SparkFun AVC

MIND your ANKLES

Sept. 17

Autonomous Vehicle Competition

2016

sparkfun®

- **Autonomous Vehicle Racing**
- **Power Racing Series**
- **Autonomous Power Racing**
- **Robot Combat**

AVC 2016 EVENT SCHEDULE

	7 a.m.	8 a.m.	9 a.m.	10 a.m.	11 a.m.	12 a.m.	1 p.m.	2 p.m.	3 p.m.	4 p.m.	5 p.m.
AVC	TEAM REGISTRATION	VEHICLE INSPECTION		ROUND 1		ROUND 2		ROUND 3			
PRS A+PRS											
COMBAT				ROUND 1			ROUND 2				

RACING 9a.m.–4p.m. see pp. 1-4

TOURS	Only 20 spots per tour group. Sign up early at the Engineers' Lounge!			BUILDING TOURS Every ½ hour on the ½ hour; see p. 8							
WORKSHOPS	20 seats available per workshop. kits available while supplies last! Sign up for your workshop at the workshop tent!			MAKER WORKSHOPS Every hour on the hour; see p. 5							
CLASSES				CLASSROOM SESSIONS See schedule pp. 6-7							
FOOD			While supplies last!	FOOD TRUCKS							
MAKER ALLEY			MAKER ALLEY see pp. 8-9								
LOUNGE			ENGINEER'S LOUNGE Check scoreboard here; see p. 9			Rich		Nate	Glenn		

AWARDS & CLOSING CEREMONIES

AVC 2016 COURSE MAP

AVC:
Classic Autonomous Vehicle Competition

PRS & A+PRS
Power Racing Series and all-new Autonomous Power Racing Series

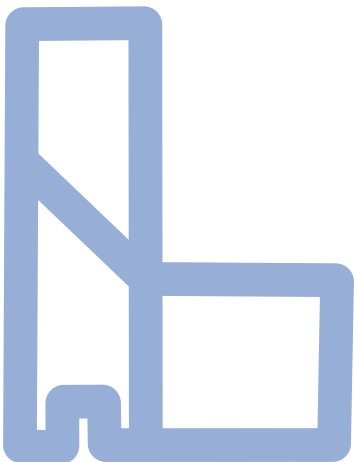Contestants' vehicles must navigate an obstacle-riddled course, in as little time as possible, completely autonomously. No direct control allowed!

PRS: Ever have Power Wheels growing up? Well, this is like that, but with grown-ups and more competitive.

A+PRS: Autonomous PRS is just that. You're not allowed to directly control your vehicle, just like in the AVC.

AVC TRACK

PRS TRACK

CLASSIC AVC

"Traditional" Autonomous Vehicle Racing

Watch teams from all over the world race their small bots against one another. All bots are autonomous, meaning they are self-driving and self-navigating … no remote controls! Bots must also be self-contained … no wireless links to supercomputers allowed. Each vehicle will have the chance to race the course three times, and races are organized into three heats with five bots per heat.

Things to look for: Each bot will start with **300 points**. For every second it takes a bot to go around the course, a point will be deducted from its total score. They will also be awarded points for each of four **bonus hazards** they successfully navigate (see below) and a bonus of **50 points** for each complete run.

The scores from all three rounds will be added together, and prize winners will be determined. See a classic AVC course preview here.

AVC HAZARD REFERENCE GUIDE:

+10   +10   +50   +50

+0   +0
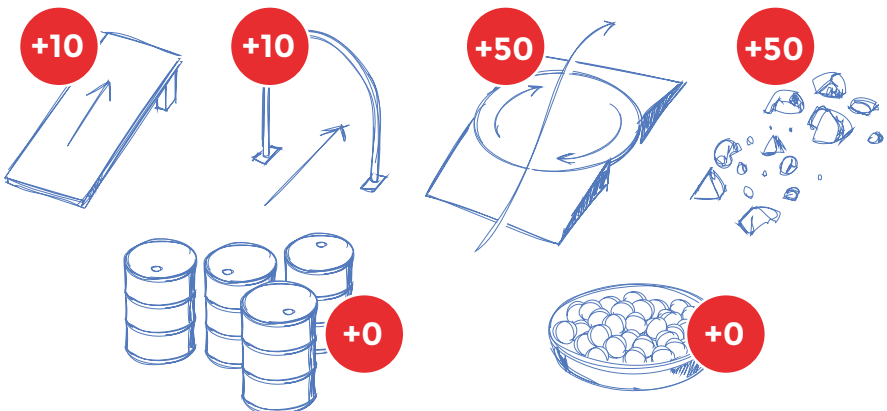
POWER RACING SERIES

POWER RACING SERIES (PRS)

Our PRS competitors will be racing against one another to see who can hit the finish line first. Their vehicles are adapted Power Wheels cars that have been souped up to be faster, stronger and better than ever.

Things to look for: Cool costumes! They get super into it.

AUTONOMOUS POWER RACING SERIES (A+PRS)

This is our own SparkFun twist on the classic PRS racing style. All of these vehicles are PRS compliant, but are self-driving and self-navigating. They will be racing for time and "moxie" points, which differentiates this competition from Classic AVC. No obstacles here!

Things to look for: All vehicles are required to carry at least a 20lb dead weight (or, even better, a brave human). You may see some awesome watermelon splats on the course. Check out an A+PRS course preview here.
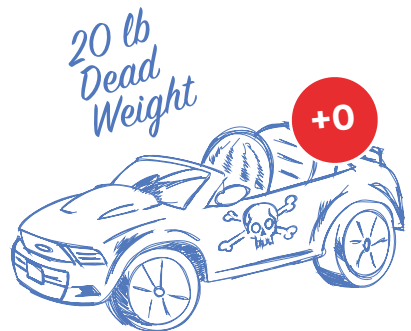
COMBAT BOTS

Bots duke it out in our custom combat arena

COMBAT BOTS

Humongously tiny robots (1lb and 3lb divisions) will be battling to the death! Or at least until one player taps out. Here, remote controls are allowed, as the challenge is to build a robot that is durable and can withstand an onslaught of attacks from their tiny foes. Check out a combat preview here.

Things to look for: "Spare" parts are always bound to be flying around the arena, or sometimes a good hit will send a whole bot careening off our arena's walls. Fights are short, and there will be many of them. Look for the wide variety of design elements in bot protection, weaponry and control. That and, of course, the occasional fire.

No projectiles or explosives! But flame projectors and pretty much everything else is permitted.

Weight classes: Ant weight includes bots that weigh 1lb or less, while beetle weight bots may weigh no more than 3lbs.

Time limit: Battles last 3 minutes unless one of the bots is rendered immobile for a 10-second count. Arena hazards will deploy at 1 minute, 30 seconds into each match.

Tap out: A bot pilot can tap out at any time during the round, forfeiting to his or her opponent.

Scoring: Combatants will score 0–5 points each for: (a) quality and quantity of attacks, (b) durability and defensive maneuvers, and (c) driver skill and spirit.

GET YOUR MAKE ON

Our workshop tent is hard to miss behind the PRS pits. Workshops take place every hour, on the hour. Sign up right away! Space is limited to 20 seats per session! You can also check out SparkFun's extensive library of projects here.

Choose to make a soldering, e-textile or circuitry project in the tent — or purchase the workshop kit to take home and make later (while supplies last).

Otto the Rolling Robot Pin
BEGINNER – PAPER CIRCUITS – **$2.95**

Use conductive copper tape to complete a circuit and make a little robot light up with an LED and a coin-cell battery. When you're done, pin the robot to your shirt to show your support for robotics!

Otto Light-Up Badge
INTERMEDIATE – E-TEXTILE – **$9.95**

For those who want to try their hand at sewing, assemble a light-up badge using a needle, conductive thread, an LED and a coin-cell battery.

Top-Secret Soldering
ADVANCED – SOLDERING – **$19.95**

Programming and soldering come together with our BadgerHacks! Solder together your BadgerStick and LED board, and then learn to program your creation to spell out words and secret messages.

LEARN SOMETHING NEW!

CLASSROOM SESSIONS—10a.m.–3p.m.

Come cool off and learn about the hottest topics in engineering, maker education and electronics from SparkFun engineers and guest speakers in the SparkFun classroom! Enter the front lobby and go up the stairs to your left (follow the signs).

10 a.m.: Introduction to Robotics with Shawn Hymel
Learn robotics basics with SparkFun's own Shawn Hymel. Consider this a primer on getting started in an exciting field!

10:30 a.m.: FIRST Robotics
Learn about the competitive high school robotics club and see a few robots in action! You'll find out how the competition works and how you can get involved.

11 a.m.: Introduction to Hacking (Autonomous) Vehicles with Josh Datko
Learn about hacking embedded systems, your car and autonomous vehicles! Get briefed on embedded device security, the threat model for autonomous vehicles, the latest research in car hacking from this year's major security conferences — HOPE, BlackHat and DEF CON — and ongoing open source projects.

Noon: Poison Arrow from BattleBots with Caustic Creations
Meet the team behind ABC Network's "BattleBots" competitor Poison Arrow, see the robot and learn what it's like behind the scenes of the hit TV show. The bot makers will share stories about building Poison Arrow and offer tips on taking your combat bot to the next level.

1 p.m.: Meet [AVC Mexico](#) Champion Jorge Cordero

Want to win AVC? Come learn from someone who has! Jorge will be flying in from Mexico to compete in SparkFun's AVC challenges and talk about his experience, the international autonomous vehicle scene and what it takes to be one of the best!

1:30 p.m.: Open Source Home Automation System with Jingfeng Liu from [LinkSprite](#)

This session will discuss an open source home automation system that lets users control and automate security, lighting, appliances, heating and air conditioning. The system is based on an inexpensive WiFi development board, the LinkNode D1, that is Arduino-compatible and easy to program.
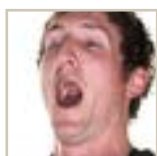
2 p.m.: [Quality Control at SparkFun](#)

How do we ensure our products work? What is the magic behind our brand quality? QC manager Pete Lewis will detail our cool test jigs and methods used to ensure quality fun!

3 p.m.: IoT Myths and Realities

Join SparkFun's director of Software Development and IT (SWIT), Timm McShane, to learn about the history of computing and how IoT isn't just another fad, but the true next step in computing. Timm will debunk myths left and right as he uncovers what's real and where the field is heading.

BEE AWARE
OUR IoT HIVE IS HARD AT WORK

SparkFun's Internet-connected honey bee colony is hard at work doing their bee thing, and they aren't likely to bother you so long as you keep a comfortable 15-foot radius between you and their bright yellow hive.

Visit with Colorado's rich community of innovators, inventors and makers in Maker Alley. You'll find new project ideas, new tools to try out and plenty of inspiration for solving real-world problems with maker technology.

Autonomous Robotics & Perception Group (ARPG) CU

An important goal in mobile robotics is the development of perception algorithms that allow for persistent, long-term autonomous operation in unknown situations (over weeks or more). Learn how ARPG CU uses real-time, embodied robot systems, equipped with a variety of sensors, to achieve this goal.

BHS Robotics

Join the Boulder High School robotics team and check out some of the cool projects the group has been working on. This includes THING, a giant robotic hand controlled by Beanie Babies, a remote-controlled shopping cart and the competition bot from last year's FRC.

Catalyze CU

An 8-week summer startup accelerator designed for CU students and faculty, Catalyze CU combines world-class mentorship and equity-free grants with the university's most promising ideas and technologies.

Caustic Creations with Poison Arrow

If you're a fan of ABC Network's "BattleBots" show, you'll want to visit Caustic Creations, one of the show's top teams. They're at AVC to talk about their experience filming and building one of these fierce fighting robots!

Colorado Maker Hub

If you've ever been to a Denver Mini Maker Faire, then you're probably familiar with the Colorado Maker Hub. Stop by their tent to hear about all the different events and educational programs happening in the state.

FIRST Robotics

Our local high school FIRST Robotics teams have come out for the day to show off their competition-ready robots. Check out these cool machines and find out ways to support robotics and electronics in our schools.

Maker Bolder

Boulder's vibrant maker coalition hosts the Rocky Mountain STEAM Fest every spring! Come say hello and learn about ways to get involved.

RoadNarrows

Based in Boulder, RoadNarrows is developing a diverse set of robotics research platforms for universities and other research groups, including Hekateros robotic manipulators, Laelaps mobile research robots and Eudoxus 3D Vision.

ROBAUTO

ROBAUTO is a local robotics startup with one mission: to provide low-cost, intelligent social robots to students and makers. Robots for the people!

Xilinx

Learn how you can implement an embedded-vision system on Digilent's ZYBO, a low-cost Zynq-7000 All-Programmable SoC development board. Xilinx will demonstrate the distinct advantages of FPGA technology for implementing real-time, high-performance image processing for autonomous vehicles.

LinkSprite

LinkSprite focuses on home automation and health care standard hardware, software and app development. LinkSpriteIO is an IoT cloud platform with open source hardware designs and firmware. Come see what LinkSprite has in the works!

ENGINEER'S LOUNGE
RACE SCOREBOARD AND TOUR SIGN-UP
9a.m.-4p.m.

Come talk shop with SparkFun pros all day!

Shawn Hymel, Creative Technologist
Mary West, Engineer
Nick Poole, Creative Technologist

Office Hours:*

10 – 11 a.m.: **Richard Parker,** SparkFun CFO
1 – 2 p.m.: **Nathan Seidle,** SparkFun Founder
2 – 3 p.m.: **Glenn Samala,** SparkFun CEO

*Office hours are subject to change. Keep an eye out for these folks wandering around!

AVC 2016 EVENT MAP

RESTROOMS

BEEHIVE AREA ✕

PRS PITS

WORKSHOPS

MEDICAL

EVENT HQ

AVC PITS

SEATING

PRS TRACK

PRS HQ

PRS PITS

SEATING

BOT PITS

BOT COMBAT

ENGINEER'S LOUNGE

MAKER ALLEY

AVC TRACK

STORE

TOURS AND CLASSROOM SESSIONS

AVC CHECK-IN

RESTROOMS

FOOD TRUCKS

AVC HQ

Online Site Map Available at
AVC.SPARKFUN.COM

AVC EVENT SCHEDULE

7 – 8 a.m.: Team Registration

8 – 9 a.m.: Bot Inspection

9 a.m. – 4 p.m.: Races and Competitions

9 a.m. – 4 p.m.: Maker Alley and Engineers' Lounge open

9:30 a.m. – 2:30 p.m.: SparkFun Tours (every half hour)

10 a.m. – 3 p.m.: Maker Workshops (every hour, on the hour)

10 a.m. – 3 p.m.: Classroom Sessions (see full schedule pp.6-7)

11 a.m. – 3 p.m.: Grub available from food trucks

4 p.m – 5 p.m.: Awards Ceremony (at the Engineers' Lounge)