Write a summary of the presentation(see PowerPoint slides) and the published paper( DOI: 10.1021/acsami.8b19433) (3 pages). Biosensing with Insect Odorant Receptor Nano discs and Carbon Nanotube Field-Effect Transistors

Discuss, how the work presented fits with what has been done in the area. Did they continue with something that had been done, or were very new things presented? How do the results/ideas presented compare with the literature in the area? Were there some ‘revolutionary’ ideas? Was there something you were amazed about? How was the contend presented? How much did you understand? Also explain Expression of Insect Olfactory Receptors for Biosensing on SAW Sensors.

Insect odorant receptors (ORs) have been reconstituted into lipid nano discs and tethered to carbon nanotube field effect transistors to function as a biosensor. Here four different insect ORs from D. melanogaster (DmelOR10a, DmelOR22a, DmelOR35a, and DmelOR71a) were expressed in Sf9 cells, purified and reconstituted into lipid nano discs. We have demonstrated that each of these ORs produce a selective and highly sensitive electrical response to their respective positive ligands, methyl salicylate, methyl hexanoate, trans-2-hexen-1-al and 4-ethylguaiacol, with limits of detection in the low fM range. No detection was observed for each OR against control ligands, and empty nano discs showed no specific sensor signal for any of the odorant molecules. Our results are the first evidence that the insect ORs can be integrated into lipid nano discs and used as primary sensing elements for bioelectronic nose technologies.

In this paper we describe the development of a protein expression system for insect olfactory receptors in Sf9 cells, which will then be used as part of a surface acoustic wave (SAW)-based biomimetic sensor. Sf9 cells expressing olfactory receptors will be used as the biological component on dual SAW resonator devices, where one side of the device functions as a reference and accordingly is coated with non-olfactory receptor-expressing cells.