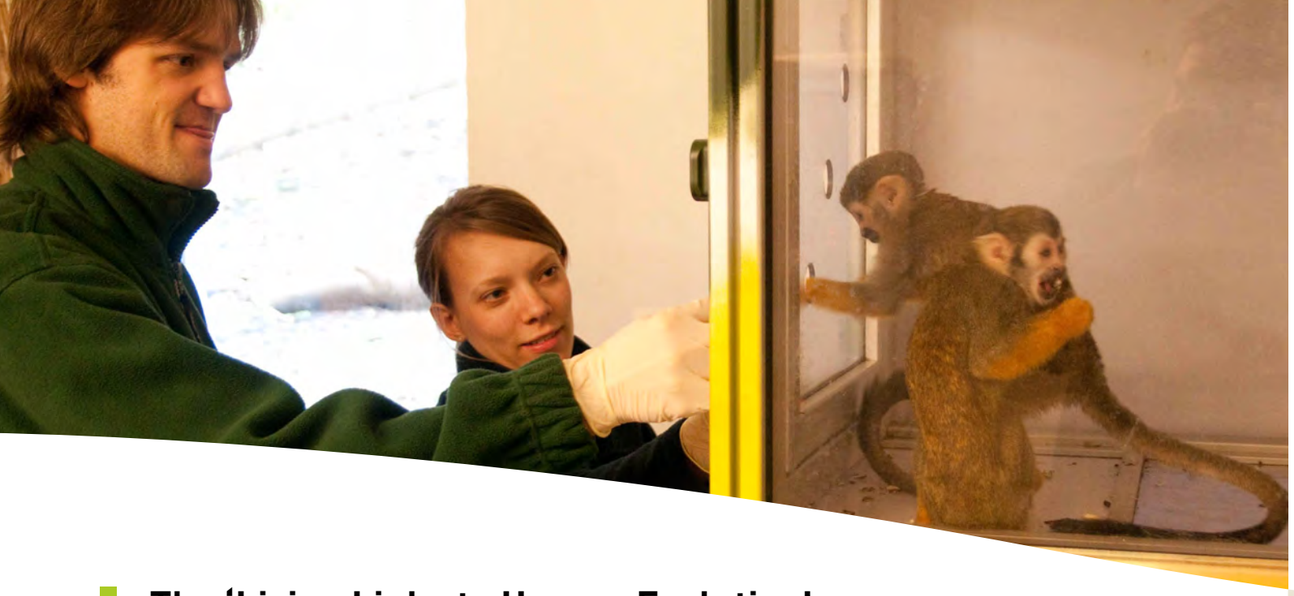
Living Links

Public Engagement with Science

University of St Andrews
Scotland's first university

600 YEARS
1413 – 2013



The ‘Living Links to Human Evolution’ Research Centre

Opened in 2008, Living Links is a field station and research centre of the University of St Andrews, established in partnership with the Royal Zoological Society of Scotland and Edinburgh Zoo.

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Virtually all research conducted at Living Links is performed in front of the viewing public

Living Links has large outside and inside enclosures in which capuchin monkeys and squirrel monkeys live together, and is designed to support studies by scientists at the Universities of St Andrews, Stirling, Edinburgh, Heriot-Watt, Aberdeen and Abertay, who together form the Scottish Primate Research Group (SPRG).

People-counters installed at Living Links suggest that around half the 650,000 or so annual visitors to Edinburgh Zoo visit Living Links and are encouraged to engage with the ongoing research there. Edinburgh Zoo is open virtually every day of the year (including Christmas day), and receives visitors from a wide spectrum of backgrounds.

THE ROYAL ZOOLOGICAL SOCIETY OF SCOTLAND
EDINBURGH ZOO
HERIOT WATT UNIVERSITY
THE UNIVERSITY OF EDINBURGH
UNIVERSITY OF STIRLING
UNIVERSITY of ABERTAY DUNDEE
UNIVERSITY OF ABERDEEN
The Scottish Government
Scottish Primate Research Group

Supported by wellcome trust

Live Science

Every researcher who conducts their work in the Living Links facility contributes to their university's public engagement work. Together, these efforts attain an extraordinary scale given their diversity, coupled with visitor numbers.

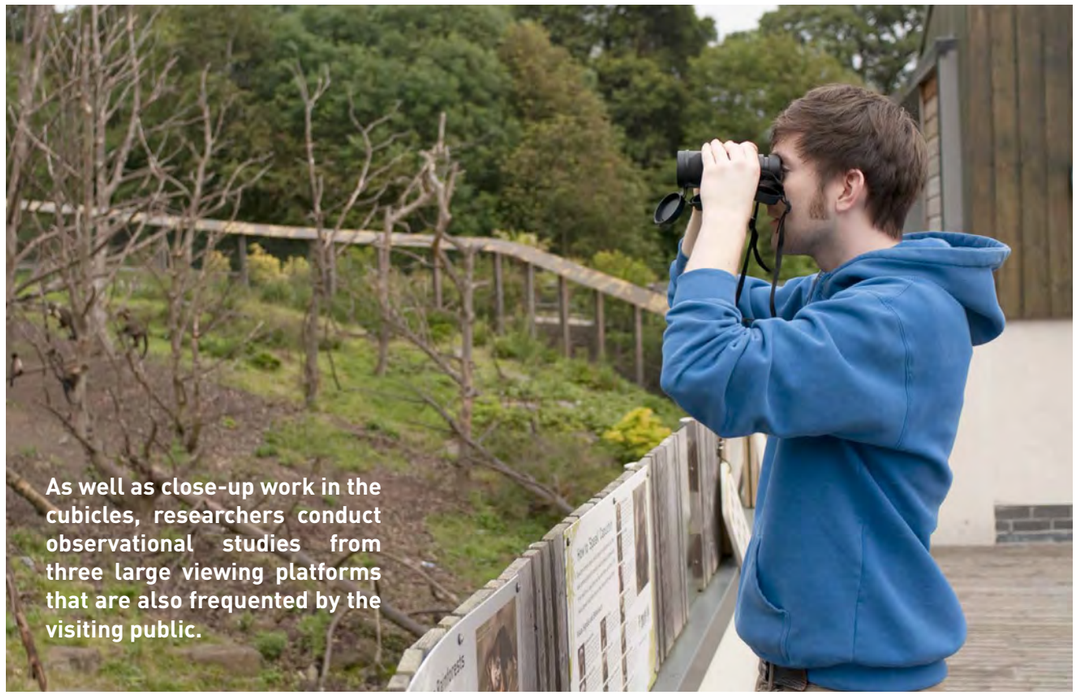
Every experiment is accompanied by a projected panel that explains what is happening for interested visitors.

Living Links showcases a recognised strength of Scottish Science in a world class research facility

At Living Links, scientists from the Scottish Primate Research Group, which enjoys a global reputation, are joined by others from overseas institutions, including European and Japanese centres. Much research focuses on what we can learn of the origins of the human mind from studies of such topics as learning and communication in our close primate relatives.

Living Links is designed to allow researchers to work closely with monkeys in the research rooms. Monkeys visit specially-designed 'cubicles' voluntarily to take part in experiments and receive rewards.

The Living Links primates are housed in generous outside enclosures with large inner rooms, all of which are designed as naturalistically as possible. This, and top-rate husbandry, ensure that the welfare of the animals is the priority that underpins successful public engagement.



As well as close-up work in the cubicles, researchers conduct observational studies from three large viewing platforms that are also frequented by the visiting public.

Grant support for Public Engagement

The Public Engagement programme at Living Links has attracted external funding in the form of a series of grants from different sources. These are projects are led by the collaborative team of Professor Andrew Whiten (St Andrews), Professor Hannah Buchanan-Smith (Stirling) and Stephen Woollard, Head of Education at RZSS.

2009 Scottish Government Science Engagement Grant
'Living Links to Human Evolution'

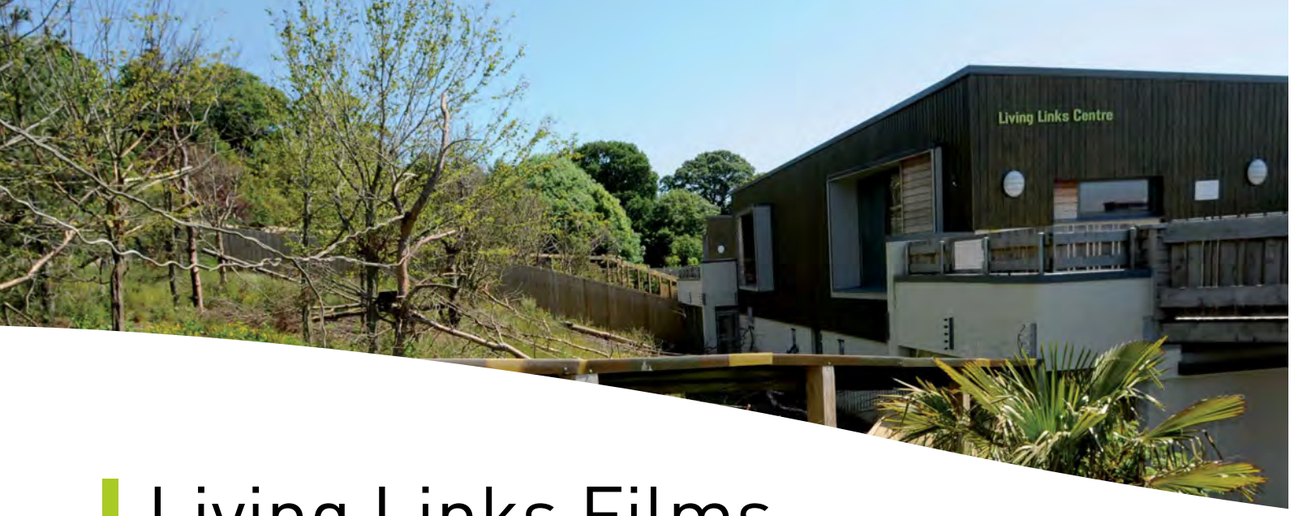
2010 Wellcome Trust VIP Award
"Bridging to Wellcome Public Engagement with Science"

2011 Wellcome Trust Award
"Living Links to Human Biology and Medicine"

2012 Wellcome Trust Award
"Living Links to Human Biology and Medicine: Extensions and Outreach"

This series of grants has supported the employment of a full-time Science Communication Officer, Dr. Mark Bowler, an active research primatologist. His expertise in photography, video and design has been applied to the informed production of information panels, videos, computer interactive screens and numerous other public engagement materials and activities.

Our initial Scottish Government Grant enabled us to add a 'Science Exploration Zone' in the heart of Living Links, where a cluster of hands-on science activities are housed.



Living Links Films

A lasting legacy of more than twenty short films about Living Links, the primates and our research has been produced by our Science Communication Officer.

HD video for our hundreds of thousands of visitors

When no research is in progress at Living Links, our HD projectors show short film sequences about our work. Visitors can select from a menu using touch-sensitive buttons on the window.

Video Highlights

Seeing Colour
This film on the colour vision of primates and other animals uses accurate simulations of colour vision that we believe have never before been achieved in moving images.

Monkey Medicine
Living Links research on the self-medicative anointing behaviour of capuchin monkeys at Living Links has developed from our Public Engagement activities. This film has proven one of the most popular with our visitors.

Capuchins Calling
This film, on work by Professor Klaus Zuberbühler's research group, has been incorporated into resources offered by Learning and Teaching Scotland, to assist in teaching the Higher and Advanced Higher Syllabuses.

Calculated Gifts
Footage from this film on research by Living Links researcher Dr. Valerie Dufour on the ability of animals to calculate and trade has been adapted for national television.

A global on-line audience

Our audience is growing steadily through our internet channels on YouTube www.youtube.com/livinglinkscentre and Vimeo vimeo.com/channels/livinglinks where logged-in users can download videos for off-line educational purposes. Videos of our public lectures are also disseminated through these channels.

My Primate Family Tree

An iconic science-meets-art engagement project

Take your place in the tree....

We commissioned a large scale piece of artwork depicting the evolutionary tree of primates, populated by life-size apes and monkeys.

Visitors need little encouragement to stand in the correct evolutionary place for a human and 'join' the primate family tree by taking their photographs. In this way our visitors take home with them a lasting scientific message about their evolutionary origins.

Visitors can upload their images to our internet gallery of photographs, alongside scientific and other celebrities. Here, Professor Anne Glover FRSE, Chief Scientific Adviser to the European Community, inaugurates the mural. http://www.living-links.org/visitors/tree-gallery

We are proud to have joined forces with one of Scotland's finest young artists, Russell Dempster, to bring our tree to life.

Primate Genome Puzzle

We have produced matching sets of human and chimpanzee chromosome puzzle pieces. These form a game that graphically demonstrates the similarities and key differences between our genetic constitutions and those of our closest relatives.

The puzzle is accompanied by a set of flexible learning activities designed in collaboration with teachers and engagement staff in the Wellcome Trust Centre for Cell Biology in Edinburgh, the Wellcome Trust Sanger Institute and the Open University.

School Syllabuses and beyond

The chromosomes have been used at the Cambridge Science Festival by the Wellcome Trust Sanger Institute and in lessons at Edinburgh Zoo. The activity addresses key themes from the Scottish Higher syllabus such as heredity, chromosome structure, duplication, deletion, translocation or inversion and even the formation of human chromosome-2 by fusion of ancestral ape chromosomes.

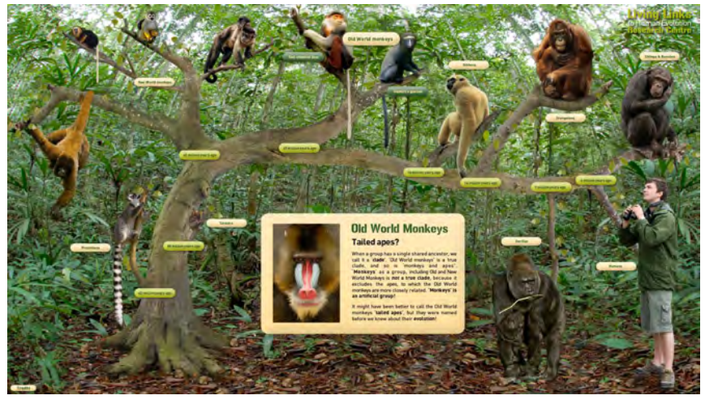
A downloadable version of the puzzle forms part of a flexible electronic teacher pack to support science teaching in the school environment. Available via www.living-links.org

Interactive Learning Stations

We have developed activities for visitors who prefer to explore Living Links themes through familiar computer-based platforms

Computers encourage many teenage and younger visitors to engage with scientific themes

Each activity is designed to be eye-catching and deliver a core message that is easily absorbed.

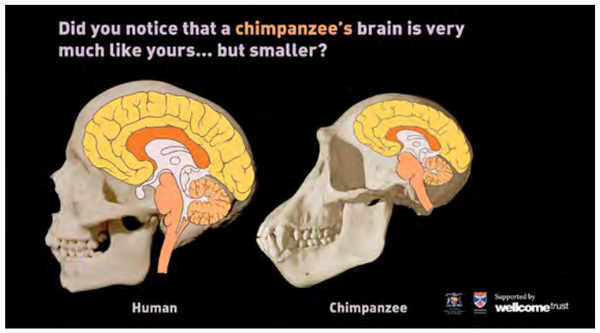


Complementing the 'My Primate Family Tree' mural, the 'Your Primate Family Tree' interactive features images from Mark Bowler's World Primate Image Archive, and is layered to reveal more and more detail as participants advance beyond a quiz, revealing the ancestors we share with our closest relatives.

Our 'See like a...' primate colour vision interactive entices visitors to view unique video simulations of monochromatic, dichromatic and trichromatic primate vision.

It is narrated by Living Links researcher Professor Hannah Buchanan-Smith, who is actively involved in studies of the evolution of trichromatism in primates.

'The Brain Game' interactive highlights the basic similarities and differences between our own brains and those of other primates, making the connection with Living Links psychological investigations



Science Engagement Panels

As well as providing regularly-updated information on our current and latest research, a rich array of attractive visual panels has been built up year by year.

Our signs use well-researched techniques and innovative presentation to layer scientific information in a way that is accessible to readers of different ages and educational backgrounds.

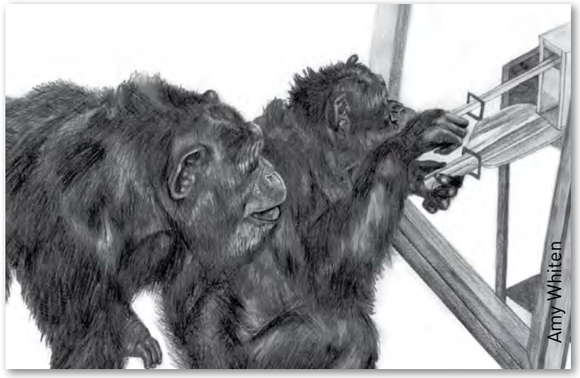
Testing of prototypes has refined the scope of information boards and their positioning so as to maximise their use. Our observational evaluations have shown that our information is read regularly and holds visitors' attention.

'Who's who' identification boards allow visitors to get to grips with the first job of researchers at Living Links; to identify the individual monkeys, whilst our visual guides to capuchin and squirrel monkey behaviour enable visitors to decipher primate communication patterns as they watch.

Our 'Spot the difference' genome frieze highlights similarities between our genomes and those of other primates. The eye-catching designs have since been used by the Wellcome Trust Sanger Institute at the Cambridge Science Festival.

Hands on ‘Artificial Fruits’

Primate puzzles, identical to those used in our psychological studies, provide an even more hands on experience in the Science Exploration Zone.



We have produced versions of the primate puzzles known as ‘artificial fruits’ in our experiments, that visitors solve with the help of videos of primate demonstrators.

These ‘games’ give participants a real feel for the cognitive problems we are asking our primate subjects to solve in our research.

Children are often captivated by these activities, whilst their parents observe and read the accompanying explanatory material.

Visitor Participation

In addition to hands-on and other public engagement activities, we have created a variety of opportunities for visitors to participate directly in research at Living Links.

Primate behaviour studies have employed 'crowdsourcing' of visitors to monitor monkey activity, each volunteer completing a single behavioural 'scan'.

Many visitors have volunteered to take part in research on the cognitive abilities of both adults and young children.

Fun social learning studies such as a 'Spaghetti Towers' project overseen by Dr. Christine Caldwell of the University of Stirling challenged visitors to Living Links to build the highest towers made of spaghetti and plasticine, learning from those who tried before them.

Self-selecting activities have been a resounding success at Living Links

One such public engagement study involving visitor response cards inspired a research project that resulted in a publication in a high profile 'open access' scientific journal.

Claidière N, Bowler M, Whiten A (2012) Evidence for Weak or Linear Conformity but Not for Hyper-Conformity in an Everyday Social Learning Context. PLoS ONE 7(2): e30970. doi:10.1371/journal.pone.0030970

School and Youth Groups

Collaboration with the Royal Zoological Society of Scotland's Education Department has led to a series of successful educational visits from schools and other organisations.

We believe that actively conducting behavioural science with live animals in a dedicated research facility, alongside real research biologists, creates a learning experience that will be exciting and memorable for visiting school-age children.

Our youth group activities aim to support efforts in increasing the uptake of science in schools.

Teaching Resources

Our latest Wellcome Trust public engagement grant is enabling us to produce a series of on-line teacher packs and other resources to support science teachers in their own classrooms

All our teaching resources are freely available via www.living-links.org

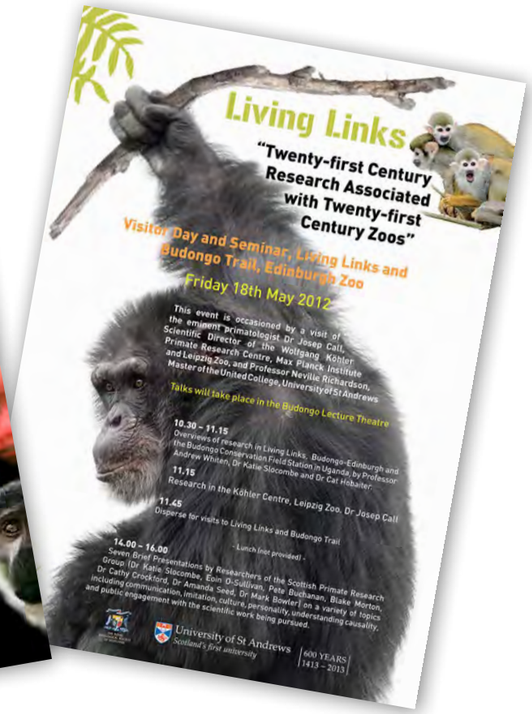
Working closely with practicing secondary school teacher Dee McCarthy and building on her links with the Association for the Study of Animal Behaviour (ASAB), we have developed resources that have been used in teaching the Scottish Biology Higher. Several have been incorporated into the 'Learning and Teaching Scotland' web site for the Scottish Higher curriculum. These successes led to the development of customizable teacher packs, each with a lesson plan and video resources. Lessons can also be delivered with live animals in the Zoo as the subject matter.

Themes include 'Measuring behaviour', 'Chimpanzee and human chromosomes', 'Primate self-medication' and 'Primate Communication

Lecture Series

Edinburgh Zoo's Budongo Lecture Theatre provides an excellent venue to host public lectures from a variety of leading scientists.

Public talks are held all year round on a variety of topics. Highlights have included our "Living Links to Human Health, Mind and Medicine" lecture series, for which we were able to attract the world's leading expert on primate self-medication in the wild, Professor Michael Huffman of the University of Kyoto, along with other talks on primate health and nutrition, Darwinian evolutionary medicine, and the evolution of HIV and AIDS in the primates of Africa.



Primate Medicines

Live public demonstrations of 'fur rubbing' or 'anointing' in capuchin monkeys led to an interesting line of new research at Living Links.

Wild capuchin monkeys rub strong-smelling substances onto their bodies, a behaviour that is thought to protect them against parasites. Onions and limes were originally provided on a regular basis as a public engagement activity in Living Links, but visitor interest soon stimulated research and data collection to tackle unanswered questions about the activity.

The Science Communication Officer supervises student projects under the "Nuffield Foundation Science Bursaries" scheme in collaboration with RZSS: for example, studying self-medication through 'leaf-swallowing' in Edinburgh Zoo's chimpanzees.

Evaluating Public Engagement

Public engagement activities are not often rigorously evaluated, but we believe this is an essential part of the development and improvement of these endeavours.

Our assessments have focused on measuring visitor interest in our exhibits and activities, by recording attraction, attention and overall dwell times. Visitors choose to spend longer watching scientific activites than anything else, and scientific converstions are regularly generated amongst groups at Living Links, during their day out at the Zoo.

The Science of Public Engagement

We consider it important to disseminate the results of our evaluations to as wide an audience as possible. We have therefore published in a prominent open-access journal. This paper generated interest amongst science communicators, who recognised both the novelty and the importance of publishing the results and the methods we used to obtain them (Bowler, Buchanan-Smith & Whiten 2012).

Workforce

Living Links Core Public Engagement Team

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Dr Steve Scott, Content Producer, Public Engagement, Wellcome Trust Sanger Institute

Dr Chris Tyler-Smith, Senior Group Leader, Human Evolution, Wellcome Trust Sanger Institute

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Dr Jane Goodall DBE, Professor Sir Michael Atiyah FRS FRSE, for official opening of Living Links and media interviews

Dr Valerie Dufour, Research Fellow; Dr Charlotte MacDonald, Research Coordinator - the starting Living Links team - for their foundational work

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Head of School of Psychology, University of St. Andrews; Professor Malcolm MacLeod; Professor Verity Brown

Jon-Paul Orsi (RZSS Digital Specialist) for photography, videos and coordinating the installation of 'Squirrel Monkey Cam'

Living Links Researchers: Dr Amanda Seed, Emily Messer, Eoin O'Sullivan, Dr. Koda Hiroki, Carolina Mayer, Alejandra Lapadula, Jack Griffey, Victoria Hartley, Blake Morton, Dr. Christine Caldwell - et al.!

Mackinnon-Slater (www.mackinnonslater.co.uk) for panel printing

Mark Bowler Scientific Images (www.markbowler.com) for stock photography

Polly Phillpot, Ruth Fraser, Susie Crocker, Jenny Combes and all RZSS Education staff, especially those who have given talks at Living Links

Professor Aubrey Manning - Chair of Living Links Management Board

Recoat Design (www.recoatdesign.com) for foliage graphics in Science Exploration Zone and research rooms: Agent for Russell Dempster, My Primate Family Tree

Russell Dempster, Artist, My Primate Family Tree

RZSS Education Volunteers for help with many of our engagement projects

RZSS Senior Staff: Iain Valentine, Darren McGarry

Steve Smart, University of St Andrews, for additional design support

Visiting Speakers: Including Professors Michal Huffman, Gillian Bentley, David Perrett; Drs Josep Call & Katie Slocombe

Warpro (Alastair Young) for data projector support

Publications

SPRG scientists are productive publishers of their scientific discoveries. Among these scores of publications, recent Living Links publication include:

Bowler, M., Buchanan-Smith, H., & Whiten, A. (2012). Assessing Public Engagement with Science in a University Primate Research Centre in a National Zoo PLoS ONE, 7 (4) DOI: 10.1371/journal.pone.0034505

Buchanan-Smith, H.M. (2012) Mixed-species exhibition of Neotropical primates: analysis of species combination success. International Zoo Yearbook, 46,150-163.

Claidière N, Bowler M, Whiten A (2012) Evidence for Weak or Linear Conformity but Not for Hyper-Conformity in an Everyday Social Learning Context. PLoS ONE 7(2): e30970. doi:10.1371/journal.pone.0030970

Claidière N, Whiten A (2012) Integrating the study of conformity and culture in humans and nonhuman animals. Psychological Bulletin 138: 126-145.

Dufour, V. C. Sueur, A. Whiten & H.M. Buchanan-Smith (2011). The impact of moving to a novel environment on social networks, activity and wellbeing in two new world primates. American Journal of Primatology ,Special Issue: on Social Networks in Primates 73, 802–811.

Leonardi, R., Buchanan-Smith, H., Dufour, V., MacDonald, C. & Whiten, A. (2010) Living Together: Behaviour and welfare in single and mixed species groups of capuchin (Cebus apella) and squirrel monkeys (Saimiri sciureus). American Journal of Primatology. 72, 33-47.

Macdonald, C. & Whiten, A. (2011). The 'Living Links to Human Evolution' Research Centre in Edinburgh Zoo: a new endeavour in collaboration. 2011. International Zoo Yearbook. 45, 7–17.

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Images and design: Mark Bowler