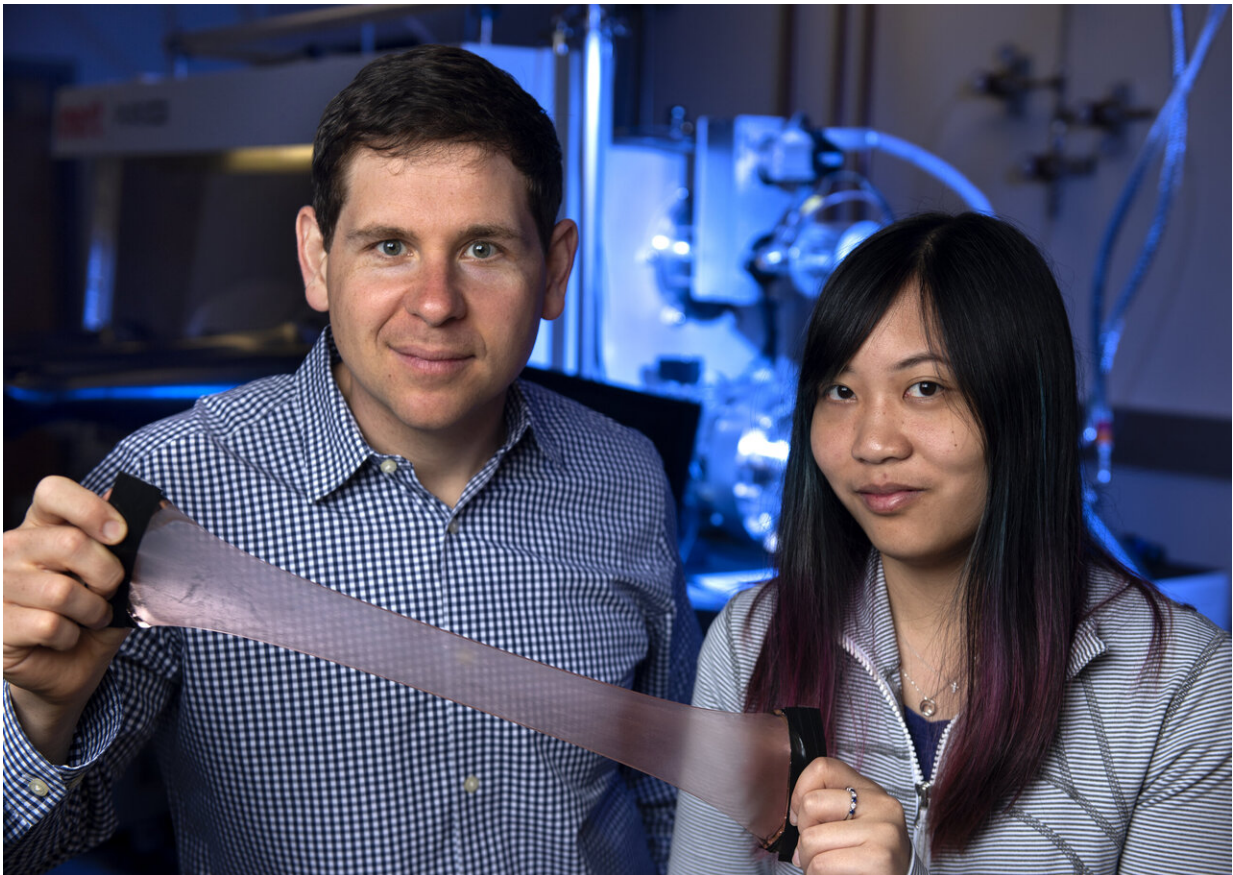


# Squid skin inspires creation of next-generation space blanket

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Alon Gorodetsky, UCI associate professor of chemical & biomolecular engineering, and Erica Leung, a UCI graduate student in that department, have invented a new material that can trap or release heat as desired. Credit: Steve Zylius / UCI

Drawing design inspiration from the skin of stealthy sea creatures, engineers at the University of California, Irvine have developed a next-generation, adaptive space blanket that gives users the ability to control their temperature. The innovation is detailed in a study published today in *Nature Communications*.

"Ultra-lightweight space blankets have been around for decades—you see [marathon runners](#) wrapping themselves in them to prevent the loss of body heat after a race—but the key drawback is that the material is static," said co-author Alon Gorodetsky, UCI associate professor of chemical & biomolecular engineering. "We've made a version with changeable properties so you can regulate how much heat is trapped or released."

The UCI researchers took design cues from various species of squids, octopuses and cuttlefish that use their adaptive, dynamic skin to thrive in aquatic environments. A cephalopod's unique ability to camouflage itself by rapidly changing color is due, in part, to skin cells called chromatophores that can instantly change from minute points to flattened disks.

"We use a similar concept in our work, where we have a layer of these tiny metal 'islands' that border each other," said lead author Erica Leung, a UCI graduate student in chemical & biomolecular engineering. "In the relaxed state, the islands are bunched together and the material reflects and traps heat, like a traditional Mylar space blanket. When the material is stretched, the islands spread apart, allowing [infrared radiation](#) to go through and heat to escape."

Gorodetsky said he has many more applications in mind for the novel material: as reflective inserts in buildings to provide an insulation layer that adapts to different environmental conditions; to fabricate tents that would be exceptionally good at keeping occupants comfortable outdoors;

and to effectively manage the temperature of valuable electronic components.

Clothing would be a particularly fitting application for the new, bio-inspired material, according to Gorodetsky, who collaborates on [research projects](#) with counterparts at athletic apparel manufacturer Under Armour Inc.

"The temperature at which people are comfortable in an office is slightly different for everyone. Where one person might be fine at 70 degrees, the person at the next desk over might prefer 75 degrees," he said. "Our invention could lead to clothing that adjusts to suit the comfort of each person indoors. This could result in potential savings of 30 to 40 percent on heating and air conditioning [energy use](#)."

And those marathon runners who wrap themselves in space blankets might be able to type in a number on a garment-integrated user interface to achieve the desired level of thermal comfort, optimizing performance during races and recovery afterward.

Other benefits Leung mentioned include the material's light weight, ease and low cost of manufacturing, and durability. She noted that it can be stretched and returned to its original state thousands of times.

Provided by University of California, Irvine

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