



# Ready, Fight! Team Bronco Takes on a New Season of BattleBots



BY DREW TURNEY    MANUFACTURING - JUN 28 2016 - 5 MIN READ



Inertia Labs' Bronco. Courtesy BattleBots Inc.

Ask any kid what's cool. The answer will be anything from sharks and Darth Vader to dinosaurs and LEGO, but "fighting robots" will inevitably come up, too. You've seen them in the movies, but real robots that fight in a real arena are magnitudes of order cooler—as the *BattleBots Season 2* audience can attest.

Ushering in some of that cool are Alexander Rose and Reason Bradley, the brain trust behind Inertia Labs. Their brutal-looking creation, Bronco, is one of this year's competitors on the mechanical-

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gladiator  
stage.

Looking like a  
cross between  
a tank and a  
machine press  
that's been  
possessed by  
an evil spirit,  
Bronco is a  
flipper: It jabs



a pneumatic arm the length of its entire  
body underneath its prey and viciously  
flips the enemy high into the air, inflicting  
damage through the impact of a long drop.

Bronco is no doubt a worthy opponent, as  
Rose and Bradley have had many years to  
perfect their robotic creations. While  
growing up in Sausalito, California, near an  
old shipyard that Rose describes as  
“basically a junkyard,” he and Bradley were  
always building stuff. After Bradley went  
on to be a machinist and Rose studied  
industrial design, they knew they were the  
perfect team for the robot-fighting  
tournament *Robot Wars*, back in the  
mid-’90s.

After performing the worst in their *Robot Wars* class, the guys kept at it, gradually gaining some success. It was a different world then, with a lot more internal-combustion bots (including one called Blendo, created by Jamie Hyneman and Adam Savage of *Mythbusters* fame) and now-illegal gas weapons. In fact, Inertia Labs earned its first victory thanks to a fire-suppression gas used to choke off the opponent’s engine.

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*Robot Wars* eventually sank under the weight of what Bradley calls being “mired in lawsuits,” but two of the original competitors went on to found *BattleBots*, and Rose, Bradley, and their teams stayed in the scene. “There are few things that combine this level of technology, building, and destruction without any humans actually getting hurt,” Rose says.



Bradley still runs the machine shop they established for that first *BattleBots* more than a decade ago. Today, Inertia Labs includes likeminded friends and coworkers who, Rose says, all bring different skills to the table. The current team includes lead parts machinist Chris Daniel, CAD engineers Greg Staples and Brad Sykes, electronics engineer and builder Nolan Van Dine, and logic-board engineer Matteo Borri.

The final designed and built Bronco is the result of a whole lot of passion and money –and the right 3D-design software: Autodesk Fusion 360 and Inventor assisted in concept and design, and HSMWorks drove the tools for machined parts. Like pro boxing, *BattleBots* has a range of weight classes; other than that, competitors are pretty free to include any

weapons they wish. Aside from flippers like Bronco, there are smashers, spinners, choppers with swinging blades, and plenty of other nasty designs.

Participation in *BattleBots*, according to Rose, is an intense period of little sleep and high pressure, making sure the robot is ready right when the network says it needs to be ready. “Things can add up, and small problems can become big problems,” he says.

Perhaps the real challenge is that until show night, competitors have no idea whom—or what—they’re fighting. Given just a few hours’ notice, competitors fill the pits alongside the studio with a flurry of activity: tools, parts, and scary-looking chassis everywhere while teams make adjustments, hoping their offensive capabilities will defeat all comers.



“The event has a rock-paper-scissors quality to it,” Rose says. “One type of offensive capability will definitely win over another, but if that robot advances to the next round, the one that lost might have won the next fight with more certainty. It’s very dependent on the configuration of the robot.”

The 3D-modeling phase is obviously crucial for design, but in some cases, teams that enter haven't even started building. As a TV show, *BattleBots* wants to pit competitors against each other that will make for the most entertaining fight, so some proof of concept is critical. "Some teams provide video or designs if they're trying something new to prove to the *BattleBots* people that it will work," Rose says.

And during the first round, Bronco delivers every bit of the promised action against Blacksmith, a vicious-looking contraption with a heavy swinging hammer to bring down on opponents' heads. The strikes Blacksmith lands on Bronco's titanium upper don't seem to faze it in the slightest, and when Bronco launches it 15 feet or more feet into the air with its brutal flipping arm, it draws the most enthusiastic reaction from the crowd all night.

Sadly, Rose, Bradley, and the gang's luck doesn't hold. When they meet Minotaur—a vertical drum spinner designed to shred metal—in the third round, one of those small-turned-big problems brings Bronco down. The pneumatic air system has a glitch, and instead of tossing Minotaur 10 feet in the air, Bronco manages to only flip its adversary slightly off the canvas. "It was pretty disappointing that we didn't get to fight at our full effectiveness, but it was a good example of the kinds of things that happen," Rose says.

Win or lose, it all comes back to one inescapable thing, which Rose notes like



any kid who knows what's cool: "We're interested in things that are entertaining and where we want to experiment. For us, it's just fun."



But there's a serious side to all this fun, and the expertise the *BattleBots* teams develop has the chance to make a real difference in the world through robotics. Past Inertia Labs projects include autonomous ocean-floor survey robots and bomb-disposal tools for police departments. Interestingly for a team that designs for destruction, Rose says that Inertia Labs has an unofficial moratorium against weaponized warfare robots.

There's also plenty to be learned from the experience gained developing fighting-robot technologies, and Rose sees potential for at least one area that isn't getting much attention. "We've done a lot of work in air-powered pneumatics, which for some reason is a largely ignored field," he says. "We're starting to see a resurgence—things like the Hyperloop are based on pneumatics—but it's an area we don't see a lot of engineering talent in."

As for Rose personally, robotics represents a “brutal feedback loop for design and material decision making,” mandating a high attention to detail that carries over from competitions to career. “I have been building robots in parallel with the length of my professional career as I manage other engineers,” Rose says. “Ultimately, learning how things fail has helped me to predict many problems before they happen.”

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