# 6 Groundbreaking Examples of Tech Innovations Inspired by Biomimicry

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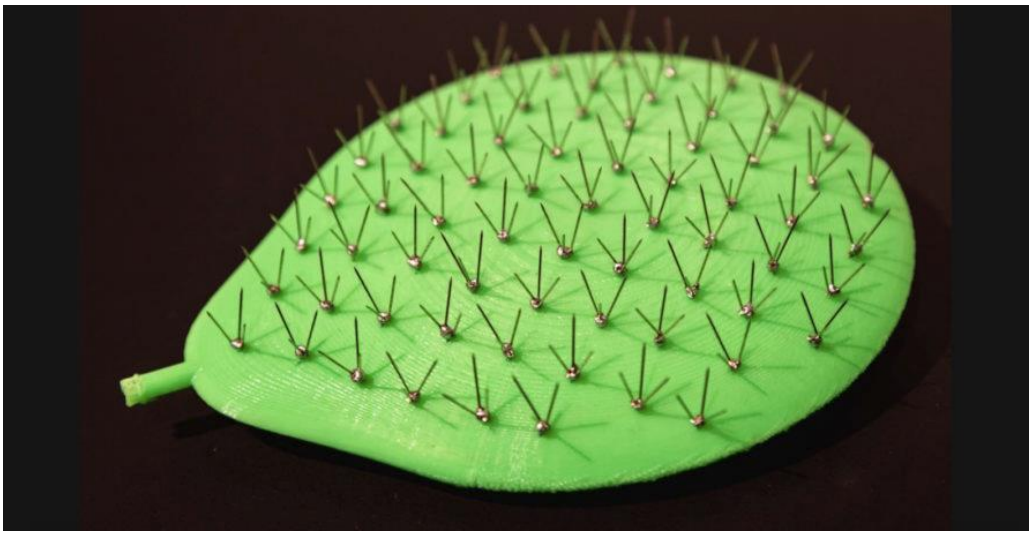
Da Vinci was definitely on to something when he observed birds and copied their forms to create his own wings for flight. Although biomimicry wasn't ultimately successful in helping Da Vinci achieve flight, it has a solid track record for getting engineers, thinkers, and inventors to approach problems in design and technology by returning to nature and its processes. Here are six examples of how observing and imitating nature lead to designs that can improve issues in the modern world.


## Wind turbine with hummingbird wings

Wind turbines typically incorporate a pinwheel shape, but a breakthrough design from Tyer Wind has cleverly tapped into the gravity-defying hovering abilities of hummingbirds. While it may look like these feather-light birds are furiously flapping their wings in a linear fashion, they actually use a figure eight configuration. The design for this new turbine uses wings instead of traditional rotating blades to turn energy from wind into green electricity through3-D Aouinian Kinematics.



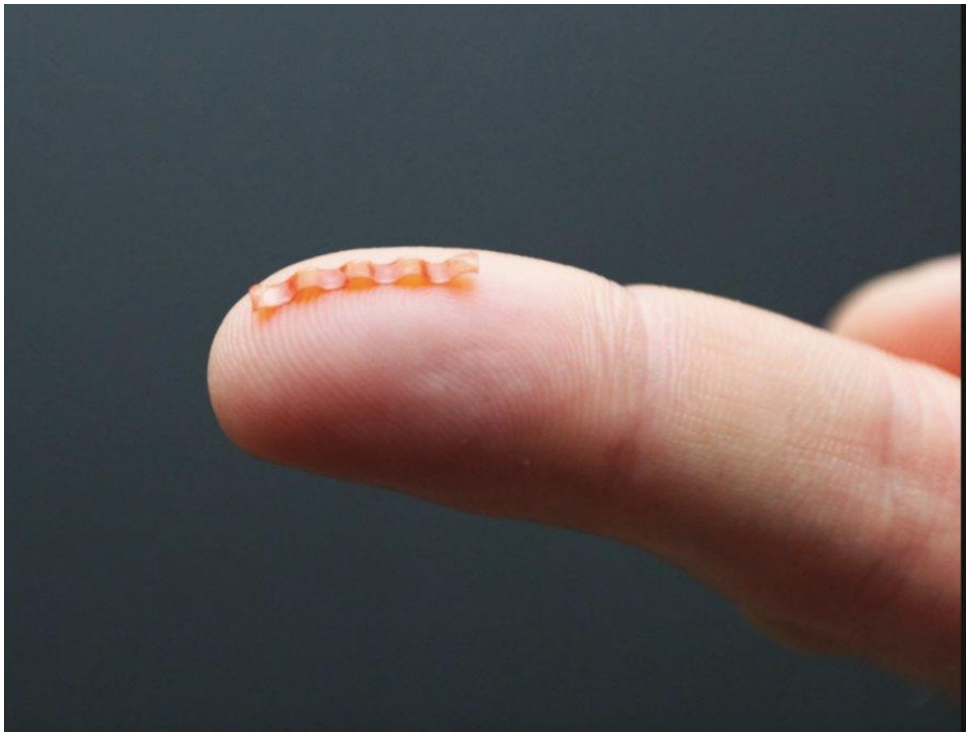
# Cactus water collector

After observing certain cacti's ability to collect and store water particles from fog, students from the School of the Art Institute of Chicago were inspired to create Dewpoint, a design with real-world applications beyond the desert. By recreating a cactus's prong-like spines and attaching them to a panel that can absorb, collect, and efficiently save water, the team is beginning to explore water security possibilities for a world that is increasingly facing drought, desertification, and disappearing water sources.

# Stable and durable bridge

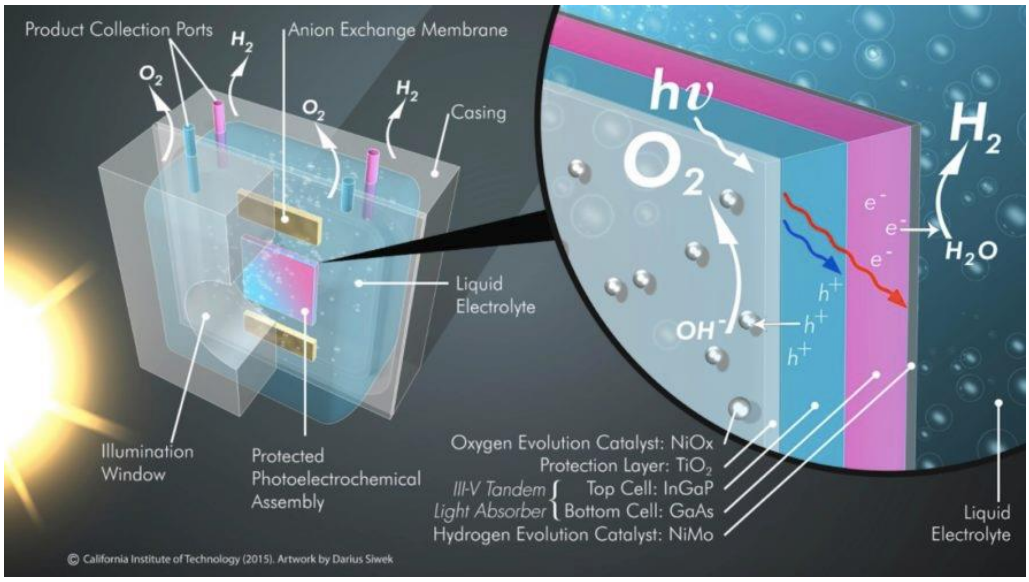
Anyone who has ever watched a little leaf on a tree take hit after hit from wind or pelting rain (or perhaps a child with a stick) and still persist knows that surprising hidden strength can be found

in many of Mother Nature's designs. Wanda Lewis has been studying that idea for 25 years, looking specifically at how examining the ways that fragile elements in nature respond to external forces and stress can benefit the structure of a modern, man-made bridge. Lewis developed a mathematical model for bridge design that would take into consideration modern stressors such as traffic and extreme weather conditions. Lewis's "form-finding" would enable the creation of bridges that are safer, more durable, and long-lasting by using a previously elusive optimal arch.



# Light-sensitive robot caterpillar

What may look like a tiny piece of wavy plastic (or perhaps a miniaturized piece of bacon) is actually a robot that can carry loads up to 10 times larger than itself. With caterpillars as inspiration, physics researchers in Poland created this 15 millimeter long critter which is crafted from light-sensitive Liquid Crystalline Elastomers. Mimicking the wave-like motions of a moving caterpillar, this soft robot can also go up a slope or squeeze into a small space. Watch this little robot move in a surprisingly meditative video.




# Artificial leaf

Artificial photosynthesis has been around for over a century, but Caltech's Joint Center for Artificial Photosynthesis has found a way to mimic the natural process and safely, effectively, and affordably produce and store energy using the sun. The group's artificial leaf consists of two electrodes (one that generates hydrogen gas, the other that generates oxygen gas), as well as a plastic membrane that keeps the collected gases separate. The Caltech crew is working on scaling up the design, but their innovation shows promise for creating a system that uses only sunlight, water, and carbon dioxide to produce hydrogen fuels that can be utilized as needed.

# Avian-inspired train

It's a bird…it's a train…it's kind of both: a bullet train whose design was partially inspired by features of an owl and a kingfisher. Engineer, general manager of the tech development department for Japan's bullet trains, and avid bird-watcher Eiji Nakatsu wanted to make his trains both faster and quieter. He first employed his observations about the noise-dampening feather parts of an owl to reduce the sound effects of the trains as they whizzed through neighborhoods and tunnels. Later, he observed that the streamlined shape of the kingfisher's bill could be used in a new train design to further reduce noise (including a persistent sonic boom effect) and decrease necessary fuel amounts, all while reducing travel time.

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