© 2015. Published by The Company of Biologists Ltd | The Journal of Experimental Biology (2015) 218, 334-335 doi:10.1242/jeb.118638

NEWS

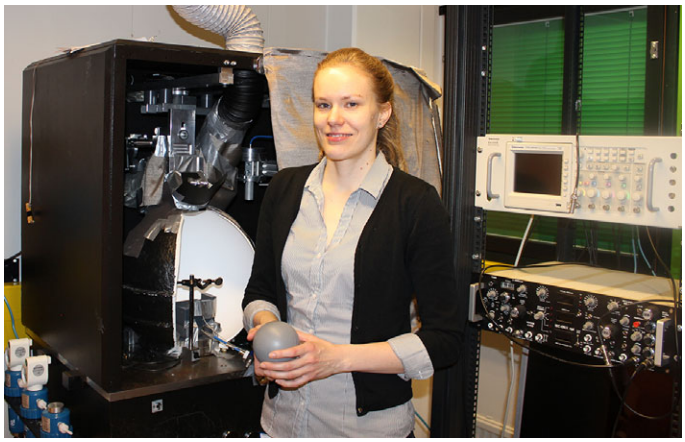
Anna Honkanen wins *The Journal of Experimental Biology* Outstanding Paper Prize 2014

Kathryn Knight

The Editors of *The Journal of Experimental Biology* are delighted to announce that Dr Anna Honkanen from the University of Oulu, Finland, is the winner of the 2014 JEB Outstanding Paper Prize. Awarded in memory of Bob Boutillier (JEB Editor-in-Chief 1994–2003), the prize recognises the junior author who made the most significant contribution to an outstanding paper. Honkanen was the lead author on the article 'Cockroach optomotor responses below single photon level' (Honaken et al., 2014). 'With the Outstanding Paper Prize we want to recognise exceptional work published by young scientists in the JEB,' says Hans Hoppeler, JEB's current Editor-in-Chief. He adds, 'What stands out in this paper is its highly integrative nature', explaining that the journal likes to promote research that has been conducted in an integrative framework with the aim of understanding underlying physiological mechanisms. This year's winner was selected from a strong shortlist of papers – available at the end of this article – that covered topics as diverse as the biomechanics of boring in fig wasps and the orchestration of salivation in ticks.

Honkanen remembers that when her supervisor Matti Weckström heard the news about the prize he was so excited that he had already told everyone in the lab before she arrived that day. She also explains that her love of neurobiology was kindled during an Erasmus exchange at the University of Manchester, UK, when she took a year out from her undergraduate studies in the Biology Department at the University of Oulu. Returning to Oulu to work on the eyes of tiny *Ectoedemia argyropeza* for her Master's degree with Victor Benno Meyer-Rochow, who was based at the Jacobs University in Bremen, Germany, Honkanen recalls that Kyösti Heimonen was appointed as her thesis examiner. This turned out to be a fortuitous turn of events as Heimonen contacted her the day after receiving her thesis to invite her to join the lab that he runs with Weckström. 'I knew that in Matti's lab they do quite demanding and ambitious stuff', says Honkanen, who jumped at the opportunity, joining them as soon as she had completed her Master's.

However, her time in the lab was not all plain sailing. 'I didn't know when I started what I was going to end up doing. I knew it was something to do with cockroach vision but it took quite a long time to find what I was going to do,' she recalls. At first she tried several different behavioural experiments before switching to the night vision study. However, Honkanen remembers that everything changed when the virtual reality arena came online. 'It was very useful for the cockroaches because you can eliminate the other senses so you can concentrate on vision,' she explains. Describing the setup, which allowed her to tinker with the insect's visual surroundings while recording their lightning-fast responses, Honkanen recalls that she had to anaesthetise the insects in order to position them correctly in the arena. However, once in place, the cockroaches were extremely cooperative and happy to keep walking for hours, ready for Honkanen to test their vision.



Anna Honkanen with the virtual reality arena in Oulu. Photo credit: Esa Luoma.

'The main open question now is how the animal's visual system, the nervous system behind the whole thing, copes with such scarce arrival of photons,' says Weckström, who has been intrigued by cockroach nocturnal vision since the early 1990s. Explaining that the animals are relatively unique amongst nocturnal insects in having large eyes, Weckström says, 'They apparently have some function… but the biological meaning remains open'. So the team decided to find out how well cockroaches see in the dark and to find out how they perform the feat.

Playing the insects movies of moving bars illuminated by light at intensities ranging from a bright day down to a moonless starlit night (0.005 lx), Honkanen was impressed to see that the insects were still able to see slow-moving objects, even in the dimmest light. And when she analysed the animals' behaviour, she realised that they were using two mechanisms to enhance the incredibly faint images; 'The photoreceptors are very slow and…they must use huge spatial pooling as well at the level of the brain', says Weckström. And, when Honkanen measured the electrical activity in the insect's retina in the darkest conditions, she was astonished to see discrete bumps – representing the arrival of individual photons at the retina – in the traces. She recalls that Weckström was really excited when she showed him the results; 'That's when I knew we had something big,' she smiles.

Weckström adds, 'I think it is highly exciting because it opens more new questions than it solves, so now we have to find out how all this happens deep down in the nervous system'. He is also delighted that Honkanen has achieved so much. 'Anna is bright, independent, capable of initiative and can work hard when needed,' he says, adding, 'she has a suitable balance of ambition and knowledge of her own skills and this can lead to good results in science'.

News & Views Editor

kathryn@biologists.com

The Journal of Experimental Biology (2015) doi:10.1242/jeb.118638

At the time that Honkanen won the award in mid December she was in the middle of a flurry of success, busy preparing for her thesis – which she defended successfully with David O'Carroll from the University of Lund on December 15. It was also just matter of weeks after her paper had been published and she admits that she was surprised by the coverage that it received in *Science* and *Nature*. 'We don't get this much publicity so often', she smiles. And, after completing her PhD, Honkanen is moving on to a postdoc at the University of Lund, Sweden, with Eric Warrant to continue her work on the visual systems of nocturnal insects. However, she admits that she won't be sorry to leave the cockroaches in Oulu. 'They are not very likeable animals,' she chuckles, adding, 'it will be fun to work on something else'.

Outstanding Paper Prize Shortlist 2014

Amélineau, F., Péron, C., Lescroël, A., Authier, M., Provost, P. and Grémillet, D. (2014). Windscape and tortuosity shape the flight costs of northern gannets. *J. Exp. Biol.* **217**, 876-885.

Camp, A. L. and Brainerd, E. L. (2014). Role of axial muscles in powering mouth expansion during suction feeding in largemouth bass (*Micropterus salmoides*). *J. Exp. Biol.* **217**, 1333-1345.

Gonzalez-Bellido, P. T., Wardill, T. J., Buresch, K. C., Ulmer, K. M. and Hanlon, R. T. (2014). Expression of squid iridescence depends on environmental luminance and peripheral ganglion control. *J. Exp. Biol.* **217**, 850-858.

Honkanen, A., Takalo, J., Heimonen, K., Vähäsöyrinki, M. and Weckström, M. (2014). Cockroach optomotor responses below single photon level. *J. Exp. Biol.* **217**, 4262-4268.

Kim, D., Šimo, L. and Park, Y. (2014). Orchestration of salivary secretion mediated by two different dopamine receptors in the blacklegged tick *Ixodes scapularis*. *J. Exp. Biol.* **217**, 3656-3663

Kundanati, L. and Gundiah, N. (2014). Biomechanics of substrate boring by fig wasps. *J. Exp. Biol.* **217**, 1946-1954.

Massamba-N'Siala, G., Prevedelli, D. and Simonini, R. (2014). Trans-generational plasticity in physiological thermal tolerance is modulated by maternal pre-reproductive environment in the polychaete *Ophryotrocha labronica*. *J. Exp. Biol.* **217**, 2004-2012.

Takahashi, E., Hyomoto, K., Riquimaroux, H., Watanabe, Y., Ohta, T. and Hiryu, S. (2014). Adaptive changes in echolocation sounds by *Pipistrellus abramus* in response to artificial jamming sounds. *J. Exp. Biol.* **217**, 2885-2891.

Tepolt, C. K. and Somero, G. N. (2014). Master of all trades: thermal acclimation and adaptation of cardiac function in a broadly distributed marine invasive species, the European green crab, *Carcinus maenas*. *J. Exp. Biol.* **217**, 1129-1138.