OPEN ENGINEERING

Devin R. Berg
www.devinberg.com
@devinberg
#openengr

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Who am I?

University of Wisconsin-Stout

Design, robotics, medical devices

Engineering education and practice

WHAT

What is open engineering?

The rules are simple

Make your work accessible

What do you mean accessible?

Accessible is obtainable

Accessible is understandable

Accessible is reproducible

Be as open as you want to be

There is no wrong way to be open

Find the level of open that works for you

There is a community out there willing to help!

Openness is a spectrum.

Preprint or self-archive

Open notebook

WHY

You want to have an impact!

People can't access our work

Many institutions do not have subscriptions

Non-academics can’t understand our work

Motivated individuals can’t recreate our work

Everyone has the right freely to participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits.

UN Universal Declaration of Human Rights, Article 27 section 1

…to aid in diffusing among the people of the United States useful and, practical information…

Morrill Land-Grant Act, 1862; Smith–Lever Act, 1914

Hold paramount the safety, health, and welfare of the public.

NSPE Code of Ethics

Create work that is reproducible

All needed components are available

The workflow can be replicated

You can recreate it 20 years from now

HOW

How to be open

Make your work obtainable

Make your work understandable

Make your work reproducible

To be obtainable

Preprint and self-archive your work

Publish open access

Open up your other artifacts

Preprints...

→ speed up dissemination

→ should be licensed and formatted to facilitate reuse

→ provide a record of priority

→ do not lead to being scooped

→ provide access to scholarly content that would otherwise be lost

DOI: 10.1371/journal.pcbi.1005473

Preprints...

→ do not imply low quality

→ supports the rapid evaluation of controversial results

→ do not typically preclude publication

→ can further inform grant review and academic advancement

→ one size does not fit all

DOI: 10.1371/journal.pcbi.1005473

To be understandable

Think about your audience

Consider preparing a version with more accessible language

Focus on applications/implications

To be reproducible

Use reproducible workflows

Use open and non-proprietary softwares

Provide what others will need

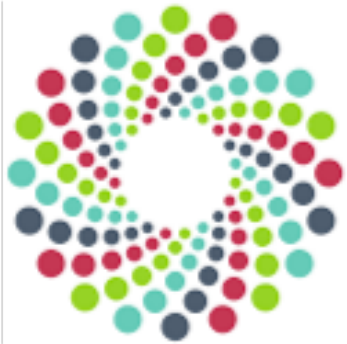
DOI: 10.7717/peerj-cs.112

There are many resources available

Make your work available in the correct format

How will others find it and interact with it?

Use the tools available to us!



figshare

Open Science Framework

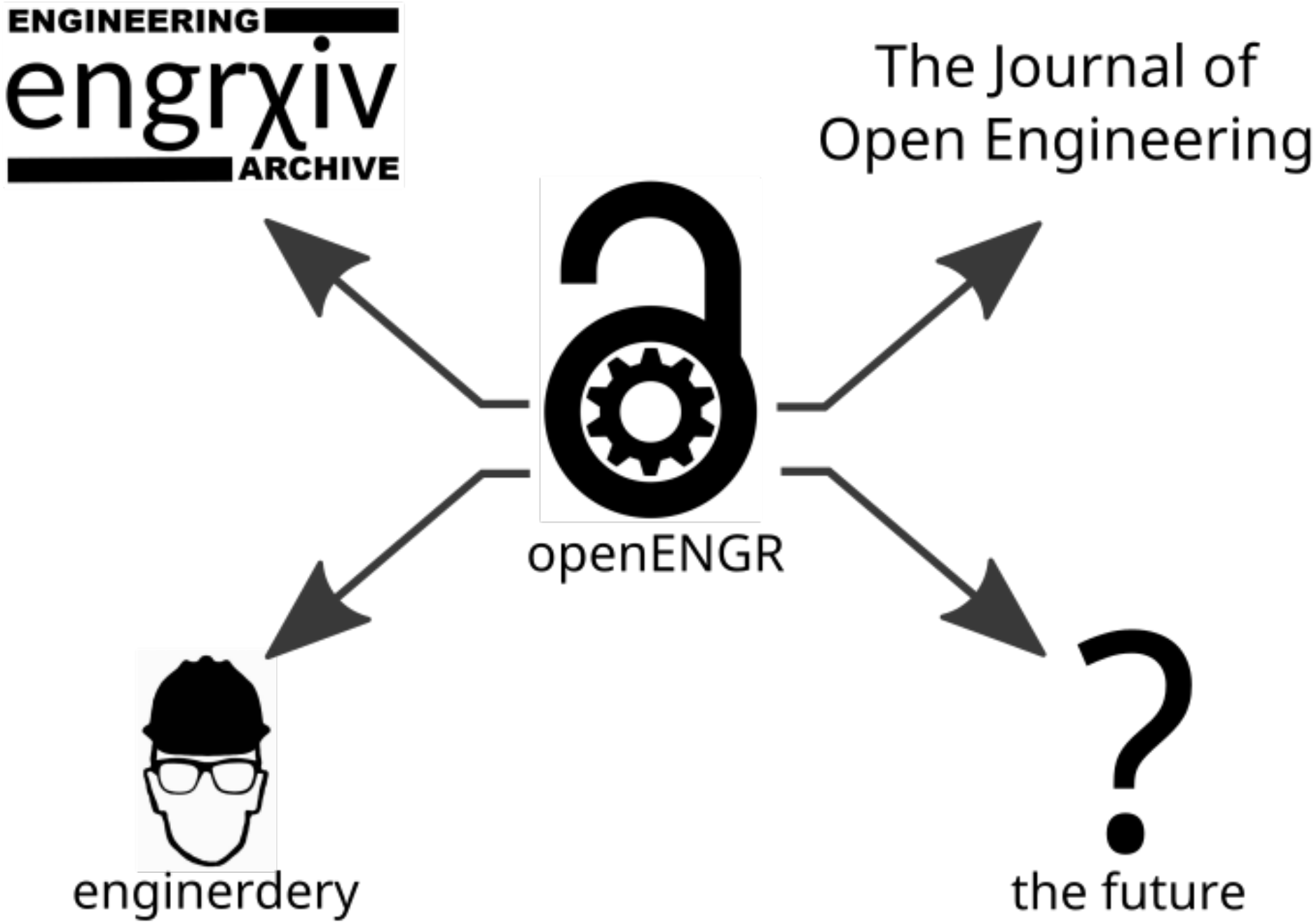
GitHub

jupyter

ORCID

Connecting Research
and Researchers

docker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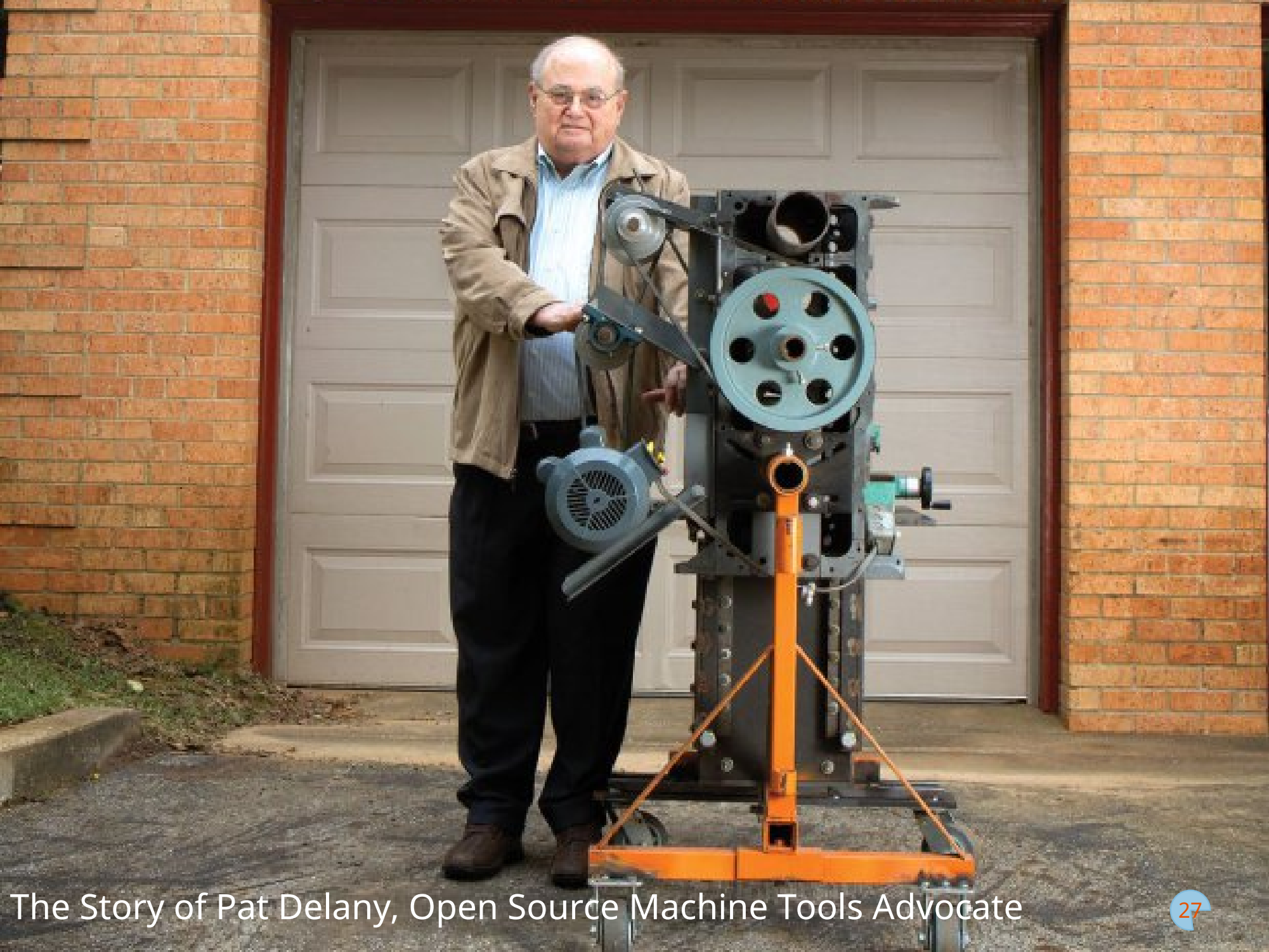
Open Engineering
openENGR
enginerdery
the future

Examples

Open engineering can lead to some amazing outcomes

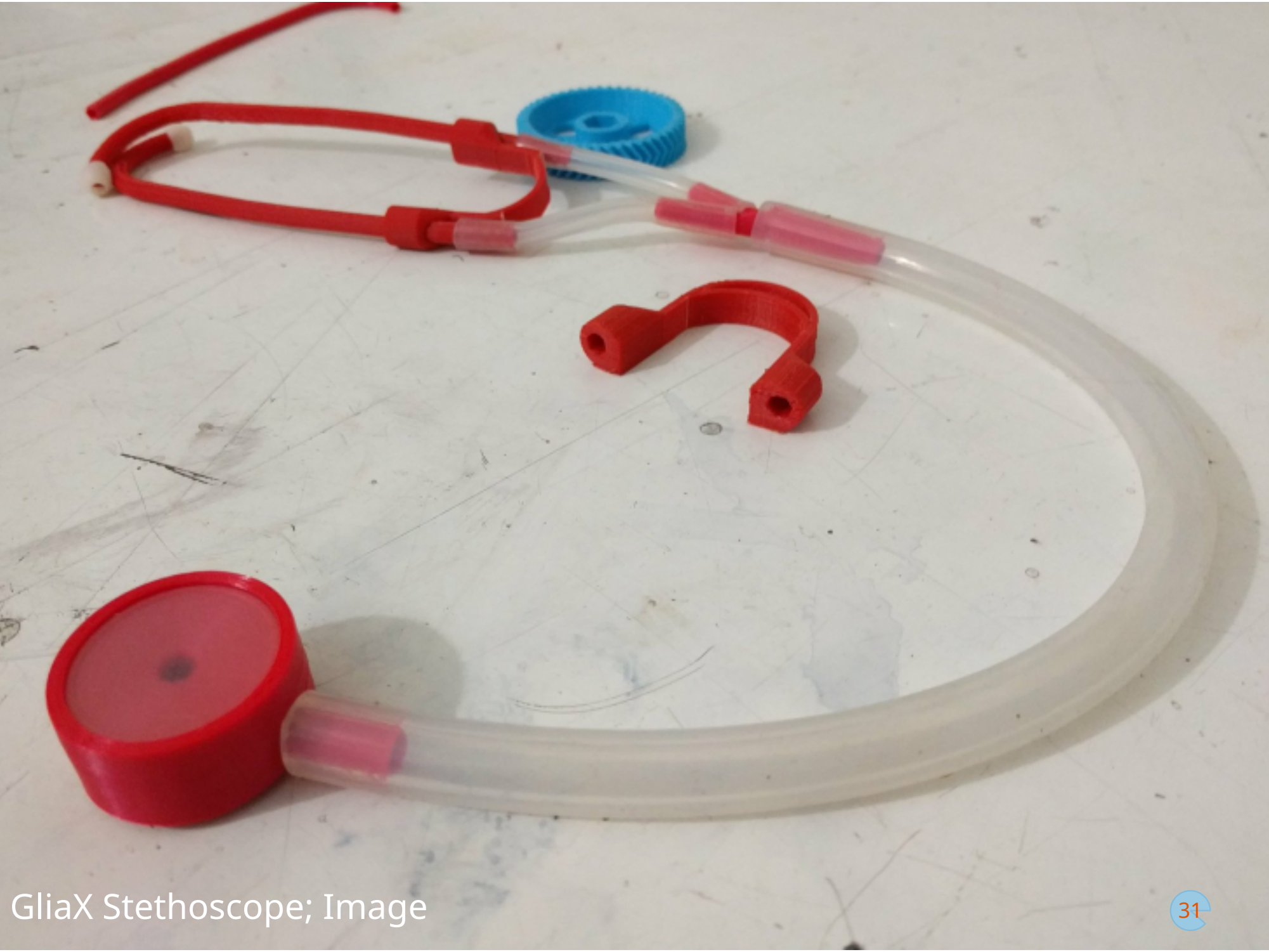
Everything from hardware to software to workflows.



The Story of Pat Delany, Open Source Machine Tools Advocate

Lorena Barba: Reproducible and replicable CFD; Image

Jessica Vechakul: Zambulance



GliaX Stethoscope; Image

Other examples

Fully public grant proposals

Cover letters, research statements, etc.

An open pledge

Barriers to adoption

Need for training and updated workflows

Career reward structures

Pressures of capitalism

But what about patents?[1]

Of course the rules of prior art still apply

In the US, preprinting may help establish your priority

Is patenting your best route to having an impact?

[1] I am not an attorney and this is not legal advise.

Further information

Dr. Kyle Niemeyer on Open Science

Why Open Research with Dr. Erin McKiernan

WhyOpenResearch.org

Thank You!