueto**. Thesis title: Ecology and Conservation of Sea Turtles in Peru

**Jeffery Mangel**. Thesis title: Interactions of Peruvian Small Scale Fisheries with threatened Marine Vertebrate Species

**Nicola Reed**. Thesis title: Quantifying Contact Rates and Space Use in the Eurasian Badger (*Meles meles*): Implications for the Transmission of Bovine Tuberculosis

**Jan Stipala**. Thesis title: Chameleon Diversity in the Highlands of East Africa

**Iker Vaquero Alba**. Thesis title: Animal Sexual Signals: Do They Maximise or Optimise Information Content?



# Selected Highlights

## Shakti Lamba, at the Wissenschaftskolleg zu Berlin

Between September and December 2012 Dr Lamba worked on a project entitled "Banking on Cooperation: Testing Evolutionary Theories of Cooperation by Examining the Real-Life Cooperative Dilemma Created by Microfinance".



Shakti explained, "A substantial body of theory has focused on explaining the evolution of cooperation. Yet there has been relatively little empirical work evaluating the extent to which existing theory explains the behaviour of individuals facing real-life cooperative dilemmas. This project tested the validity of evolutionary models of cooperation by studying how individuals behave in the high-stakes, real-life cooperative dilemma created by microfinance and cooperative banking".

## Brendan Godley, Inaugural Professorial Lecture

Brendan was one of the founding members of the Centre for Ecology and Conservation and this made his Inaugural Professorial Lecture all the more poignant and enjoyable. He joined the fledgling Centre in 2003 and since then has been central to all its successes, in teaching, staff-hires and research. His energy, commitment and drive, coupled with his vivacity and gregariousness, have set the tone for all those who followed, and it has been wonderful to witness Brendan's career flourish since his arrival at the University.

Brendan is a conservation biologist who primarily concentrates on marine environments, with special interest in marine turtles and other marine vertebrates.

His talk was introduced by one of his best friends, Professor Stuart Bearhop and featured the many people who have helped and influenced Brendan's illustrious career to date. The evening was capped off with a meal in Falmouth at which staff, students and friends celebrated this wonderful achievement, which was the culmination of a truly exceptional academic year for Brendan.

## Professor Nina Wedell, becomes President of the International Society for Behavioural Ecology

The International Society for Behavioural Ecology (ISBE) was established in 1986 and enjoys a large membership from around the globe. It is a Learned Society run by members of the behavioural ecology research community and this year Nina Wedell secured the position of President-elect and will take up the society's Presidentship in 2013. This extremely prestigious appointment recognises the importance of Nina's work within behavioural ecology and is testament to the very high regard the community has for her and her research.





# Selected CEC Publications from 2012



**Archer CR**, F Zajitschek, SK Sakaluk, **NJ Royle** and **J Hunt**. 2012. Sexual selection affects the evolution of lifespan and ageing in the decorated cricket *Grylodes sigillatus*. *Evolution* **66**:3088-3100.

Bailey NW and **AJ Moore**. 2012. Runaway sexual selection without genetic correlations: social environments and flexible mate choice initiate and enhance the Fisher process. *Evolution* **66**:2674-2684.

**Bonneaud C**, SL Balenger, J Zhang, SV Edwards and GE Hill. 2012. Innate immunity and the evolution of resistance to an emerging infectious disease in a wild bird. *Molecular Ecology* **21**:2628-2639.

**Boots M**, A White, **A Best** and R Bowers. 2012. Diversity in host resistance: the importance of who infects whom. *Ecology Letters* **15**:1104-1111.

**Cant MA**. 2012. Suppression of social conflict and evolutionary transitions to cooperation. *American Naturalist* **179**:293-301.

Cristescu R, **CH Frère**, P Banks. 2012. How successful is mine rehabilitation for fauna? Mine rehabilitation and fauna: current status and future direction. *Biological Conservation* **149**:60-72.

**Dall SRX**, AM Bell, DI Bolnick and FLW Ratnieks. 2012. An evolutionary ecology of individual differences. *Ecology Letters* **15**:1189-1198.

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Harrison PW, JE Mank and **N Wedell**. 2012. Incomplete sex chromosome dosage compensation in the Indian meal moth, *Plodia interpunctella*, based on *de novo* transcriptome assembly. *Genome Biology and Evolution* **4**:1118-1126.

Heidinger BJ, **JD Blount**, W Boner, K Griffiths, NB Metcalfe and P Monaghan. 2012. Telomere length in early life predicts lifespan. *Proceedings of the National Academy of Sciences USA* **109**(5):1743-1748.

Henri DC, D Seager, T Weller and **FJF van Veen**. 2012. Potential for climate effects on the size-structure of host-parasitoid indirect interaction networks. *Philosophical Transactions of the Royal Society B* **367**:3018-3024.

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**Koskella B**, DM Lin, **A Buckling** and JN Thompson. 2012. The costs of evolving resistance in heterogeneous parasite environments. *Proceedings of the Royal Society B* **279**:1896-1903.

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**Lamba S** and R Mace. 2012. Behavioural variation needs to be quantified at multiple levels. *Proceedings of the National Academy of Sciences USA* **109**:E34-E34.

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Morrissey MB, CA Walling, **AJ Wilson**, JM Pemberton, TH Clutton-Brock, LE Kruuk. 2012. Genetic analysis of life-history constraint and evolution in a wild ungulate population. *American Naturalist* **179**:E97-114.

**Royle NJ**, TW Pike, P Heeb, H Richner and M Koelliker. 2012. Offspring social network structure predicts fitness in families. *Proceedings of the Royal Society B* **279**:4914-4922.

Scott R, **DJ Hodgson**, **MJ Witt**, MS Coyne, W Adnyana, JM Blumenthal, **AC Broderick**, AF Canbolat, P Catry, S Ciccione, E Delcroix, C Hitipeuw, P Luschi, L Pet-Soede, K Pendoley, PB Richardson, **AF Rees**, **BJ Godley**. 2012. Global analysis of satellite tracking data shows that adult green turtles are significantly aggregated in Marine Protected Areas. *Global Ecology and Biogeography* **21**:1053-1021.

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**Wilfert L** and FM Jiggins. 2012. The dynamics of reciprocal selective sweeps of host resistance and a parasite counter-adaptation in *Drosophila*. *Evolution* DOI:10.1111/j.1558-5646.2012.01832.x

**LI Wright**, WJ Fuller, **BJ Godley**, **A McGowan**, **T Tregenza**, **A Broderick**. 2012. Reconstruction of paternal genotypes over multiple breeding seasons reveals supra-annual breeding intervals of male green turtles. *Molecular Ecology* **21**:3625-3635.

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