

ARC

MAGAZINE

Fall 2018 | arcmagazine.pub



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Nick **Offerman** Actor/Writer

Nick Offerman is an actor, writer, comedian, and woodworker who is best known for his role as Ron Swanson in the NBC sitcom, *Parks and Recreation*. When he's not acting, he makes furniture and other wooden structures in his shop in Los Angeles. He is the author of three books: *Paddle Your Own Canoe: One Man's Fundamentals for Delicious Living*; *Gumption: Relighting the Torch of Freedom with America's Gutsiest Troublemakers*; and *Good Clean Fun: Misadventures in Sawdust at Offerman Woodshop*. He also released an instructional DVD in 2008 entitled *Fine Woodstrip Canoe Building with Nick Offerman*, which was shot by Jimmy DiResta, the subject of this issue's cover story.



Peter **Chakerian** Writer

Peter Chakerian is an award-winning writer, author and journalist whose work has been featured in dozens of publications across the country. His 25-year career has earned him several awards, including "Best in Ohio" nods for online journalism by the Ohio Society of Professional Journalists. A regular contributor to the Cleveland Plain Dealer and Cleveland.com, Chakerian covers dining, nightlife, popular culture, features and entertainment for Northeast Ohio. He is the author of four books.



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Karl Hoes has been a welding instructor at The Lincoln Electric Company since 2003. He has taught many aspects of the welding school curriculum, including basic and advanced motorsports classes. He has trained welders and instructors at multiple welding schools and national union training programs across the country. Karl is a Certified Welding Inspector/Educator (CWI/CWE).



Jimmy **DiResta** Fabricator

Jimmy DiResta is a New York-based artist, designer, master builder and video producer. His work has been showcased on Discovery Channel, HGTV, DIY and FX, as well as YouTube. His goal is to educate and inspire people to embark on their own home projects in an entertaining way. His unique builds are comprised of many different materials and processes. With his artisan skills and a shop full of power tools, he lets the build process speak for itself.



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LETTER TO THE EDITOR

DEAR EDITOR:

I am a structural steel fitter and QC/CWI inspector. There is a welding shop about a block away from my company's property. I stop in there maybe once or twice a month for personal supplies that I use on the job. If there is a copy of *Arc Magazine* available when I stop in, I will always grab it. It makes for good reading on my breaks at work. It's good to hear what's going on in other parts of the welding and fabrication trades. Thank you for making this publication available to people like me. I have really enjoyed it, and will continue to do so!

— Michael Leonard
South Meriden, Connecticut

► **Thanks for checking in, Michael. Glad to hear you're enjoying the magazine. One of our primary goals is to help people connect with the larger welding culture, regardless of their skill level, professional background, area of expertise, etc. It sounds like we've been able to do that for you. Per your request, we're happy to get you on the subscription list. Be sure to keep in touch.**

DEAR EDITOR:

Thank you for the "Women of Summer" issue of *ARC* (Summer 2018). I am a 62-year-old old retired nurse who finally has time to weld. As in the nursing profession, welders hone skills through continual practice and exposure to new experiences.

I was hoping the articles about women and welding in this issue would discuss the challenges of a novice woman welder who is learning the art and

science of welding. For example: how they learned, either through classes or continued experimentation; projects that women have completed and the steps they took from start to finish; articles about women mentoring women in this practice; or women who started welding after the age of 55.

“... It's good to hear what's going on in other parts of the welding and fabrication trades. Thank you for making this publication available to people like me ...”

Your articles told the interesting stories of the lives of the women, but lacked the nitty-gritty details about the topic of welding itself. Women welders have knowledge and substance to offer your readers.

— Susan Sterner-Howe
Kalispell, Montana

► **First of all, Susan, many thanks for your years of dedication to a the noble profession of nursing. And congratulations on finally finding time in retirement to pursue interests that had apparently been put on hold for a long time. All of your suggestions are worthwhile. Unfortunately, we only have so many pages to work with in each issue, and within that space, we do our best to appeal to a broad audience that includes beginning welders, seasoned veterans and everyone in between.**

Consequently, we usually opt for the broad cross section rather than the deep dive.

We do include a few technical columns in each issue of the magazine that address some of finer points of welding technique. In addition, every issue includes a welding project that takes the reader from step one to completion (the Project Spotlight also has a video component on our website, www.arcmagazine.pub). Bottom line, we continue to find women who are taking a leadership role and doing interesting things in a trade that was once considered primarily men's work. Expect to see some of them in future issues.

DEAR EDITOR:

Loved the Summer 2018 issue of *ARC*! It's great to see the many interesting things women are doing not just in welding and fabrication, but also in teaching the next generation of welders and community outreach for folks who are struggling. I especially enjoyed reading about what Krystal Hess is doing with Motorcycle Missions in Texas. She's developed an alternative form of therapy for veterans, first responders and other people who are dealing with emotional trauma. I hope the idea catches on.

Thanks for an interesting issue. Keep up the great work!

— Jessica Mason
Beverly, Ohio

► Thanks, Jessica! Glad you enjoyed the Motorcycle Missions story (and the rest of the Summer issue). We're keeping an eye on what Krystal Hess is doing in Texas, and what others like her are doing with similar initiatives in other parts of the country. Sometimes welding and fabrication aren't just about building. They're also about rebuilding.



- John C. Bruening, Editor

As always, the communication channel is always open at ARC Magazine, and we welcome your feedback about what you see or what you'd like to see on these pages. Contact us at editor@arcmagazine.pub or publisher@arcmagazine.pub.

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ASK THE EXPERTS

Welding experts at Lincoln Electric answer your questions about equipment setup, processes, techniques, safety and more.

Looking for guidance with technical issues? Contact us at questions@arcmagazine.pub

I have a small Lincoln Electric wire feed unit that I use for light repairs around the farm (hay rings, exhaust pipes, etc.). The recommended wire gauge for the machine is .035 flux-core, but the local store where I buy my consumables was out of .035, so I grabbed a spool of .030 flux-core instead. After a few adjustments for the heat and wire feed speed, I found that I was getting better penetration and more consistent bead uniformity than I had with the thicker wire. There seemed to be less spatter, and the slag was much easier to knock off with a wire brush. Given this discovery, I see no reason why I would use the .035 wire in the future. Can you explain why this different gauge works so much better?

- Jason Mocarisky, Halifax, Virginia

► NR211 .035 and NR211 .030 both have a maximum thickness of 5/16, which is within the acceptable range for that type of machine. You have more range of adjustment with the smaller wire than the larger wire for a given wire feed speed (WFS) and voltage setting. So your machine is designed to operate at only so much voltage and amperage. Those factors will not change. What does change is the amperage reading, depending on the size of the wire you use (smaller versus larger) at the same WFS.

For the NR211MP .035 wire, the amperage range is 30 amps at 50 WFS to 155 amps at 275 WFS, and the voltage range is 14 to 21 volts. For the NR211MP .030 wire, the amperage range is 30 amps at 50 WFS to 140 amps at 300 WFS, and the voltage

range is 13 to 19 volts. As you can see, the WFS changes the amperage draw considerably. As long as you adjust your wire and voltage to what the machine can give you, there really isn't much difference. The only difference is that you have a greater WFS to do the same work as the .035 setting. Try and run the same amps and voltage - not WFS - for both wires and see if you notice a difference. Both wires will run the amperage with different WFS and voltage. However, you cannot go beyond the amperage draw no matter what wire you use, or you will exceed the duty cycle of the machine.

IF YOU HAVE QUESTIONS ABOUT WELDING, HERE'S YOUR CHANCE TO GET CLARITY.

Submit your question to questions@arcmagazine.pub, and be sure to include your full mailing address. If we use your question, you'll get a FREE Lincoln Electric baseball cap or ARC Magazine t-shirt. Feel free to submit more than one question, but please be specific; the more details you provide, the more likely we are to use your question.



I have seen different variations of color while TIG welding stainless steel art – anything from red to blue to green, etc. What factors determine these color variations? Is it temperature, penetration, just plain luck or some other factor?

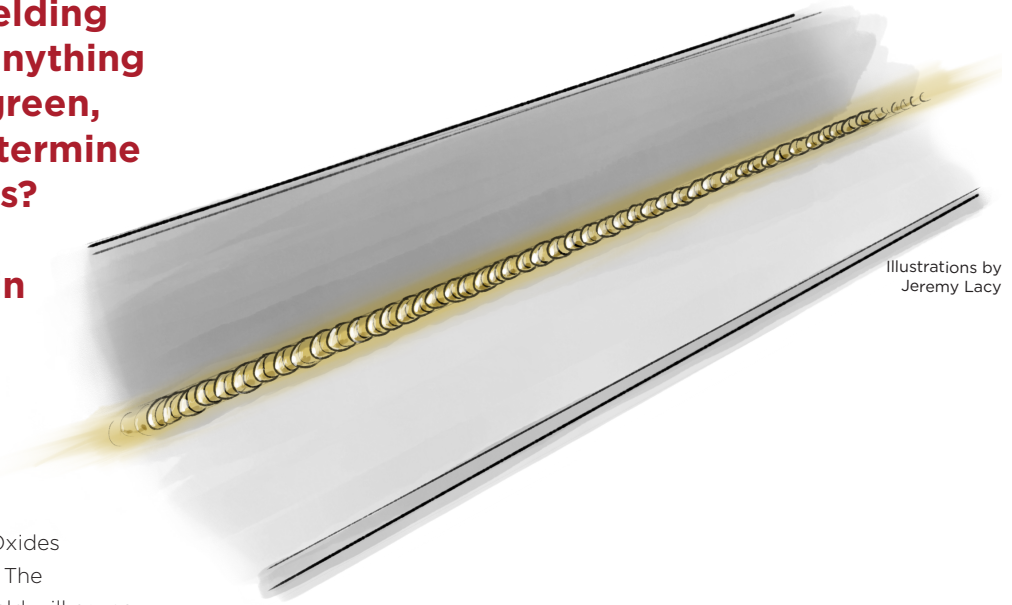
- Jason Beard, Norwalk, Ohio

► The difference in color has to do with lack of shielding gas coverage. Oxides form where there is no gas coverage. The more atmosphere allowed into the weld will cause more color. This doesn't necessarily mean the weld is bad. Generally, though, the color dictates how bad the weld is. You want a yellowish color to clear. When you starting getting into such colors as blue, dark blue, white or gray, it's an indication of a lot of oxide, which will deplete the mechanical properties of the weld. If you correctly purge, the weld should be clear. The same applies to welding titanium. Before a weld is approved on titanium, the color is examined. Welds that are glossy silver, light straw and dark straw are acceptable, while purple, blue, yellow and gray are unacceptable. Brushed welds are also unacceptable.

Is there a widely accepted rate that's considered the optimal travel speed for MIG welding? Or is it merely a case of practice and experience until the operator finds the most suitable speed for the settings and the material being welded?

- Matt Clough, Berkshire, England, UK

► There are a lot of variables to consider, including what you're running, what mode you're running, how thick or thin is the material, and what direction are you're traveling. Vertical up is always slower than vertical down. Thin materials will always run faster than thicker materials. Spray arcs are high-energy arcs that travel fast, while short arcs are low-energy and travel more slowly. Sometimes gas blends will increase or decrease travel speeds. It's a matter of watching the puddle, knowing its size, and practice. That comes with experience.

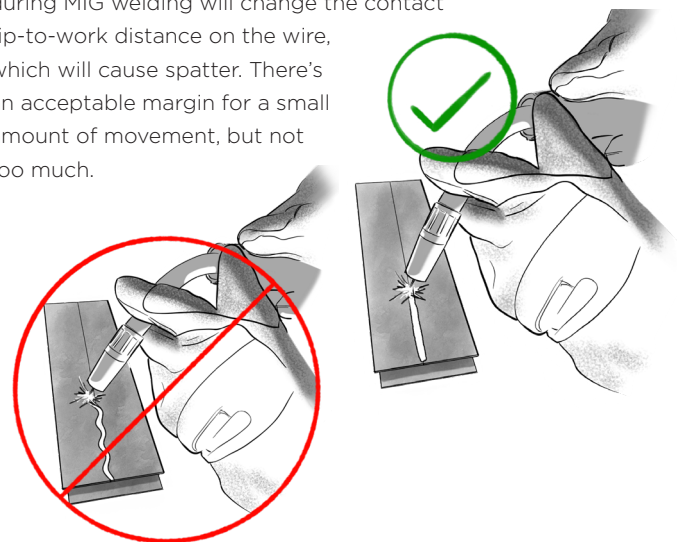


Illustrations by
Jeremy Lacy

When MIG welding, is there any benefit to whipping or weaving. Does it increase penetration or create a more aesthetically pleasing weld?

- Matt Clough, Berkshire, England, UK

► There is really no benefit to whipping or weaving. In reality, you don't want to move too far out of the puddle because you lose gas shielding. Too much movement or too much distance between the weld and the nozzle will result in less effective gas coverage and a weld integrity problem. As long as you stay within the gas coverage, you can manipulate the weld somewhat, but whipping way in or way out will cause oxides and porosity. It's no different than pulling the filler metal in and out during TIG welding. In addition, too much movement during MIG welding will change the contact tip-to-work distance on the wire, which will cause spatter. There's an acceptable margin for a small amount of movement, but not too much.



A close-up portrait of a man with a beard and mustache, wearing a dark green baseball cap with the Wilson logo. He is looking directly at the camera with a slight smile. The background is a workshop with shelves containing various tools and equipment.

HE'S BEEN MAKING
THINGS EVER SINCE
HE WAS ABLE TO
HOLD A HAMMER...

JIMMY DIRESTA

WORKSHOP DAVINCI (MAKER-LANGELO?)

STORY : NICK OFFERMAN

PHOTOGRAPHY : TAYLOR JEWEL



...AND LIKELY LONGER THAN THAT.

He grew up working around, alongside and for his dad, a long island handyman, so his early education involved a wide array of problem-solving using all manner of tools, skills and materials. It's likely that jimmy could lay down a pretty welding bead before most of us had wrapped our heads around the mechanics of the glue stick. He attended art school (Manhattan's School for the Visual Arts or SVA), spent some years designing toys in the cutthroat world of the toy business, and then followed that by working on approximately five different reality television shows that did (not quite) do their best to commodify his ever-burgeoning skills as a maker/teacher/ambassador.

With each new boob-tube show idea, our hero thought he had finally received his "big break" in terms of getting paid to communicate the tenets of making, pure and simple, to a large audience. Unfortunately, as is so often the case when fine artists enter the arenas of media and commerce, a vast, multicolored talent such as Jimmy's slammed directly up against the agendas of entertainment companies. This happens all too often in show business – the executives and noncreative producers on a show are in constant fear of losing their jobs, because their security depends upon scoring viewer ratings that seem to be swayed by the fickle whims of fashion or trend.

Therefore these befuddled bosses “weigh in” with their dictatorial opinions on a show’s creative direction instead of simply trusting the talented individuals who have been hired for their that very purpose. I liken the situation to a client hiring a master oil painter based on the client’s appreciation for the artist’s past work, and then proceeding to instruct the artist in what colors to choose, where to dab them, and with what brush to do it. It’s infuriating, but it’s sadly the norm in far too many instances.

Of course, despite his obvious potential as a well-callused-but-hunky spokesperson, Jimmy had no interest in bending his principles to fit any television producer’s idea of a show about making, a specialty for which Jimmy had unwittingly been training himself his entire life. So he duly put the television folks in his rearview mirror, where they continue to this day to enjoy a fulsome snack of his dust.

Fortunately for the rest of us, Taylor Forrest (his charismatic girlfriend and co-captain of 8 years), said to him, “You already spend so much time making these little videos of your work, why don’t you just put ‘em on YouTube and cut out the middle man?” The emergence of do-it-yourself online channels such as YouTube dovetailed very conveniently with Jimmy’s insatiable desire to share his knowledge with anyone watching, so when he launched his channel he almost immediately established a devout audience of his TV fans who were simply craving more of Jimmy’s tool jazz. Over just a handful of years,

his YouTube channel has amassed a subscriber base of 1.3 million (and counting) and he averages over 5 million views per month, not to mention appearing on the cover of a glossy welding periodical (this one). Boom. People flock to Jimmy for his informational treats and visual delights, but then they remain, adhered to the flypaper of his candor and his open generosity in sharing his knowledge however he can. I’ve known him for over a decade now, and I still click on everything I see of his, including regularly tuning into his pithy contributions as one third of the estimable Making It podcast. Put quite plainly, I cain’t quit him, and I am not alone. Not by a long chalk.

I am of the opinion that the reason for Jimmy’s inexorable triumph in the maker field, in addition to his flat-out wizardly acumen when it comes to all things tool and material-related, is his incredibly innovative video style. His content strips every build down to the bare essentials, his camera athletically describing each process by exhibiting only the maker’s hands applying the tools to the materials, with very little to no talking. He does not beat around the bush. No, he gets right down to business, crafting Spartan instructional content which he instinctively comprehends is all that we, his devotees, want to see. Like a workshop-centric Anthony Bourdain, Jimmy is a gentle, magnetic ambassador into the scary, dark swamp of seemingly impenetrable tasks, the type of undertaking that most of us would write off, thinking, “There’s no way I could ever get that rusty, old hand-printer machine working.”

1.3

ON HIS YOUTUBE CHANNEL, JIMMY HAS AMASSED A SUBSCRIBER BASE OF 1.3 MILLION (AND COUNTING)

5

JIMMY AVERAGES A STAGGERING FIVE MILLION VIEWS PER MONTH.



◀ JIMMY HAS NO INTEREST IN BENDING HIS PRINCIPLES TO FIT ANY TELEVISION PRODUCER'S IDEA OF A SHOW ABOUT MAKING, A SPECIALTY FOR WHICH JIMMY HAD UNWITTINGLY BEEN TRAINING HIMSELF HIS ENTIRE LIFE.

He instead rolls up his sleeves, dives into the morass and tells it like it is as we navigate our way past the pitfalls with him. This is often without even speaking, in a way that can't help but fascinate the viewer, whether he or she be a novice or a seasoned pro.

The Merriam-Webster dictionary defines "Renaissance Man" as "a person who has wide interests and is expert in several areas", which of course describes Jimmy Diresta to a "T", and it's even perhaps a bit of an understatement in his case. I would go so far, risking blasphemy to reality itself, as to accuse him of possessing superhuman powers! To hell with it! I'm sorry, I tend to get excited when I talk about my friend. Let me get my feet back on the ground and just attempt to calmly analyze why I would feel compelled to make such a claim. In this modern era, this "age of information," a Gandalf-level jack-of-all-trades like Jimmy is perfectly situated to reap a substantial harvest

as the Johnny Appleseed of hot glue. This Renaissance Man has tried on and discarded the old models (TV series, toy business) and instead found himself swimming with strong strokes in the river of the free market. The conversation he engenders among his hordes of fans (among which I count myself) is one that we have been craving throughout our lifetimes.

Jimmy's relationship with this very magazine is a perfect example of how he organically seems to find opportunities and then capitalize on them to the fullest extent, to all of our enjoyment and edification. As a rookie welder myself, yet a person with plenty to crow about when it comes to encouraging the maker movement, I was asked to sit for an interview early on in the life of ARC Magazine. I gladly did so, always eager to goose the creativity of the people wherever possible, but at the close of the interview I said to the publisher, "I'm grateful to you for having me, but the guy you want to talk to is Jimmy Diresta."



▶ JIMMY SURVEYS THE LANDSCAPE AND SPIES THE FOLLOWING AT HIS DISPOSAL: HIS TOOLS, HIS TALENTS, HIS READERSHIP, AND THE BODY OF KNOWLEDGE SURROUNDING HIS AUDIENCE ONLINE AND IN PRINT.

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Well, the brains behind ARC contacted Jimmy, and quickly discovered that I had steered them in the direction of a rich vein of golden knowledge, delivered with a Long Island accent. Jimmy has been a regular contributor since that time. When asked about this, Jimmy says, "When we first met, I didn't know much of anything about welding. I mean I knew how to weld two pieces of metal together and they would stick." Ok, so Jimmy has humility as well. Frankly, I'm starting to get annoyed with him. But the point is that he seized the opportunity to collaborate with this magazine, and while he was contributing his thoughts as a general maker, he was also taking advantage of the opportunity to learn much more about welding. "Now I know about all the different processes, I know about TIG, MIG, Stick, Spray-Transfer, all the bigger processes...things I never would have known...now I can actually sit down with a professional welder and have a conversation."

Together with ARC, Jimmy has applied his energies to concocting interesting projects that readers can actually manifest at home, making welding more accessible to the layperson and taking the intimidation factor out of the equation. In other


words, Jimmy surveys the landscape and spies the following at his disposal: his tools, his talents, the readership of ARC, and the body of welding knowledge surrounding the Lincoln welder folks. He then curates these separate factors, shaping them and smoothing them until he has created a pleasing result: in this case, eight DIY projects for ARC Magazine to date, furthering the dissemination of maker knowledge to which he has devoted his life.

Now apply that paradigm to every other discipline that catches Jimmy's eye in a given year. Blacksmithing, leatherwork, woodworking, antique machine restoration, barn-building, fashion design, cedar-strip canoes--you name it. Together with his impressive lady friend Taylor (who specializes in leather & steel), he has created a (lumberjack's) dream maker retreat in upstate New York. One can enlist to spend a week with them and guest instructors, learning tintype photography or knife making or whatever else they come up with, while sleeping in their restored boarding house and eating flapjacks until one has to unbutton one's britches, all in the company of other makers, not to mention an army

of prolific egg-laying chickens and several other farm-appropriate mammals.

Like a fine sculptor, but one who instead of marble shapes life itself, Jimmy is able to perceive the raw materials at hand, one of which (perhaps the most important) is ignorance, coalesce and carve them into something truly beautiful, either literally or figuratively. Often it's both. That's why I call him the Workshop DaVinci, or Maker-langelo. **ARC**

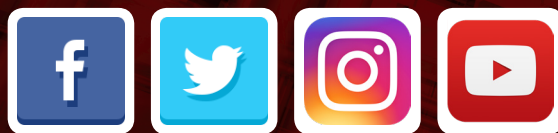
▶ LIKE A FINE SCULPTOR, JIMMY IS ABLE TO PERCEIVE THE RAW MATERIALS AT HAND AND CARVE THEM INTO SOMETHING TRULY BEAUTIFUL.



**"HE INSTEAD
ROLLS UP
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THE MORASS
AND TELLS IT
LIKE IT IS AS
WE NAVIGATE
OUR WAY
PAST THE
PITFALLS
WITH HIM."**

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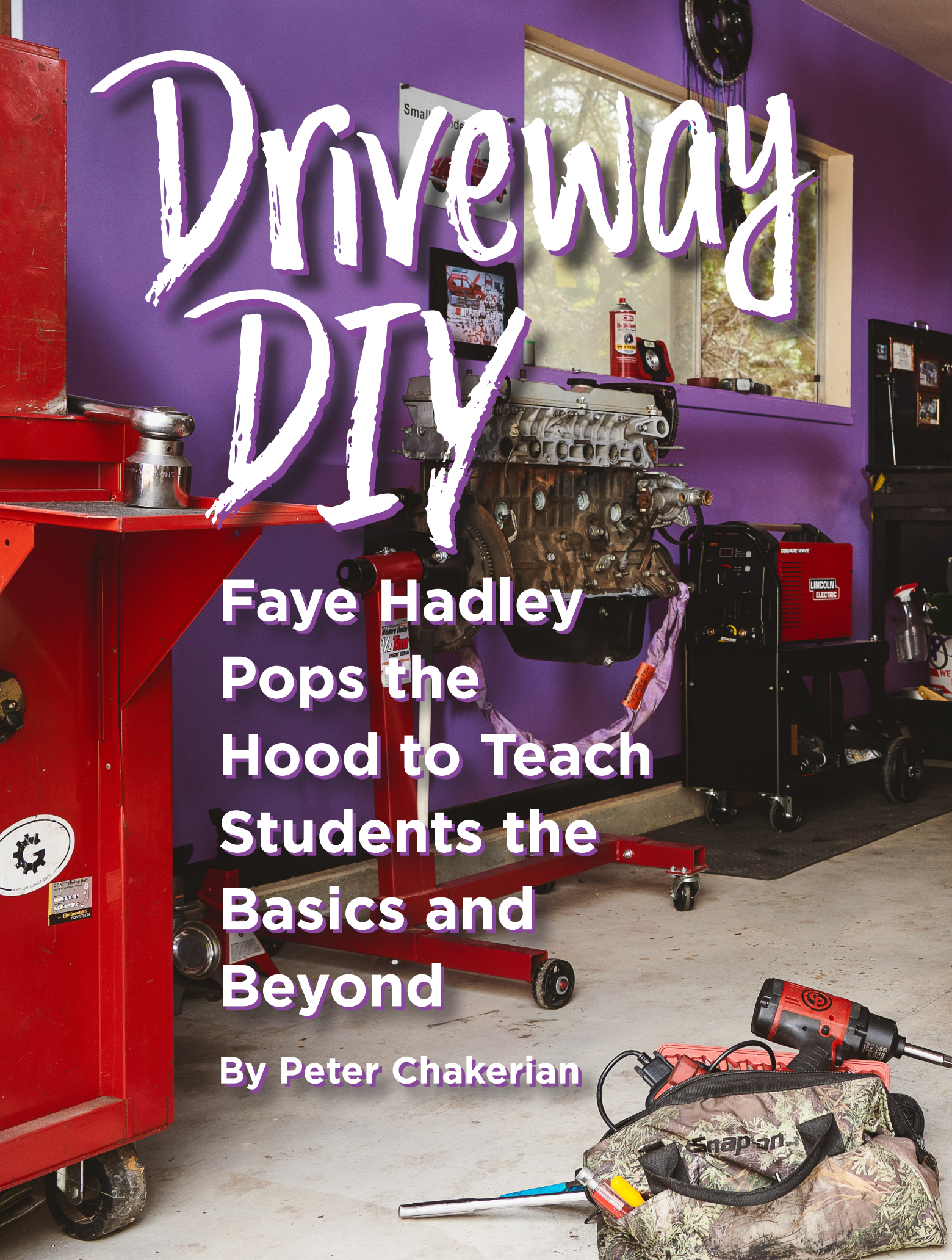
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Driveway DIY

Faye Hadley
Pops the
Hood to Teach
Students the
Basics and
Beyond

By Peter Chakerian







© G Stanley Photography

Rosie the Riveter? Meet Faye the Fabricator.

Seems like quite the historical jump, right? Well, maybe not.

The revolution may be televised, and it just might happen in a driveway classroom near you.

Faye Hadley is turning her mech-trade world on its ear with that very spirit in mind. To hear her tell it, we're all going to have to get more inventive and resourceful in the 21st century, and with that imperative in mind, the sky's the limit for what she calls her "low-key shop-on-wheels with no mansplaining" auto repair incubator in metro San Antonio, Texas. And that little-business-that-could includes welding and fabrication as a part of her truly inspired business model.

Hadley is the catalyst, entrepreneur and head mechanic at Pistons & Pixie Dust, a small business with the goal of taking the

fear and loathing out of automobile service and repair. Hadley's end goal for her customer base transcends the traditional model of top-shelf customer service and drops them inside the experience itself, without all the dread and angst usually attributed to vehicle work.

It could be a class or a workshop, or even a visit from Hadley right to your driveway to assess and repair an ailing ride. Whatever the scenario, she wants clients to feel comfortable enough to actually understand these emotionally — and often financially—loaded vehicle repairs, and maybe even start tackling some of that work themselves if they feel so inclined.

"What could be better?" she says on her website. "Maybe adding in some power tools and a glass of wine?!? Check!"

Sure, you can come to see Hadley and she'll repair your jalopy or delightfully-cared-for used vehicle. And she can roll out to you, too, to do that work, but a trip out to Austin costs "a little extra," she says.



"low-key shop-on-wheels with no mansplaining."

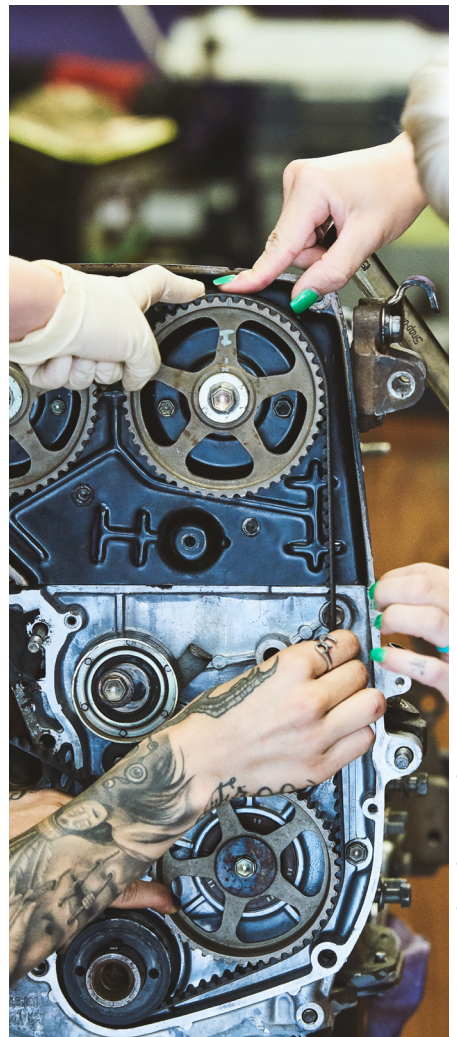
But perhaps you're looking for more than just a repair or routine maintenance. Maybe you want to see what's happening under the hood, and see what you are capable of — actually learn some of the tricks of the trade, and perhaps start to tackle some of these service challenges yourself? She's got your back, too. You can sign up for one of her "pop-up classes" and dive headlong into it.

Wait, what? A grease monkey graduate degree? We could all use one of those, no? And that's just one of the highlights on Hadley's chrome-plated agenda that just keeps getting more prominent by the day.

Hadley's aim is a simple one, and her attitude is as no-nonsense as her approach: you can do this.

"I have been teaching classes for women for about six years now, maybe longer," she says. "It all started when I was a technician at a locally-owned repair shop in Portland, Oregon, as a response to my customers. I found that, as a young woman, my customers — and even the men, honestly — felt a lot more comfortable asking me questions about their cars than they did the other mechanics at the shop."

Over time, the random Q&A evolved into something a little more structured. "I would teach my customers how to check their fluids and filters," Hadley explains, "and eventually my first 'Underhood Basics' class was born from that. Things sort of took off from there. It's all very much hands-on — interactive workshops that cover everything from the basics like changing a spare tire and under-hood maintenance, to



"My customers are mostly really busy/single moms."

advanced classes such as electrical systems and introduction to engine building."

Hadley describes the typical Pistons & Pixies client as "the automobile averse," but those same people are also wise enough to know that leaves them at a decided disadvantage when it relates to understanding and negotiating their car mending needs. Hadley is the handshake between those two worlds for her client base.

Hadley laughs when she explains the typical profile. "My customers are mostly really busy/single moms," she says. "Women who often don't trust mechanics."

"And then about a quarter [of those people] are what I call 'wrench-curious' women," she adds. "They hire me to perform a repair, but they want to watch, to follow along and to learn. So, part of my business model is also show-and-tell with those repairs... I want people to be empowered. I provide an educational space where you can admit that you don't know how to check your oil and nobody's going to judge you. It's about learning where your air filter is, and how to check it, and how to change it."

She adds: "It's also about learning how to talk to a mechanic, so that you don't get taken advantage of. I have a responsibility to other women in the biz to really make this work well, to enlighten and to look good."

But beyond that, it's just "cool to know what's going on under the hood of your ride," says Hadley. "And I don't charge any extra to let the customer get hands-on like that. So quite often, I am performing repairs with the customer. Some even use my YouTube channel video guides to purchase tools after we work together, and then they call me back for [instruction and] more and more maintenance!"

or so) and "100% word of mouth," her Pistons & Pixie Dust business launched on Valentine's Day 2018. It's been a love affair ever since.

"I am swamped," she says. "I'm a bit of a perfectionist and a control freak, so this all works great! If I complain about the boss, well, she is me, so I can't be too critical."

And she's learned that there's a certain therapeutic dividend to what she does, not just for her customers

"If I complain about the boss, well, she is me, so I can't be too critical."

Hadley's background is as unusual as her business model, but in some ways, it makes so much sense in how she approaches her chosen field. She holds a degree in psychology from Harvard ("one of those things that sets me apart, a back-pocket thing") and worked as a therapist for a year with "a loyal following," before she decided to take a different direction.

"I was great at it," she says. "But if I'm honest, it was hard for me to quantify the results – to know if I was doing more harm than good. That's a far easier thing to grab hold of here."

After working in an auto shop (she's been a mechanic for a decade

but for herself as well. "It's a cool way to take the things that I am and weld them together," she says. "I'm passionate and like to help people, but couldn't change things for [my patients], but when my Volkswagen Rabbit's engine blew up, it pushed me to do some work – you know, trade for repair – and it was the most rewarding thing I've ever done in my life."

It's a result that she can quantify, she says. "It's not that I didn't like being a therapist," she says. It just didn't fit. Now I'm 'The Automotive Therapist,' which is a newer movement for women in the field. There are success stories,

but there are boundaries, too! Whenever it feels a bit too much, I can always direct people to the YouTube channel first for a video which should help with their issues."

Hadley says she never started this venture to become a "radical thing for crazy attention." It's really been more about "catering to someone like me," she says. "Like, what do I need? What's the end goal? It's been humbling and I'm honored to do that for everyone on the daily."

What kinds of skills and technical knowledge and wisdom is she passing along to her prospective student body?

"Well, I teach everything from how to change a spare tire to how to rebuild an engine!" says Hadley, whose 'Intro to Engine Building' is the most advanced class she currently offers.

To quote the Ginsu knife commercial, "Now how much would you pay?" Wait, there's more.

Hadley also provides Mobile Mechanics Services, and Pre-Purchase (and Pre-Sale) Inspections. She also offers a class called Panic at the Dealership? and other classes at a level of depth that will hopefully enable students to eventually teach their own classes. Her ultimate goal is to inspire her student to take the knowledge she's imparting and continue to build on it.

"There is empowerment in education, not just to battle budgetary considerations," she says. "We get to pay it forward, We all want to save

money. There's something bigger here that we can all do to help one another."

Inevitably, this leads to a line of questioning beyond service and simple repairs. Many automobile enthusiasts are diving into bigger repairs that require welding — from exhausts and actual structural frame repairs to full-blown customization of their vehicles. To that end, she's developed an Intro to Welding course that she looks forward to diversifying and expanding into related course offerings in the near future.

Hadley maintains a tight-knit team that she's been gathering on the Internet, and together they are slowly evolving into partners, helpers and sponsors.

"I do work solo, so to speak" she says, "but it takes a village, and the Woman and Machine group I am building through the business includes some great resources who have been providing wonderful help with momentum."

Among those resources who have become partners is Karen Sullivan, founder and editor-in-chief of *Girls N' Garages*, a self-proclaimed "sucker for vintage trucks and sunflowers" and a catalyst for the Garage Sisterhood Collective that Hadley promotes on her website.

Sullivan and Hadley together are committed to gathering in and empowering the same audience that Hadley herself has been cultivating all along. It was a natural fit and quickly became a friendship beyond partnership.

"We connected through social media," says Sullivan. "I

originally wanted her to write for the magazine, but she was very busy. We maintained that connection through a couple 'Woman and Machine' programs." Sullivan eventually ended up staying with Hadley for this programming, and they hit it off. "At this point," says Sullivan, "we are partnering with [Pistons & Pixie Dust] while keeping our own businesses on the side.

It's a mutually beneficial relationship. "We are all developing together, helping each other grow our businesses," Sullivan adds. "And there's plenty of room to expand."

To that end, when Hadley is asked what the future looks like for Pistons & Pixie Dust and the growing coalition she's building — more programs, more students, maybe even her own shop facility? — Hadley prefers to take the pragmatic approach, and she's happy to do so.

"There is no proper shop," she says. "I'm mobile repairs only — a 'pop-up shop' for the time being. As for where we are in 2020? I don't even know where I'm going tonight after work!"

If there is a plan at all, it's just to keep on keeping on.

"Still wrenching!" she declares. "Building cred. Creating my own destiny, and working toward being a master tech! And hopefully we're empowering more women, who will flock to the trades without the barriers."

Beyond that, she says, "We're just going to enjoy the ride!"

ARC

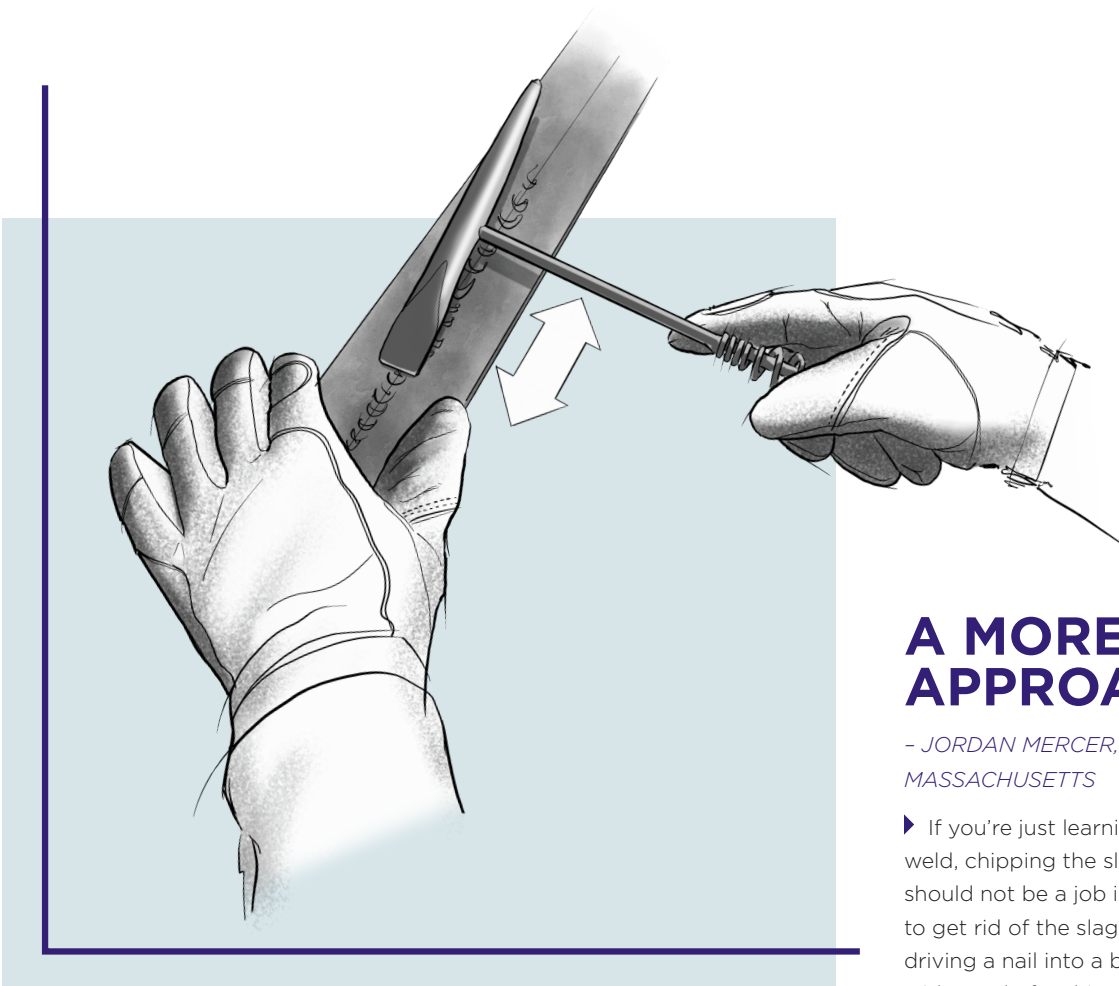
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"Well, I teach everything from how to change a spare tire to how to rebuild an engine!"

BEGINNER TIPS & TRICKS

Make It Easier to Weld Your Workpiece.



Illustrations by Jeremy Lacy

A MORE GENTLE APPROACH

- JORDAN MERCER, SPRINGFIELD, MASSACHUSETTS

► If you're just learning to stick (SMAW) weld, chipping the slag to reveal the weld should not be a job in itself. A good way to get rid of the slag is not to smash it as if driving a nail into a board, but to take the wider end of a chipping hammer, place it flush against the metal and move it to make the impact on the weld toe.

BREATHE EASY

- OMAR PEREZ, GILBERT, ARIZONA

► A straight, attractive bead is everyone's goal. So much so that our first instinct is to hold our breath while watching the weld puddle. Although a short weld bead may not be affected by this, longer and more precise welding will prove to be harder to achieve by holding your breath. Practice welding while breathing as you normally would. Doing this will result a more focused mind and a much steadier hand.

FEEDING THE FILLER ROD

- CAREY JARVELA, HOLLY HILL, FLORIDA

► A common mistake often made by new TIG welders is improperly feeding the filler rod into the arc. The arc heat is used to form the molten pool. The filler rod should then be fed intermittently to the leading edge of the pool.

AVOID THE AGGRAVATION

— JOE PASKEURIC, HOWELL, MICHIGAN

► Prepping the weld surface and keeping it clean can help prevent aggravation. Even though arc welding can be more forgiving than the other processes, keeping the area to be welded (and the location chosen for the ground) prepped and cleaned can greatly increase the overall quality of the weld and ensure that the first weld is a good weld. Make sure the area is free of oils and grease as work as dirt and rust. When possible remove all paint, rust and debris down to a shiny base metal to help ensure a porosity-free weld with good penetration and no cracks.



ALWAYS TACK BEFORE A FINAL WELD

— JOHN MACKENZIE, BERLIN, NEW HAMPSHIRE

► Always tack weld your pieces together first, then recheck all your angles and square before the final weld. It's easier to break a tack and reset things than to cut everything back out.



HAVE A TIP OR A TRICK YOU'D LIKE TO SHARE WITH BEGINNERS? LET US KNOW!

Send your tip or trick to questions@arcmagazine.pub and we just might feature it in an upcoming issue!

Feel free to submit more than one tip, but please be as specific and detailed as possible. The more details you provide, the more likely we are to use your tip. Note: We reserve the right to edit responses for the sake of grammar, appropriateness and/or available space.

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EDUCATOR SPOTLIGHT

HANNAH VAUGHAN

MAKING, A LIFE

By John C. Bruening

Hannah Vaughan believes there's meaning in making.

She would know. She's been doing it for about a decade now, ever since she was an undergraduate art student at Oberlin College in northeast Ohio. Along the way, she's been teaching others how to do it too.

"I think it's something that a lot of people in my generation specifically have been missing," says the 31-year-old Los Angeles native. "It's something they've really been yearning for – that meaningful experience of making in their lives."

Vaughan started in woodworking at Oberlin and eventually segued into welding and fabrication. By the time she finished graduate school at Cranbrook Academy of Art near Detroit, she had worked for a variety of design studios and initiatives around the U.S., including Desert Design Lab (a traveling workshop around the southwestern states), Lagomorph Design (Chicago) and Penland School of Craft (Penland, North Carolina). Nearly every one of these gigs included an element of formal or informal teaching.

She currently runs her own furniture design and fabrication studio in Newburgh, New York, where she also teaches woodworking, welding and other basic skills that are part of furniture building. In addition to her classes in Newburgh, she has recently partnered with designer/fabricator Vivian Beer to teach various welding workshops – with an emphasis on TIG and CNC cutting – at Beer's craft school in Pembroke, New Hampshire.

For as much energy as she brings to teaching, she admits that the enthusiasm can actually be a drawback at times. "I think the hardest part for me is slowing down and remembering what it was like when I was first learning to weld, and how

complicated everything seemed," she says. "I have to remember to go step by step in a proper sequential order. Sometimes I'll get excited and say, 'Oh, look at this!' or 'Hey, let's do this!' But it's really about walking students through the basics."


Nina Cho and Vaughan have been friends since the Cranbrook days. Although they were both students at the time, Vaughan had already been teaching fabrication techniques that Cho was able to apply to the metal chair she'd been constructing as part of her thesis project.

"Hannah helped me with a lot of structural problems," says Cho, who currently runs her own design studio in Detroit. "We were attaching the leg of a chair to the metal seat, but when we tried to weld it together, the overall structure didn't work. She said, 'Don't be frustrated. We can take the leg off and weld it again.' It was sort of like disconnecting and re-gluing. I had done undergrad work that was very different from metalworking, so her guidance was very helpful and very fun. She was super-positive, and whenever I got frustrated with my structure, she'd just say, 'Don't worry about it. We'll fix it.' And she showed me how to just redo it and fix it."

In the end, Vaughan sees teaching as a process of providing people with the tools to release their inner maker.

"I love watching what people do with the skills I teach them," she says. "The creativity that comes out of it is pretty amazing. The students can do a lot of similar things, but you can get one who really sort of blows your mind. You have those moments where you look at something a student is doing and you say, 'Wow, I'm the teacher, and I didn't even think of that!' That's cool. That's what it's about." **ARC**



A woman with brown hair tied back, wearing a black tank top and black pants with a tear on the knee, is sitting on a metal workbench in a workshop. She is smiling at the camera. On the workbench in front of her are various tools, including a green angle grinder, a pair of white gloves, and a pair of pliers. In the background, there is a window with a view of greenery and a red door.

"I LOVE WATCHING WHAT PEOPLE
DO WITH THE SKILLS I TEACH THEM.
THE CREATIVITY THAT COMES OUT
OF IT IS PRETTY AMAZING."

▶ CONNECT WITH HANNAH
www.hannahvaughan.com
Instagram @hannahcvaughan

Project Spotlight

BIG DOORS FOR BIG PROJECTS IN YOUR BARN-SIZED WORKSHOP

By Jimmy DiResta

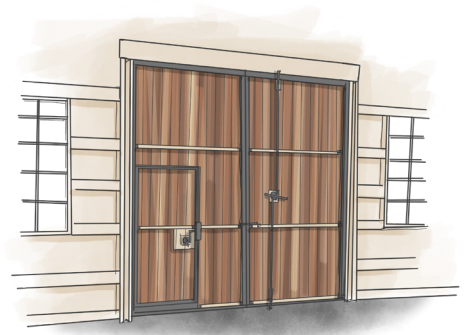


Illustration by Jeremy Lacy

Jimmy Diresta, the subject of this month's ARC cover story, has spent more than a year building out a space to hold classes, maker events and otherwise flex his creative muscles. Just in time for more inclement weather, the "Maker Church," as it's been dubbed, is finally water-tight, but not quite secure. In this Project Spotlight, Jimmy builds and installs massive doors for the openings of each end of the building large enough to accommodate the delivery of heavy machinery and

large objects. Within these larger doors, he adds man-doors for day-to-day use.

This is a custom project, so if you want to build it, you'll have to size your materials accordingly. For his project, Jimmy is using reclaimed lumber for the wood panels and 4 x 4 x 3/16 inch angle iron for the frames and casing. A video of the build can be found at www.arcmagazine.pub



© Jimmy DiResta

MATERIALS

- Main Frame: 4 x 4 x 1/4" Angle iron
- Various pieces of angle iron and steel strapping
- Wood for door panel
- Gate hinges
- Bullet hinges – 1 1/2 inch cold rolled round steel and 1 inch stainless steel for hinge pin

WELDING/CUTTING EQUIPMENT AND TOOLS

- Lincoln Electric Power MIG® 260
- Lincoln Electric Power MIG® 210 MP
- Lincoln Electric Ranger® 250 GXT
- Flux cored wire
- Large welding/clamping square
- Drill
- Angle Grinder
- Cutting and flap disks



SAFETY FIRST

Before you start any project involving welding, make sure you have the right Personal Protective Equipment (PPE), which includes, at least, an ANSI-approved welding helmet, safety glasses, appropriate welding gloves for the process you're using, and a flame-resistant shirt, jacket, or sleeves to protect from UV rays and burns. You should also keep a fire extinguisher close at hand. Use adequate ventilation when welding. Use an approved respirator if exposure to welding fume cannot be controlled, or if welding outside and natural air movement is not sufficient to keep welding fume out of your breathing zone.



Watch exclusive footage at arcmagazine.pub



Step 1: The Door Casing

Like any other door, this set of barn doors needs to have something for each side of the hinges to be mounted to. We cut each “leg” of the casing as well as the “head” piece from 4 x 4 angle iron stock, and pre-drilled and countersunk each screw hole on the ground, where gravity was our ally, prior to mounting them to the door framing using structural deck screws.

Step 2: Outer Door Frames

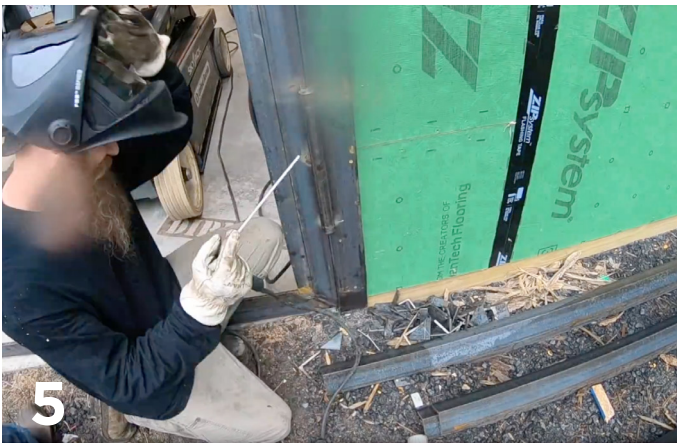
Measuring the door opening with the casing in place gave us the most accurate dimensions for the larger outer doors. With these measurements in hand, we clamped each length of angle iron in place using a pair of heavy duty squares and tacked them at each corner. We then took diagonal measurements to ensure the assembly was square, adjusted as needed, then finish welded each joint.

Step 3: Inner Door Frames

Using the same process as we did for the outer doors, we built the inner doors to be roughly half the width of the outer doors, taking care to ensure that the framing for the outer doors would act as a stop for the inner doors.

Step 4: Inner Door Hinges

We trimmed heavy-duty strap hinges (purchased from our local farm supply store) to make the connection between the inner door and the outer door frames, cutting them to size and reinforcing the hinge with scrap pieces of 3/16” steel before welding them into place.



Step 5: Outer Door Hinges

With the inner doors connected to the outer doors, it was time to connect the door assemblies to the casing. For our project, we custom built our hinges for using interlocking lengths of solid, round bar stock, fabricated using a metal lathe (see video). Recognizing that not everyone has this equipment on hand, similar bullet-style hinges can be readily purchased online.

Step 6: Door Panels

Our door panels were assembled from reclaimed lumber that we had in the shop, but whether you create your doors using dimensional lumber or plywood, the process is largely the same. First, arrange your pieces so the bottom edges are all even and squared up. Using several boards of the same width as each half of the door, attach each vertical board to the horizontal boards using screws or a combination of construction adhesive and nails. From this large panel, cut out a piece that will serve as the filler panel for your smaller inner frame.

▶ A detailed drawing and cut list for this project can be downloaded at arcmagazine.pub.

Step 7: Install Panels

Hoist the panels into place and secure them to the frame. In this project, we used small clamps to hold the panel in place, then welded small pieces of angle iron were welded to the door frames to hold them in a more permanent way.

Step 8: Install Locks, Latches and Slide Bolts

Once the panels are installed and secured, and you're happy with the alignment of the doors within your openings, it's time to think about how you'll keep them closed and secured. Methods can be as simple or as complex as suits your needs. To see how we did it, check out the video at www.arcmagazine.pub.

A SLICE OF AMERICANA

Traveling the roads of Onaway, Michigan, along the northern tip of the state's Lower Peninsula, you can experience a piece of American history courtesy of Tom Moran. As a way to enrich the community, Moran has sculpted and welded busts of U.S. Presidents George Washington, Abraham Lincoln and Gerald Ford. There is also a replica of the Statue of Liberty, as well as its inspiration, Libertas, the Roman goddess of freedom.

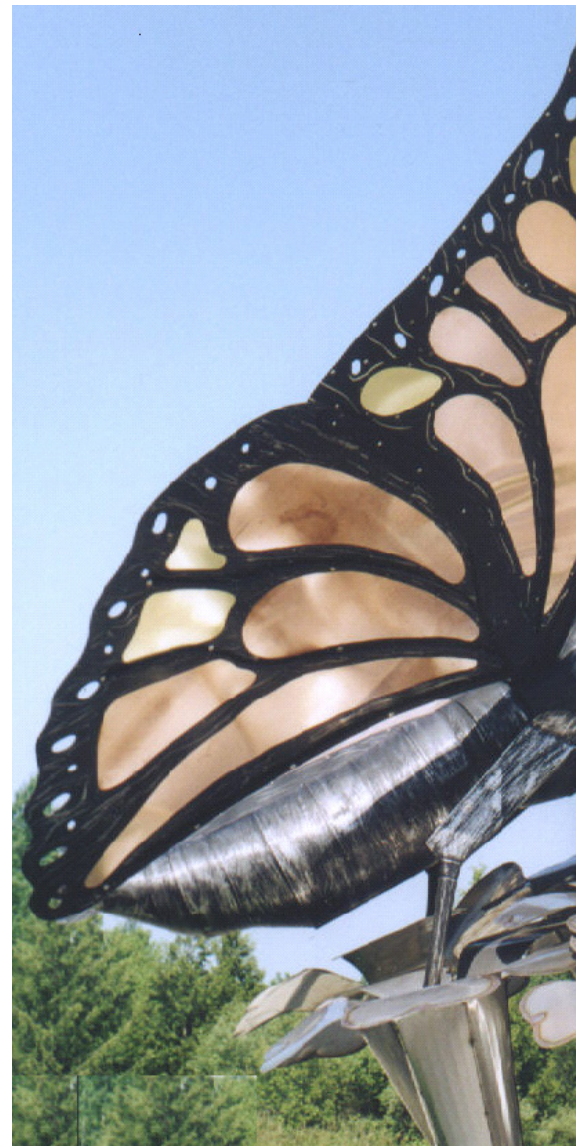
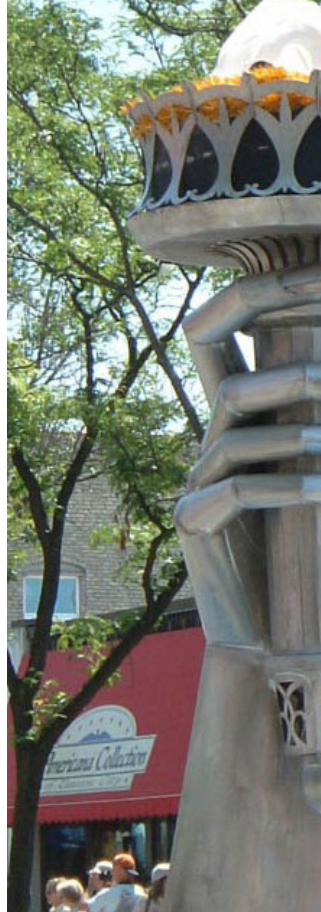
Moran, owner Moran Iron Works in Onaway, is a self-taught welder who has no artistic training. He began welding in high school, working on bicycles and farm equipment. Later, he was fabricating on structural steel and specializing in large module equipment.

While refusing to describe himself as an artist, Moran says works of art can have a great impact on his own projects. "By looking deeper, you can tell what a person is thinking in their art," he points out. "You can see the thousands of hours it takes to create something."

He hopes travelers will see that same dedication in his own work.

▶ SEE MORE PHOTOS AT
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All Photos by Moran Iron Works





Master Class

A discussion of advanced materials and techniques
for the seasoned welder.


GETTING PAST THE SURFACE

By Karl Hoes



The layman, and even the moderately experienced welder, usually thinks of welding in its simple terms – the process of joining two or more pieces of material together using a fillet or groove weld. However, the surface weld serves a different purpose. Surface welding, a process frequently used in industry, is not the joining of metal together. Instead, surface welding is a process that involves the depositing of beads or layers of weld metal on the surface of the base metal.

Surface welding is actually a broad term used to describe any of the following processes:



Surface welding is a broad term used to describe a variety of processes that involve depositing beads or layers on the surface of a base metal.

Build-up

Build-up is used to restore worn or undersized parts back to a desired dimension by depositing layers of weld metal to the surface of the base metal. Build-up welds are typically similar to the base metal in chemistry and hardness, and are not intended to prevent wear or corrosion. There are times when extra build-up material would be required to allow for machining to a specific size. In some cases, build-up might be left undersized to allow for one or more additional layers of a material that has resistance to wear or corrosion.

Hardfacing

Hardfacing is accomplished by depositing a hard, wear-resistant layer or beads of weld metal to the surface of base metals subjected to wear. There are a number of different types of wearing environments, so hard-surfacing products are usually selected based on the type of wear that the product will be subjected to in service. For example, some hard-surfacing products are designed for severe abrasion, while others are better for impact. Some hard-surfacing products have certain limitations on how many layers can be deposited.

Buttering

Buttering is a process of depositing a transition layer of weld metal to the surface of the base metal. The process is sometimes used for joining dissimilar metals, or to create a cushion layer of ductile material before adding a hard surfacing product. An example of buttering would be depositing a mild steel filler metal on a high carbon steel before hardfacing is applied.

Cladding

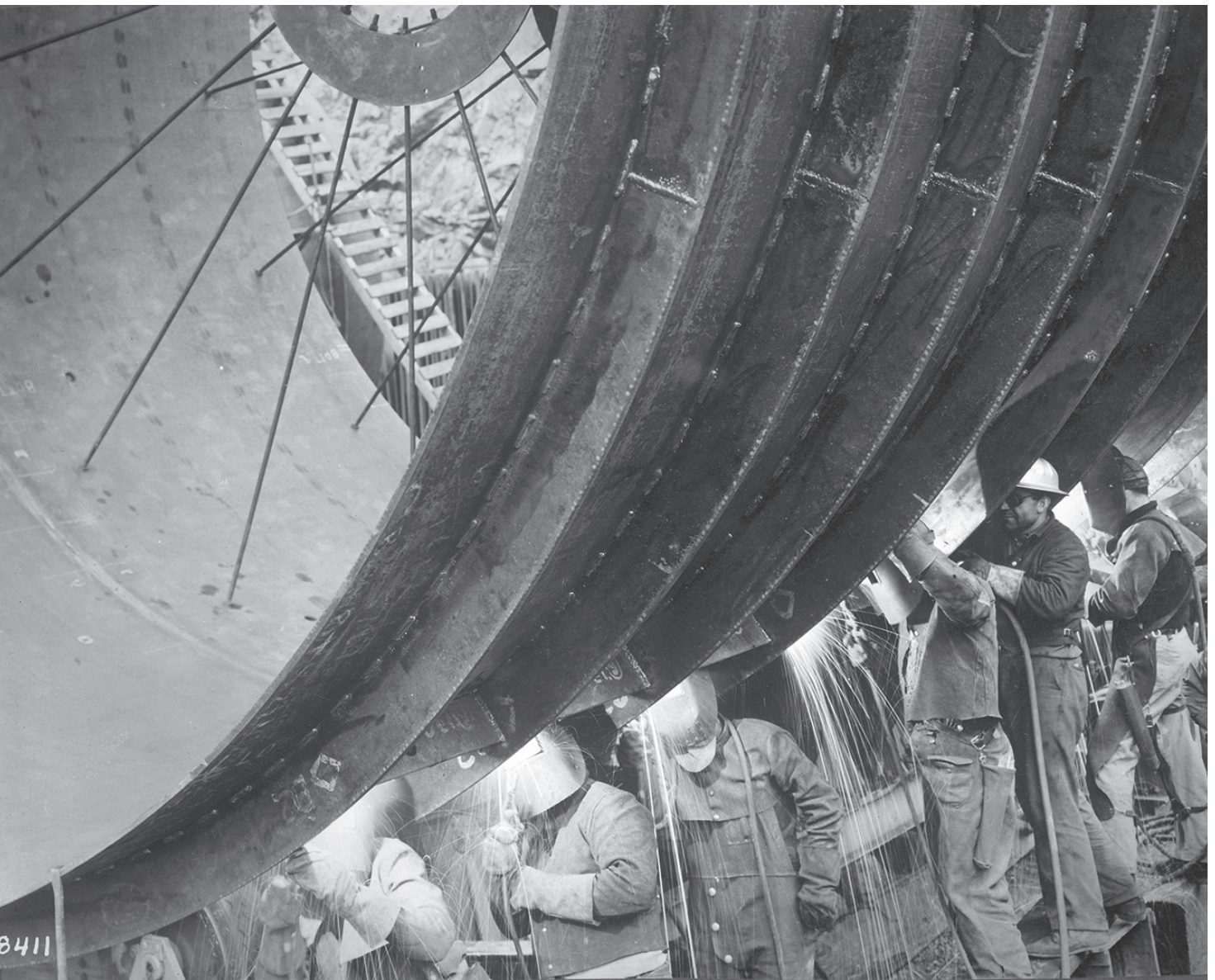
Cladding sometimes refers to a process that involves the adding of a corrosion-resistant plate to the surface of an alloy steel or carbon steel to improve corrosion resistance of the base metal. Most of the welding processes could be used to apply cladding materials. One example would be explosion welding nickel alloy sheets to high-strength steel plate. Another common way to apply cladding would be to use an arc welding process to create a surface weld. Stainless or nickel alloys are commonly selected for their ability to resist various types of corrosion. Another common application for cladding is the deposit of copper alloys such as brass or bronze onto a bearing surface to prevent galling between two sliding metal surfaces.

Surface welding is the general term that encompasses a variety of different processes. All of these processes involve the application of weld metal to the surface of the base metal to strengthen, add thickness, improve corrosion resistance and more. Your intended use for the base metal will determine which surfacing process you should use. **ARC**



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Electric Tornado



Have any vintage (pre-1975) photos you'd like to share? Email them in jpeg format to editor@arcmagazine.pub with a date the photo was taken (actual or approximate), a brief description (three or four sentences), and an email address where we can reach you for additional information.



July 1941—Seven arc welding operators converge on a penstock section of the Parker Dam hydroelectric power project on the Colorado River at the border of Arizona and California. The entire penstock was fabricated in the field using the “electric tornado” process developed by Lincoln Electric. The process involved the placement of the large cylindrical segments on power driven rollers that turned the structure into position for welding. **ARC**



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