Mechanisms for staying clean

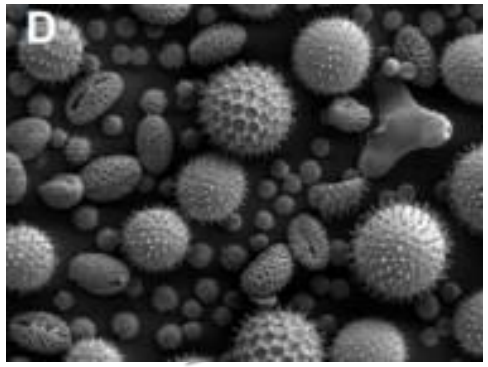
Do you know Self-cleaning is hard for animals ?

The difficulty is from their hair

Pollen on the body of a bee

A mite on a bee's chest

A mosquito body is covered with water



A variety of pollen

Mites on a bee

A mosquito leg covered with dew

Why we study cleanliness

01 Self-cleaning technologies

02 Autonomous robots and microelectromechanical systems (MEMS 自主机器人和微机电系统)

03 Bio-inspired renewable cleaning strategies

04 The limits of the organisms on which our lives depend

05 ...

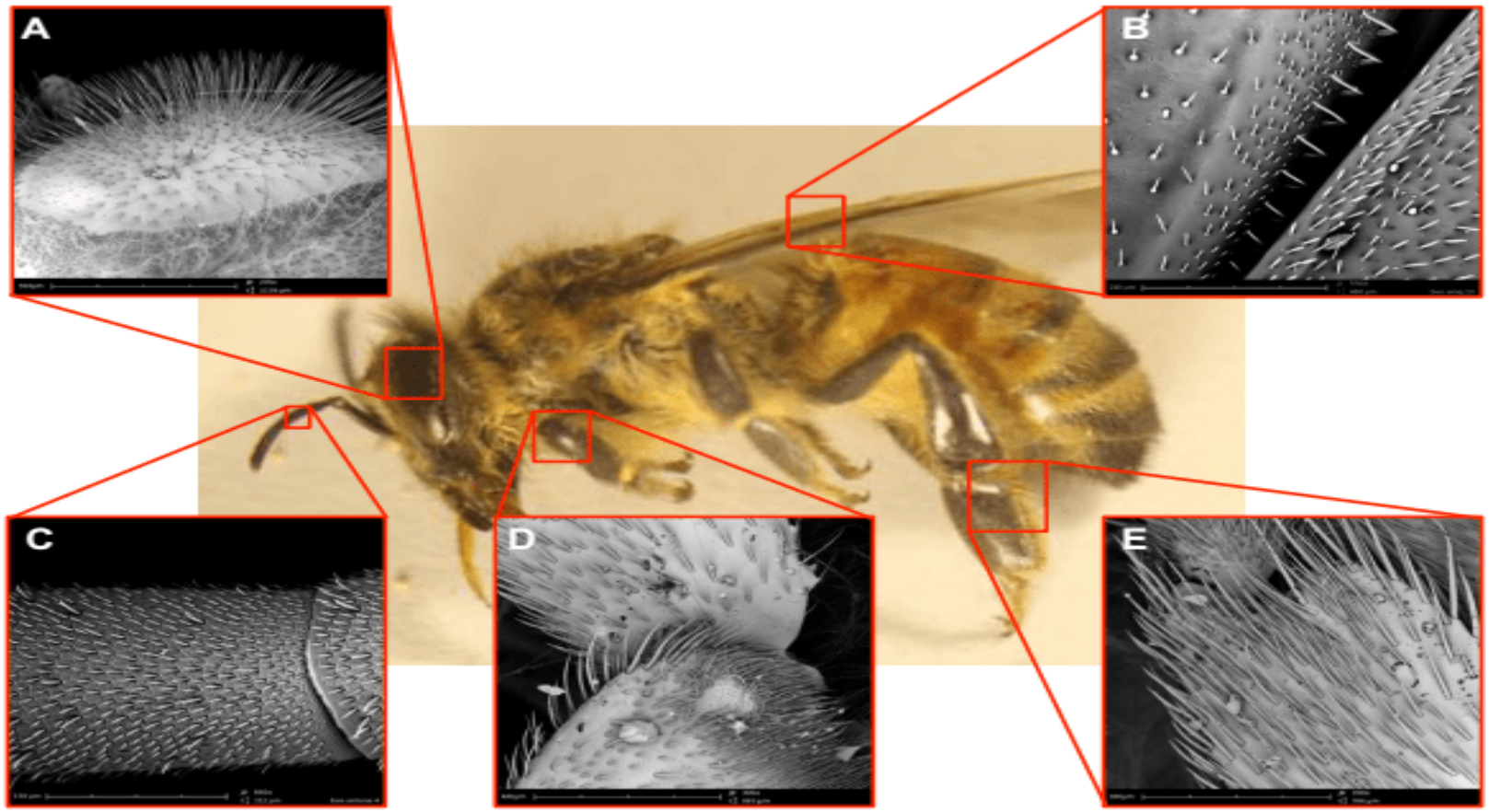
the process of finding the problem

pollen 花粉

dust

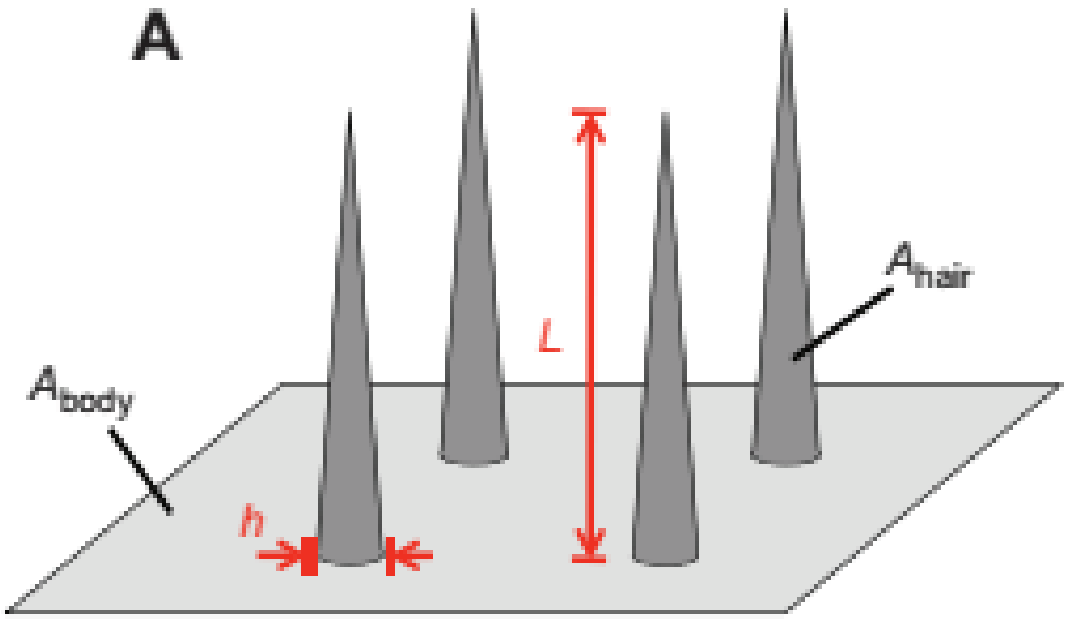
bacteria

the principle of research



grooming structure and their targets on the honeybee

both skin and hair are susceptible to deposition of particles .the real surface erea is the sum of the surface of the surface erea of the skin A_{body} and hairs A_{hair}



$$A_{\text{hair}} = \frac{\pi}{2} h \sqrt{L^2 + \frac{h^2}{4}} A_{\text{body}} \eta.$$

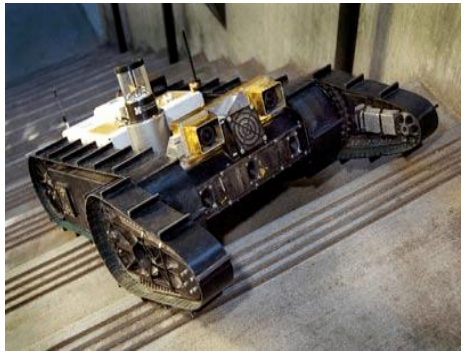
clean strategies

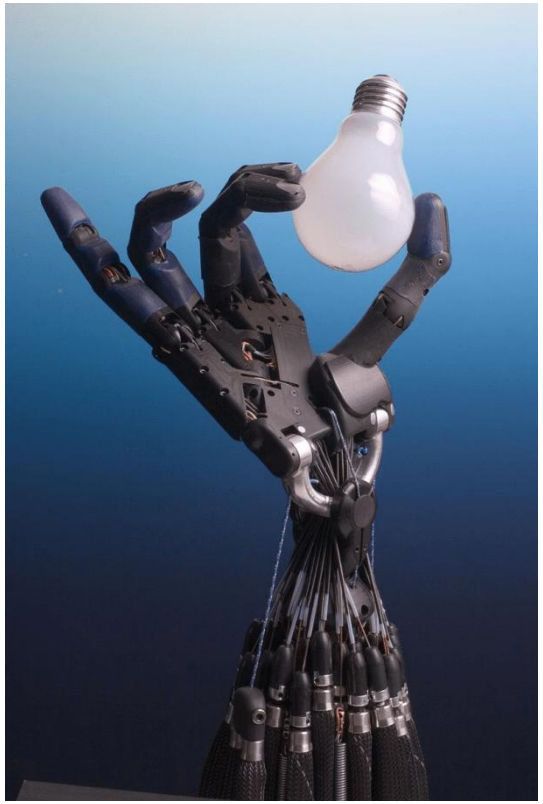
1.non-renewable clean strategies

2.renewable clean strategies

The relation between research and science technology

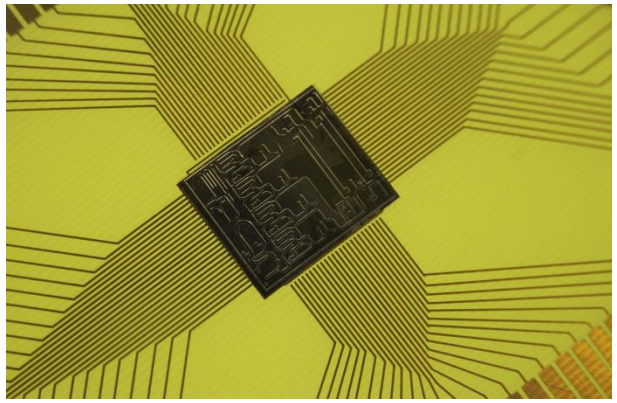
autonomous robots





Shadow Dexterous Robot Hand holding a lightbulb

microelectromechanical systems (MEMS)



Microelectromechanical systems chip, sometimes called "lab on a chip"

A Texas Instruments DMD chip for cinema projection

UAV(drones)

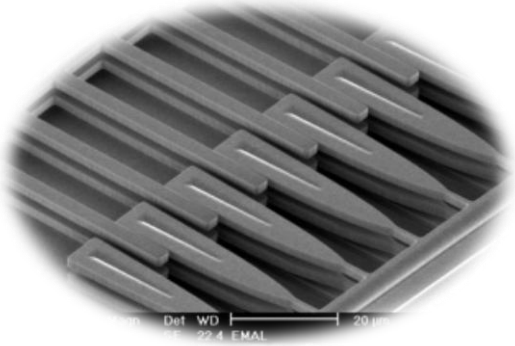
A DJI Phantom UAV

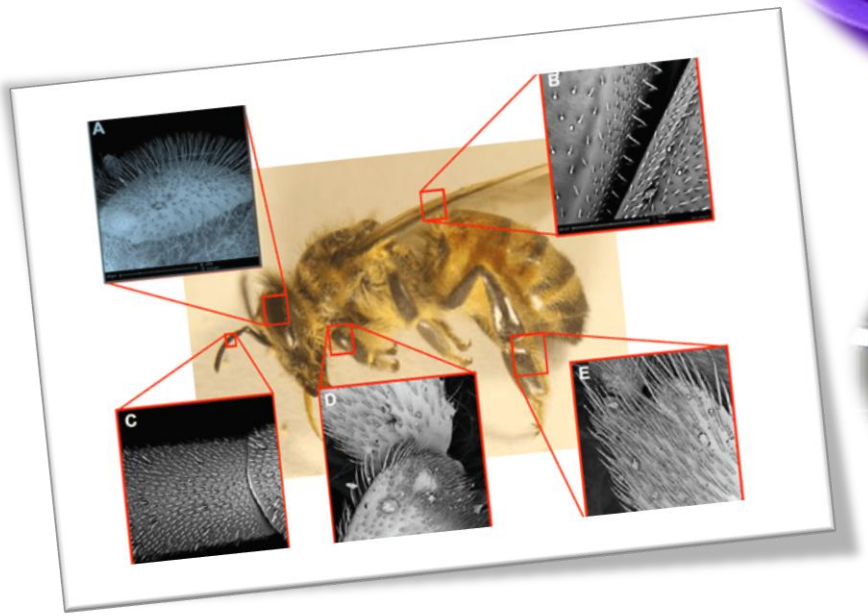
An MQ-9 Reaper, a hunter-killer surveillance UAV

Aeryon Scout in flight

The significance


ASIMO




A
B
C
D
E


TOSY

Why do they do this research?

Self-cleaning desigs for autonomous robots and microelectrome-hanical systems.

solar panels

Mars Exploration


Be prepared for the coming problem!

Shortcomings of this research

Unstudied animals

underwater animalslike fish

birds

Q&A

Thanks for listening!