Biomimicry: Science inspired by nature could feed the hungry, reduce impact of technology

September 26 2012, by John Platt

A wind turbine designed to incorporate the bumps on a whale's tale. A fast-growing rice that needs half the normal amount of water to grow, thanks to observation of a hot-spring fungi. A video display inspired by the iridescent wings of a blue butterfly. These are just a few examples of biomimicry, which examines nature to solve human problems, and it could change the world as we know it.

"Biomimicry looks for how nature performs a function," Marie Zanowick, a certified biomimicry professional for the Environmental Protection Agency, told Boulder Weekly. "It mimics natural strategy and the best design principles on this planet."

Biomimicry has been around for decades, but modern scientists are increasingly embracing the concept. Velcro, for example, was inspired by the way burrs grab on to fur. By looking at systems that exist in nature, scientists hope to solve world hunger, create better technologies, and produce more sustainable devices that will improve people's lives.

Take Russell Rodriguez, for example. A researcher at the University of Washington, Rodriguez has developed a way to grow rice to five times its normal size while using half the amount of water. Meanwhile, the plants are more resistant to cold and salt. If it is commercialized, this rice could be a way to help solve world hunger.

How did Rodriguez come up with his discovery? According to a recent report in Forbes, he was studying the symbiotic relationships between

natural systems, specifically a grass that grew in a geothermal hot spring. He found that the reason the grass thrived at the spring was because it has a symbiotic relationship with a fungi. Rodriguez applied the fungi to rice and found that it could increase production while resisting drought.

Some biomimicry researchers are using nature to develop better technology, while others are developing new fields of medical science. Scientists at MIT and the University of Pennsylvania, inspired by their own musculature, have created artificial cells that flex in response to light that they hope to use to create artificial tissue to create articulated, flexible robots. Scientists at Harvard and Caltech are using heart cells from rats to create an artificial jellyfish that moves and contracts like a real jellyfish. They hope to reverse-engineer this experiment to create an artificial, biologically based heart that could beat on its own.

Much of this research is expected to result in eco-friendly discoveries. Zanowick says biomimicry is a great way to create more sustainable technology because it mimics things that already work efficiently in nature. "It's based on 3.8 billion years of research and development, and the only organisms that survive are the ones that follow life's principles." Those principles include: evolve to survive; be resource-efficient; adapt to changing conditions; integrate development with growth; be locally attuned and responsive; and use life-friendly chemistry.

Many organizations are exploring biomimicry today, and for good reason. San Diego Zoo, which opened its new Center for Bioinspiration in August, says biomimicry could contribute $300 billion to the U.S. GDP in 15 years, while also providing an additional $50 billion in environmental savings by conserving natural resources and reducing CO2 pollution.