



IUSI North-west European section

International Union for the Study of Social Insects

Autumn Newsletter 2014

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Announcements

The IUSSI NW Europe section 2014 Winter Meeting

(www.iussi.org/NWEurope/meetings.htm): This year's meeting will take place at the Natural History Museum, London, Royal Holloway, University of London, on Monday 15th December.

- The timetable will run from 10am until about 5pm, (a detailed timetable, agenda and directions to the venue will be posted closer to the date). Afterwards, we will go for drinks and food together in the surrounding area.
- There is no need to register for the meeting in advance.
- **Titles and brief abstracts (max 200 words) of potential talks or posters should be emailed to Elli Leadbeater (elli.leadbeater@rhul.ac.uk) by 7th November 2014.** We especially encourage students to come forward, and as always, there will be a prize for the best student talk.
- Please also send anything that you'd like to be on the agenda for the section's business meeting.

Other upcoming meetings

ASAB winter conference 2014: <http://asab.nottingham.ac.uk/meetings>. This year's theme is "Individuals in Groups". The conference will take place on December 4th-5th at the Zoological Society of London's meeting rooms

More upcoming meetings are advertised on the section's webpage (www.iussi.org/NWEurope/meetings.htm)

Behaviour 2015: <http://www.behaviour2015.org>. The biennial IEC meeting will take place 9th -14th August 2015, in Cairns, Australia. Invited speakers this year include Prof. Mandyam Srinivasan.

IV Meeting of the Central European Section of the IUSSI: <http://www.bayceer.uni-bayreuth.de/iussi2015/> 26th-29th March 2015, Lichtenfels, Germany. Registration will be open from 1st September to 30th November 2014. The deadline for abstract submission of oral and poster presentations is midnight (CET) of 31st December 2014. The detailed program will be announced on 30th January 2015.

Lab updates

University of Bristol

Over a hectic summer of packaging boxes and moving wasps and ants, Seirian Sumner's group has finally moved into Bristol University's brand new Life Science Building. It's very shiny – we need some lab funds for sunglasses... Meanwhile, the group continued its penchant for international travel, with fieldwork in Spain, Trinidad, & South Africa and conferences/workshops attended in Borneo & Australia. Armed with vials of RNA later and ethanol, no wasp or ant is safe! Two new postdocs joined the lab in the spring: Dr Daisy Taylor has become our resident RNA sequencing expert and has been identifying the molecular basis of phenotypic plasticity in differing levels of eusociality in a range of neo-tropical social wasps.



Dr Peter Graystock, between setting up the new labs, has been getting to grips with the bioinformatic techniques needed to analyse next generation sequence data of bumblebees, and genotype-to-phenotype mapping. His personal crusade to find the best steakhouse in Bristol also continues. Both 1st year PhD students managed to survive this summer's field season: Adam Devenish returned from Girona, Spain, studying the impacts of *Linepithema humile* on seed dispersal

processes, and promptly leapt on a plane to Borneo to attend the 2014 Ant Course. He is currently preparing for another fieldtrip to South Africa later this year. Robin Southon managed to finally escape with wasps in tow from the island of Trinidad, no thanks to some rather difficult airline pilots – what's wrong with live wasps on a plane?! Robin has been looking at male behaviour and colony structure/decline in *Polistes lanio*. He was lucky enough to win a Genetics Society Summer Studentship to fund undergraduate student Joshua Valverde to join him in the field.

3rd year PhD student Emily Bell recently presented her work on the plasticity of castes in *P. canadensis* at the IUSI Conference in Cairns, as well as running a Popup Science Outreach event, and is now back at Bristol about to start work using RNA-seq. We said a sad goodbye to Chris Wyatt who over the summer was completing bioinformatics analyses on transcriptomics of multiple social insect species. We are delighted that he has secured a prestigious PhD position at the Centre of Genomic Regulation, in Barcelona, Spain and hope he'll come back to visit us lots! Undergraduate student Jacob Podesta has been assisting Adam & Pete with animal work over the summer, and hopefully will continue his Masters project with us this year. Two new PhD students start this month. Patrick Kennedy won the University of Bristol Biology PhD student scholarship this year; he will be exploring nest drifting in *Polistes* wasps. Sam Duckerin starts his BBSRC funded PhD, in collaboration with Dr Dick James at Bath; he will be taking a computational social networks approach to examine the effects of pesticides on bee social cohesion. Finally, the lab continues to throw itself into ventures that contribute to the public understanding of science: Pete Graystock praised the wonders of bumblebees at Bristol's Festival of Nature; Emily and Seirian organised Soapbox Science events in multiple locations across the UK <http://soapboxscience.org>, and a Popup Science event in Cairns, in attempt to get IUSI delegates out of the conference centre to share their obsession with special insects with the people on the streets of Cairns <http://www.popupscience.co.uk>.

University of Copenhagen

Tabitha Innocent writes: Unlike Noah's Ark (with two of every animal) when the floods hit Copenhagen last month we rescued ants, ants, and only ants... Thankfully, they all made it fine and everyone else is back at CSE from a busy summer of great conferences: social insects in Cairns, microbes in South Korea, genomics in China.

First up in our news, we're delighted that Michael Poulsen kicked off the summer with his appointment as Associate Professor in Evolutionary Ecology... congratulations to him from all of us and, no doubt, many of you too. By the time the newsletter goes to print we'll have a list bursting with successful masters and PhD defences from recent months. The roll of

honour... Sara Cherasse defended her MSc thesis on 'Sperm storage and immunity in the leaf-cutting ants' (supervised by Koos & Morten), and is currently applying for a PhD grant to work in Serge Aron's lab in Brussels. In June, Louise Savstrup Pedersen defended her MSc work on 'The causes and consequences of supercolony structure in *Myrmica rubra* ants' (supervised by Jes & Dora). Pepijn Kooij defended his PhD 'Fungal adaptations to mutualistic life with ants' and is working as a postdoc at CSE until January to complete our DNA barcoding project. In May, Sämi Schär presented his work on 'The evolution of exploitation strategies by myrmecophiles', and this month, Luigi Pontieri successfully defended his PhD thesis, 'Discrimination behaviour in supercolonial ants', with Dóra Huszár following suit with her research on 'The evolutionary ecology of multi-queen breeding in ants'. Very many congratulations to everyone for their fantastic achievements, and we'll keep you posted on their next steps.

Joining Michael's growing group, Ben Conlon and Jane de Verges are both starting masters theses, on the associations between termites and *Cordyceps* and *Podaxis* fungi, and the potential for nitrogen-fixation by symbiotic bacteria associated with fungus-growing termites, respectively. Rafael da Costa has arrived from Brazil (just in time for Danish winter!) to begin his 'Science Without Borders' funded PhD on specific adaptations to decomposing plant components in the fungi and gut bacteria associated with fungus-growing termites.

And they're not the only new faces around CSE. Jack Howe arrived earlier in the year for his MSc work on genomic imprinting in social insects (with Morten & Koos); Bitao Qiu joins CSE from China to begin his masters work, using genomics and bioinformatics to understand the gene regulatory network in leaf-cutting ants (with Guojie Zhang & Koos); and Ea Bechmann Milling Hørsving begins her masters in Jes' group focusing on colony fusion and possible mixed origins of supercolonies.

Not-so-new to CSE, Joanito Liberti has now started his PhD on sexual selection in leafcutter ants with Koos (and will also be working with Boris Baer's group at CIBER); Saria Otani has started his PhD with Michael and the fungus-growing termites; and Anne Andersen is continuing her work on the *Maculinea* butterflies for her PhD with David Nash. Rick Gawne has joined CSE from Duke University on a Fulbright fellowship for the next year, working on superorganisms.

Earlier this spring, Mariya Zhukova arrived from Siberia for a postdoc studying the functional and structural adaptations of bacterial symbionts of fungus growing ants using microscopy techniques (electron, fluorescent), with some great collaboration across many current projects. Susanne den Boer has returned from maternity leave (daughter Nora now 16 months) to complete the return leg of her Marie Curie, wrapping up datasets on post-copulatory sexual selection in leaf cutters and honeybees. Jon Shik is now in Copenhagen straight from his year in the Panamanian rainforest as a STRI fellow, and his Marie Curie project continues his work on the physiological consequences of the transition to farming in ants. And Tabitha Innocent arrived in April to start her Marie Curie work on the Actinobacteria-attine ant symbiosis, and continue CSE's collaboration with Matt Hutchings and Doug Yu at UEA.

We said goodbye to Marlene Stürup who has left for a postdoc with Bill Hughes in Sussex working on sharks... And Janni Larsen will be going on maternity leave any day now.

In other news, we had great field seasons in Bornholm, South Africa and Panama (complete with the drama of the first two Panama City hospital trips in CSE history – everyone's fine!). And the CSE-STRI 'Tropical behavioural ecology & evolution' field course will be running

again next year (<http://megalomyrmex.com/Teaching.html>): if anyone has interested students or can publicise, please get in touch with Rachelle (rmmadams@gmail.com).

The CSE social media is now up and running... we'll be posting more of our news and research and will also happily post/share/publicise any of your news: find us via our Facebook page (www.facebook.com/centreforsocialevolution/) and on twitter @CSocialEvo.

And finally, CSE officially became Nordic-cuisine consultants this summer when Jes had an emergency call from Noma: they wanted directions to a *Lasius fuliginosus* colony to source that evening's serving of ants toppings...unfortunately they couldn't make it to the nearest known colonies in time!

University of East Anglia (UEA)

Over the past year the Andrew Bourke's group has seen some new faces arrive and old friends depart. Our group was recently joined by David Prince, who comes to us from The Sainsbury Laboratory in Norwich to start a NERC-funded project on genes influencing worker reproduction in the bumble bee *Bombus terrestris*, a joint project between Andrew and UEA colleague Tamas Dalmay. Tim Huggins will shortly be moving to the same project following the end of his work on worker longevity and reproductive success in *B. terrestris*. The group will also soon be joined by Pierre Blacher from Université Paris Nord 13, who will be supported by a fellowship from the Fyssen Foundation to investigate sociality in relation to ageing in *B. terrestris*. Meanwhile, David Collins will be continuing the work started in his PhD on microRNAs in *B. terrestris* in a new BBSRC-funded project (also collaborative between Andrew and Tamas Dalmay). At the time of writing, David and Henry Ferguson-Gow are in the very final stages of submitting their PhD theses, their PhD projects being on, respectively, the role of microRNAs in the caste determination in *B. terrestris* and evolution and diversification of ants from a comparative perspective. Henry has continued to be based in London in the group of his CASE partner supervisor, Kate Jones at UCL; his other supervisor is Seirian Sumner at the University of Bristol.

At the end of 2013, Jacob Holland was awarded his PhD on the control of events in the colony cycle of *B. terrestris* and, in January, Jacob started his postdoctoral research as a member of Guy Bloch's group at the Hebrew University of Jerusalem. Liam Crowther and Becca Franklin are both near the end of the first years of their PhDs with Andrew at UEA, on *B. hypnorum* ecology (collaboratively with CASE partner Claire Carvell at the Centre for Ecology and Hydrology, Wallingford) and the combined analysis of bee and pollen movement, respectively. Liam and Becca have each been busy with fieldwork over the spring and summer. There was good news for the group recently when both Henry and Liam had papers accepted or published, in *Proceedings B* and *PLoS One*, respectively. Likewise, a paper from the PhD project of former group member Lucy Friend was recently accepted in *Animal Behaviour*, and the first paper from Andrew's collaborative Insect Pollinators Initiative project recently came out in *Molecular Ecology*, the first author being Stephanie Dreier at the University of Bristol and the coauthors including Seirian at Bristol and our other collaborators Matt Heard and Claire (lead PI) at the Centre for Ecology and Hydrology and Jinliang Wang at the Institute of Zoology.

University of Helsinki

The third year of TEAM::ANTZZ as part of the Centre of Excellence in Biological Interactions (CoE) has been busy and full of exciting research and meetings including the IUSSI 2014 in Cairns, Australia (in the picture: the attending team members demonstrating "antennation")

Undergraduates: We have been pleased to witness some happy graduations this year! Annu Tertsonen (supervised by Martina Ozan and Lotta Sundström), Sini Vuorensyrjä and Siiri Fuchs (both supervised by Dalial Freitak and Lotta Sundström), as well as Viljami Kankaanpää (supervised by Nick Bos) and Ulla Vattulainen (supervised by Lotta Sundström) have all finished with their MSc thesis. Anna Hietala (supervised by Claire Morandin and Heikki Helanterä) is also nearly finished with her work. There have also been some new additions to the team. Taina Stark started a project on the effect of oxidative stress on gene expression in the honeybee under the guidance of Heli Havukainen. Jonna Kulmuni's new MSc student Katri Ketola has been looking at signs of natural selection at molecular level in a few chemosensory genes from several *F.rufa* group species. We were also very pleased to have the help of two hard-working field assistants this year: Gautier Baudry and Francisko Rezende.



PhD-students: Everyone has been working very hard this year teaching, joining several conferences and workshops and most of them were again spending a long and productive field season at the Tvärminne Zoological station. Jana Wolf gave her first IUSI talk in Cairns about the "Mating biology of *Myrmica ruginodis*". Motivated by this great experience she and her supervisor Perttu Seppä went immediately for her last field season to finish data collection. Jenni Paviola in turn has been busy analyzing sequencing data and teaching undergraduates and Dimitri Stucki is finishing the first manuscript of his PhD, co-authored by Dalial Freitak, Nick Bos and Lotta Sundström. Unni Pulliainen secured a 4 year fellowship for her PhD and has now spent her first year enjoying several conferences and continuing on her experiments on brood recognition in *Formica* ants. Stafva Lindström and Kishor Dhaygude have been working with *Formica exsecta* pathogens. Stafva is continuing to map the microbiome detecting some very interesting insect pathogenic fungal species and Kishor is working on structural and functional genomics of key pathogens including interesting novel viruses and endosymbiont bacteria. Eva Shultner has submitted her thesis and is now preparing for her defense, which will take place in October! She has been busy submitting papers and recently presented her research at the IUSI meeting in Cairns. Since then, she has been enjoying the Australian outback and trying not to think too much about what awaits her at home. Claire Morandin is also almost finished with her PhD thesis looking at caste-biased gene expression in multiple species of ants and will submit it in the next couple of months! Sanja Hakala is currently on a maternity leave, but to keep the balance in check, Martina Ozan has in turn returned from her maternity leave and is now concentrating on the last year of her PhD.

Post-docs: We have been extremely happy to welcome Sarah Matthey to the group! Sarah finished her PhD in May at the University of Edinburgh and started this post doc position in June. Her current project aims to build from her PhD, which studied social effects of inbreeding. For her postdoctoral research she will work on the natural population of the ant *Formica exsecta*, investigating the social response to infection at various levels of inbreeding and polygyny. Nick Bos is working hard to try and obtain a grant for a post-doctoral fellowship from the Academy of Finland, in order to continue his studies on ecoimmunology in ants. Furthermore, after two successful field seasons, a big pile of data remains on his desk that still needs to be transformed into several manuscripts. Both Juan Galarza and Dalial Freitak have been spending parts of the year with our CoE colleagues at the University of Jyväskylä and parts in Helsinki. Juan is working with both ant and moth genomics and

collaborating with Kishor. Dalial is applying for the Academy of Finland funding for researcher fellowship and meanwhile has been busy submitting papers as well as building up collaboration with Gro Amdam to study honey bee immunity and behavior. Heli Havukainen and Dr Lumi Viljakainen from University of Oulu started a collaboration regarding modeling of ant immune proteins. Helena Johansson is on maternity leave with her twins, Alma and Felix, but has still been able to find time to supervise her two PhD students Stafva Lindström and Kishor Dhaygude. Jonna Kulmuni in turn came back from maternity leave last September and successfully got funding from both Finnish Foundations post doc pool and a three year fellowship from Human Frontiers in Science Program for her project "Genetic and epigenetic basis of speciation in mound-building wood ants". She will spend the first two years of the fellowship in Sheffield with Robert Butlin. Her last thesis chapter was published in PNAS.

Perttu Seppä continues his efforts educating students to the secrets of population genetics and studying spatial structure of social insect populations. The active projects include studies on speciation, genetic divergence, spatial population structure, dispersal polymorphism and breeding systems in *Myrmica* and *Formica* ants, *Polistes* wasps and butterfly parasitoids. In addition to supervising Eva, Claire and Jenni in his main project on ant social evolution and genetics, Heikki Helanterä has been involved in various collaborations outside Helsinki. Within our CoE, he's been co-supervising the PhD thesis of Petri Rautiala, a theoretician working on evolution of helping and social control at University of Jyväskylä, and the first paper has just been published in *AmNat*, on haplodiploidy and sociality (yes, there still are things to discover in this!). And since this is the last year of Heikki's Academy fellowship, he's busy thinking about the next projects to embark on!

Lotta Sundström has been very busy with supervising, being a co-director of the CoE and the director of the graduate school in ecology and evolution, now also being the vice dean of the Faculty of Biological and Environmental Sciences! None the less the months of May and June were spent working as a field assistant, i.e. boat driver and ant colony sampler, in Tvärminne.

Imperial College, London

Richard Gill writes: It has been a busy last 1.5 years at Silwood Park trying to set up the new lab and getting some social insect research up and running. Rich Gill has now settled in and desperately trying to catch up on the literature – where does time go? The lab has now grown and in July it welcomed the first arrival, Andres Arce, who is a NERC funded postdoc (3.5 years) and will work on how stressors affect bumblebee populations in close collaboration with Yannick Wurm (QMUL), Nigel Raine (Guelph, Canada) and Lars Chittka (QMUL). Just one week later our new technician, Ana Ramos-Rodrigues, joined the group to contribute to our research on bee behavioural ecology. At the start of October we will be welcoming two new PhD students: Dylan Smith who will be looking at brain morphology in bees and funded by NERC, and Leonie Gough who will be investigating the population dynamics and colony responses to stress in bees and funded by BBSRC. Furthermore, we are looking forward to receiving in February an Erasmus funded student from Italy, Ilaria Pretelli, who will spend 6 - 9 months working closely with the group on social insect behaviour. We would also like to thank Emma Randall (who has just successfully got a PhD position at Rothamsted Research) and Thomas David for their hard work on bumblebee behaviour in the lab as part of their Masters projects.

This year Rich managed to attend the Pollinators in Agriculture conference in Belgium which he found very informative and enjoyed meeting a number of new faces, as well as the recent EurBee 6 meeting in Spain which was fascinating and great fun. But the highlight of the year had to be the IUSSI conference in Australia which was both educational and super fun to catch up with everyone that attended - so a big thank you goes out to the organisers.

Royal Holloway, University of London

Over the past year, some important changes occurred in Mark Brown's group. The autumn-winter season was characterized by mixed feelings of joy and sadness. Two veterans of the group concluded their collaboration with Mark and left the London area: Matthias Fürst moved to Vienna for a new postdoc position in Sylvia Cremer's lab, although not before having his and Mark's first *Nature* paper accepted(!), and Catherine Jones finished her PhD and moved to Yorkshire... We all look forward to seeing them both again in London in December! In the same period, both Gemma Baron and Catherine Jones published their first papers, and Fabio Manfredini was awarded a Marie Curie International Incoming fellowship to work with Mark for 2 years: these remarkable and properly celebrated events, together with multiple Christmas celebrations mitigated the sadness due to farewells.

In January Catherine Jones defended her PhD very successfully and started her new life as a Doctor. She travelled to Sweden as the parasite expert with the SubT (*Bombus subterraneus*) re-introduction team and performed parasite screening at Lund University as part of a pilot project. In July she attended the first BBCT (Bumblebee Conservation Trust) meeting in Yorkshire, where she presented her research project and she is currently assisting the BBCT with the organization of outreach events on a voluntary basis. Gemma Baron started the new year attending a meeting in London on the impacts of pesticides on bee health, which was a joint initiative by the British Ecological Society, the Biochemical Society and the Society for Experimental Biology. Then she had a very busy spring, where she combined nice field work collecting overwintered bumble bee queens in Windsor Great Park and lab work to test the impact of parasites and pesticides on queen fitness and mortality. Fabio Manfredini spent the winter months learning how to analyse RNAseq data and just before total mental blackout springtime came to rescue him with exciting field work in Florida, where he collected newly mated fire ant queens to investigate the molecular basis for cooperative founding behaviour. Two scientists visited the Brown group over the past year to finalize their research projects: David Baracchi, postdoc fellow in Lars Chittka's group, came to Royal Holloway to sample bumble bee infected with *Chritidia* and subsequently test them for self-medication behaviour, and Zaheer Sikandar, a PhD student from Pakistan, spent the whole summer in the Brown's group to run immune assays on honey bee colonies as part of his research project.

The major highlight of the summer for everybody was the trip to Australia to attend the International IUSSI meeting in Cairns. The group was well represented at the conference with posters, talks and lots of networking. After the conference group members properly spread across the continent for vacations and never saw each other again...on Australian ground - with only a few exceptions...! Not content with travels in Australia, Mark went to Lausanne to examine Dumas Galvez's PhD in Michel Chapuisat's lab, before bouncing over to Seville and Donana National Park for a new project on commercial bumblebees. Now vacations are over, summer is almost gone, and the group is ready to start the academic year by welcoming three new PhD students. Dylan Hodgkiss will be working on a collaborative project co-supervised by Michelle Fountain at East Malling Research on hoverflies, pollination and integrated pest management, Callum Martin will be studying the

impact of parasites on bumblebee pollination efficiency, again in collaboration with Michelle, and Sarah Walkington will be working on microbes in bumblebees, based predominantly at CEH Wallingford with Matt Heard. We look forward to reporting on their successes in the future!

Elli Leadbeater's first year at RHUL has gone well, and her group has grown from a rather solitary N=1 to N=4, plus MSc students and undergrads! We are pleased to welcome Liz Samuelson who has recently started a BBSRC-funded PhD project to compare honeybee foraging patterns along urban/rural gradients. Liz joins PhD students Karen Smith and Lisa Evans (co-supervised by Nigel Raine, now at the University of Guelph). Both Lisa and Karen are now in the final stages of writing up their theses. Elli's fellowship on Mexican Honey Wasps in collaboration with Texas A&M University is in its final year, and both she and collaborator Erika Dawson at QMUL are disappointed not to have any more upcoming opportunities to experience life in a caravan in the Lone Star State. Elli will be on maternity leave from approximately 17th November 2014: any IUSI-related queries should be directed to Mark Brown or William Hughes in her absence.

University of Sussex

Social insect news from Bill Hughes' Lab at Sussex: Pete Graystock completed a short postdoc with us developing data to help end-users mitigate the risk of pathogen spillover from commercially produced bumblebees, and finally said goodbye to us and the Trojan hives earlier in the year to take up a postdoc position with Seirian Sumner. Julia Jones has spent part of the summer following up on the pathogen spillover story and part of it investigating the effects of land use on bee microbiomes, before starting a Marie Curie fellowship with us in September investigating metagenomics and methylomics in honeybees, sweat bees and dinosaur ants. Julia is doing an impressive job of juggling multiple projects but Tobias Pamminer is giving her a good run for her money. Tobias joined us on a DFG fellowship for 2014, and then a Marie Curie fellowship from 2015, investigating the reproductive ground-plan hypothesis using a variety of comparative and experimental approaches, and developing a bewildering diversity of spin-off projects at the same time. Joe Turner completed his MPhil with us studying the effect of parasite infection on ant behaviour and has moved on to a PhD at Liverpool. Chris Tranter is now entering the final year of his PhD studying disease resistance in ants, Victoria Norman is entering the third year of her PhD studying caste and task determination in leaf-cutting ants, and David Treanor is entering the 2nd year of his PhD investigating the effects of *Wolbachia* and other symbionts on social insects.

On the non-social insect side of the lab, Marlene Stürup has joined us from Copenhagen on a Carlsberg Fellowship, leaving leaf-cutting ants behind her to start a new life with us as a white shark researcher, Georgia French has started her PhD with us also on white sharks, Jasmine Parkinson is entering the final year of her PhD studying symbiont dynamics in mealybugs, and Norma Neszi has spent the summer with us exploring potential projects on the surprisingly interesting behaviour and symbionts of plankton. Although we skipped on our annual antdigging extravaganza to Panama this year, we have made up for it with plenty of other fieldwork. As well as white shark watching in South Africa and a new Med ecology field course in Portugal, we've sent Tobias and Chris on a very successful and, for Bill, pleasantly cheap field trip collecting ants in Romania, while Julia has undertaken a succession of rather more expensive road trips around Switzerland, Austria and a large part of the UK collecting bees. Life wouldn't be complete though without *some* Neotropical ant

collection, so Chris, Victoria, Julia and Bill will shortly be heading to Brazil to dig up some dinosaurs.

University of York



Elva Robinson's ant research group in York said goodbye to Zoe Cook, who completed her PhD thesis on modelling the costs and benefits of decentralisation in polydomous species, graduating this summer. She has moved away from social insect research to work for a geological company, Rock Deformation Research. We welcome back to the ant group Phillip Buckham-Bonnett, who did an MSci in the group previously, and is now starting a PhD studying "The impact and spread of

Lasius neglectus in the UK. Duncan Procter is continuing to combine a large distributional dataset with genetic work on wood ants in the North York Moors to investigate the impacts of large-scale landscape changes on the ants. Yi-Huei Chen and Sam Ellis are entering their final years. Sam has had good weather for a very productive final field season studying the organisation of polydomous *Formica lugubris* wood ants in the Peak District. Elva Robinson is currently much occupied with editing a book on Wood Ant Ecology and Conservation and also is continuing to work on behavioural aspects of polydomy and other areas of ant organisation. Yi-Huei Chen writes: This is going to be the fourth year of my PhD study. The second paper of my study has been submitted. We visited Cairns for the 17th Congress of IUSSI, which is a wonderful reason to take a rest in Taiwan (sweet home) and to visit the Southern Hemisphere for the first time. I had a talk presentation of the study about the application of Bergmann's rule to the relationship between altitude and ant colony size. The manuscript of this study is in progress as well.

Travel Grant Reports

Yi-Huei Chen (York)

The 5th Central European Workshop of Myrmecology (CEWM) was held in Innsbruck, Austria in September 2013. I was so glad and lucky to attend my first international conference (just finished my 11-week fieldwork in the Swiss Alps at the end of August). I would like to thank Dr. Birgit Schlick Steiner, Dr. Wolfgang Arthofer, and Dr. Florian Steiner for hosting this well-organised conference.

This was a three-day conference. The first two days were filled with a number of inspiring talks and posters, and the last day included a Cross-Alpine-Trip. There were two keynote speakers: Dr. Serge Aron talked about the evolution of unorthodox reproductive systems in *Cataglyphis* desert ants; Dr. Bernhard Seifert talked about evolutionary significance of hybridisation in ants. During the talk session, we could choose between two venues with different speakers. Among these, the presentations of Daniela Sorger (trap-jaw ant) and Tomer Czaczkes (route learning on complex trails) were appealing not only because of their brilliant experiments but also their engaging presentation style. I also presented a poster on

my work from the first two years of my PhD. On the field trip day, we went to a part of the Alps and spent one hour hiking. Although I had been hiking for almost three months before I went, the spectacular scenery from the hill-top still was astonished me. After having lunch on the grass, we stopped by an exquisite city in Italia. The conference ended cheerfully with a farewell dinner, and... my poster was awarded first prize! Everything was gorgeous, even the weather!

Jana Wolf (Helsinki): report I

The 19th European Meeting of PhD Students in Evolutionary Biology (EMPSEB) took place from 3rd–8th September 2013 at the University of Exeter in Cornwall, UK. It was an international conference with approximately 80 participants who had the opportunity to present their research projects in front of other doctoral students, as well as several well-known researchers at the field of ecology and evolution. Each day began with a one hour presentation from one of the plenary speakers. I would like to highlight Jarrod Hadfield as an evaluator and plenary speaker, who was able to replace a last minute drop out just 4 days before the meeting! His talk about “Comparative Analyses of Host-Parasite Interactions” was remarkable and he was of great value to the whole meeting.

Every student gave a 15 minute presentation followed by a five minute discussion. Since there were always two talks at the same time and the themes of each set of talks were different, an overlap between two desirable topics was avoided most of the time. Since most of the students were in the first or second year of their PhD this meeting was a good opportunity to practise how to present first results and discuss challenges they encountered during their research so far. Suggestions for improving the project came from other students as well as from the plenary speakers- all in all it was a stimulating atmosphere to present and discuss your research topics with other scientists. During the several activities, coffee breaks and excursion day we had the opportunity to bond and discuss research topics in a less formal atmosphere than at a big conference. I especially would like to mention the event “for the love of science” where students, post docs and professors were given the opportunity to present their own work to an interested but non-professional audience. The atmosphere was just amazing and this event demonstrated that the public can be involved and excited about science. Furthermore, it inspired me and gave me new ideas for my own task of organising a three day symposium next March in Helsinki.

The conference ended with a wonderful good bye party where a vote for next year’s meeting location was conducted, with the result being that the EMPSEB 2014 will take place in Belgium. I am very grateful that I could attend this conference and I would like to thank the committee of IUSSI NW for giving me the opportunity to visit this meeting! Furthermore, I would like to thank the whole organising team, who obviously invested a lot of time and effort in making this event a big success!

Jana Wolf (Helsinki): report II

The 17th international congress for the IUSSI (International Union for the Study of Social Insects) took place from the 13th–18th July 2014 at the Convention Centre in Cairns, Queensland, Australia. These worldwide meetings of the IUSSI take place every four years – bringing together researchers of (eu-)social insects from a variety of disciplines. It was a very big conference with approximately 600 delegates and 36 different symposia, with each symposium consisting of up to 16 talks. The topics ranged from behavioural studies to conservation, genetics, chemistry, neurobiology and many more. Since there were so many different topics it enabled delegates not only to listen to topics that were important for their own research but also from a wider range of fields or even completely unrelated subjects.

Each day started with a plenary talk, followed by several presentations and a poster session in the evenings. Since several sessions were taking place at the same time it was sometimes difficult to choose which one you wanted to attend. In general this congress was a very good opportunity to broaden your scope of knowledge no matter what your research field was! This conference was also a good opportunity to meet scientists from other research groups, who you would normally not be able to meet - especially the ones from different countries and even other continents. It was a stimulating atmosphere to present and discuss your own research and results with other scientists from all over the world and it is a rare opportunity that occurs just once every four years! The last day concluded with a talk by Justin O'Riain, who gave an entertaining presentation about "conflict, cooperation and sociality in mammals". Furthermore the Hamilton award was presented to Mary Jane West-Eberhard.

I am very grateful that I could attend this conference since I presented my own results there as a talk. Thus, I would like to express my gratitude towards the committee of IUSI NW for giving me the opportunity to visit this meeting! Additionally, I would like to laud the organising committee, who obviously invested a lot of time and effort in making this conference a big success! The next worldwide meeting of the IUSI will take place in Brazil in 2018!

Sue Shemilt (Keele)

From the 13th – 18th July I was lucky enough to be able attend the IUSI's 17th International congress. As I was fortunate enough to attend the last meeting in Copenhagen I knew that this would be a fantastic conference. Additionally I had the opportunity to present my research, which focused on feeding ants with chemically labelled substrates in order to help determine the biosynthetic routes used by ants to make long chain hydrocarbons, which they use for a variety of purposes. The North West section of the IUSI was extremely generous in awarding me £1150 towards attendance at this conference, a sum which secured my ability to be able to travel and was put towards the large flight costs to Australia. The benefits to me in attending this conference are numerous, both in terms of my professional and personal life. Professionally the main feature and my conference highlight, was the symposium on '*Decoding the sophisticated chemical communication of social insects*' during which I was able to present my talk. This opportunity led to some great feedback and several discussions with various researchers from around the world. Other speakers within this symposium presented their research and there were multiple opportunities to network over coffee and delicious cakes during the morning and afternoon breaks. The plenary lectures on various species were extremely interesting, especially that on the ability of bees to cognitively learn information, presented by Martin Giurfa. One of the wonderful things about this conference was the opportunity to be able to watch talks completely unrelated to my area, but on fascinating topics such as pheromone identification, ant navigational ability, and bee health. On this theme I especially enjoyed the plenary by Justin O'Riain on the sociality of mammals, a talk which I thoroughly enjoyed partly due to his delivery style which was refreshingly candid.

Personally for me the highlight of this meeting was in the Insect Photography workshop held prior to the start of the conference. This was taught by one of the leading insect photographers in the world, Alex Wild and the skills that I learnt from this will enable me to use my own photographs in posters, presentations and public engagement opportunities to highlight the exciting chemistry of these animals. It was also a fantastic opportunity to get an up close view of some of Cairns smaller residents, such as funnel web spiders, green ants and various moths and butterflies.

This conference is undoubtedly the highlight of my PhD so far and I am extremely grateful to the North West section for helping me to reach my funding target to allow me to participate. I would also like to take this opportunity to thank the Australian section for putting together such an amazing and memorable event in a wonderful city.

Emily Bell (Bristol)

Firstly, and most importantly, may I thank the North West European branch for generously assisting with my travel to the IUSSI 2014 in Cairns this July, I thoroughly enjoyed my first international conference. During this year's conference I gave both an oral presentation and presented a poster addressing two separate aspects of my current research at the University of Bristol. My talk was entitled "Caste plasticity maximises personal fitness at the origin of sociality" and my poster "Is every female equal? Caste biasing in a primitively eusocial insect". I received some excellent and useful feedback from both my presentation and poster session. It was also a great opportunity to meet with many other *Polistes* researchers from around the world to discuss our research interests, conversations that I hope will continue in the future.

Online presence: Throughout the conference I was actively promoting events and talks on twitter. This proved to be extremely enjoyable encouraging much discussion between delegates online, with a number of "tweet-up" meetings occurring as a result. I kept a record of all of my tweets, and retweets over the course of the conference and I have included these as an appendix to this report should you wish to view them. Next to each of my tweets are the details of the number of times each was 'retweeted' or 'favourited' by other users of the social network. All of these tweets went out to my 90 followers.

Popup Science: Whilst attending the conference I took the opportunity to organise a one off science communication with the assistance of Dr Seirian Sumner (University of Bristol) and Dr Tanya Latty (University of Sydney). Popup Science is a new science communication event that brings scientists out of their offices and laboratories (and in this case a conference) to engage with the public about their research. Our Popup Science Cairns event ran on Wednesday afternoon of the conference and was a great success. In total 23 delegates from the conference helped out on the day from PhD students through to one of our plenary speakers. I was delighted by the number of enthusiastic visitors who stopped to listen, from holiday makers to school groups, it was so popular that we ran an hour over our allotted time slot. A summary of the afternoons events went out on my blog "A Zoologist Abroad" (<http://zoologist-abroad.blogspot.co.uk/>), this will also be adapted to be included on the Popup Science website. The text for this post has been included in this appendix for your attention. Photographs of the event can be found online at www.popupscience.co.uk. During the conference I was also managing the Popup Science twitter feed, along with Seirian Sumner. I have not included a summary of this activity but it can be found by looking up our account @popupscientists

Eva Schultner (Helsinki)

Climb every mountain, follow every ant..... and you will arrive in Innsbruck, the capitol of Tirol in the Austrian Alps. It is in this beautiful mountain setting that I participated in the 5th Central European Workshop of Myrmecology in September 2013. Having never attended this meeting, I was admittedly just as intrigued by the idea of an all-ant-audience as I was by spending a few days in one of my favourite countries. It turned out that my expectations

were completely justified. Perfect weather, stunning views, excellent food and wine, it was Austria at its best. But that was not all. This small meeting that takes place every two years succeeded at bringing together ant researchers from a huge diversity of fields. In Innsbruck, taxonomists, ecologists, behaviourists and geneticists came together and gave a unique view on the state of the art in myrmecology. This made it a meeting that was especially fruitful for students, providing us the opportunity to interact with researchers from all over Europe in a friendly and relaxed atmosphere. Impeccably organised by Birgit Schlick-Steiner, Wolfgang Arthofer and Florian Steiner from the Molecular Ecology Group at the University of Innsbruck, this meeting was one of the most enjoyable I have attended so far and in my opinion a must for students of myrmecology. The sound of myrmecology travels to Hungary next, and I'll be sure to follow for the 6th CEWM in two years!

Christopher Tranter (Sussex)

I arrived out in Cairns, Australia a week before the 2014 IUSSI international congress begun in order to slowly shift my sleep pattern to something half-normal, (though inevitably wound up waking at 4am each day in some inexplicable neither UK, neither Australian, sleep cycle) and acclimatise to moving from summer in Europe to one of Queensland's coldest winters: so swapping my jeans and jumper for shorts and a t-shirt. I had a plan for whilst I was out, to make the most of the opportunity, and get some field work done: as I kept trying to explain to friends and family, this was NOT a holiday. It's not my fault my work and the conference had to be based somewhere so tropical and sunny, with lush rainforests rolling down picturesque hillsides, before running out onto sandy beaches and blue waters all fringed by tropical reefs. And ants, lots of charismatic, colourful and certainly compared to the UK, exotic species. So by the time the conference started, having been out and about collecting and observing *Oecophylla* weaver ants, I was already quite familiar with the area and the local fauna: a few more of which I was introduced to at the opening meet-and-greet, held down at the cruise ship terminal, as some of the more iconic Australian wildlife, including a snake and cockatoo, were brought in to entertain the crowds. With a meeting schedule in one hand, drink in the other, and several canapés balanced somewhere in between, it was nice to catch up with other students and scientists from other meetings or collaborations, put faces to names, and get a feel for the labs that were in attendance and what we had in store for the week to come. Each day of the conference we were treated to at least one plenary talk as well as a whole day of other talks spread over a number of meeting rooms. With military efficiency I had planned out a route between talks, held in the very professional Cairns conference centre, factoring in distances between meeting rooms, relevance of talk, and the excitement-factor of the title, and only a few times did I deviate because the next lecture in a series popped up onscreen and looked too-good to leave. Without exception there were no talks or posters that didn't hold interest or teach me something new, if anything the greatest shame was that I was not able to attend more of the sessions run in parallel. I was myself giving a talk, the opportunity of which had come at a nice time during my PhD, and I felt I really benefited from the chance to address such an international and diverse group of social insect scientists. Each day I came away mentally invigorated but paradoxically exhausted from the sheer amount of information processed: so many new concepts, ideas, faces and names. And especially my knowledge of the very cool, and very well represented, *Cerapachys* system has been significantly expanded upon. Of course none of this would have been possible without the help of funding from the IUSSI section, to whom I am extremely grateful, and the organisers and the society as a whole for providing this event where social insect scientists, and students such as myself especially, from around the world can come together, discuss ideas, present work, meet new collaborators and share a cocktail made of crushed weaver ants.

Carolina Doran (Bristol)

The Northwest European Section of the IUSSI grant allowed me to attend one of the most relevant conferences on my field. This was the 17th congress for the International Union for the Study of Social Insects. This is an event that only happens once every 4 years and I am extremely grateful to the Northwest European Section for giving me this unique opportunity. The quality of the conference was outstanding. The list of speakers and posters was of really high quality and I learned a lot about several different topics:

How weaver ants construct their nest, and are able to assemble themselves into bridges in order to get to different places; how individuals in different metabolic conditions are able to collectively adjust the colonies nutritional balance; how division of labour can be achieved at the level of the brain by individuals having different hormonal thresholds in specific subsets of neurons; and how fire ants assembling rafts can represent the dynamics of fluids or solids are just a few of the many topics. I was fascinated by the diversity of subjects covered, from robot bees in the study of collective behaviour to the use of wasps together with genomic sequencing in the search for how eusociality evolved.

I got the opportunity to talk about my work and ideas with several experts on the field. It was reassuring to be with so many people interested in the same topics and studying the same ideas. I am really interested in the idea of explaining complex behaviour by using simple rules, and social insects represent a really powerful organism in the study of such questions. This conference gave me new insights into my project and several ideas on how to improve it. Furthermore I was able to initiate a few collaborations for the future and improve existing ones. I participated on the pop up science event and spent one afternoon on the streets of Cairns discussing with locals how ants are able to reach a consensus on where to live, which was an extremely rewarding experience.

On a more personal note, having the opportunity to travel to Australia was definitely a life changing experience. In the space of a few days I was exposed to the most amazing diversity of wild life. Not far from where the conference took place I saw cassowaries, koalas, ants that taste like lemon and enormous salt water crocodiles. Not to mention being able to dive in the beautiful great barrier reef and explore the amazing variety of rain forests. Thank you so much for investing in me and in my future in science.

Kirsty Lloyd (Plymouth)

The International Union for the Study of Social Insects (IUSSI) is a large international conference held every 4 years and is open to all those interested in any aspect of the study of social insects. The conference enables researchers from around the world to convene and share the details of their current research, gain useful feedback, share ideas and develop connections for future collaborative opportunities.

This year the conference was held in Cairns North Queensland, Australia. Delegates arrived from far and wide to the Cairns Conference Centre in the heart of the city. There were 9 plenary speakers, 38 symposia, nearly 200 posters, over 400 platform presentations and 1 world premiere held over 5 days. In total I would describe the conference as interesting, energetic, informative and well-structured. With so many interesting sessions and useful talks run concurrently the most difficult thing was deciding which to attend.

The conference began on the evening of the 13th of July with the welcome reception held in the spacious Cairns Cruise Liner Terminal. This beautiful water front location provided the perfect venue for meeting and greeting with a steady flow of a wide selection of drinks and delicious canapés. However, the highlight of this evening, and which set a high standard for

the rest of the conference, was the presence of keepers from the Cairns Tropical Zoo, who had brought along a variety of species that could be viewed and even handled. The beautiful yellow-crested cockatoo, the more exotic black headed python and the Australian icon; a Koala munching on eucalyptus leaves, all provided ample discussion points for a lively evening of networking.

Following the welcome reception, the first full day of the conference covered topics from nutrition and social behaviour to the chemical ecology of foraging. However, I found myself primarily attending talks in 'the impacts of environmental stressors on bee declines' symposium. This collection of talks detailed the experimental findings of sub-lethal effects of various neonicotinoid pesticides and addressed issues relating to disease transmission and resistance. The most stimulating talk of the symposium for me was presented by Gemma Baron. She is currently investigating the effects of multiple stressors on queen bumblebees, specifically the combined effects of a pesticide and a parasite on survival and fitness. I anticipate this to be a very interesting paper when published. This entire session was of particular relevance to me as I am also researching bumblebees. My study species has recently colonised the UK and are exposed to the same ecological stressors that are affecting native species; however despite this they appear to be expanding and abundant throughout the colonising range.

Throughout the conference a wide variety of symposia were offered, always providing something highly relevant to my study area. Each day there were a large number of fascinating talks but always one that stood out as the most thought provoking. One such talk was given by Prof Paul Schmit-Hempel on host parasite interactions. He explained that specific host parasite responses may not fit the classic genetic model as diversity can also be generated through expression variation of antimicrobial peptides. Another key talk was given by Prof Amro Zayed who discussed how and why sociality evolved and emphasized the role that population genomics can now play in looking at regions of the genome under positive selection over long and short time scales to elucidate long standing questions.

Although quite a specialized conference in some ways considering it concentrated solely on the study of social insects, there was also a strong genomics focus. The use of next generation sequencing (NGS) has become more prominent in recent years; it is good to know that social insect scientists are at the forefront in pioneering research by harnessing these novel techniques. The availability of NGS technologies and development of analysis methods and tools have opened many avenues for more robust studies of populations as well as the examination of adaptive genetic variation. This is the area I am hoping to enter as an early career scientist and during my poster session I was able to talk to a number of leading researches in genomics, many of whom provided me with valuable advice for my forthcoming study.

There were several symposia dedicated to genomic level studies. The presentations at these symposia were wonderfully informative; they outlined the various applications of NGS tackling numerous topics and several highlighted issues experienced at different stages during their use. Our research group has limited familiarity with NGS technology thus far, so gaining first-hand accounts of the common pitfalls and possible ways of mitigating them has been invaluable in preparing me for my research. As such, perhaps the most beneficial part of the conference was talking to Dr Broke Harpur and meeting Prof Amro Zayed who are eminent in the field of genomics and hymenopteran research.

In addition, the conference also provided the opportunity to participate in an outreach event through 'Popup Science'. I was amongst a group of researchers who volunteered at the event. A small marquee was conveniently located along the esplanade which attracted

many members of the public. The aim of the session was to bring the scientists to the streets to engage with the public about their research. Having participated in events such as this previously I am always pleasantly surprised by the number of people that stop and the eagerness with which they ask questions. I believe that public engagement is incredibly important and thoroughly enjoyed talking with Australians about their native insect species and those found in my own country.

Lastly, the conference delegates had the opportunity to attend the world premiere of a documentary on Australian weaver ants produced by WildCAM. The film was expertly presented, entertaining and particularly interesting to me as I had no previous knowledge of the species. Afterwards many attendees could be found gazing at previously unnoticed weaver ant nests high up in the trees throughout the city. The conference closed with a delicious dinner and delightful entertainment. During which I was excited to learn that the 18th annual congress of the IUSSI will be hosted by the Brazilian section and is to be held in Guarujá, São Paulo state.

The information that I have learnt and skills I gained from the conference have been vital for me to develop an understanding and proficiency in the methods I intend to use. Also it was a valuable opportunity for me to meet researchers who were implementing these techniques in my chosen field of research. There are so many fascinating aspects of social insect biology and ecology that make this an exciting field to work in. My hope is that my future career will enable me to travel abroad and work with the scientists whom I had the privilege of meeting at the IUSSI conference this year. This opportunity would not have been available to me without the financial support provided by the IUSSI. As such I am extremely grateful to the IUSSI North West Branch for awarding me the junior scientists travel grant enabling me to attend this exciting and educational conference.

IUSSI (North-west European Section)

Section website: <http://www.iussi.org/NWEurope>

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