COVID-19 and Collaborative Projects for Life-Saving

By Roy Schestowitz
Created 29/03/2020 - 10:19pm

Pop-Up Open Source Medical Hardware Projects Won’t Stop Coronavirus, But Might Be Useful Anyway. Here's why. [3]

MIT resuscitates 10-year-old design to create open source respirator [4]

An MIT design has resulted in the E-Vent respirator-design that can be brought online quickly using available valve bag masks used by EMTs and others in emergency situations to ease breathing problems. The advantage of the design, says the MIT team, is that the masks are approved components. The MIT design automatically squeezes the respirator bag.

NYU makes face shield design for healthcare workers that can be built in under a minute available to all [5]

New York University is among the many academic, private and public institutions doing what it can to address the need for personal protective equipment (PPE) among healthcare workers across the world. The school worked quickly to develop an open-source face-shield design, and is now offering that design freely to any and all in order to help scale manufacturing to meet needs.

Face shields are a key piece of equipment for front-line healthcare workers operating in close contact with COVID-19 patients. They’re essentially plastic, transparent masks that extend fully to cover a wearer’s face. These are to be used in tandem with N95 and surgical masks,
and can protect a healthcare professional from exposure to droplets containing the virus expelled by patients when they cough or sneeze.

- EPAM Introduces COVID-19 Mask For Medical Professionals Designed By EPAM Continuum[6]

- 'It's one small piece': Area companies develop open-source design for medical face shields, donate 10,000 to KU Health [7]

- 3D Printers Being Recruited For Health Care Workers' PPE [8]

- In progress: Rapid deployment of open-source, low-cost ventilator design [9]

  One of the most pressing shortages facing hospitals during the Covid-19 emergency is a lack of ventilators. These machines can keep patients breathing when they no longer can on their own, and they can cost around $30,000 each. Now, a rapidly assembled volunteer team of engineers, physicians, computer scientists, and others, centered at MIT, is working to implement a safe, inexpensive alternative for emergency use, which could be built quickly around the world.

- Hundreds of Volunteers Are Working to Create Open-Source Ventilators to Fight Coronavirus[10]

  Coronavirus attacks the lungs. In some cases, your throat and chest may rattle from the effort just to breathe. It's fast become common knowledge that ventilators can be a life-saving intervention and that there simply aren't enough of the machines to meet the growing number of patients. As a last resort, some hospitals are deploying the experimental technique of hooking two patients up to one unit.


  Folding@Home, a crowdsourced computing project from scientists at Stanford University lets people across world join computing capabilities of their personal computers to form a crowdsourced supercomputer. Folding@Home then carries out research, mostly on diseases
like Cancer, Parkinson's, Alzheimer's, and now COVID-19. With the coronavirus outbreak, Folding@Home comes as a platform that will allow people across the world to play their part. By lending computing powers from their PCs, people can help scientists speed up their research as they have shifted their focus towards coming up with a cure for the deadly pandemic that has sent the whole world in a lockdown.

- **Thanks to KC?s Dimensional Innovations, you can now download designs for an open source face shield** [12]

  The simple, all-plastic shield created by InStore Design Display and in collaboration with DI, The Center for Design Research at the University of Kansas, and The University of Kansas Health System consists of two interlocking plastic parts cut from PETG, a clear plastic sheet material, that provides significant durability, chemical resistance and excellent formability for manufacturing.

- **The first medically-reviewed open source PPE design is here!** [13]

- **This open source ventilator hackathon could help fight the coronavirus** [14]

  Infineon engineers developed a 3D printed lung ventilator to help address the shortage of ventilators due to the COVID-19 pandemic.

  The German federal government held a hackathon called #WirvsVirus (We against the virus?) where 42,000 people met to find solutions to challenges from the coronavirus. Infineon engineers, led by Mahmoud Ismail who has a doctorate in lung mechanics, submitted a 3D print design and a design for the electronics and algorithms to develop and open-source lung ventilator.

- **UF researchers design low-cost DIY ventilator** [15]

- **UF researchers design low-cost DIY ventilator** [16]

- **VU engineers and VUMC doctors team up for open-source ventilator design** [17]
As COVID-19 continues to push unprecedented challenges on medical communities, one of the most pressing threats for hospital staff across the country is a dwindling supply of ventilators.

Now, an interdisciplinary team of Vanderbilt University and Vanderbilt University Medical Center faculty is taking on the challenge by way of a fabricated, open-source ventilator design. Led on the Vanderbilt side by engineers Kevin Galloway, research assistant professor of mechanical engineering and director of making at the Wond’ry, and Robert Webster, Richard A. Schroeder Professor of Mechanical Engineering, the team is currently on “version two” of the ventilator prototype and hopes to soon move into the final prototype phase before manufacturing.

A professor of anesthesiology at the University of Florida is building an "open source" ventilator out of common items from hardware stores, in an effort to meet the desperately high demand internationally due to the coronavirus pandemic.

Decades ago, Dr. Samsun Lampotang helped build a minimal-transport ventilator while he was a mechanical engineering student at UF. That ventilator became a commercial success, the university says.

John Strupat wants to make his design open source so it can be used by 'anyone from anywhere'

Canadian startup DarwinAI and researchers from the University of Waterloo are open-sourcing COVID-Net, a convolutional neural network that aims to detect COVID-19 in X-ray imagery. In response to the pandemic, a global community of health care and AI researchers have produced a number of AI systems for identifying COVID-19 in CT scans.

[Though it is by] no means a production-ready solution, the hope is that the open access COVID-Net, along with the description on constructing the open source COVIDx data set, will be leveraged and built upon by both researchers and citizen data scientists alike to
accelerate the development of highly accurate yet practical deep learning solutions for detecting COVID-19 cases and accelerate treatment of those who need it the most, the paper reads.

- **3D Printing for COVID-19, Part Three: Open Source Ventilators** [21]

  Since the initial news flurry about how a network of Italian 3D printing users came to the rescue of a hospital on the front lines of the COVID-19 outbreak in Northern Italy, a number of new stories have come out about how additive manufacturing (AM) is or could be used to help medical workers. Here we will break down just some of the news that has made headlines recently.

  Due to the overall inundation faced by medical workers on the frontlines of the coronavirus outbreak, the store of medical supplies doesn’t meet the demand. As most readers will know at this point, the two biggest medical items currently lacking (aside from medications and COVID-19 tests) are ventilators and masks. In part this lack of supply can be attributed to bureaucratic mismanagement, but even in locations that are well prepared for such an outbreak, there just aren’t enough masks and ventilators to go around.

- **Agencies Release Free COVID-19 Open-Source Assets** [22]

  Agencies are lending their talents and resources to help make a difference in the COVID-19 pandemic with the release of open source assets.

  MullenLowe is launching a public-facing version of its proprietary conversation-analysis tool, Speedbag, to help industry professionals navigate this new landscape. The tool parses the social conversation around COVID-19 as it relates to key sectors (including alcohol, automotive, construction, finance, grocery, health and wellness, healthcare, the US military, QSR, technology and travel). New categories are being added on an ongoing basis.

- **Engineers Made a DIY Face Shield. Now It's Helping Doctors** [23]

  EARLY LAST WEEK, Lennon Rodgers, director of the Engineering Design Innovation Lab at University of Wisconsin-Madison, got an urgent email from the university’s hospital. Could his lab make 1,000 face shields to protect staff testing and treating Covid-19 patients? The hospital’s usual suppliers were out of stock, due to the spike in demand prompted by the coronavirus pandemic.
After putting his kids to bed, Rodgers went to Home Depot and a local craft store and grabbed supplies, including transparent plastic and a couple of foam mannequin heads. Then he made a hasty prototype at the UW maker space by adapting a construction visor and presented it to his wife, an anesthesiologist. "I was really proud of it, but she put it on and said 'This is way too heavy.'" Rodgers recalls.

- **Coronavirus outbreak: MIT team working on an open-source, low-cost design of ventilators**[24]

  COVID-19: The team, which consists of only volunteers, has been working without any funding and is working anonymously so that people do not call them with inquiries about the project.

- **Coronavirus: University of Florida researchers design ventilator from hardware store items**[25]

  Here’s a new project for do-it-yourself lovers. It could save someone’s life.

  A professor of anesthesiology at the University of Florida is building an open-source ventilator out of items consumers can buy from hardware stores as a way to meet the demand for ventilators since the outbreak of the coronavirus pandemic, WCJB reported. The cost? Anywhere from $125 to $150.

- **10 Covid-busting designs: spraying drones, fever helmets and anti-virus snoods**[26]

  Designers, engineers and programmers have heard the klaxon call. The last few weeks have seen a wave of ingenuity unleashed, with both garden-shed tinkerers and high-tech manufacturers scrambling to develop things that will combat the spread of Covid-19.

  Many of their innovations raise as many questions as they answer, though. Could 3D printing now finally come into its own, with access to open-source, downloadable designs for medical parts? If so, will intellectual property infringements be waived, or will altruistic hacktivists still face costly lawsuits? Could mobile phone tracking map the spread of infection like never before, keeping people away from virus hotspots? If so, might governments use the pandemic as an excuse to ramp up surveillance measures post-crisis?

- **Kerala uses open source public utility to fight COVID-19**[27]
The otherwise serene, calm and beautiful southern state of Kerala known for its palm-lined beaches and backwaters, has grabbed the headlines for some not so healthy news off late. The state popularly called God’s own country is the worst hit state by the Novel Coronavirus in India, reporting 95 cases till 24.03.2020 at 08:45 AM (as per the Ministry of Health and Family Welfare). It is estimated that 50% of Kerala’s population (about 16.5 million) may catch the corona virus at some stage.

**CURA: an open-source design for emergency COVID-19 hospitals**[28]

In the last weeks, hospitals in the countries most affected by COVID-19, from China to Italy, Spain to the USA, have been struggling to increase their ICU capacity to admit a growing number of patients with severe respiratory diseases, in need of ventilators. Whatever the evolution of this pandemic, it is expected that more ICUs will be needed internationally in the next few months. CURA aims to improve the efficiency of existing solutions in the design of field hospitals, tailoring them to the current pandemic.

**CURA is the open-source project that reuses containers to house medical units**[29]

Guided by Carlo Ratti, an interdisciplinary team of researchers in continuous expansion provide a not-profit alternative to the tents currently used in field hospitals during the medical emergency.

**Open-source CURA to turn shipping containers into emergency COVID-19 units**[30]

Hospitals overwhelmed by the COVID-19 pandemic could find a much-needed capacity lifeline in retrofitted shipping containers. An international task force, comprised of designers, engineers, medical professionals and military experts, has unveiled designs to convert shipping containers into plug-in Intensive-Care Pods as part of an open-source design dubbed CURA (Connected Units for Respiratory Ailments). The first CURA biocontainment pod prototype is currently being built in Milan, Italy.

**Squint/Opera presents CURA: an open-source design for emergency COVID-19 hospitals**[31]

Squint/Opera, the creative digital studio and consultancy, presents CURA (Connected Units for Respiratory Ailments), an open-source design for emergency coronavirus (COVID-19) hospitals.
The idea is to create extra space for hospitals and medical facilities which are under pressure due to the pandemic. The use of shipping containers means that they are fast to mount and safe to use as isolation wards. CURA could be quickly deployed to cities around the world, allowing medical professionals to respond fast to the spread of the virus despite lack of hospital space.

Researchers use open-source software to improve COVID-19 screening with AI

Researchers at the University of Waterloo have partnered with an artificial intelligence (AI) startup on a project that aims to use AI to improve COVID-19 screening.

The Waterloo research team publicly released AI software that can better detect infections from chest x-rays and is looking to enlist expertise from around the world to aid in the project.

Ireland: Researchers Create Open-Source 3D Printer for Neurophysiology

Researchers Thomas Campbell and James F.X. Jones, both of the School of Medicine, University College Dublin, Ireland, have created a new 3D printer for the medical field, detailing their work in the recently published "Design and implementation of a low cost, modular, adaptable and open-source XYZ positioning system for neurophysiology."

With the integration of the Raspberry Pi 3, the authors were also able to incorporate the Open Computer Vision Library (OpenCV) stating that feature is what makes the system unique in comparison to other XYZ positioning systems. The open-source machine learning software library is used with automated movement, and the creators expect it to transform the exploration of mechanotransduction, the method for sensory neurons to change a mechanical stimulus to an electrical signal.

An open-source respirator for 40 Euros - from a 3D printer

Ventilaid is an unusual project straight out of Poland and just in time for the COVID crisis19: a team of engineers has developed and made available free of charge on the Internet a breathing apparatus that can be printed with a 3D printer for the modest sum of 40 euros.

The project uses inexpensive and widely available components. It could save the lives of thousands of people in places where access to such devices is difficult. The beta version of the
device is ready to be deployed, while work on a second prototype is almost complete. At this stage, the support of specialists like doctors and engineers is necessary. Those who want to help can apply directly via the project’s website.

**Hospitals turn to crowdsourcing and 3D printing amid equipment shortages** [35]

Earlier this month, the CEO of an Italian 3D-printing startup learned that a hospital near the center of the coronavirus outbreak in Italy was running short on a small but crucial component: the valves that connect respirators to oxygen masks.

The company that makes the valves couldn't keep up with the demand, and doctors were in search of a solution.

"When we heard about the shortage, we got in touch with the hospital immediately. We printed some prototypes. The hospital tested them and told us they worked," the CEO, Cristian Fracassi, told Reuters. "So we printed 100 valves, and I delivered them personally."

**MIT Ventilator Designed With Common Manual Resuscitator; Submitted For FDA Testing** [36]

In many parts of the world the COVID-19 pandemic is causing shortages in hospital space, staff, medical supplies, and equipment. Severe cases may require breathing support, but there are only so many ventilators available. With that in mind, MIT is working on FDA approval of an emergency ventilator system (E-Vent). They have submitted the design to the FDA for fast track review. The project is open source, so once they have approval the team will release all the data needed to replicate it.

**Techie collective to whip together official WHO-backed COVID-19 app within a week to meet 'urgent, global need'** [37]

The app, aimed at "location-based containment, triage & response", is described here. People involved include US-based Dr Daniel Kraft, who describes himself as a "physician/scientist and innovator"; Bruno Bowden, ex-Google; and Dean Hachamovitch, formerly general manager for Internet Explorer. Three WHO representatives – Peter Singer (special advisor), Ray Chambers (global ambassador) and Sameer Pujari (digital health and innovation) – are also listed on the team, which calls itself the COVID App Collective.

**COVID-19 response: North Junior High teacher uses 3D printer to make N95 masks** [38]
When health care workers sounded the alarm about a serious shortage of N95 masks to fight the novel coronavirus pandemic, people across the state and country started sewing handmade medical masks.

A St. Cloud school district teacher has also taken up the initiative but in a more high-tech way: printing face masks on a 3D printer.

"I have the materials. I have a little bit of knowledge. I thought, can I attempt this?" said Rick Wilson, who teaches engineering and technology at North Junior High. "And (the district was) great about it."

---

**Coronavirus: Turning windscreen wiper motors into emergency ventilators**

A group of Spanish innovators is attempting to alleviate the Covid-19 ventilator crisis by developing an ultra-simple machine that uses a car windscreen-wiper motor to turn a manual resuscitation bag into automated breathing aid.

The machine can be made in four hours by an untrained person, using simple materials such as wood, acrylic or aluminium. ?You don?t need special tools. All you need is a saw,? says Lluís Rovira Leranoz, a Barcelona-based robotics maker at prototyping company Protofy, one of the leads on the OxyGEN project.

---

**Anomali Offers Open Source Threat Intelligence to Fight COVID-19-themed Cyber Attacks**

In response to the growing threat of Coronavirus (COVID-19)-themed cyberattacks, Anomali, a leader in intelligence-driven cybersecurity solutions, today publicly released over 6,000 open source Indicators of Compromise (IOCs) that were collected, curated, and validated by Anomali researchers. In addition, Anomali has also released a related Threat Bulletin providing a narrative description of the attacks being seen. This actionable threat intelligence, which identifies COVID-19-related threats and the malicious actors looking to capitalize on the pandemic, is available now for organizations to immediately feed into their cybersecurity technologies to rapidly and proactively block the identified threats.

---

**Lynn student facilitates open-source community to combat COVID-19**

As the World Health Organization named COVID-19 a pandemic, the global need for medical equipment and fast, effective supply chain management became apparent.

That?s when Ja'dan Johnson, Lynn University class of 2021 and Watson Scholar, joined MegaBots Founder Gui Cavalcanti to create Open Source COVID-19 Medical Supplies
OSCMS launched as a Facebook group March 12 and grew to a community of over 40,000 in less than two weeks. The group’s mission is to mobilize makers and fabricators around the world to generate open-source plans, build a library of medical supply requirements and designs, and create distributable plans for organizing effective local responses to medical supply chain interruption.

- **A 3D-printed ventilator prototype from an open-source project** [42]

  A 3D-printed #ventilator prototype from an open-source project

  A research group including the Irish Colin Keogh and Gui Calavanti, CEO and co-founder of Breeze Automation, studied in less than a week the prototype of a ventilator made by 3D parts and other easily available low-cost materials. The project is open-source. The research team is also focusing on other projects for the rapid and cost-effective manufacture of products required for this health emergency, such as masks or other equipment needed by medical personnel.

- **Respirators From 3D Printers: How The Spanish Maker Community Fights Covid-19 From Their Living Rooms** [43]

  As hospitals prepare to take in more patients with the coronavirus, they are in acute need of life-saving equipment: ventilators that help patients breathe, face masks and protective gear. The problem is, there aren’t enough of them. And there’s not enough manufacturing capacity to easily hike up production.

  This is where the do-it-yourself (DIY) community in Spain comes in: Under the name Coronavirus Makers, over the last few weeks, thousands of citizens have been connecting online to fight against the shortage of life-saving equipment. From their living rooms and basements, they tinker with ideas and designs, share them, build prototypes and print them out with 3-D printers.

  Ashoka Fellow David Cuartielles and César García, both innovators in the open source space, are helping to curate the Coronavirus Makers Forum that they set up on March 13 as the crisis was getting worse. The Forum takes a bird’s eye view of all the community’s activities, connects members, extracts insights, and builds bridges to health care institutions and experts to speed up solutions that could save lives.
Could a bunch of internet denizens give us more ventilators? [44]


Open Source Face Shield to Help Block COVID-19 [46]

While face masks that block particles from coming into the lungs via the nose and mouth are important to prevent the spread of COVID-19, the eyes and the rest of the face can also be a pathway for the disease to find its way into the body.

There are now a number of projects around the world, big and small, manufacturing breathing masks as fast as they can. A group of designers and engineers in New York City with access to a machine shop has designed a face shield that can be quickly, cheaply, and easily manufactured using simple tools and supplies available in local hardware stores.

Details are posted online on how to build new masks, including design files, and you can also help the organization by joining their distribution efforts. All at this link?

Source URL: [http://www.tuxmachines.org/node/135761](http://www.tuxmachines.org/node/135761)

Links:
[4] [https://gfxspeak.com/2020/03/26/resuscitates-design-respirator/](https://gfxspeak.com/2020/03/26/resuscitates-design-respirator/)
[10] [https://onezero.medium.com/hundreds-of-volunteers-are-working-to-create-open-source-ventilators-to-fight-coronavirus-a10a5c719c1f](https://onezero.medium.com/hundreds-of-volunteers-are-working-to-create-open-source-ventilators-to-fight-coronavirus-a10a5c719c1f)
[12] [https://www.startlandnews.com/2020/03/dimensional-innovations-face-shield/](https://www.startlandnews.com/2020/03/dimensional-innovations-face-shield/)