

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](#)