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Machine artist Carl Zachmann mobilizes

TOOLKITS FOR CHANGE

Practical toolkits from artists and art

studio in the fight against COVID-19

MAY 1, 2020 | IN ARTISTS WITH IMPACT | BY NICOLE RUPERSBURG

Over the coming weeks, Creative Exchange will be highlighting artists responding practically to the COVID-19 pandemic with creative solutions to this unprecedented problem. If you know of an artist or organization doing creative work in direct response to this crisis, drop us a line at creativeexchange@springboardforthearts.org. You can also view all of our COVID-19-related coverage [here](#).

Fergus Falls-based machine artist [Carl Zachmann](#) couldn't sleep one night—an issue many of us have probably been experiencing lately. So he designed and built a working prototype of a mechanical ventilator based on the [University of Minnesota's open source design](#).

“It was an open call for people who thought they could make them—metal shops, 3D printers—that could help fill the need for ventilators,” he explains. The open call included the prototype design with a list of needed parts on-hand.

Zachmann had started working on this idea with his father, with whom he shares a studio (both are mechanical and metal artists). His father wanted to try building a prototype based on the university's open

organizations for creative, artist-led community projects and programs.

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source design, which invited collaborators and manufacturers around the globe to create their own prototypes based on the designs they posted online.

“I hemmed and hawed over it,” Zachmann says. “I thought we wouldn’t make much of a difference.” But by then university had released a second prototype design at this point, so he just started working on it. From design to fabrication, it took about seven hours.

The university has had many iterations of their mechanical ventilator prototype design, “The Coventor,” which has [since been approved by the FDA](#) only 30 days after conception. It costs just four percent of a normal ventilator—about \$1,000 compared to \$30,000. The design is still open source for any manufacturer to produce.

Zachmann’s prototype, unfortunately, ultimately was not adequate for their needs, being only practical for extremely short-term use—no more than a few hours. But he and his father are on the university’s list of available fabricators should they need additional assistance in manufacturing parts. They haven’t received a call yet, which, Zachmann says, is probably a good thing.

“But if the demand gets so great that they need 3D printers and metal shops to help out, if they call we’ll start making whatever they send us,” he says.

The issue with the Zachmanns’ ventilator isn’t that it doesn’t work; it does, and it could be used as a short-term stopgap for a patient who needs ventilation but is

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waiting for an available ventilator. But their ventilator is purely mechanical, forcing air in and out of a person's lungs without any responsiveness to the body's needs.

"Our ventilator works by forcing air in instead of the body wanting it, and that can be damaging to the lungs," he explains. "It's like a balloon inflating inside a vacuum, where it's just squeezing air in; it's just squeezing that balloon."

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Computer components control this responsiveness, but that's not something they're able to make in their shop.

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“We have a bare-bones shop. We can make a lot of machines, though,” he says. “The device we came up with will work for a very short term; a few hours. It can be the first device a patient gets put on until a ventilator shows up.”

Another short-term stopgap measure involves “splitting” ventilators, where multiple people with similar lung capacities can share the same ventilator for a few hours. Artists are rising to the occasion here as well: Boulder, Colorado glass blower Josh McMenamin has been making glass splitters after he stumbled across a medical [study from 2006](#) that suggested “splitting” ventilators as an emergency option. He calls his glass piece the “[Wishbone](#),” and it is made with impact-resistant lab glass and can be easily sanitized for re-use.

Fashion designers and clothing manufacturers all over the world have also transitioned to producing facemasks and other protective gear en masse (you’d probably be hard-pressed to find one currently manufacturing that *isn’t* doing this). And so are non-designers: Zachmann says he has a “small army” of friends all sewing masks, and a friend in Minneapolis with a 3D printer who can print the technical components needed for PPE. His studio, he says, can also supply some of those parts.

“We can help supply components for facemasks, like the nose straps that hold them over the nose,” he says. “At this point we’re just trying to pitch in wherever we can.”

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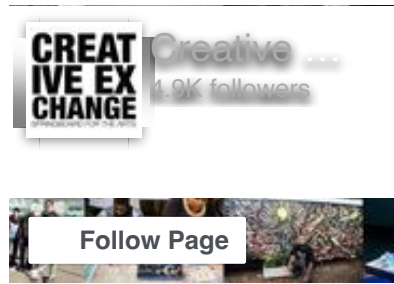
He hasn't yet received a call to produce any of their mechanical ventilators, but says they are still very much available if the need should ever arise.

"But that also means our little shop isn't needed yet. It's one of those things where you want to help, but it's even better if you don't get that call."

As for his career as an artist, well...as any working artist already knows, it's been put on hold indefinitely. Spring and early summer art shows that he relies on for sales have been cancelled or rescheduled; late summer and fall shows that haven't yet postponed remain an uncomfortable unknown. Scheduled projects are now on hold, and, though he is finishing up a couple of previous commissions, he anticipates future commission work to dry up for some time. He, like so many others, is in a holding pattern, and he doesn't expect his career to return to anything remotely resembling "normal" until there is a readily available vaccine—12 to 18 months from now.

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