



NEWSLETTER

April 2013

Welcome to our sixth Newsletter

This year I am happy to welcome 10 new members. One of our new members is based in Iran and another in Singapore. Also, a few members have moved away from Australia/New Zealand (to the US, China and Singapore) but still stay on as our members. Perhaps we need to consider changing our logo again ☺ Unfortunately not all current members have paid their renewal fees, so if you haven't, please do so as soon as possible. It is important to keep the number of members up, as the student travel grants are based on the number of members we have. This year we had three successful candidates: Michael Holmes, Naïla Even and James Makinson. Well done to all! Also, make sure you regularly check the Conference website for updates and expressions of interest: www.IUSSI2014.com. If anyone is going to a meeting this year and would like to advertise IUSSI2014, drop me an email and I will send you our promotion slide. Have a good year.

Madeleine Beekman

Treasurer of the Australian Section of the IUSSI (madeleine.beekman@sydney.edu.au)

Annual General Meeting

This year's Annual General Meeting will be held at the University of Sydney on Friday April 26, at 9:30am. I shall circulate the agenda and the financial report prior to the meeting. All members are welcome. As soon as the financial report is finalised, I will not be able to accept any new members for 2013. Hence, if there are still people out there who want to sign up, do it as soon as possible. Remember, only students who are a member in 2013 will be able to apply for next year's travel grants. In addition to the local travel grants, the International Body will also advertise grants to attend IUSSI2014. Again, these grants will only be for current (student) members.

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Who's New?

The following people have joined us this year.

Jerome Buhl, Isobel Ronai and Daej Arab, School of Biological Sciences, The University of Sydney

Alexandra Sebastien, School of Biological Sciences, Victoria University, Wellington

Ghislaine Small, CIBER, University of Western Australia

Zhang Manping, National University Singapore

Hamy Khery, Stephanie Biergans and Morgane Nouvian, Queensland Brain Institute, University of Queensland

Behzad Habibpour, Shahid-Chamran University, Ahwaz-Iran

Introducing Hamy Khery

My name is Homayoun (Hamy) Kheyri, and I come originally from Iran. I have a BSc in Zoology, MSc in Environmental Engineering, and a PhD in Science Journalism. I'm also the Science Correspondent for BBC World Service in the Pacific region. Now, I am doing a PhD at the University of Queensland under the supervision of Dr Judith Reinhard, A/Prof Charles Claudianos, and A/Prof David Merritt. The project I'm mainly working on is Development of Honeybee Venom and Hypopharyngeal Glands, investigating the anatomy, ultrastructure and function of these glands in honeybees from different castes and different ages. I am particularly interested in studying the effect of social environment on gland development. I'm also working on stink bug's Methatoracic and Abdominal glands. Interested in our work? Have a look here for some recent papers.

<http://onlinelibrary.wiley.com/doi/10.1002/cm.21059/full>

<https://www.sciencedirect.com/science/article/pii/S1467803912000813>



Introducing Stephanie Biergans

My name is Stephanie Biergans. I studied Biological Sciences at the University of Konstanz, Germany. Currently, I am doing a joint PhD at the University of Queensland and the University of Konstanz under the supervision of A/Prof Charles Claudianos, Prof Giovanni Galizia and Dr Judith Reinhard. The main focus of my project is on how epigenetic mechanisms

regulate long-term memory formation in honeybees. I am specifically looking at DNA methylation and microRNAs.



Beekeeping with an audience. Photo Madeleine Beekman

Introducing Morgane Nouvian

I just started a joint PhD under the supervision of Judith Reinhard and Charles Claudianos at UQ, and Martin Giurfa at UPS in France, my native country. The aim of my project is to understand how odours can modulate the aggressive behaviour of honeybees, and what are the neural and molecular mechanisms underlying these shifts in behaviour. I'm working with the alarm pheromone but also plant odours, mainly the green odour Praescent™ which has been shown to decrease stress in rodents. Preliminary results suggest that Praescent™ is also acting on bees, and I'm particularly interested in investigating what is happening in the bee's brain that induce such a decrease in aggressiveness.

Introducing Isobel Ronai

I also just started my PhD, a continuation of my honours project, under the supervision of Ben Oldroyd at the University of Sydney. My project is on the genetic basis of worker sterility in the honey bee. I will be focusing my project around functional genomic experiments, such as systematically altering the expression of candidate genes using RNA interference and then observing the effect of this knockdown of gene expression on reproductive phenotype. Ultimately this could provide an empirical example of a kin-selected

'gene for altruism' investigated at the molecular level.

Chris Reid's new home

I have recently begun a 2-year postdoc position at the New Jersey Institute of Technology, after completing my PhD at the University of Sydney with Madeleine Beekman and Ben Oldroyd. My new role as part of the SwarmLab with Simon Garnier (<http://www.theswarmlab.com/>) will largely be a continuation of my PhD work, examining mechanisms of collective behaviour and decision-making using ant colonies and slime moulds as model systems. You may ask; "What do ants and slime mould have in common?"

The acellular slime mould *Physarum polycephalum* behaves as a distributed, collective system, in much the same way as do groups of other animals like birds, ants and fish. The plasmodium is composed of many smaller oscillating units. Just like in an ant colony, the collective behaviour of the oscillators, each passing on information to entrain its neighbours, drives the organism's movement and decision-making. Despite the absence of centralised control, trail-laying ants and slime mould cells deftly solve the problems they encounter when foraging. Understanding how these organisms organize their foraging is central to understanding their behavioural ecology. At the same time, understanding the collective behaviour of ant colonies and slime moulds can provide insights into the workings of other, less accessible complex systems.

The theme of my research is to uncover the mechanisms that ants and slime moulds use to achieve collective behaviour. In particular, I explore how Argentine ants (*Linepithema humile*) and slime mould construct efficient networks through mazes, how they adapt their solutions to foraging problems when conditions change, and uncover new mechanisms of collective decision-making and navigation.

If you would like to know more about my research, visit my website <https://sites.google.com/site/chrisreidbiologist/home>

If you would like to contact me, or give me a job starting in 2015, email me at chriseidresearch@gmail.com.

What Ben Oldroyd and Madeleine Beekman have been up to over the summer

Ben and Madeleine spent three months working with the wonderful South African honeybees. The Cape honeybee *Apis mellifera capensis* is an interesting beast as the workers are able to lay diploid eggs and often do so. A few years ago we discovered that the workers preferentially lay eggs in queencells which are then raised as queens (queens and workers in honeybees are genetically identical). Even more interesting is that about half of all queens raised in a colony are the daughters of parasites: workers that are not natal to that colony. This is rather amazing as such parasitism results in the host colony raising queens to which it is not related thus reducing its fitness to zero.

The ability of workers to lay diploid eggs and to successfully compete with the queen over the production of new queens, has led to the evolution of a specialist parasitic lineage: the 'clone' ('clone' because recombination occurs during the formation of a diploid zygote). This 'clone' has killed thousands of honeybee colonies after it was accidentally introduced into the northern part of South Africa where the Savannah bee *A. m. scutellata* resides. Somewhat to our surprise, our lab has shown that all individuals currently parasitizing *A. m. scutellata* colonies are the descendants of a single worker that lived in 1990. This finding is surprising because with each generation of asexual reproduction, offspring become more homozygous if recombination occurs. Hence, after 20 years this clonal lineage should not be able to exist because it would have become homozygous at the sex determining locus a long time ago, resulting in inviable diploid males. Not so. In fact PhD student Frances Goudie has found that there are specific regions at which heterozygosity is maintained.

Because of its parasitic life style, the clonal lineage can suffer huge losses due to loss of heterozygosity. Investment in eggs is low and provided one can lay enough of them, the most heterozygous ones will yield viable offspring.



The individual with the white mark is an A. m. capensis queen. The black individual above her is an A. m. capensis worker that has been raised by A. m. scutellata nurse bees (the yellow bees in the photo). Because of 'miscommunication' between A. m. capensis brood and A. m. scutellata workers, the A. m. capensis worker is fed so much food she turns into an inter-caste individual. Hence her large size. Photo: Ben Oldroyd

The Cape honeybee can only be found in the Southern most tip of South Africa. The area is beautiful with rugged mountain ranges, Cape Dutch architecture and wild coasts. And guess what, it is also the prime wine growing region of South Africa, with Stellenbosch (our home away from home) having about 700 wineries. The things we do for Science....



Stellenbosch vista. Photo Madeleine Beekman

EUROIUSSI2012

A large number of our members went off to Tuscany last year for the 5th meeting of the European sections of the IUSSI (**EUROIUSSI 2012**). Montecatini is a charming old city, replete with grapevines, pizzarias, palaces and churches. My favourite bit was the funicular (cable car), 1898, that ferried hungry (and thirsty) delegates to the pizza joints in the old monastery town on the hills just outside the city. Madeleine and I ran the same track in the morning (in the rain) and I can understand why the monks prayed for a funicular.

Refreshingly, all the plenary speakers were mid-career women who had been post docs in the European 'Training and mobility of researchers' social insects network during the 1990s. It was wonderful to see how well these folk have done, and the power of these European networks to foster science. Sirian Sumner gave an interesting talk that showed how genomics can inform Tinbergen's famous 'four questions' about the animal behaviour in general and social insects in particular. She also recommended that we Tweeted about each talk we heard, advice that few if any of us took up. Sylvia Cremer spoke on *Collective disease defence in ant societies*, with amazing video of a worker squirting an egg with something from her sting thereby to help the egg overcome some ailment. Returning to her native Italy, Patricia D'Ettore gave a nice history of her work on ant recognition, which somehow managed to include a picture of the Italian football team in various states of undress. Finally our own Madeleine Beekman spoke on what bees can tell computers and vice versa, focussing on nest site selection in honey bees.

The contributed papers were an eclectic bunch spanning genomics to applied apiculture.

President of the conference, Stephano Turillazzi, was his usual charming and urbane self, and made everyone feel extremely welcome. All the Aussies plugged the Cairns conference

shamelessly, and if any of the Europeans were wavering they won't be now.

Ben Oldroyd

(Social Insect) Meetings

The Australasian Evolution Society will meet this year in Geelong from September 30 until October 2. Depending on interest, the Australian IUSSI may join the AES and again hold a joined meeting. See their website:

www.australasianevolutionsociety.com

This year's Australasian Society for the Study of Animal Behaviour conference will be held between July 1-4 at the University of Auckland, NZ. See:

www.assab.org

Not quite this year, but definitively before the next newsletter comes out, ***The Cooperation and Conflict in the Family*** conference will be held at UNSW in Sydney, Australia from February 2-5 2014. If interested, see the website where you can also place yourself on the mailing list to receive updates:

<http://www.evolvingeconomics.com/>