

## 1 **Eureka Prize winners show off Australian-grown science ingenuity — from super lasers to killer wings**

2 Researchers working on everything from **smart** stick-on solar-**reactive** sensors to bacteria-killing **surface** materials  
3 inspired by insect wings have been **awarded** one of Australia's top science prizes. Take a look at some of the  
4 **groundbreaking** entrants who **made up** the Eureka Prize 2017 shortlist:

### 5 **Smart sun sensor lets you know when you're cooked**

6 Where else but in this sunburnt country would scientists **invent** a sticker that changes colour when you have had too  
7 much sun. Professor Justin Gooding, Dr Parisa Khiabani and Dr Alexander Soeriyadi from the University of NSW  
8 created the simple sensor **to alert** people they need to get into the **shade** or slap on more sunscreen. The UNSW **invention**  
9 **fades** in colour after sun **exposure**.

10 The smart sensor is cheap and can be printed from an ordinary inkjet printer using special **ink** made from food **dye** and  
11 titanium dioxide — the active **ingredient** in many sunscreens. Like dog poo baking in the Australian sun, the sensor will  
12 turn white when it is cooked. "It's smart because when UV light hits the piece of paper, the ink loses its colour," Professor  
13 Gooding said. **Variations** of the slap-on sticker can be made that **take into account** skin tone and **whether** you have put  
14 on sunscreen. Professor Gooding said he hoped the sensor would make it to store shelves in the next year or two.

### 15 **Dragonfly wings can kill even antibiotic-resistant bacteria**

16 **Normally** when you think about killing bacteria you think about attacking them with a chemical. But researchers at  
17 Swinburne University of Technology have discovered that the **surface** of dragonfly and cicada wings will physically  
18 self-sterilise, with no chemicals necessary. They do that with tiny spikes called nanopillars that catch, **stretch** and rupture  
19 the bacteria, destroying and **neutralising** them. Scientists hope a new generation of nanotextured material based on the  
20 wings can provide an antibacterial surface for medical **implants** that will physically stop and kill bacteria. Swinburne  
21 researcher Professor Elena Ivanova said the new surfaces had exciting potential in the fight against antibiotic-**resistant**  
22 bacteria. "Because this is a mechanical process it's less **likely** that the bacteria will be able to **develop** resistance to this  
23 material," she said. The project impressed the judges, with it winning Eureka Prize for Scientific Research.

### 24 **Balding Sydney coastline gets transplant**

25 Pollution, including sewage being pumped into the ocean off areas including Bondi Beach, is thought to have killed off  
26 a huge 70-kilometre stretch of underwater seaweed forests. The crayweed, which supported lobsters and abalone,  
27 **disappeared** and even an **improvement** in water quality in the 1990s could not bring back what was lost. So scientists  
28 at the Sydney Institute of Marine Science at UNSW decided they would do a **large-scale** transplant of the underwater  
29 forest. Scientists say underwater seaweed forests along Sydney's coastline have made a **remarkable** recovery. Operation  
30 Crayweed started more than five years ago and sought the help of **volunteer** citizen scientists to replant the seaweed in  
31 **affected** areas from Palm Beach to Botany Bay. The crayweed is installed on the reef floor in specially **designed** mats,  
32 and in just months, new generations of the seaweed were sprouting and rejuvenating the coastline.

### 33 **Biopen doodles could erase arthritis**

34 Doctors might not be famous for their **legible** writing, but their penmanship will soon be put to the test **repairing**  
35 **damaged** or diseased bone during orthopaedic implant surgery. A team of scientists from Wollongong working with  
36 doctors in Melbourne have made a pen-like handheld 3D printer that can deliver stem cells right to where they need to  
37 go.

38 Surgeons will use the Biopen and its ink of living cells and growth factors to fill in damaged bone during surgery, giving  
39 them great control and **precision**. The stem cells are encased in gel when dispensed and an ultraviolet light on the pen  
40 hardens the "hydrogel" ink. It is being tested on sheep at St Vincent's Hospital in Melbourne, where stem cells are  
41 delivered directly to a knee to regrow damaged cartilage. So far the testing is showing better **results** than any **current**  
42 treatment used on humans "Although we have used this **primarily** for cartilage, we can already see how this can be used  
43 in a **variety** of situations," St Vincent's Hospital orthopaedic surgeon Professor Peter Choong said.

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45 Adapted from [ABC NEWS](#)