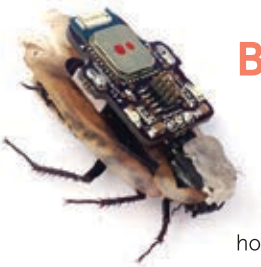
2025/2026 Catalog

www.backyardbrains.com



Backyard Brains

The brain is our soul... our consciousness... it contains all of our hopes, dreams, and desires. It is our most important organ, yet how it works is still a mystery for most people. Neuroscientists actually know quite a bit about how the brain functions, but the tools to understand the brain have been relegated only to large university laboratories. Backyard Brains is the effort to democratize neuroscience.

As neuroscience Ph.D. students at the University of Michigan, co-founders Tim and Greg experimented with discussing neuroscience with middle school children. They quickly realized that there was no way to demonstrate compelling experiments like the ones from their research lab to the kids they were working with. The equipment was too big and too expensive. So they endeavored to fix that. Founding Backyard Brains in 2009, Tim and Greg used off-the-shelf electronics and readily available products to create their first kits that would let kids learn about neuroscience at an earlier age. The first SpikerBox was born... a hand-held device able to provide insight into the inner workings of the nervous system, and record living "spikes"... the messages of neurons in the brain.

Our products all have a focus on neuroscience, but have expanded into multiple STEM research fields: Our Neuron SpikerBox kits record directly from neurons in invertebrates. Our Human Physiology kits enable you to record the brain's electrical activity from motor unit and muscular contractions (EMG), from the heart (EKG), and even from the whole brain (EEG). Our neuroengineering devices let you use your nervous system to control computers and robotics. We even have kits that reveal the secrets of plant signalling and behavior, proving that the action potential isn't unique to nervous systems! All of our products are accompanied by detailed instructions, lesson plans, and experiments to make learning (and teaching) neuroscience a breeze.

We've grown an enormous community of citizen-scientists. We have a Jaw-Dropping 9 TED talks, including a series called "DIY Neuroscience" which follows our student investigators using our gear to expose the wonders of the brain. We have been awarded 4 grants from the U.S. National Institutes of Health to develop our tools and to research their effectiveness. And our work has not gone unnoticed: we were awarded the "Champion of Change for Citizen Science" award by President Barack Obama at the White House, we won the Next Generation Award from the Society of Neuroscience, the Director's award from the NIMH, we received nominations at the Imagine Science Film and the Viten Filmfestival, and most importantly we've been recognized with the prestigious "unit of the year" by the 7th grade class of Seitz Middle School!

Thank you for your interest in Backyard Brains. We hope our products will help you bring neuroscience to life!

Our Development Team

Greg Gage

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Working on teams: Software, Electrical Engineering, Sales, Marketing.
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Ph.D., Co-Founder, Neuroscientist and Engineer.
Working on teams: Invertebrate Physiology, Mechanical Engineering, Sales, Education.
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Production Manager.
Working on team: Production and Office Management. Ensures we have enough 10k resistors in inventory.
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Marcio "Max" Amorim

Brazilian getting things done.
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Aleksandra Gage

Psychologist, Accountant, Photographer
Working on teams: Accounting and Marketing. Handles our finances and helps us capture amazing visuals of live DIY Neuroscience.
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Daniel Grenzicki

Production Staff, Roach Wrangler
Working on teams: Production and invertebrate husbandry.

SpikerBot

Buildable Brain, Visible Neurons, Real-Time Behavior.

Spiking Neural Networks, Editable Circuits, and Open-Source Code in One Robot.

SpikerBot is the world's first robot driven by real-time spiking neural networks you build yourself, no programming required. Create your own brains, test behavior instantly, and make neuroscience hands-on for students, makers, and future roboticists.

Current Price:

$299.99

Spiker:Bit

for Brain Machine Interfaces

Discover your body's hidden signals, no coding experience needed!

The spiker:bit lets you turn your own heartbeats, muscle signals, or brainwaves into real, interactive projects, instantly. It integrates seamlessly with Make Code (the micro:bit's drag-and-drop editor), so anyone can build without writing syntax. No matter your role, curious individual, caring parent, inspiring teacher, or maker at heart, spiker:bit gives you the tools to see what's usually hidden, to build something real, and to feel confident doing it.

Get started now, slide in your micro:bit, snap on electrodes, open Make Code, and watch your own signals light up the next great idea.

1-Pack	Classroom 10-Pack
Current Price:	Current Price:
$99.99	$899.99

DIY Neuroprosthetic Kit

For Brain Machine Interfaces
Requires a Muscle SpikerShield

Neuroprosthetics are cutting-edge biomedical devices that bring ability back to people's lives who have suffered neurological illness or physical injury. With this kit, students can build their own neuroprosthetic "cyborg hands," which they can then control with the electrical activity of their nervous system! Teach many cross-cutting concepts, like anatomy, physiology, engineering, biology, and of course neuroscience! Students will be the engineer, designing a real prosthetic, and then brainstorm ways that this tool and this technology could literally help people.

Current Price:

$199.99
(10 PACK)


HOT MAMA
DEAD FISH

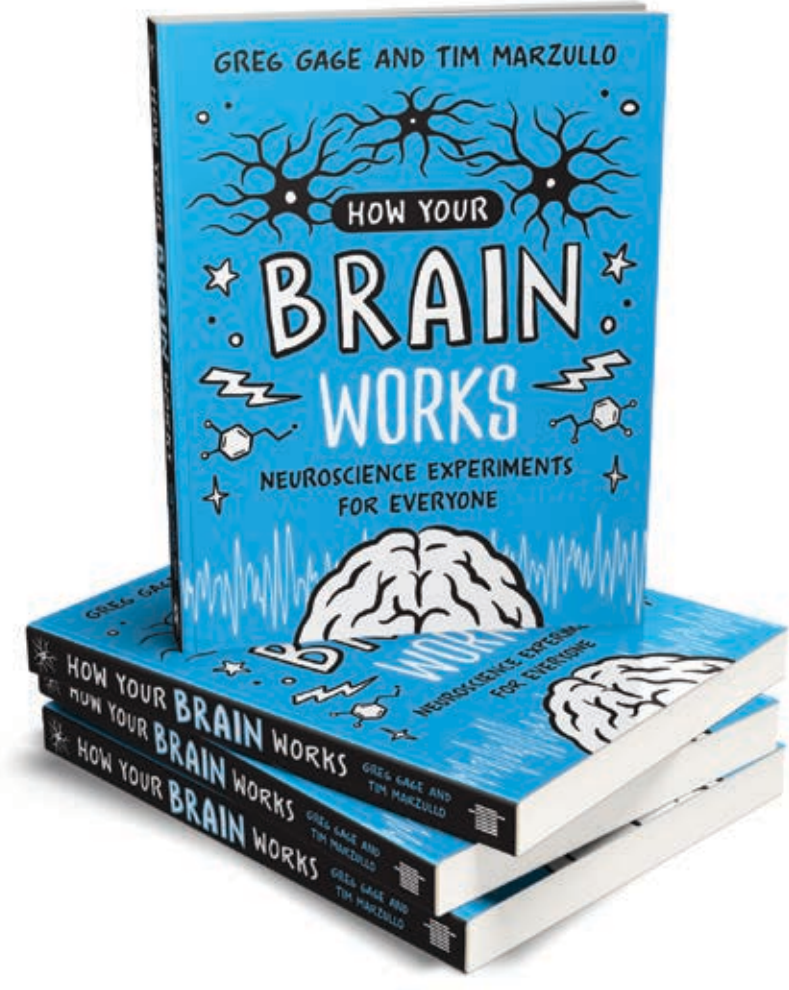
Book: How Your Brain Works

This book allows anyone to participate in the discovery of neuroscience through hands-on experiments that record the hidden electrical world beneath our skin and skulls. In How Your Brain Works, neuroscientists Greg Gage and Tim Marzullo offer a practical guide - accessible and useful to readers from middle schoolers to college undergraduates to curious adults - for learning about the brain through hands-on experiments.

Armed with some DIY electrodes, readers will get to see what brain activity really looks like through simple neuroscience experiments. Written by two neuroscience researchers who invented open-source techniques to record signals from neurons, muscles, hearts, eyes, and brains, How Your Brain Works includes more than forty- fi ve experiments to gain a deeper understanding of your brain, off ering fascinating reading for students at any level, curious readers, and scientists interested in using electrophysiology in their research or teaching.

Current Price:

$25.99



How to control someone else's arm with your brain

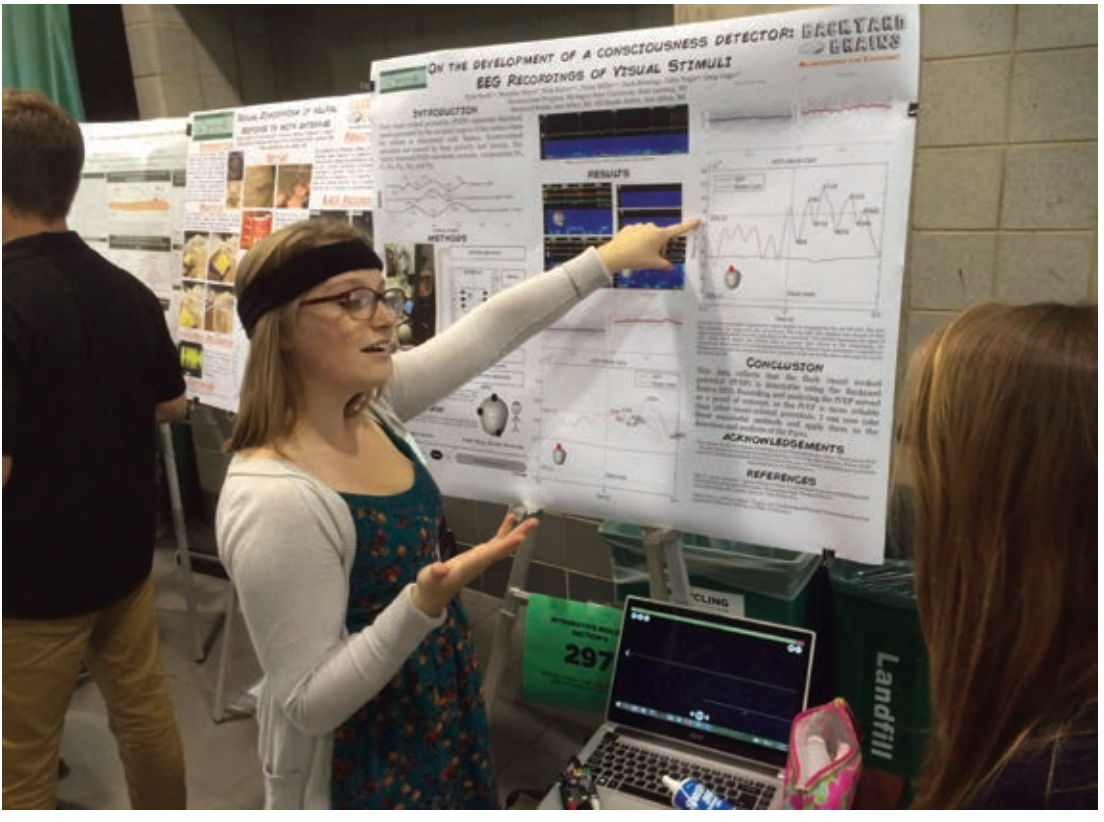
TED
IDEASWORTHSPREADING

Backyard Brains is on a mission to make brain science accessible to all. In this fun, kind of creepy demo, the neuroscientist and TED Senior Fellow, Greg Gage uses a simple, inexpensive DIY kit to take away the free will of an audience member. It's not a parlor trick; it actually works. You have to see it to believe it.

Electrical experiments with plants that count and communicate

TED
IDEASWORTHSPREADING

Neuroscientist Greg Gage takes sophisticated equipment used to study the brain out of graduate-level labs and makes them accessible to middle- and high-school classrooms (and, sometimes, to the TED stage.) Prepare to be amazed as he hooks up the Mimosa pudica, a plant whose leaves close up when touched, and the Venus flytrap to an EKG to show us how plants use electrical signals to convey information, prompt movement, and even count.


On the development of a consciousness detector:
EEG Recordings of Visual Stimuli
Introduction
Results
Conclusion
Acknowledgements
References
Landfill

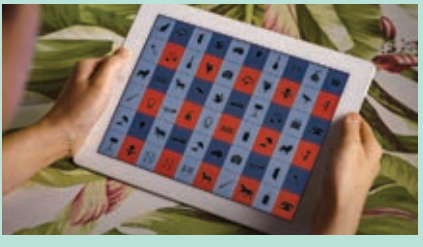
DIY Neuroscience Series

Watch neuroscience in action in this original TED series about cutting-edge neuroscience experiments on a shoestring budget. Backyard Brains' Greg Gage and his merry team of scientists dive into the inner workings of our neural circuitry. This 6-part series explores how the brain works using DIY tools using both humans and some amazing invertebrates.

TED
IDEASWORTHSPREADING
DIY NEURO SCIENCE

The Real Reason Why Mosquitoes Buzz

What does the love song of a mosquito sound like? Find out as our intrepid neuroscientists explore the meaning of all that annoying buzzing in your ear.



How Sound Can Hack Your Memory While You Sleep

Can you cram for a test while you sleep? Our intrepid neuroscientists attempt to enhance memory by running experiments on subjects while they sleep. You'll be surprised by the results.

How Octopuses Battle Each Other

Them's fighting words if you're an octopus, in that more than one octopus in a space often means a rumble. Our intrepid neuroscientists analyze aggression by observing the fighting behavior of two-spotted octopuses or, if you prefer, octopodes.

Can We Train a Computer to Read Your Mind?

Modern technology lets neuroscientists peer into the human brain, but can it also read minds? Armed with the device known as an electroencephalogram, or EEG, and some computing wizardry, our intrepid neuroscientists attempt to peer into a subject's thoughts.

How a Dragonfly's Brain Is Designed to Kill

Dragonflies can catch prey with near perfect accuracy, the best among all predators. But how does something with so few neurons achieve such prowess? Our intrepid neuroscientists explore how a dragonfly unerringly locks onto its preys and captures it within milliseconds using just sensors and a fake fly.

Can Your Taste Buds Be Tricked?

Can the mind be manipulated to love a food we loathe? The evidence from fruit flies is compelling, and perhaps surprising. Our tag team of neuroscientists attempts to change a fly's preference for fruit over vegetables simply by shining a light on their brain.

Human Physiology

Designed for learning about the nervous system in our own bodies, our human physiology line of SpikerBoxes are designed for easily recording from muscles (EMGs), hearts (EKGs), eyes (EOGs) and brains (EEGs). There are no knobs to adjust. Just plug it in and start listening, seeing, recording and analyzing your own physiology.

TED TALK

Human SpikerBox

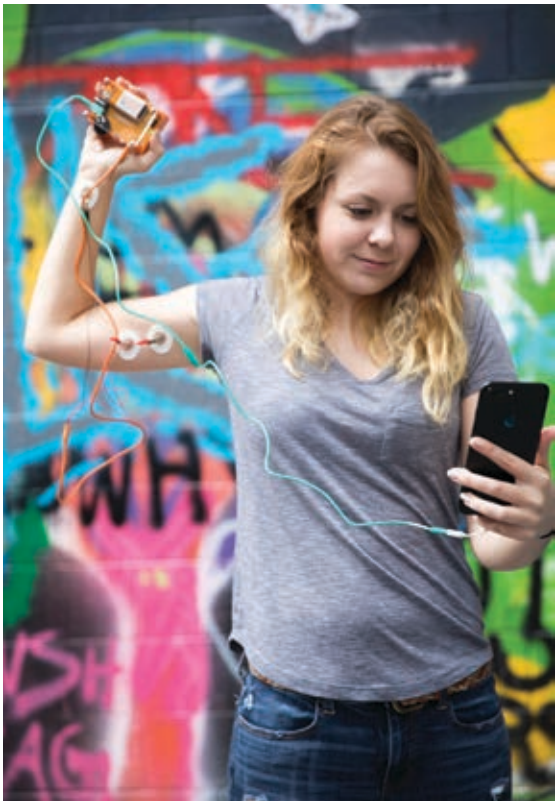
Reveal and record the electrical activity hidden within your body — heart, brain, eyes, muscles and more! The slow-wave signals of your nervous system allow you to perform countless human electrophysiology experiments. What do your muscles sound like when you do a push-up? What do spikes look like when you give a high five? With the built-in speaker, you can perform EMG (electromyography), as well as P300 and other audible cue EEG experiments, but also EKG (electrocardiography) and EOG (electrooculography).
The expansion pins give you control over every element of your experiment - like programming in event markers. Power users may even reprogram the board! As part of our Pro line, this all-in-one kit is simple enough for beginners, but powerful enough to record publication-ready results! It can turn any home or classroom into a Ph.D. lab. Order your kit today and begin performing your own experiments!

The Human SpikerBox

Current Price:
$299.99

The Heart and Brain SpikerBox

Current Price:
$189.99



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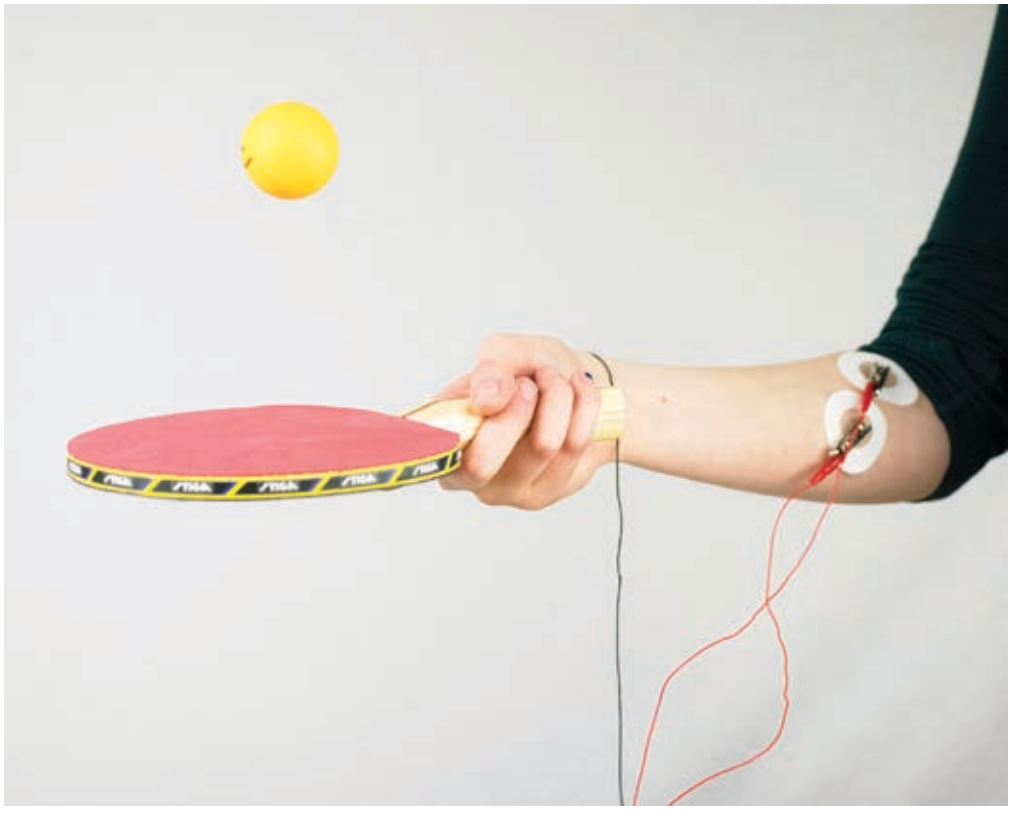
TED TALK



Reaction Timer

Now you can participate in the ongoing history and study of how quick our brains can receive and send signals, with DIY tech that leverages the power of electrophysiology for precise measurements!

The Reaction Timer allows you to precisely quantify a person's reaction time by recording how quickly they can flex their muscles in response to a stimulus!

Current Price:

$59.99

Reflex Hammer

Reflexes are fascinating. These hard-wired, evoked responses are the result of millions of years of evolution and development. But how are they different from a reaction? How fast exactly is a reflex?

The Reflex Hammer allows you to record exactly how fast your reflexes are!

Current Price:

$59.99

Game Controller

Control video games with signals from your brain! Capture EMGs and EOGs, and then transform these bio-signals into inputs for video games. Learn about assistive technology and cutting edge brain-machine interfaces.

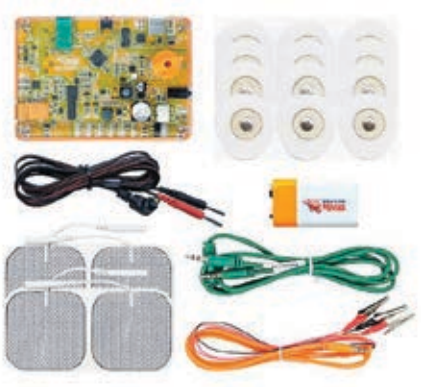
Current Price:

$59.99


BACKYARD BRAINS

Neuroengineering

Neuroscience is one of the most integrative science, so it's no surprise that neuroscience and engineering go hand in hand. The brain, like computers, communicates with electricity. Our neuroengineering products demonstrate how humans can interface directly with real-world objects, while our SpikerShield line allows you to develop your own creative DIY brain-machine interfaces (e.g. this brain to fan interface).



Human-Human Interface

Now you too can do the same human "mind control" experiments as seen on Mythbusters, Bill Nye, and our most popular TED Talk! Ever dream of controlling the people around you? Family, friends, coworkers, even total strangers? Well now that power is yours, thanks to the cutting edge of neuroscience and biotechnology we call the Human-Human Interface. Lose your "Free Will" as one person's brain controls another person's body! Demonstrate neuroscience in arguably the most compelling (and memorable) way!

TED TALK

Current Price:

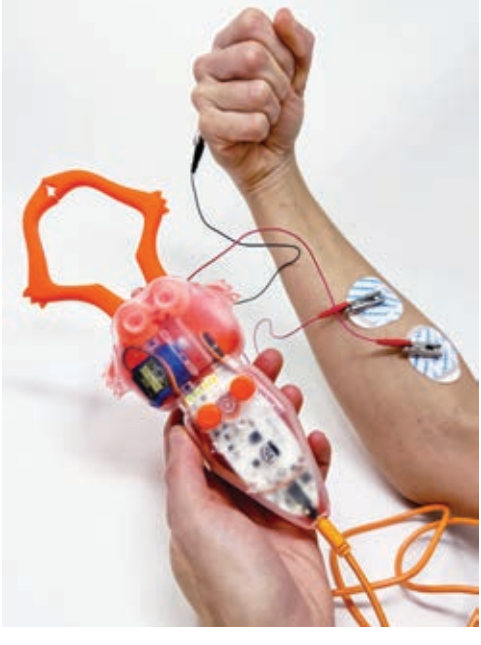
$299.99

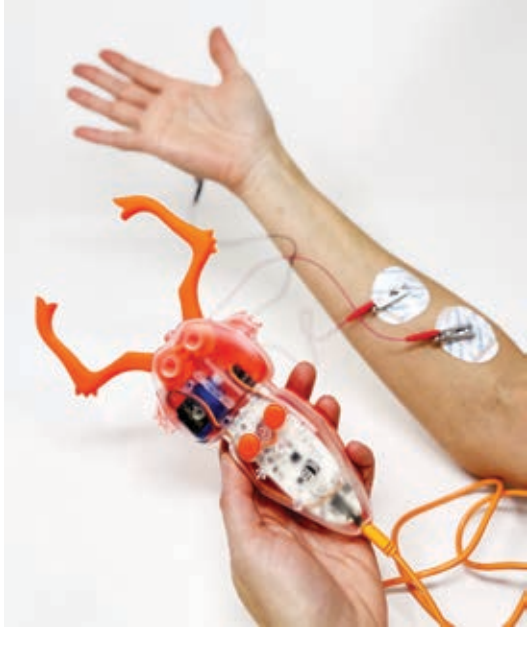
The Claw

Jealous of the cyborgs you see in the movies? Wish your brain could send signals to robotic devices? Your days of yearning are over. Backyard Brains introduces The Claw, your very own DIY neuroprosthetic brain-machine interface. Experience the future of robotics with The Claw, a motorized gripper modeled after insect legs that makes it possible for YOU to be the innovator of human interfaces! Paired with a pre-loaded Arduino microcontroller, the Claw responds to the EMG signals of your muscles. Make a grip with your fist, the Claw's appendages closes. Relax and the claw relaxes, or vice versa!

Current Price:

$149.99

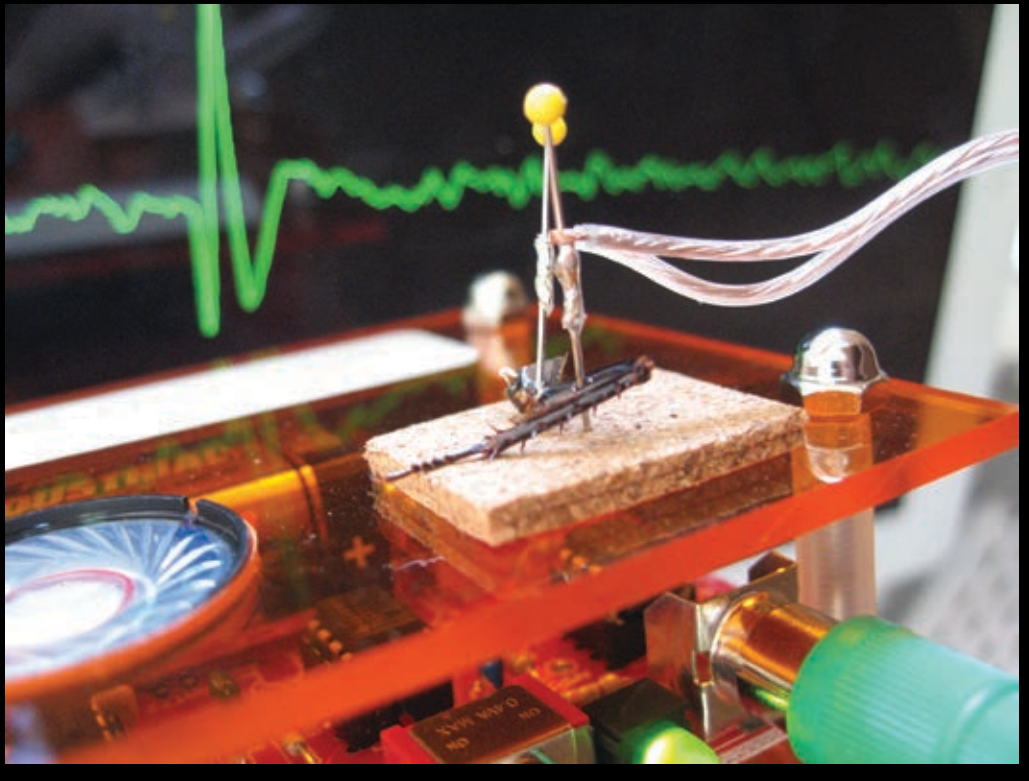




Neuron Physiology

BACKYARD BRAINS

The brain is made of billions of neurons. So when learning neuroscience, it's important to get a deep understanding of how neurons work. Our Neuron Physiology products allow you to get an up close and intimate with neurons and their electrical (and chemical) properties. Using insects, it's possible to record action potentials from single neurons, stimulate neurons to control behavior, and learn advanced neuroscience techniques easily.



The Neuron SpikerBox

Record living neurons, hear what the brain sounds like, and see Action Potentials on your Smartphone or PC. Never before have powerful neuroscience tools been this accessible!

As part of our Pro line, this kit is simple enough for beginners, but powerful enough to record publication-ready results! This kit can turn any home or classroom into a Ph.D. lab!

Order your kit (and some invertebrates) today and begin performing your own experiments!

TED TALK

The Neuron SpikerBox

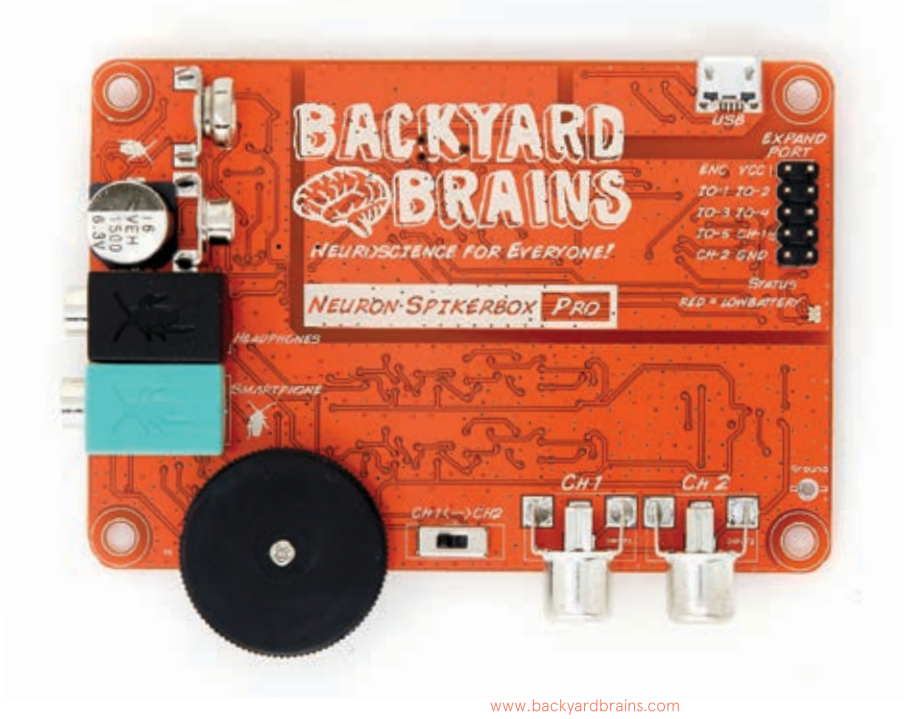
Current Price:

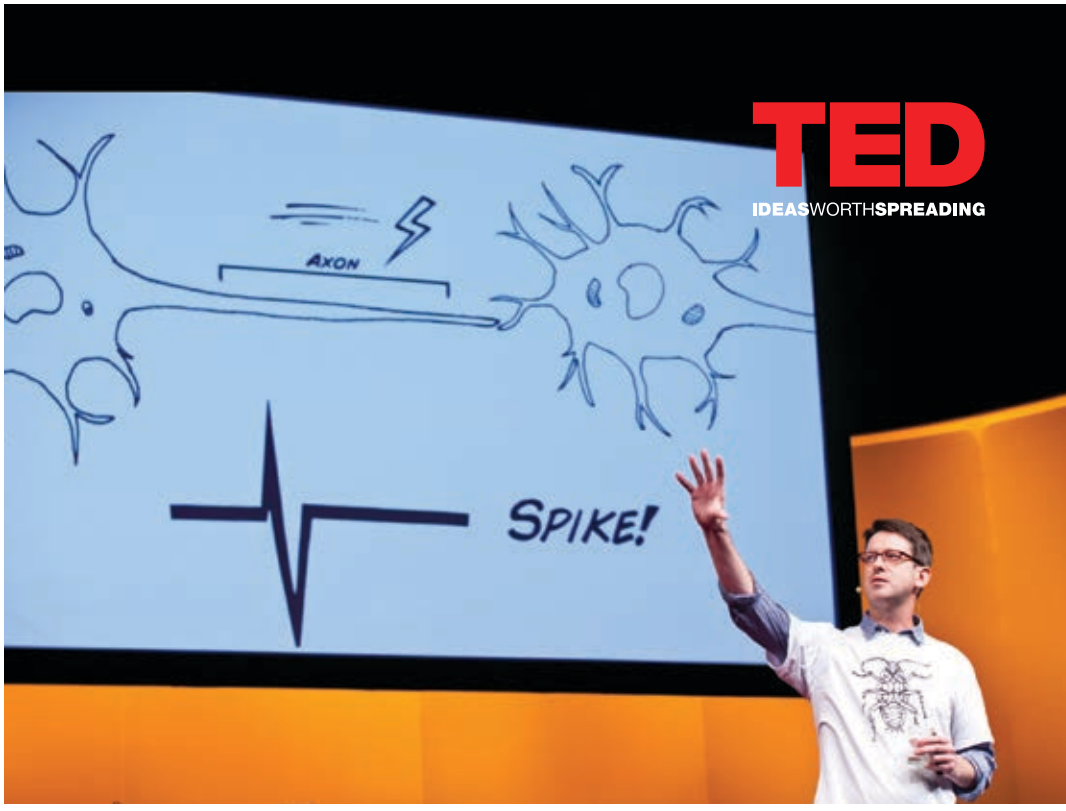
$249.99

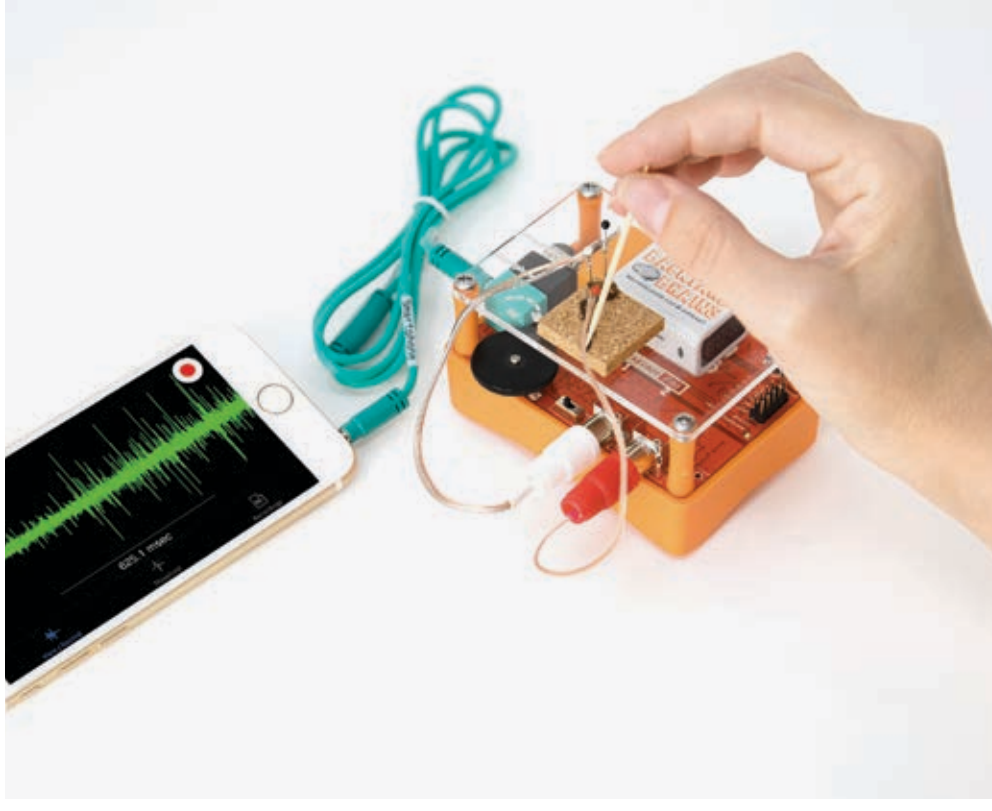
Neuron SpikerBox Classic

Current Price:

$189.99




TED
IDEASWORTHSPREADING
AXON
SPIKE!



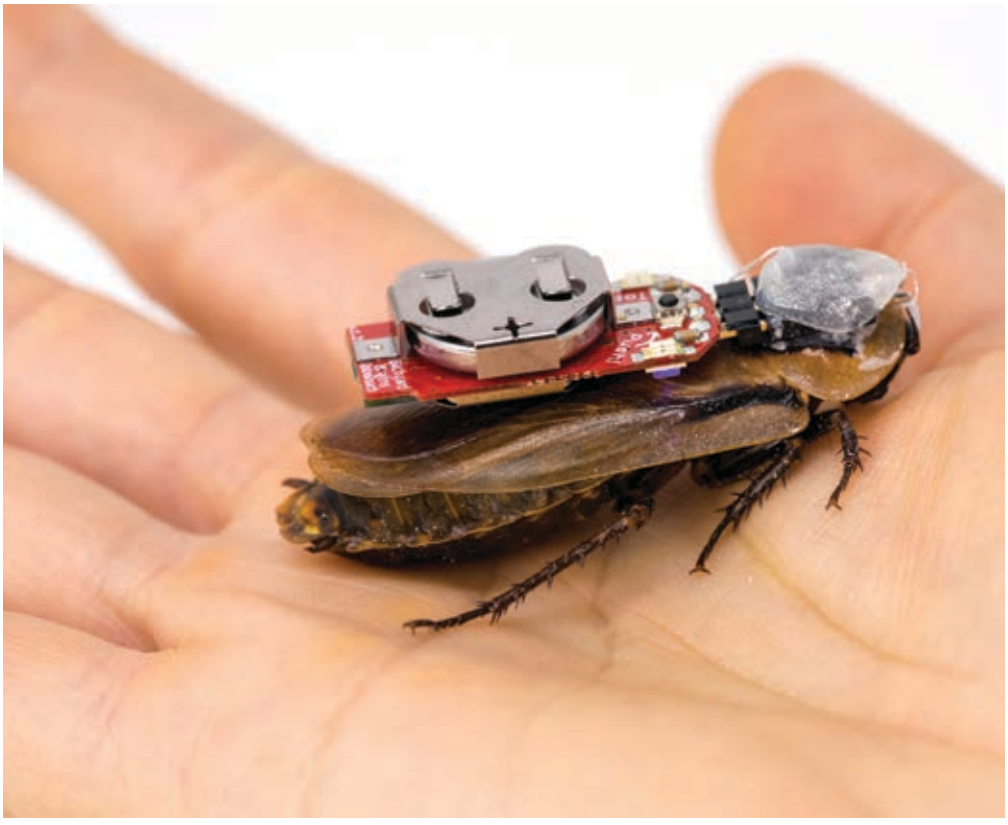
The RoboRoach

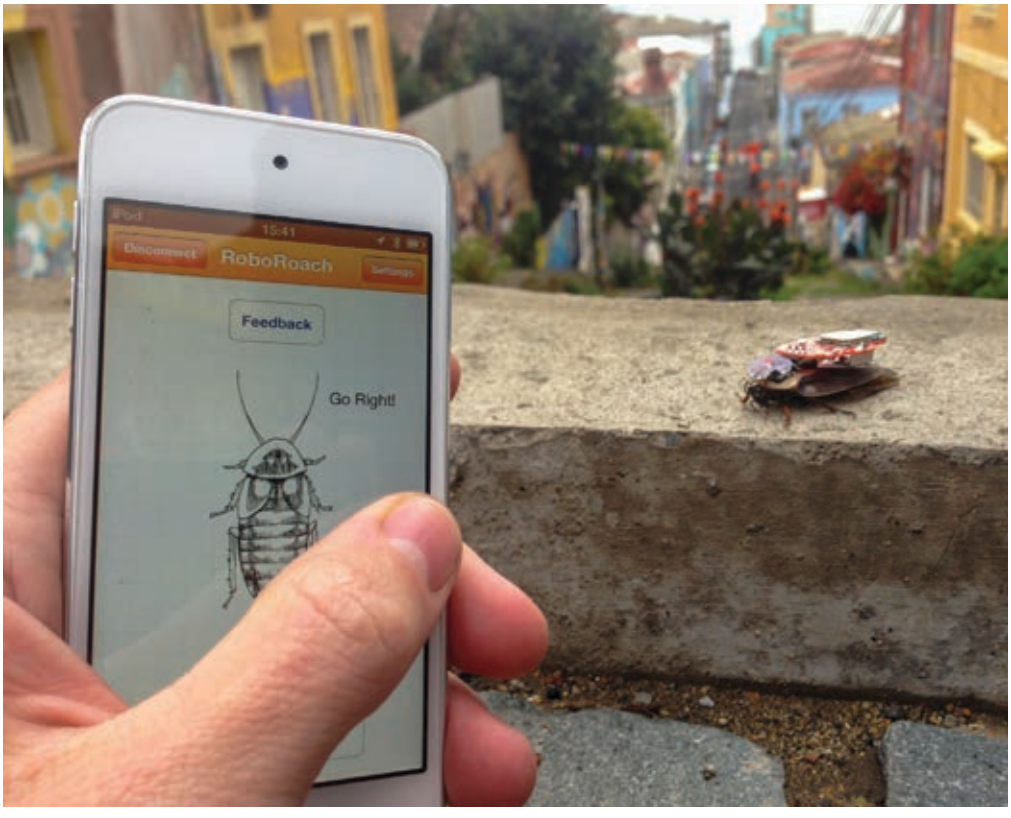
Experiment first-hand using microstimulation: an advanced clinical neurotechnology used in Deep Brain Stimulation (Parkinson's Disease) and Cochlear Implants (deafness). Microstimulation is a way to "talk to the brain" using a tiny amount of electricity.
Our RoboRoach uses this same technology with the cockroach antenna nerves to control (from your smartphone) the left/right movement of a living cockroach! It's the world's first commercially available cyborg in the history of mankind! The RoboRoach is a great way to learn about ethics, neural microstimulation, learning, and electronics.

TED TALK

Current Price:

$199.99

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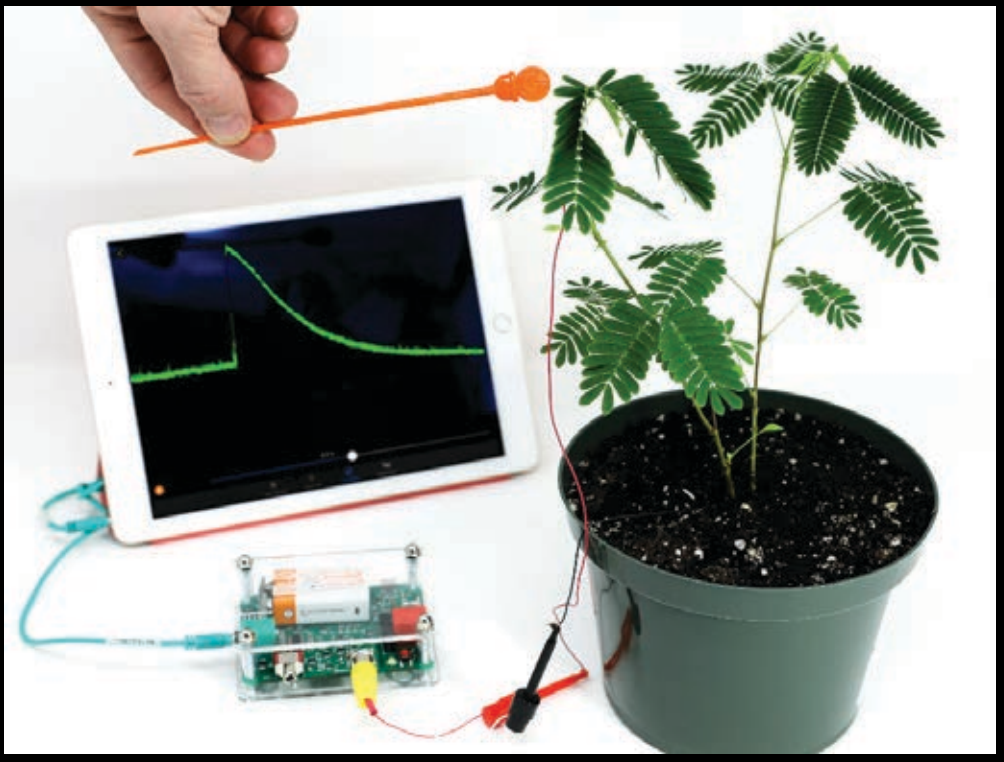
Disconnect
RoboRoach
Settings
Feedback
Go Right!

Plant Physiology

BACKYARD BRAINS

While plants don't have brains, they do show many fascinating animal-like behaviors. Moving, responding to stimuli, even learning. Our Plant Physiology products and experiments allow you to dig a bit deeper into how this is possible. Explore the secret world of plant electrophysiology, and see how the cell properties of plants can be similar to those of neurons!



The Plant SpikerBox

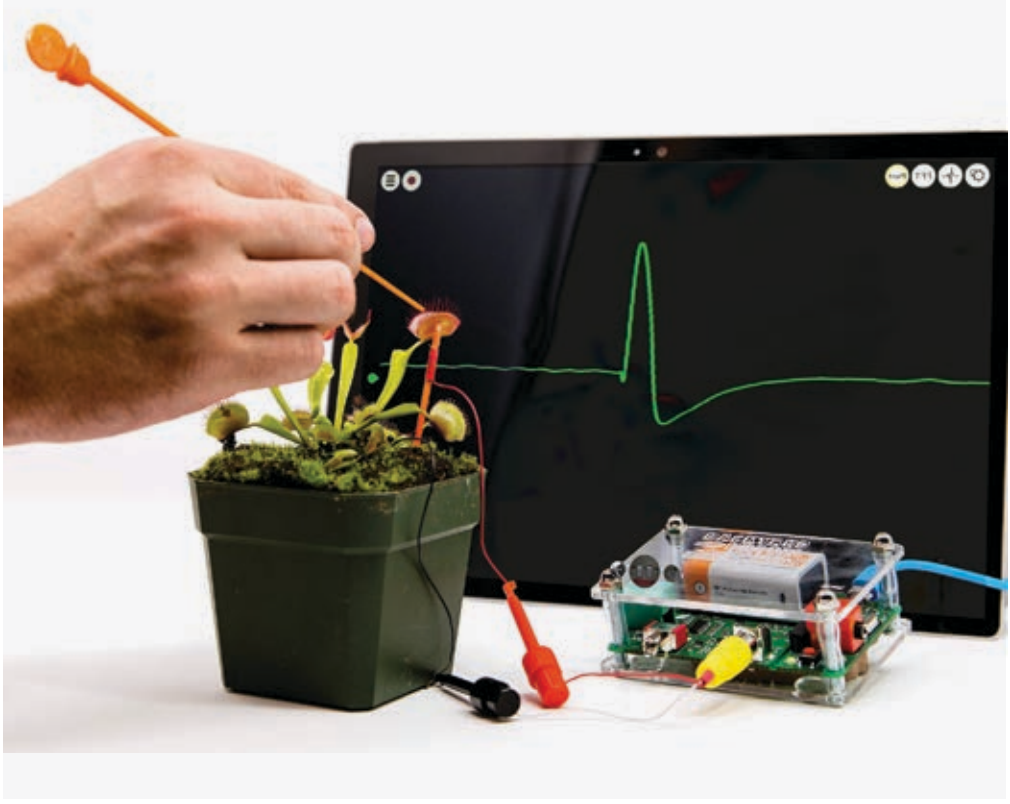
Unlock the secret electrical language used in plants! Plants don't have brains, but some of them still move, and our newest addition to the electrophysiology product line allows you to perform data-driven experiments to understand how. The Plant SpikerBox is an easy-to-use device that makes it possible to record and visualize the signals emitted by plants, offering users the unique opportunity to peer into the fascinating world of plant signaling and plant behaviors.

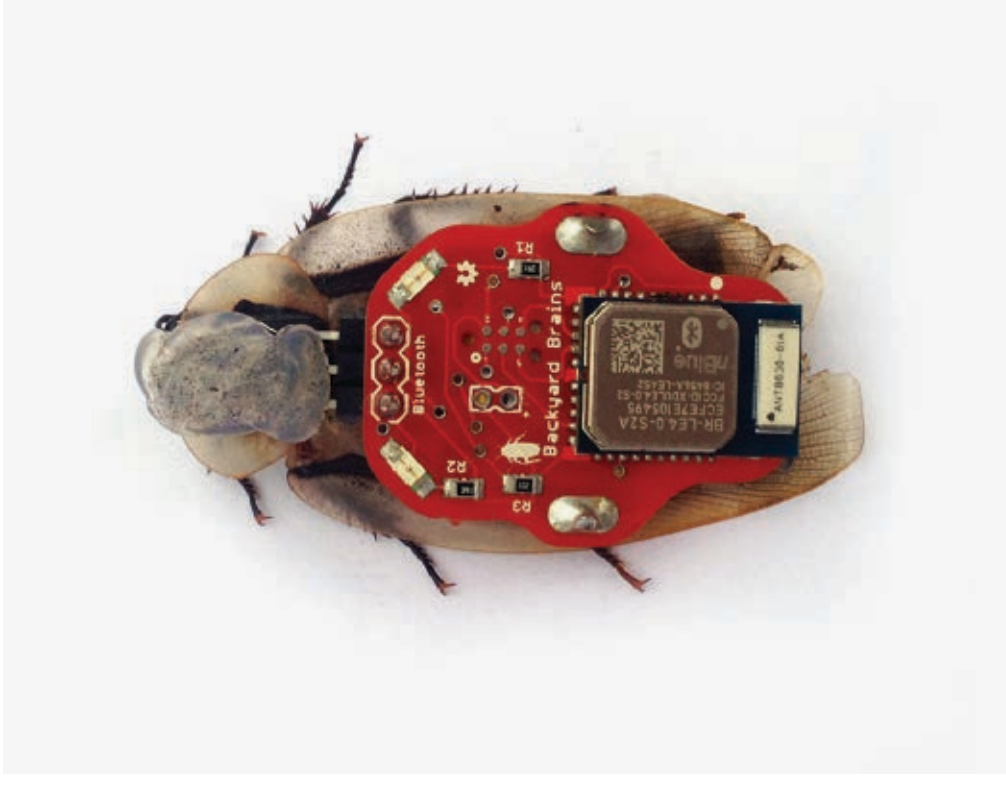
Order today and start experimenting in your home or classroom.

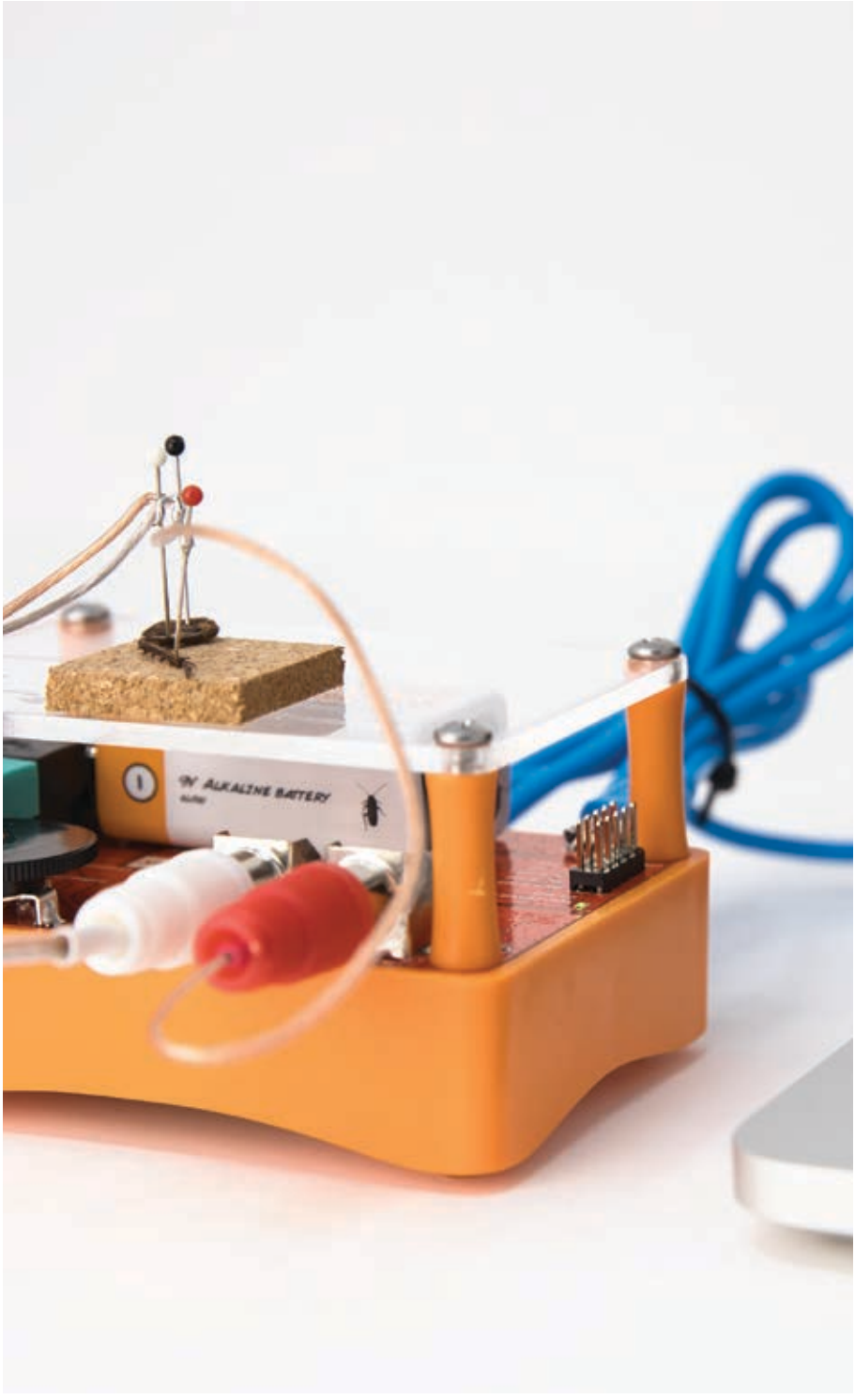
TED TALK

Current Price:

$149.99




Backyard Brains
Bluetooth
R1
R2
R3


9V ALKALINE BATTERY

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We are based in downtown Ann Arbor, MI. Our offices are on the 3rd floor above See Eyewear on State Street. If you are in the area, please feel free to stop by. We have production and development happening every day! If you e-mail us, we can read and write in English, Spanish, Portuguese, Serbian, Russian, and Belarusian.