

The Open Toolchain Foundation

Pieter Hijma and team

#tfom23

INTERFACER.EU

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Behörde für Wirtschaft
und Innovationen

The Open Toolchain Foundation



Open Toolchain
FOUNDATION

open source software ecosystems
for better engineering

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HIWW



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Problem

Engineering in general and
Open Source Hardware in particular
lack an Open Ecosystem of Software Tools.

The Open Toolchain Foundation

Inspiration



What does it take to create an all-inclusive **open source ecosystem** for **engineering and design** as we know it from open source software?

The Open Toolchain Foundation

Inspiration



What does it take to create an all-inclusive **open source ecosystem** for **engineering and design** as we know it from open source software?

Goal



Support a **robust open source ecosystem** that produces **interoperable software toolchains** to enable **collaborative and resilient engineering**.

simply
BETTER
engineering!

Example



Areas



supporting the development
of open source software



promoting the adoption
of open source software

Means to achieve our goals



scholarships

fund development



**community
events**

bring people together



academia

promote open toolchains in
research and education

Accomplishments

- Specification for a legal entity
- Mission / Vision / Corporate Identity
- Consultancy for legal entity
- Virtual Organization under wings of Center for the Cultivation of Technology

Kick-Off Event

29th - 30th July 2022

Kick-Off Event Summary



Curated Database of Software Tools

The screenshot shows the Open Toolchain Foundation website in a browser window. The page title is "Tools" and the subtitle is "Collection of tools and software for the development and production of open-source hardware". The navigation menu includes HOME, ABOUT, ROADMAP, BLOG, RESEARCH, CONTACT, FORUM, and GERMAN. A search bar is located at the top of the tool list. The tools are displayed in a grid of six cards, each with a title, description, supported platforms, license, and links to the website, source code, and community.

Open Toolchain FOUNDATION

HOME ABOUT ROADMAP BLOG RESEARCH CONTACT FORUM GERMAN

Tools

Collection of tools and software for the development and production of open-source hardware

Search...

- Arduino IDE**
 - electronic, IDE, MCU, microcontroller
 - macOS, Linux, Windows
 - AGPL
 - Simple integrated development environment (IDE) to program and compile Arduino programs for use on the board
 - Website Sourcecode Community
- AVRDUDE**
 - electronic, MCU, microcontroller, CLI, AVR
 - macOS, Linux, Windows
 - GPL
 - Utility to download/upload/manipulate the ROM and EEPROM contents of AVR microcontrollers using the in-system programming technique (ISP)
 - Website Sourcecode Community
- Beso**
 - mechanical, FEM, optimization
 - macOS, Linux, Windows
 - GPL
 - Python code for topology optimization using CalculiX FEM solver
 - Website Sourcecode Community
- Bforartists**
 - artwork, 3D, animation
 - macOS, Linux, Windows
 - GPL
 - 3D suite to create CG content for game graphics, pre-rendered movies and stills, Fork of Blender with improved UI
 - Website Sourcecode Community
- Blender**
 - artwork, 3D, animation
 - macOS, Linux, Windows
 - GPL
 - 3D creation suite. It supports the entirety of the 3D pipeline—modeling, rigging, animation, simulation, rendering, compositing and motion tracking, even video editing and game creation
 - Website Sourcecode Community
- blenderCAM**
 - artwork, CAM, 3D, animation
 - macOS, Linux, Windows
 - GPL
 - Add-on for Blender for artistic CAM - Computer aided machining - a g-code generation tool
 - Website Sourcecode Community

The screenshot shows the Open Toolchain Foundation Forum interface. At the top, there's a navigation bar with the logo, "Sign Up", "Log In", and search icons. Below the navigation bar, there are tabs for "all categories", "all tags", "Categories", "Latest", and "Top".

The "Categories" section lists three categories:

- General** (4 topics): Create topics here that don't fit into any other existing category. Sub-category: Introductions.
- Toolchain Discussion** (1 / week): Create topics here to discuss tools in the open source engineering toolchain.
- Toolchain Research** (1 / week): Create topics here to discuss research into the open toolchain.

The "Latest" section lists several topics:

- Introduce yourself!** (27 replies, 7h): Sub-category: Introductions.
- OTFN Hackathon 2023: nimble networks and its open toolchain** (8 replies, 1d): Sub-categories: General, toolchain, nimble.
- Tell us about the tools in your toolchain** (6 replies, 2d): Sub-category: Toolchain Discussion.
- The state of toolchain research** (3 replies, 2d): Sub-category: Toolchain Research.
- Visualization of toolchains** (0 replies, 2d): Sub-categories: Toolchain Research, toolchain.
- Copyright for File Formats** (10 replies, 4d): Sub-category: Toolchain Discussion.
- Sigrok leaderless** (0 replies, 7d): Sub-category: Toolchain Discussion.
- We'll be at FOSDEM** (2 replies, 8d): Sub-category: General.
- Paper on CAD collaboration** (0 replies, 23d): Sub-category: Toolchain Research.
- Announcing the Open Toolchain Hackathon 2023** (3 replies, 25-Jan): Sub-category: General.

A "More" button is located at the bottom right of the topics list.

Software Development Grants

We are currently funding five 6000 Euro projects around FreeCAD:

- Snapping in the Sketcher Workbench (paddle)
- Architectural Modeling (yorik)
- B-Splines in the Sketcher Workbench (jnxd/ONSDEL)
- Coded CAD / OCCI Database, (jmwright, Dave Cowden, Mark van der Net)
- Electromagnetic Simulations, (uwestoehr)

Electromagnetic Simulations

[report] implementation

https://forum.freecad.org/viewtopic.php?t=75888&sid=bd618d6c9a97e5c3c2c3d32e52bee30

by **amjan** - Mon Feb 14, 2023 12:51 pm

Thanks for the prompt reply and the background information.

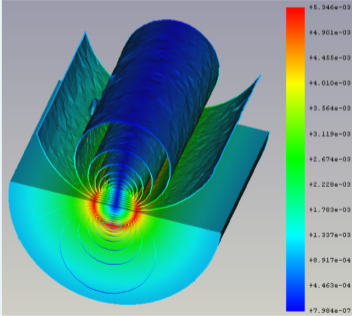
Posts: 6
Joined: Sat Apr 03, 2021 3:30 pm

Re: [report] implementation of electrodynamic

by **uwestoehr** - Tue Feb 14, 2023 5:09 pm

The last project milestone was achieved: There is now a filter to create iso-surfaces and iso-contours.


So e.g. electric/magnetic field lines can be visualized:

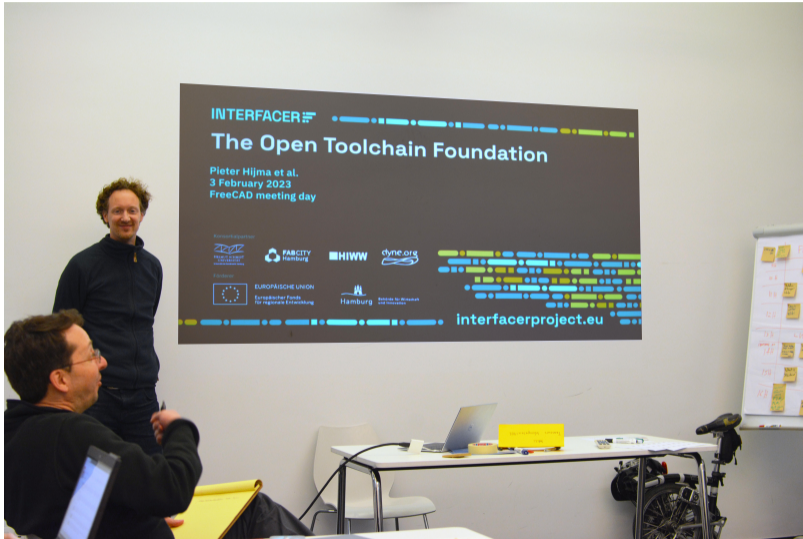


Of course the new filter can be used for any analysis, also for CalculiX results.

- all new features are already properly documented, here is the one for the new filter: https://wiki.freecad.org/FEM_PostFilterContours

uwestoehr
Veteran

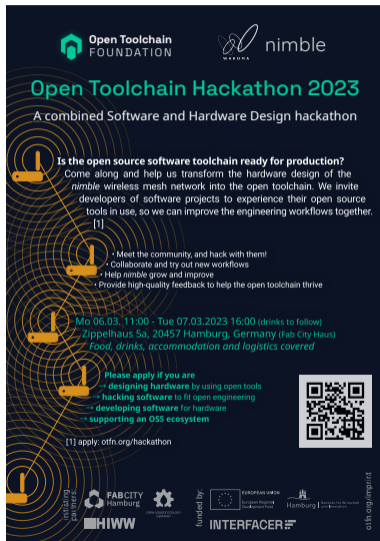
Posts: 4817
Joined: Sun Jan 27, 2019 9:21 am
Location: Germany
Contact: 




Stand at FOSDEM



Organizing Hackathon

The poster features a dark blue background with a pattern of concentric orange circles and lines, resembling a mesh network. Several yellow icons of a 3D printer are scattered across the design. At the top, the logos for Open Toolchain Foundation and nimble are displayed. The main title 'Open Toolchain Hackathon 2023' is in a light blue font, followed by the subtitle 'A combined Software and Hardware Design hackathon'. The central text asks 'Is the open source software toolchain ready for production?' and invites developers to help transform the nimble wireless mesh network. A list of activities includes meeting the community, collaborating on workflows, helping nimble grow, and providing feedback. The event dates and location are specified as Monday 06.03.2023 from 11:00 to Tuesday 07.03.2023 at 16:00, at Zippelhaus 5a in Hamburg. A QR code is provided for registration. At the bottom, logos for Fab City Hamburg, HIWW, and Interfacer are shown, along with funding information from the European Union and Hamburg. The website 'oth.org/imprint' is listed in the bottom right corner.

 **Open Toolchain**
FOUNDATION

 **nimble**

Open Toolchain Hackathon 2023

A combined Software and Hardware Design hackathon

Is the open source software toolchain ready for production?
Come along and help us transform the hardware design of the *nimble* wireless mesh network into the open toolchain. We invite developers of software projects to experience their open source tools in use, so we can improve the engineering workflows together.

[1]

- Meet the community, and hack with them!
- Collaborate and try out new workflows
- Help *nimble* grow and improve
- Provide high-quality feedback to help the open toolchain thrive

Mo 06.03. 11:00 - Tue 07.03.2023 16:00 (drinks to follow)
Zippelhaus 5a, 20457 Hamburg, Germany (Fab City Haus)
Food, drinks, accommodation and logistics covered


Please apply if you are


- designing hardware by using open tools
- hacking software to fit open engineering
- developing software for hardware
- supporting an OSS ecosystem

[1] apply: otfn.org/hackathon

 **FAB CITY**
Hamburg

 **HIWW**

 **EUROPEAN UNION**
European Regional Development Fund

 **Hamburg** | Partner for the North

INTERFACER

otfn.org/imprint

Gratitude

Funding Agencies

- EU ERDF
- Behörde für Wirtschaft und Innovation Hamburg

Political support and interest in Hamburg

Gratitude

Support from INTERFACER

- Prof. Wulfsberg
- Tobias Redlich
- Manuel Moritz
- Anna Moritz

Colleagues from the INTERFACER

- all my colleagues, but in particular:
 - Michel Langhammer
 - Axel Sylvester
 - Wolf Kühr
 - Lasse Burmeister
 - Jacqueline Bertlich
 - JC Mariscal-Melgar
 - Robin Vobruba
 - Mohammed Ohmer

Gratitude

The team!

- Timm
- Martin
- Julian
- Robert
- Basti
- Moritz
- Natalia
- Isa
- Mark
- Michel

Gratitude

- OSEG (Martin Häuer and others)
- IOPA (Andrew Lamb)
- FreeCAD Community (Yorik van Havre, Brad Collette, the developers)
- CadQuery (Dave Cowden)
- Archiyou (Mark van der Net)
- KiCAD Community (Seth Hillbrand)
- Maximilian Voigt (Verbund Offener Werkstätten, Prototype Fund Hardware)
- Appropedia.org (Emilio Velis)
- LibreSolar (Martin Jäger)

Outlook for the Future

- High-quality Open Source **CAD/CAM/CAE software**?
- Open firmwares for machine control?
- Proper **file formats** for design/manufacturing **exchange**?
- A **vibrant community** behind this ecosystem?
- Manufacturing/Engineering **accessible to anyone**?

The Future of Making



Open Toolchain
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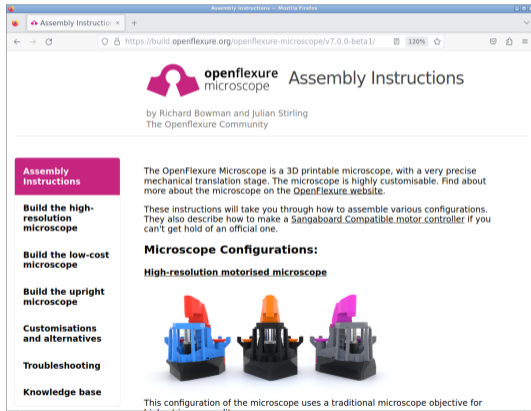
opentoolchain.org

The Future of Making
requires
Open Software Toolchains

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- otfn.org
- info@opentoolchain.org

Julian Stirling

- Expert on Open Toolchains
- Open Flexure Microscope
- GitBuilding



The screenshot shows a web browser window displaying the 'Assembly Instructions' page for the OpenFlexure Microscope. The page features the OpenFlexure Microscope logo, the title 'Assembly Instructions', and the authors 'by Richard Bowman and Julian Stirling, The Openflexure Community'. A sidebar on the left contains a list of links: 'Assembly Instructions', 'Build the high-resolution microscope', 'Build the low-cost microscope', 'Build the upright microscope', 'Customisations and alternatives', 'Troubleshooting', and 'Knowledge base'. The main content area includes an introductory paragraph about the 3D printable microscope, a section for 'Microscope Configurations' with a sub-section for 'High-resolution motorised microscope', and an image of three different microscope configurations (blue, black, and grey) with colored top caps (red, orange, and pink). Below the image, it states: 'This configuration of the microscope uses a traditional microscope objective for...'