Landcare Research
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# Odour detection

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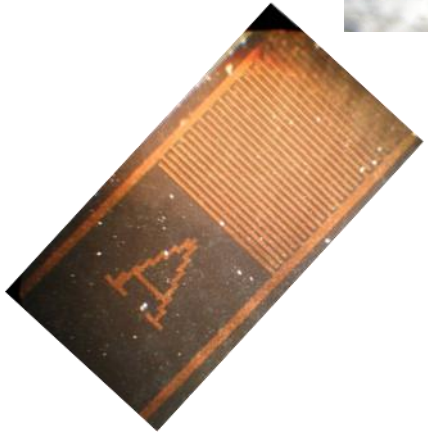
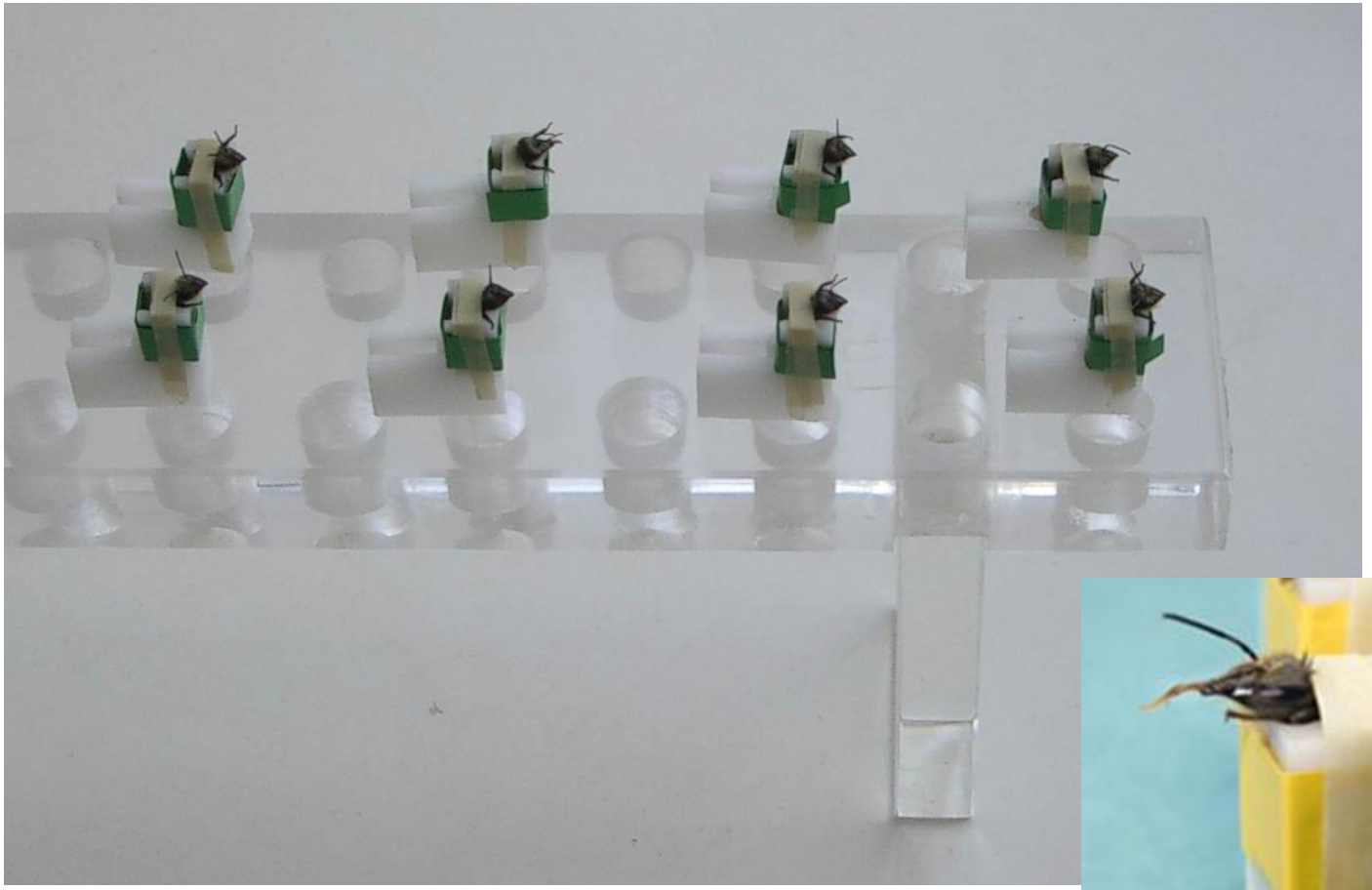
# Odour Detectors

- Biological:
  - Dogs
  - Rats
  - Bees

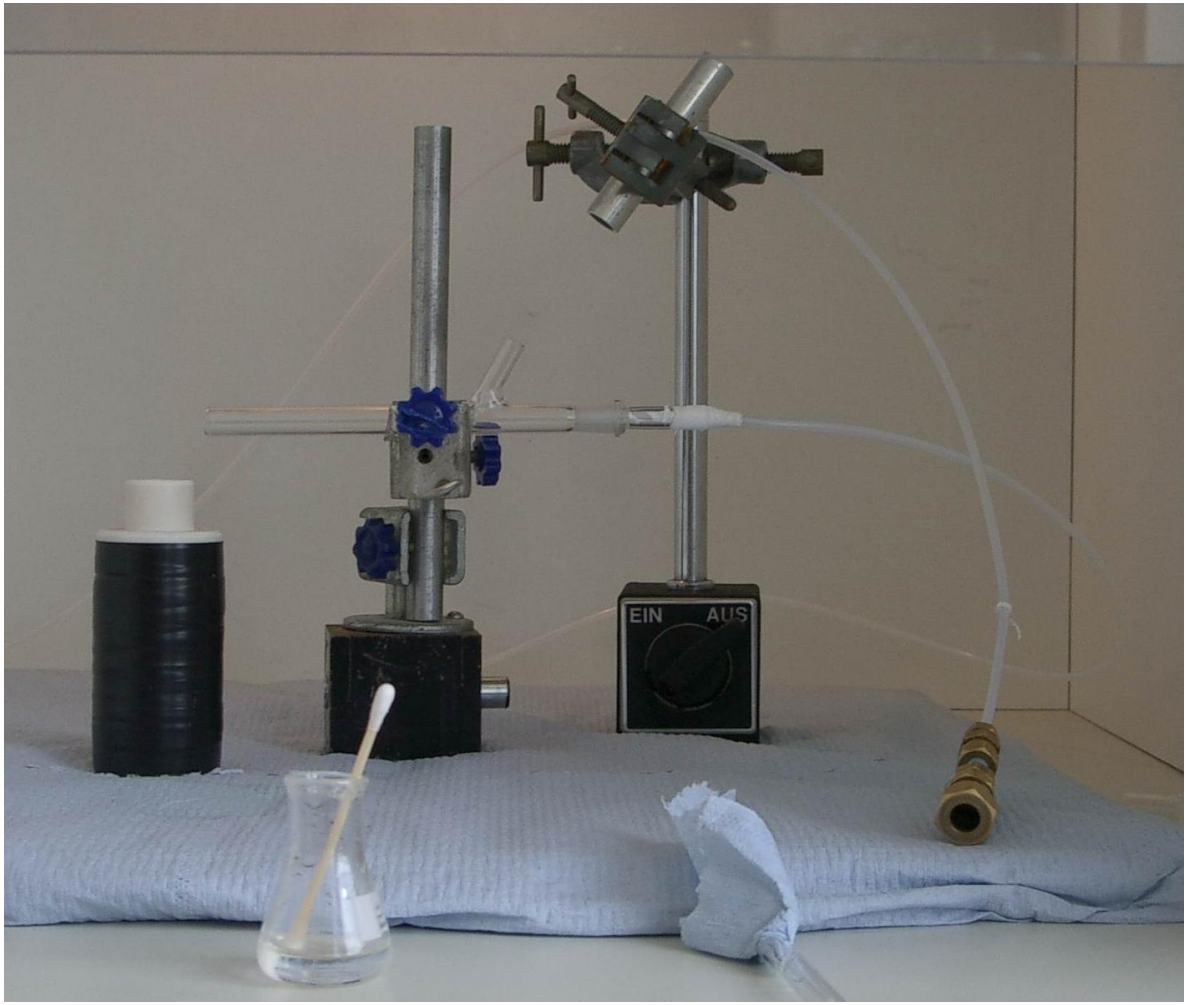
- Electronic:
  - E-noses
  - RFID tags



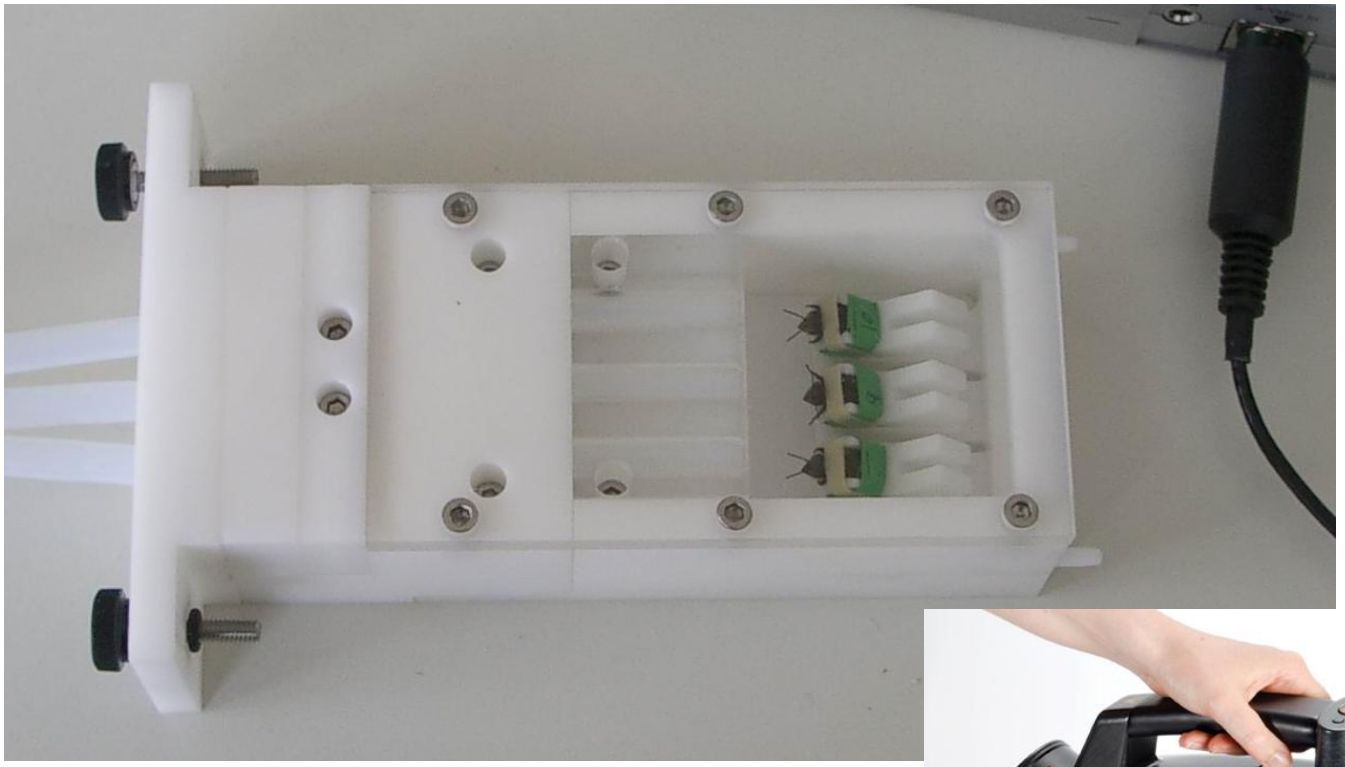
# Bees…1



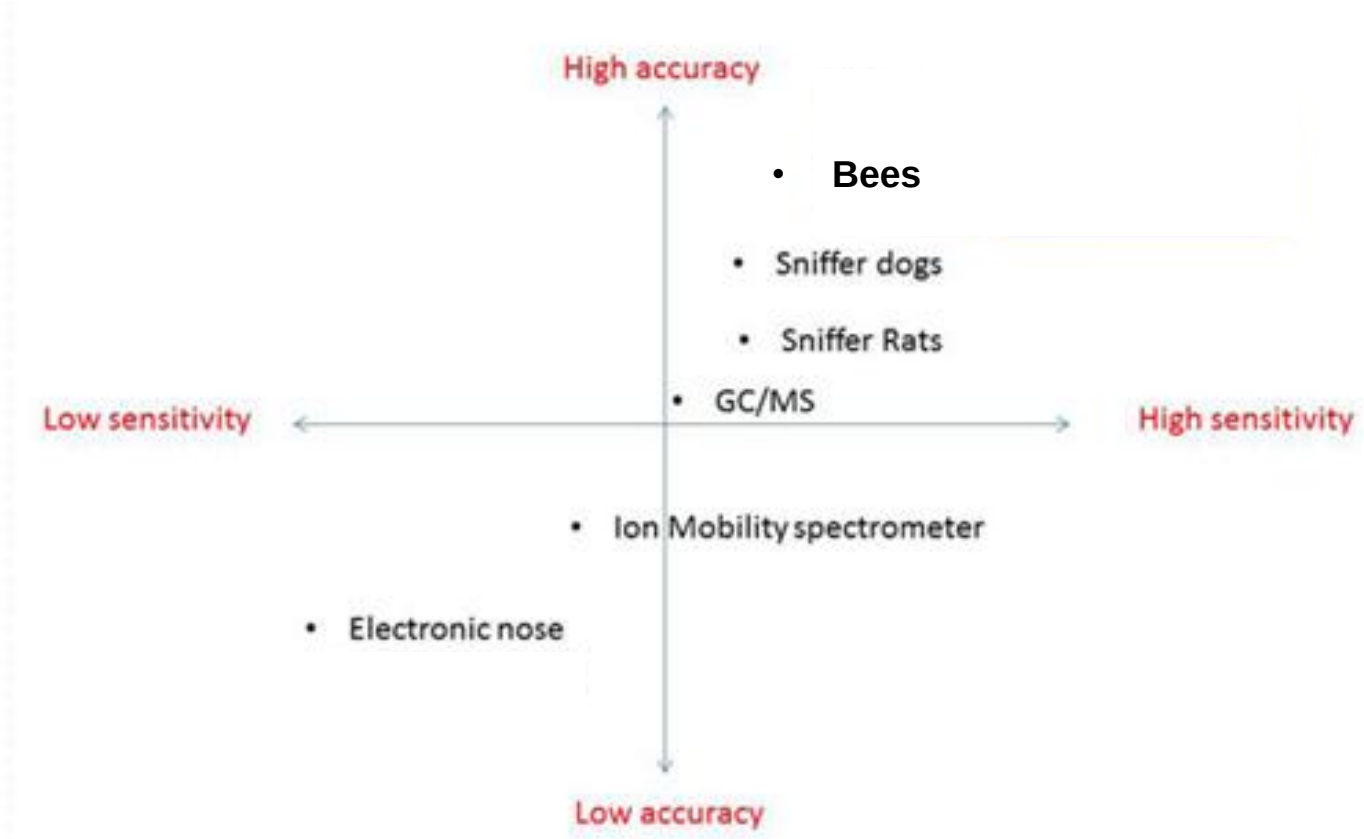
# Bees…2



# Bees…3



# Sensitivity and Specificity

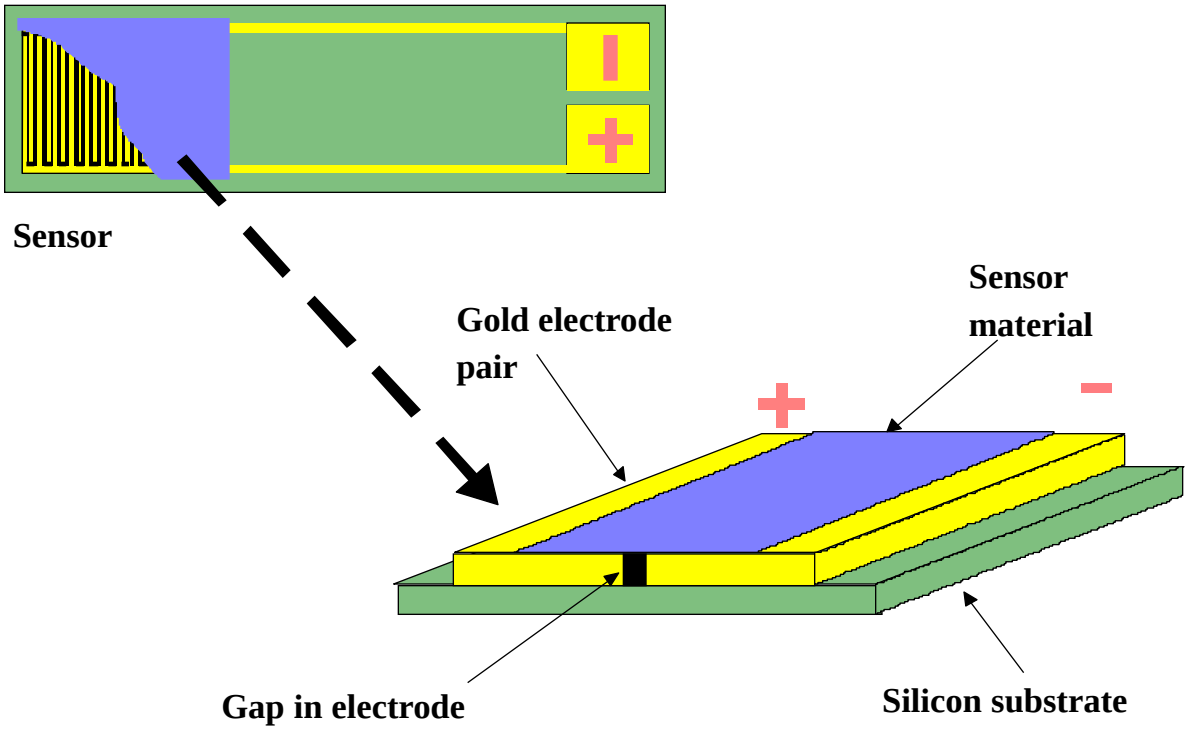


# E-noses…1

| Biological System | | Electronic Nose |
|---|---|---|
| **Respiratory system**<br>***Nose - Diaphragm*** | = | **Pump and valves**<br>***Sampling system*** |
| **Olfactory Membranes**<br>***Receptor Proteins*** | = | **Sensors**<br>***Many types*** |
| **Olfactory Area of the Brain (*Signal Processing*)** | = | **Computer and Software**<br>***Algorithims, Neural Networks, Statistical Analysis*** |
| **Output = Recognition of smell / discrimination** | = | **Output = Discrimination and recognition** |

# E-noses…2

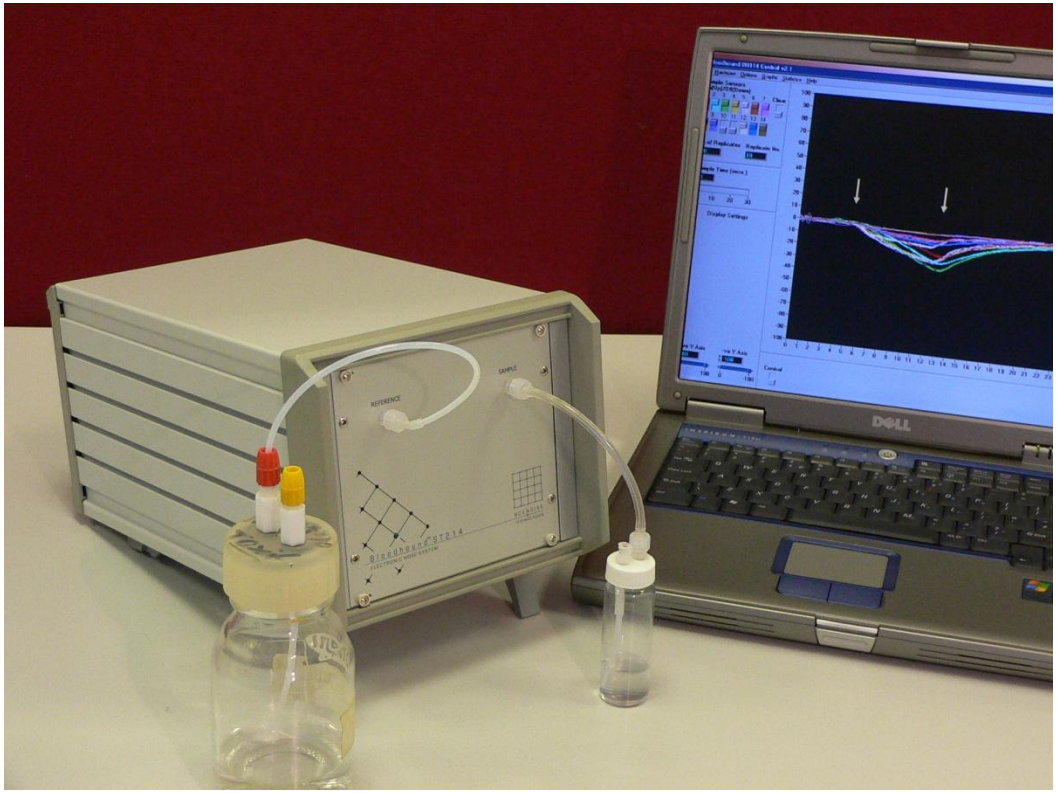
## Conducting Polymer Sensors.




**The resistance of the polymer material deposited on the electrode changes when volatile chemicals interact with the surface.**

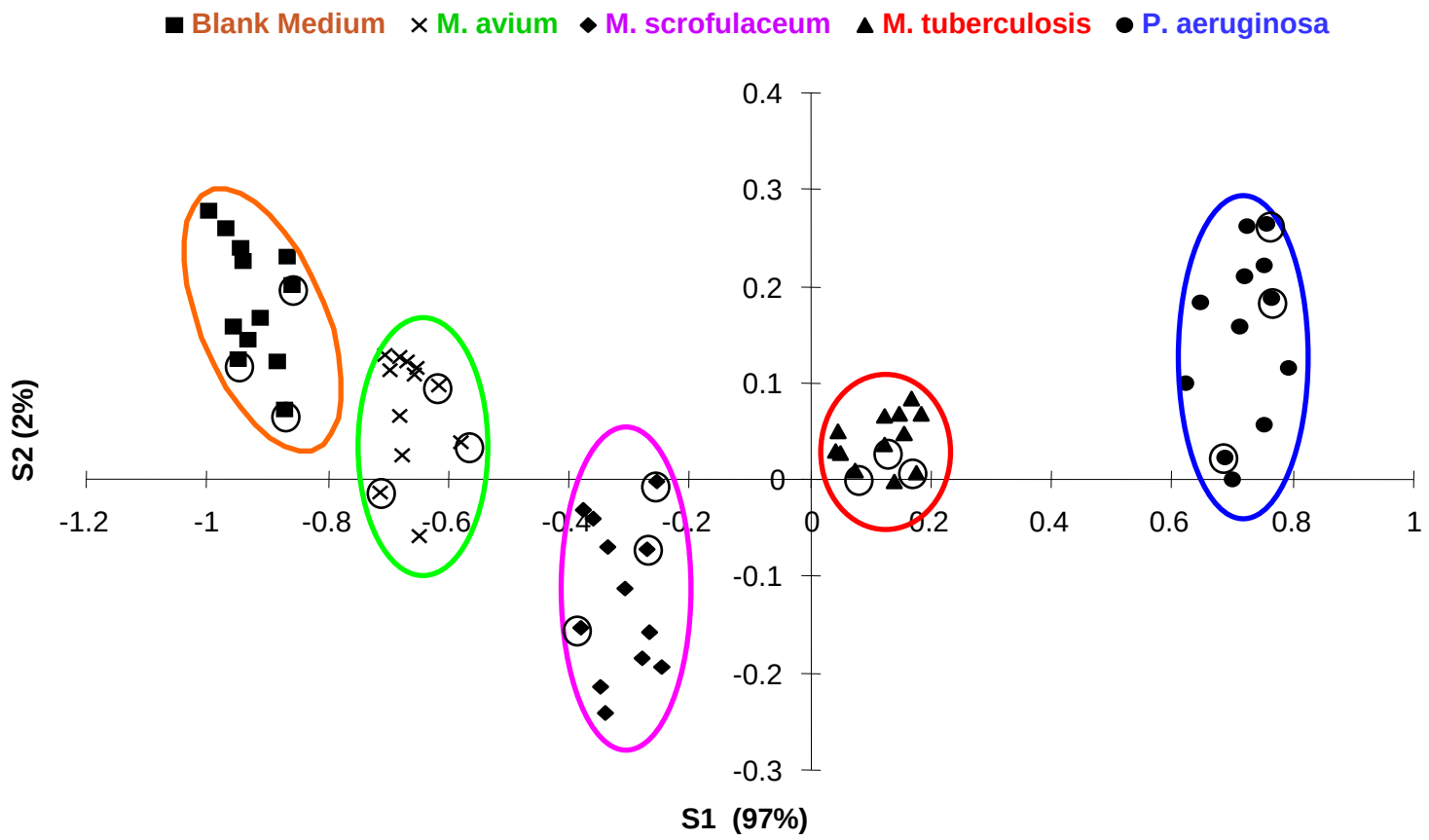
# E-noses…3

## Bloodhound ST214




- Flow injection system (pulse or sniff of volatiles to give transient response)
- Constant flow rate
- Reference gas, cleaned air
- Automatic system check to a control substance (usually aqueous butanol)
- Typical sampling time 1-3 minutes including wash and baseline steps.
- 14 Conducting polymer sensors
- Lightweight (<2.5Kg)
- Windows-based software

# Detection of Mycobacterium volatiles

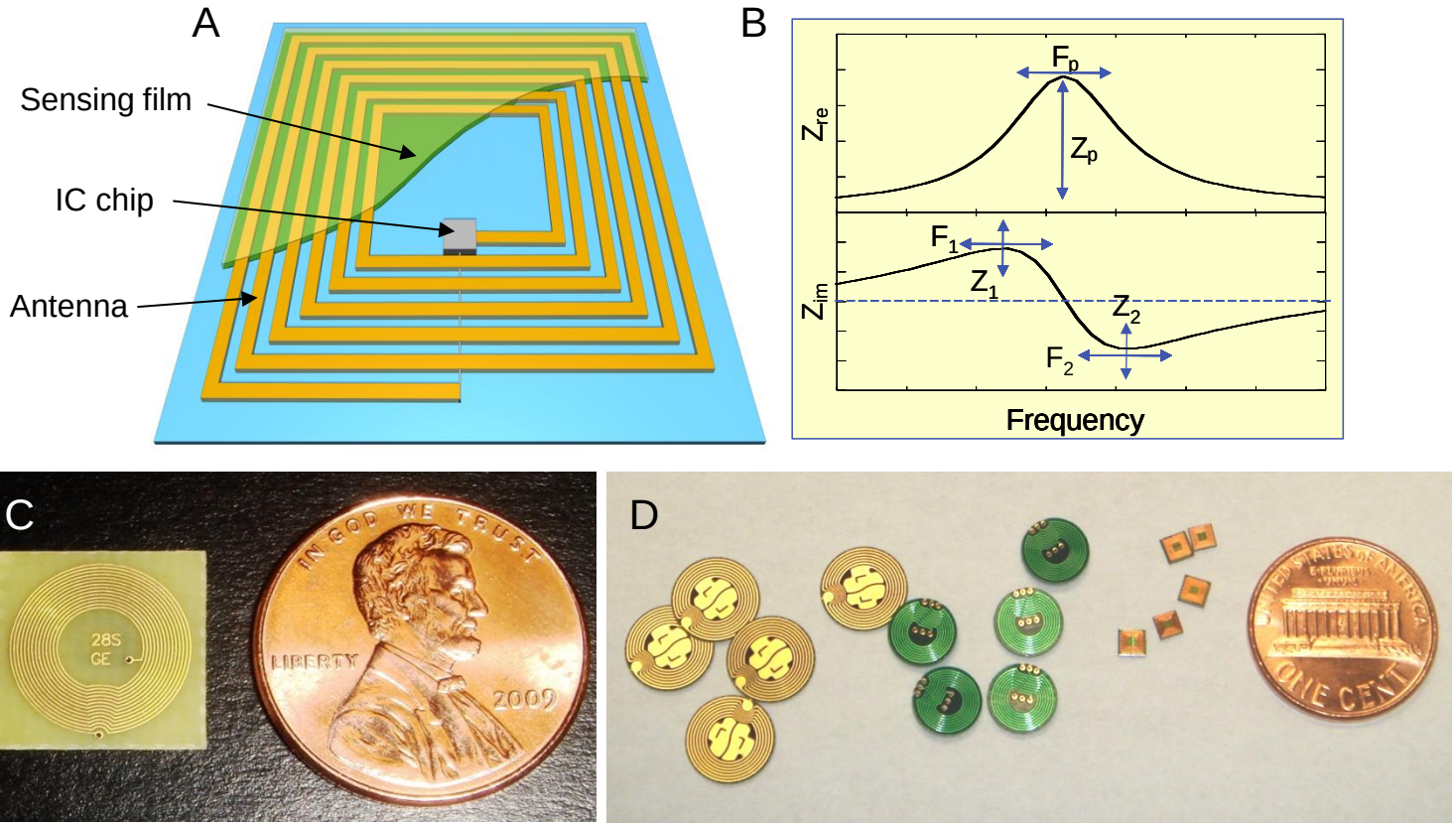



Volatiles associated with TB: methyl phenylacetate, methyl p-anisate, methyl nicotinate

# Second Generation E-noses

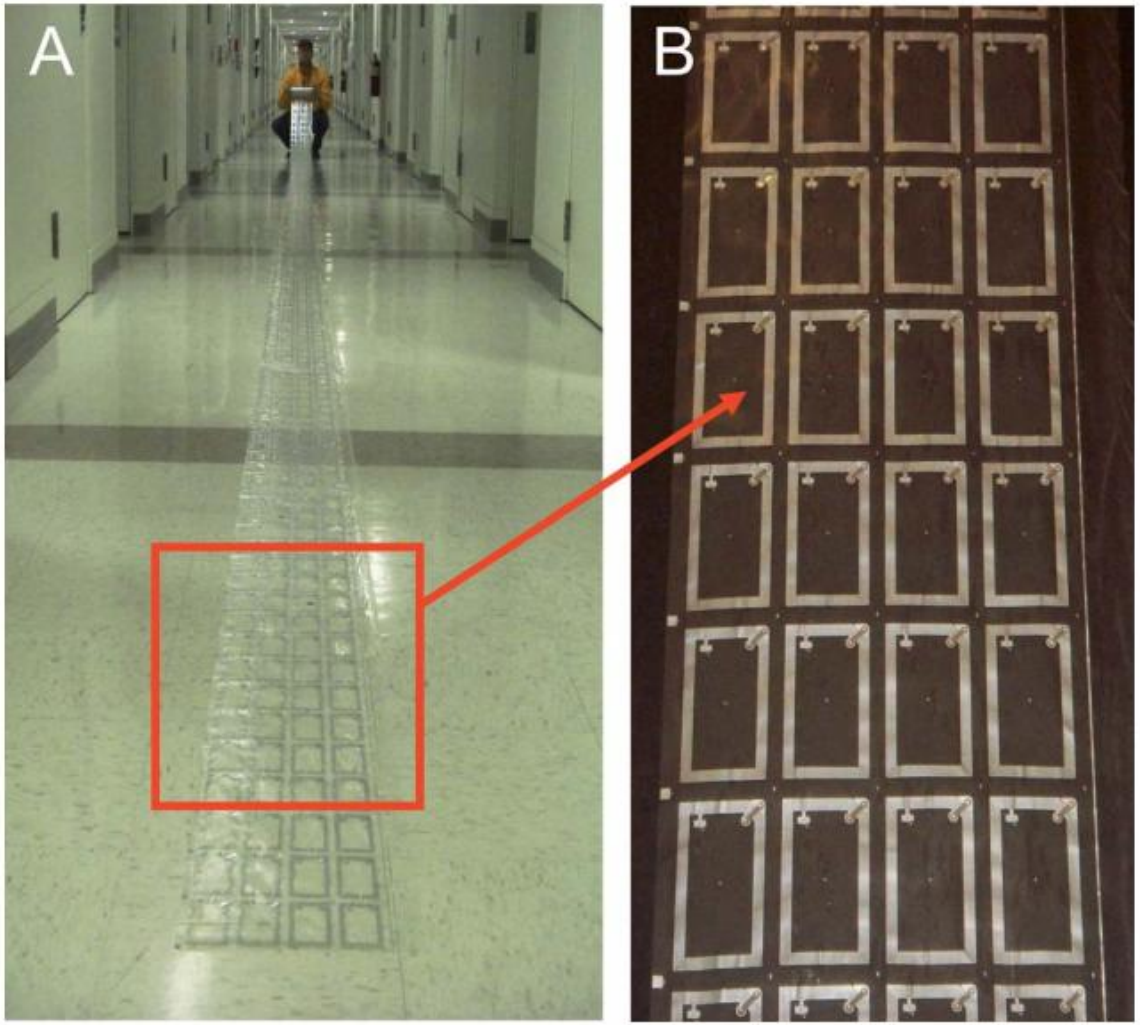
**Miniaturisation to produce portable instruments is also possible.**

# RFID odour sensors…1

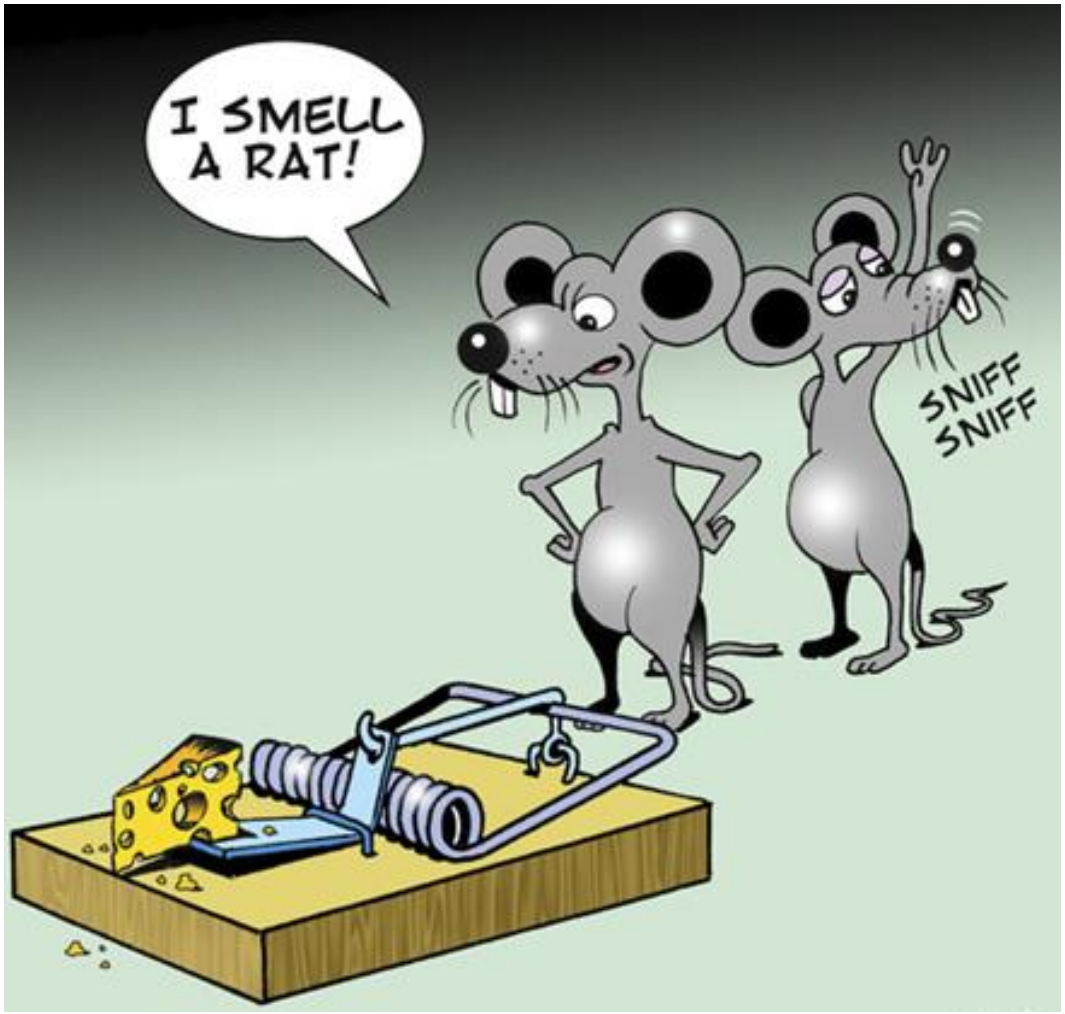



Specific VOCs change the impedance of the RFID sensor antenna

# RFID odour sensors…2




- Can use passive and active RFID tags
- Low-power requirements
- Large-scale production
- Lend themselves to Wireless Sensor Networks
- E.g. Can detect rabbit Hexanal, Nonaldehyde & Octenol


I SMELL A RAT!
SNIFF SNIFF