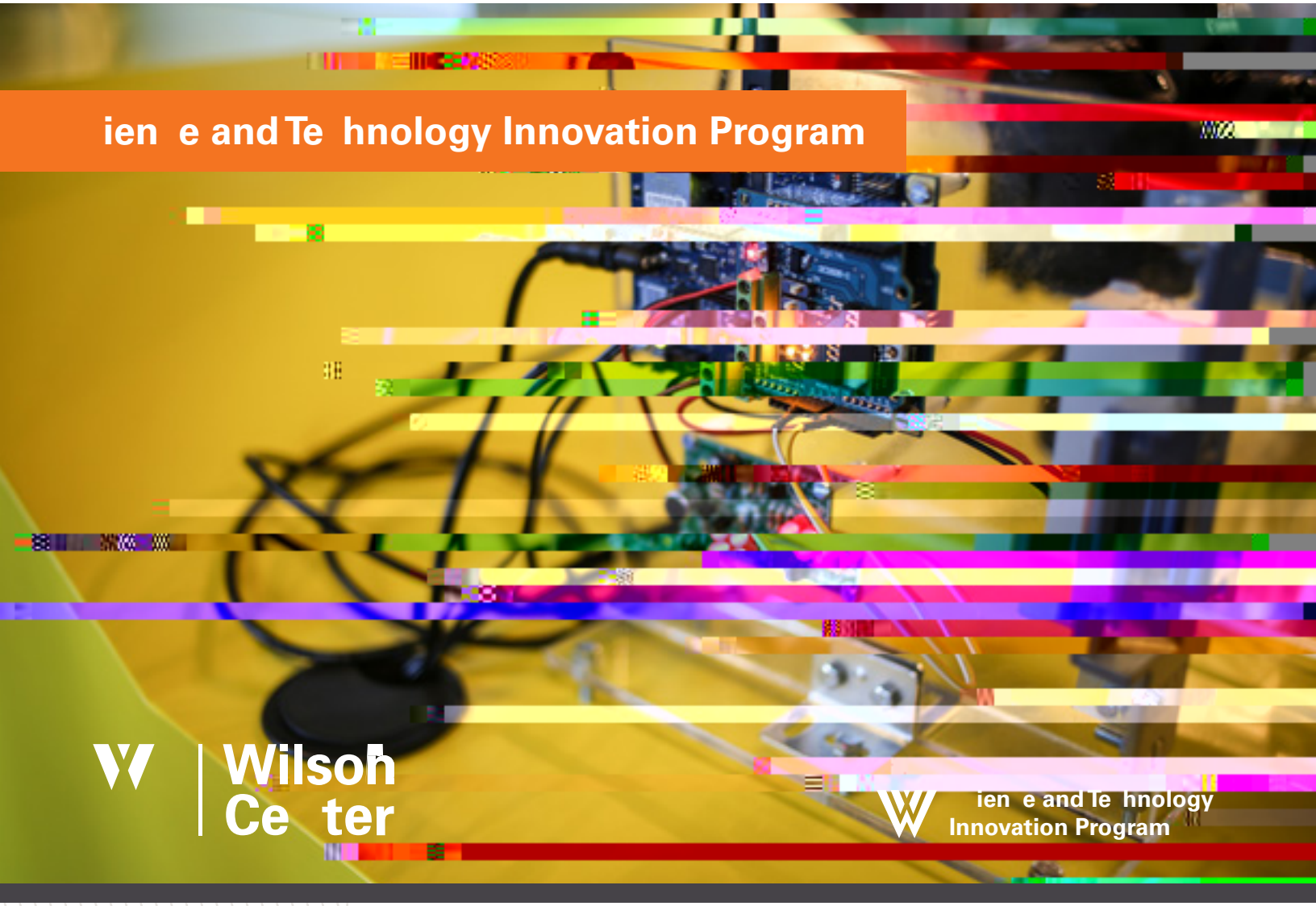

Authors

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Open Hardware:

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April 2021

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Conveners

Workshop Contributors

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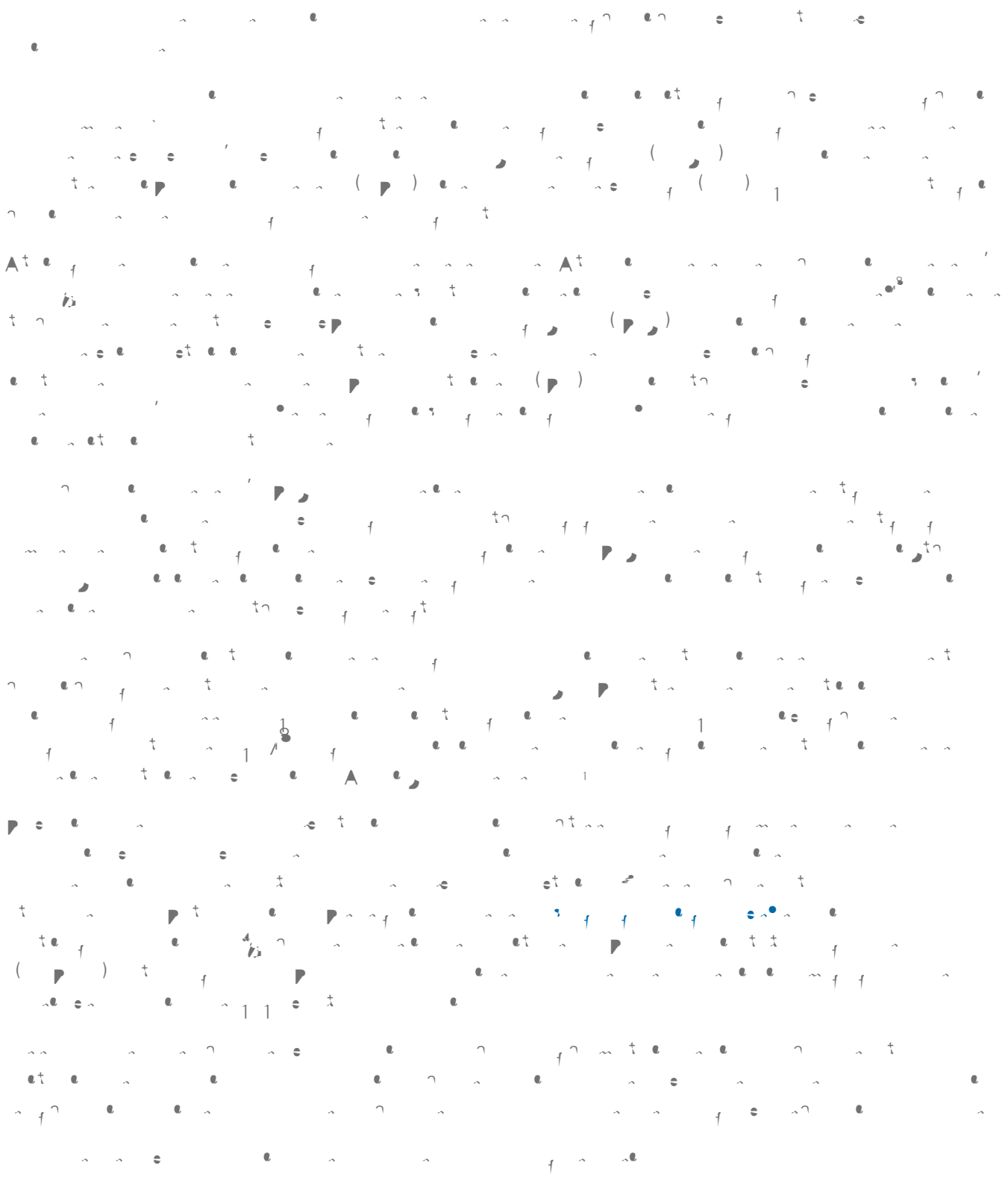
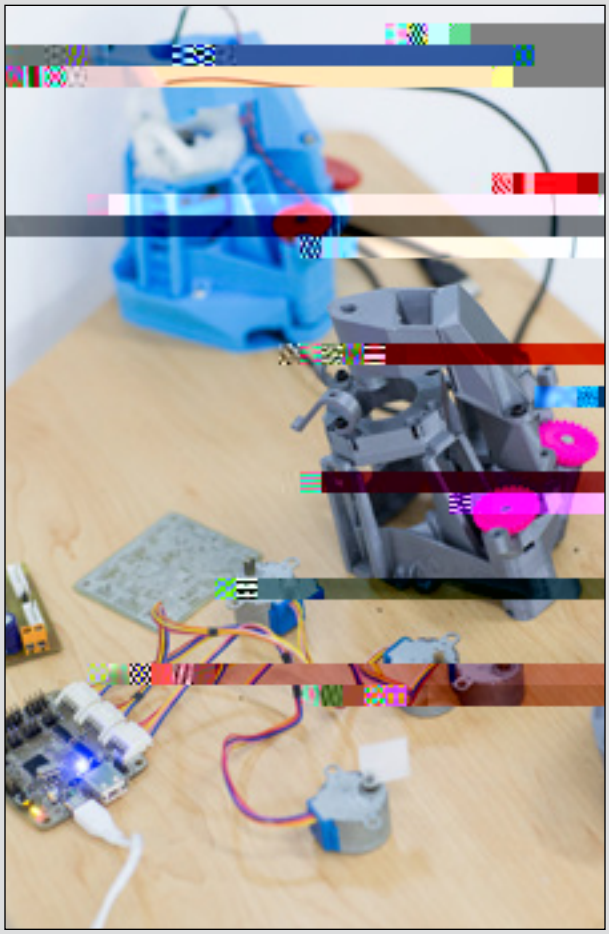
ien e is not moving fast enough

all hands on deck

Ba :A W a B a a P A





OpenSPINMicroscopy

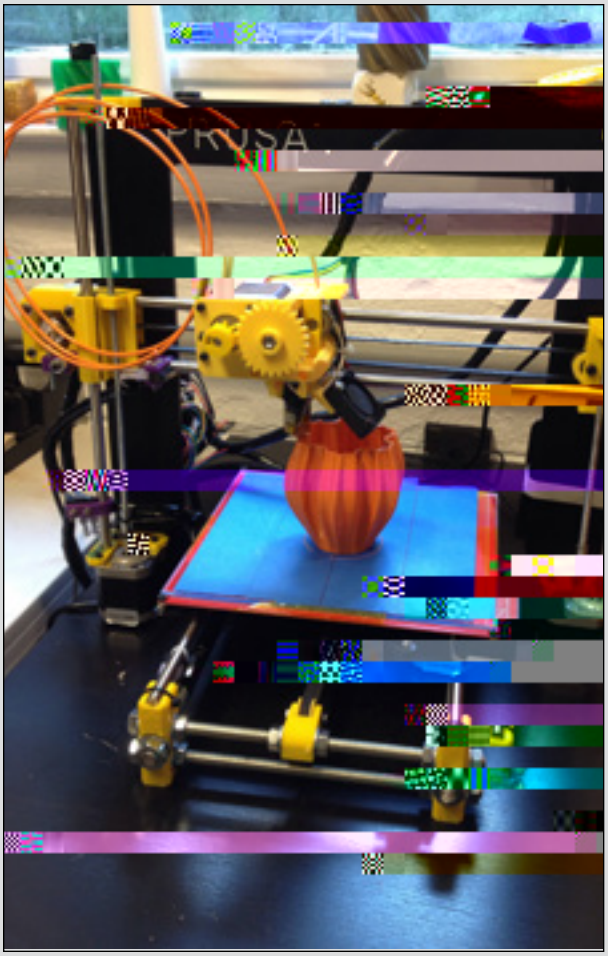


Image: *"Prusa i3 - RepRap 3D printer"* by *jabella* is licensed under *CC BY 2.0*

"RepRap 3D printers accelerate scientific progress through bespoke mechanical components for developing tool libraries for optics or syringe pumps as well as become scientific tools in the form of microfluidics prototypers, chemical handling systems and 3-D microscopes."[23,24,25,26]

C i Hu -C D i

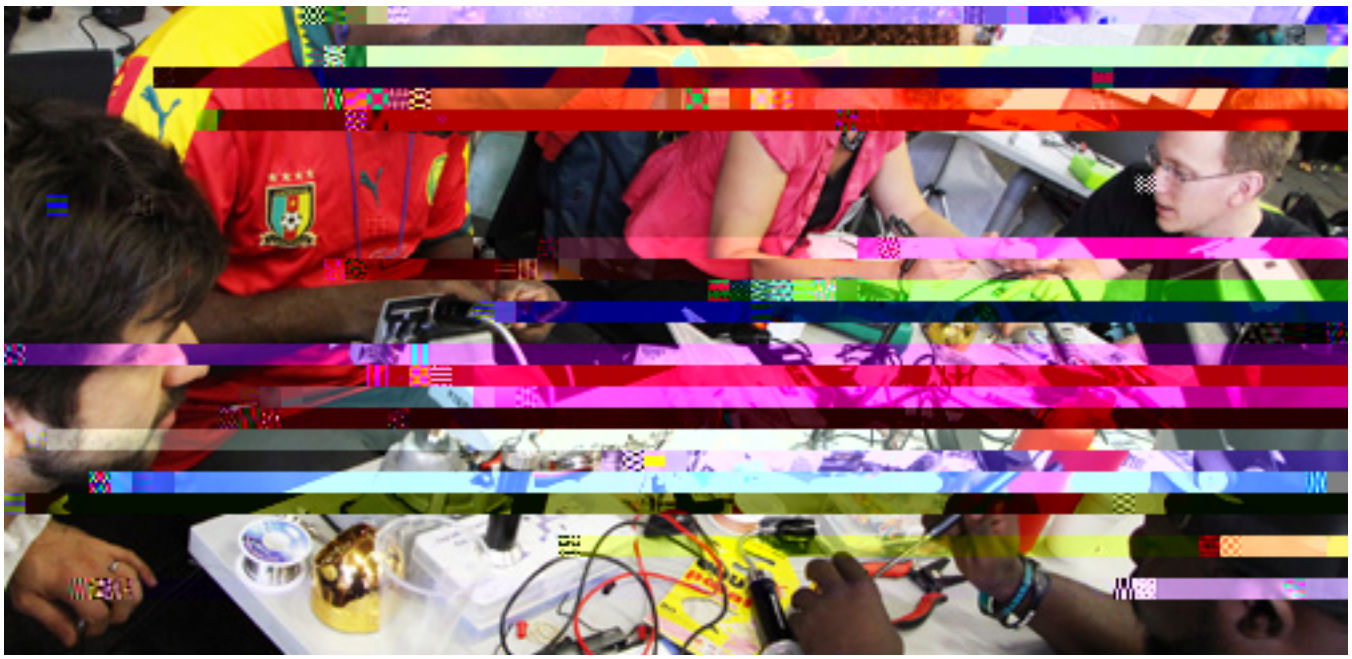


Image: IMG_0968 by GOSH Community is licensed under CC0 10 Universal

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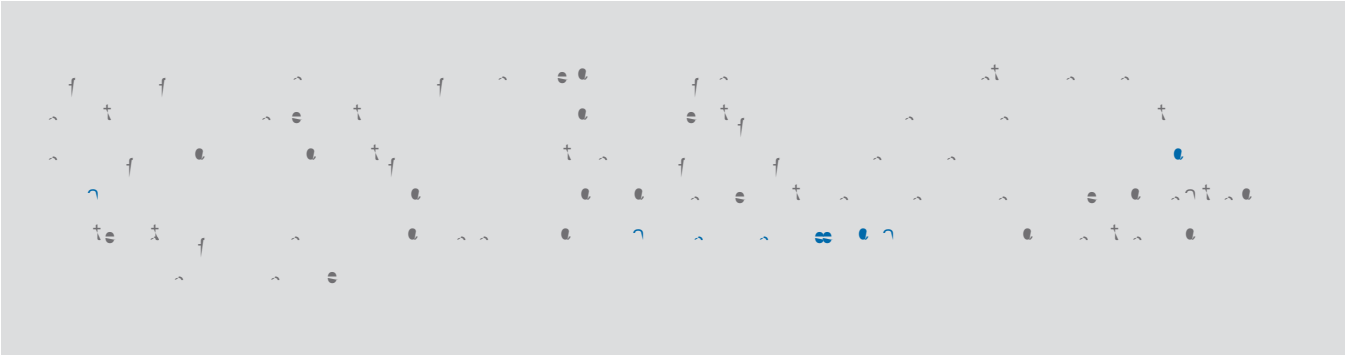


O Ha a L S a S

“[Open hardware] allows whole communities to rapidly learn, reuse and modify tools to address new research challenges or urgent environmental and humanitarian disasters.”

Open hardware provides a better chance for scientific reproducibility

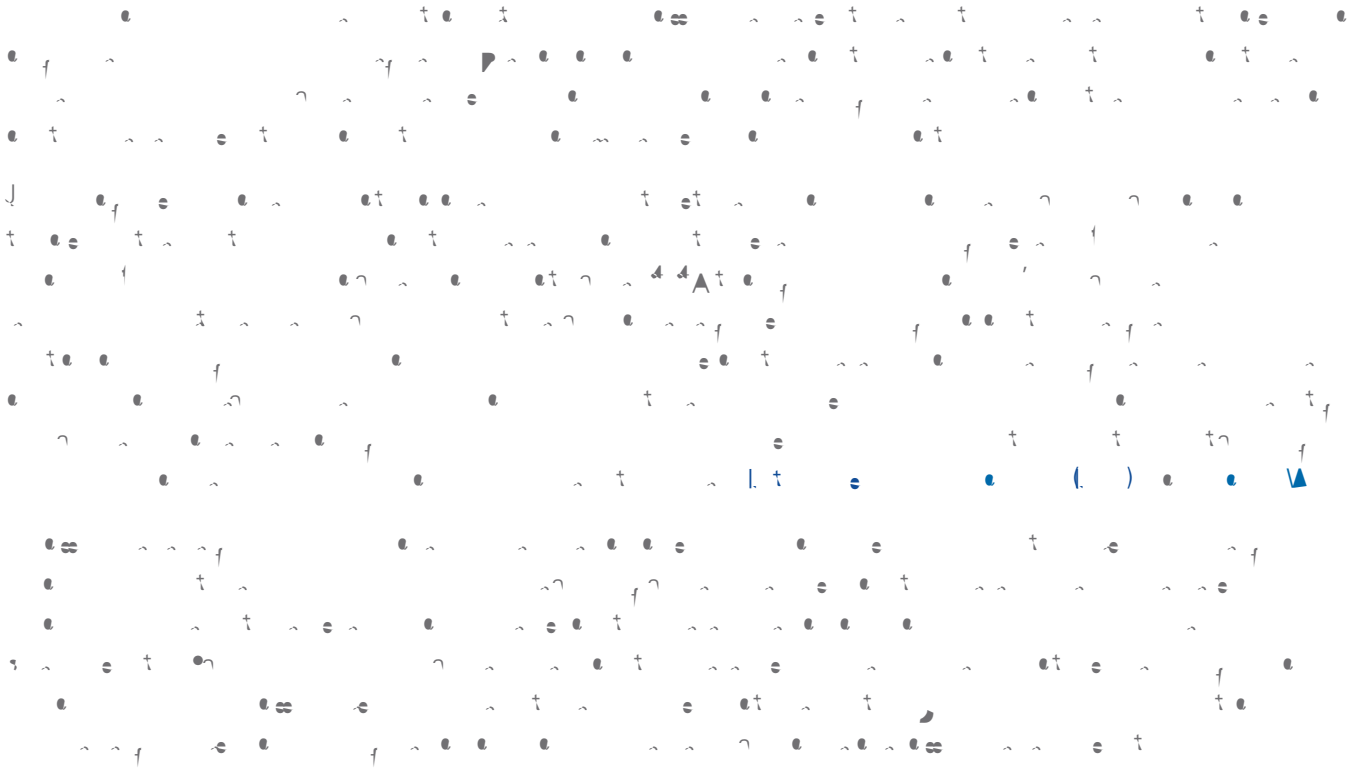
O Ha a S B a M A STEM E a

Image: "K-12 STEM Education" by Idaho National Laboratory is licensed under CC BY 2.0

O Ha a B Ca a I a Ma a

"The [open hardware] network has revealed a capacity for distributed innovation and creativity that is core to the original and cherished American entrepreneurial spirit."

Open source hardware can unleash the core American spirit of creativity and innovation



I i ui Ch C i Sh i O H

Instead, "research organizations [should] recognize, prioritize, and actively support this shared public infrastructure in the long term"[41]

Building support for local production capacity through small-batch manufacturing and production can significantly reduce these barriers and diversify supply chains.

CHALLENGE: TODAY WITH SAPHANA

"We are facing wicked problems related to energy, the environment, and inequality. The complexity of these problems dictates the complexity of the science we need to address them. We do not have time to waste. If scientists are encouraged to work together on their shared infrastructure, it will be easier for them to work together on our shared planet. Open source hardware is one way to win some time."

Open hardware accelerates the process of science and addressing challenges

R

( ) *Definition (English)*

OSHWA.

WIRED

Open hardware accelerates the process of science and addressing challenges.

Open Source Science: Public Money, Public Hardware.

Science and Public Policy, 43( )

Issues in Science and Technology, 34( )

Increasing Access to the Results of Federally Funded Scientific Research

Addressing Societal and Scientific Challenges through Citizen Science and Crowdsourcing.

microscopy, 264( ) .

PLoS biology, 15( ) .

Nature methods, 4( ) .

PloS one, 9( ) .

Frontiers in cellular neuroscience, 8 .

Wilson International Center for Scholars.

PloS one, 8( ) .

PloS one, 9( ) .

Journal of laboratory automation, 21( )

) *Open hardware is economically efficient and generates a massive return on public investment*

Open Source Science: Public Money, Public Hardware.

HardwareX, 8

Open hardware is economically efficient

Open Source Science: Public Money, Public Hardware.

) *Open Science Hardware contributes to aligning the research agenda with societal needs.*

Journal of Radiological Protection, 36( )

Open source hardware can unleash the core American spirit of creativity and innovation.

The Open Hardware Community Responds to COVID-19 Shortages.

Woodrow Wilson International Center for Scholars.

Gathering for Open Science Hardware.

Lessons from 17th Century Scientific Experiments: Data Commons Need Open Hardware

Open hardware provides a better chance for scientific reproducibility

Open hardware provides a better chance for scientific reproducibility

The best public investment in R&D? Think open.

Journal of Open Hardware, 1( )

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