Fostering STEM Talent through Hands-On Learning in a Photonic Makerspace

Johannes Kretzschmar, Canan Gallitschke, Fabian Lukas, Mina Afsharnia, Marija Curcic, Falko Sojka, and Christian Helgert

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LICHTWERKSTATT | JENA
OPEN PHOTONICS MAKERSPACE

Abbe Center of Photonics | JENA
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OPEN INNOVATION IN PHOTONICS

LICHTWERKSTATT **MAKERSPACE**

Idea & Prototyping Lab

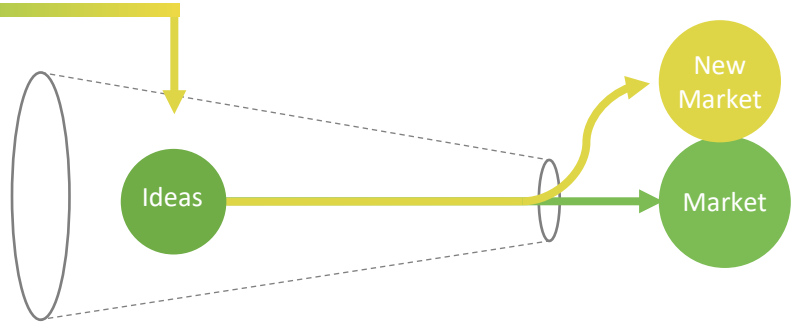
Technology	Mentoring
Space	Community

Open Innovation Formats

like Hackathons, Innovation Camps, Innovation Challenges

PHOTONICS INDUSTRY

Open Innovation Process



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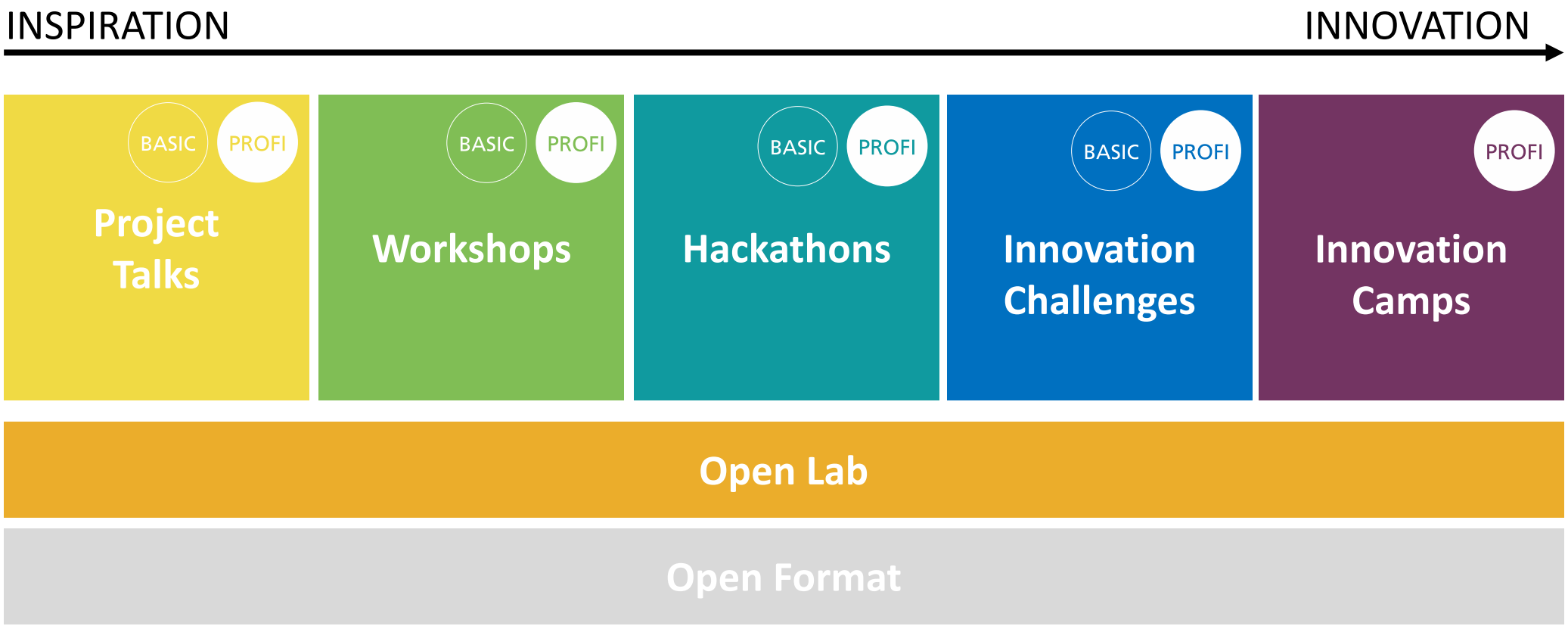
MAX PLANCK SCHOOL of photonics

PAF

BUILDING A COMMUNITY



TECHNOLOGY COMPETENCY

FPGA

Electronics

uC

CAD

CAM Tools
Lasercutting,
3D Printing

Pandas, Numpy, pyTorch,
TensorFlow, openCV

Simulation
3D Sensing
Optik Design

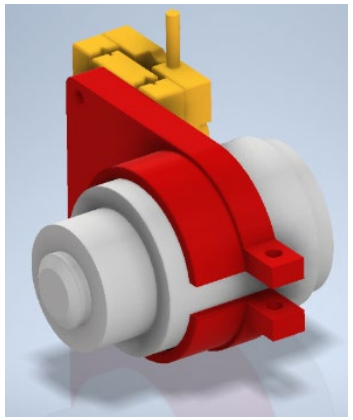
Prototyping

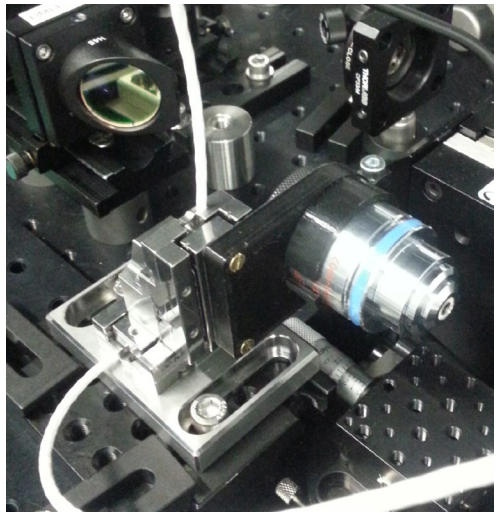
Animation &
Media Production

Design
Thinking

SELF-EFFICACY

refers to a person's belief in their own ability to successfully perform tasks, handle challenges, and achieve goals. It's the confidence that one can exert control over their own behavior, environment, and life outcomes. (Albert Bandera)

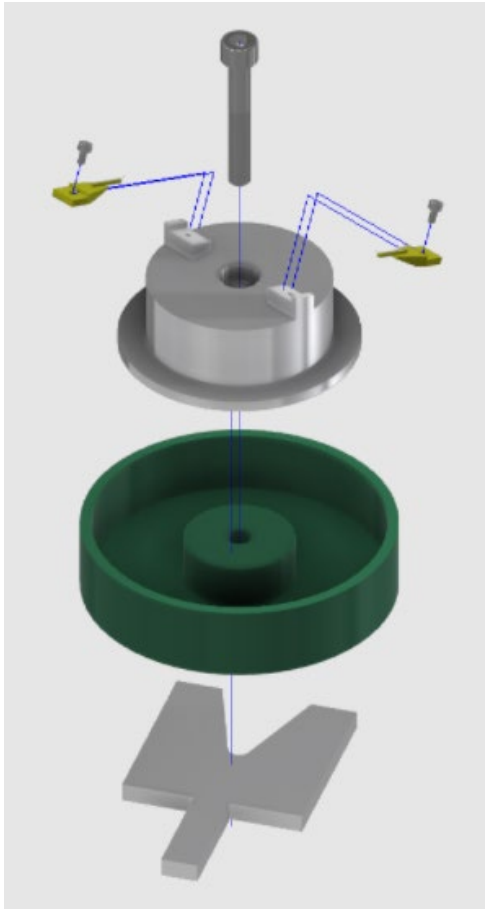




Maximilian Weißflog, IAP
Mount for Objective on
Piezo Stage

Dr. Barbora Marsikova, Max
Planck School of Photonics
Rotatable PolFilter Mount
for old ZEISS Microscope

Daniel Füßel, IAP
Mount for processing
SNOM Tips in FIB



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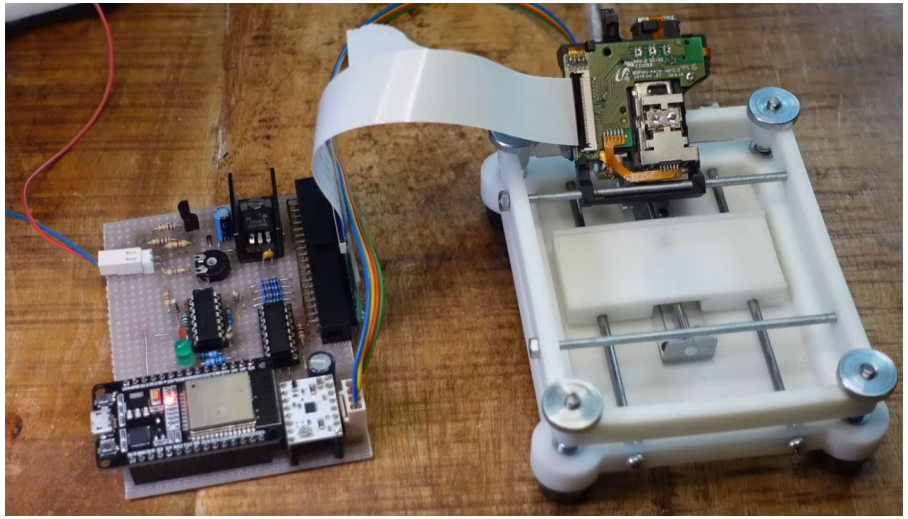
FRUGAL INNOVATION

refers to the process of creating affordable, simple, and effective solutions by minimizing the use of resources, while still meeting the essential needs of consumers, especially in resource-constrained environments. It focuses on delivering value by removing non-essential features and costs, making products or services accessible to a larger population.

FoldScope



Blu-Ray Player Laser Scanning Microscope

Open Flexure Microscope

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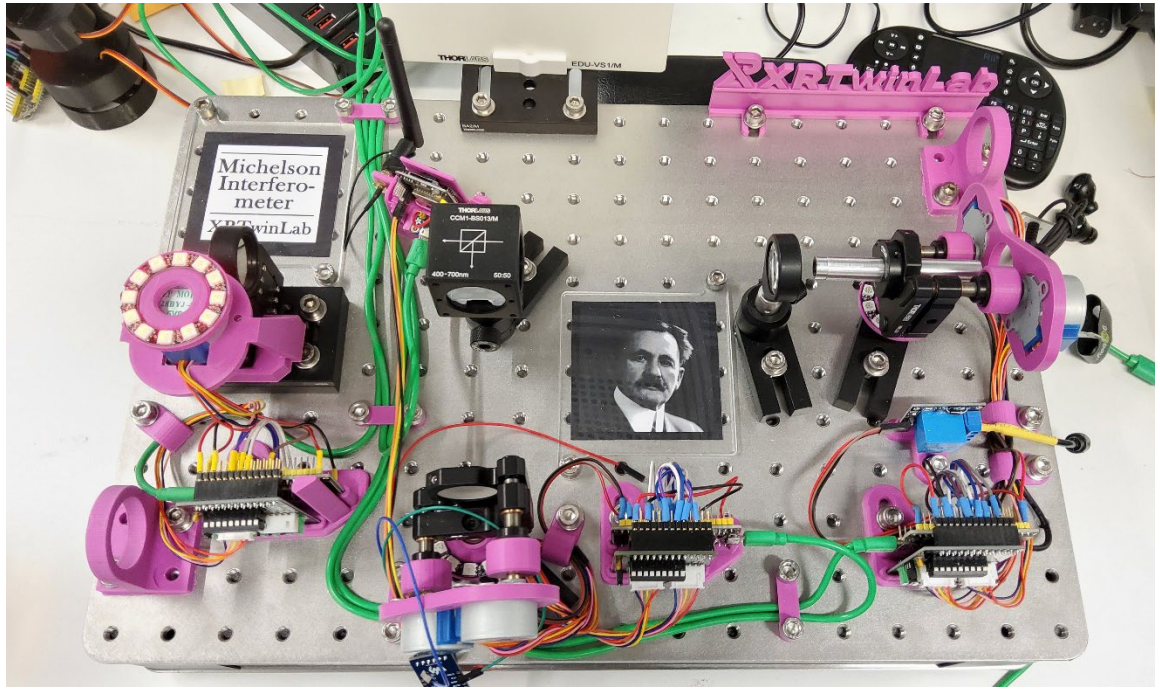
ACCESSIBILITY



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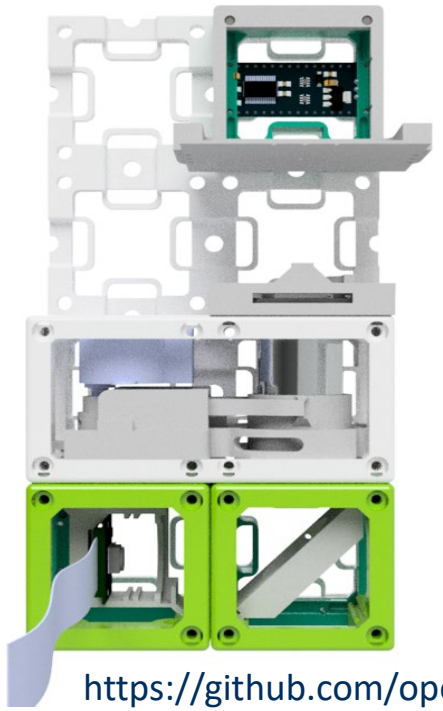
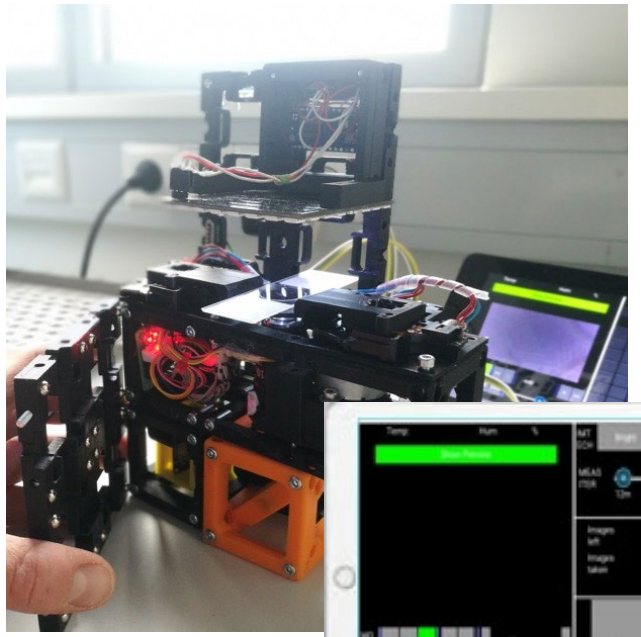
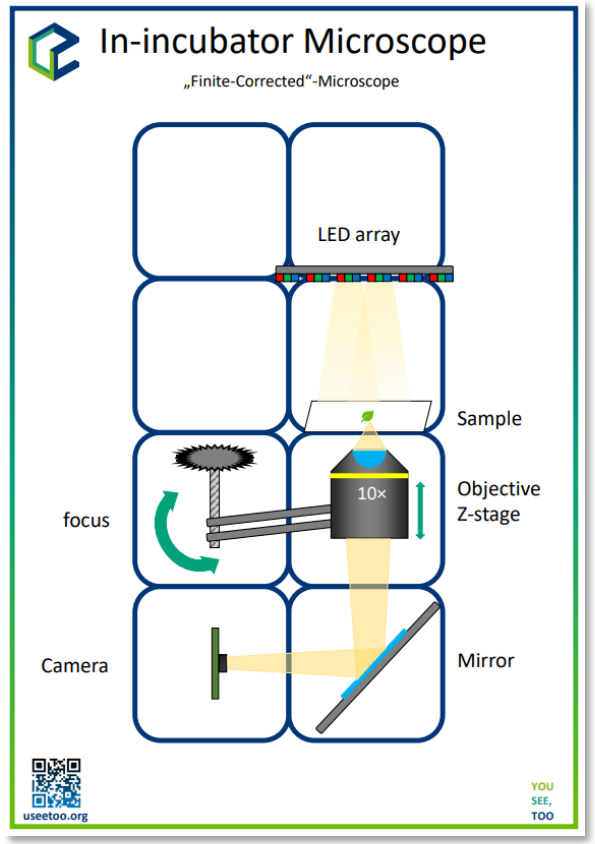
OPEN SOURCE DEV

is a collaborative approach to development where the results are made freely available to the public. Anyone can view, use, modify, and distribute them, usually under an open-source license. The goal is to promote transparency, community-driven innovation, and collective problem-solving







https://github.com/openUC2/UC2-GIT

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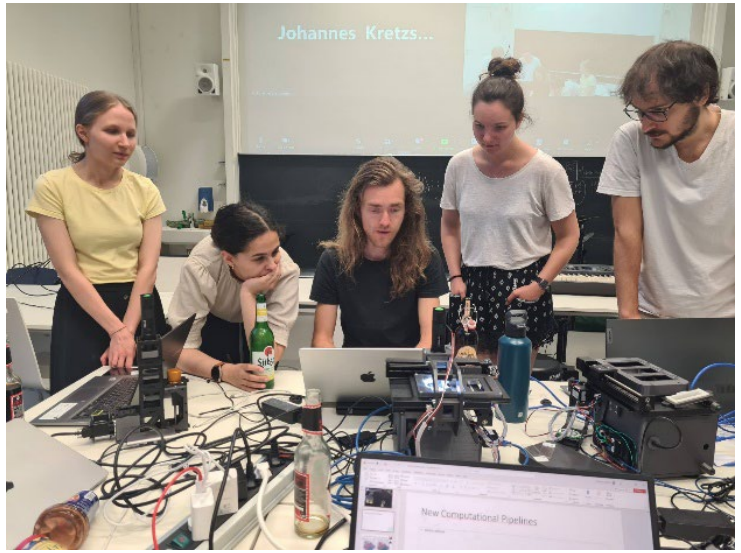
OPEN INNOVATION

is a concept where organizations go beyond their internal resources and collaborate with external partners — like startups, universities, research institutions, customers, or even competitors — to drive innovation. Instead of relying solely on internal ideas, they combine internal and external ideas and paths to market to advance their technology or products.



UC2 Hackathon

Photonics Academy

Laser Marking Workshop

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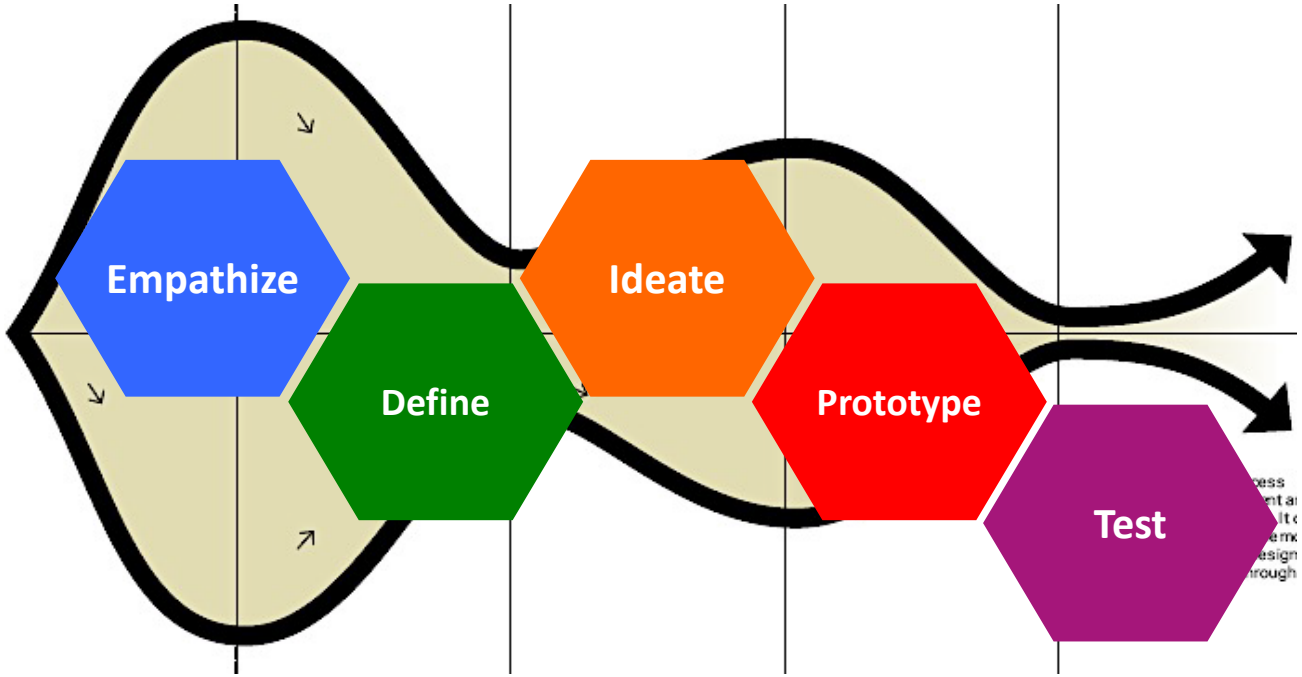
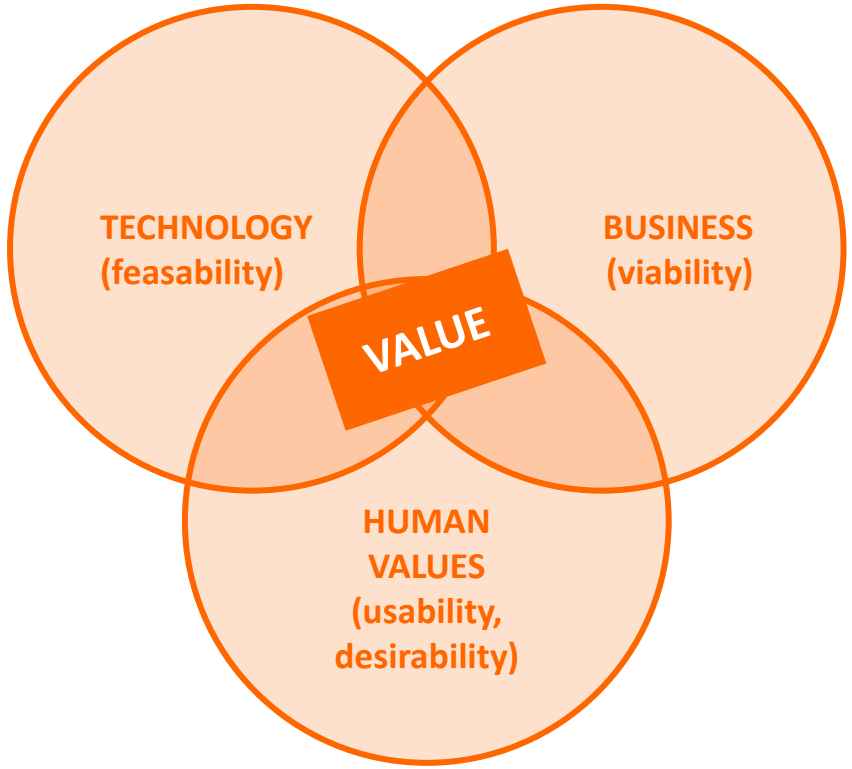
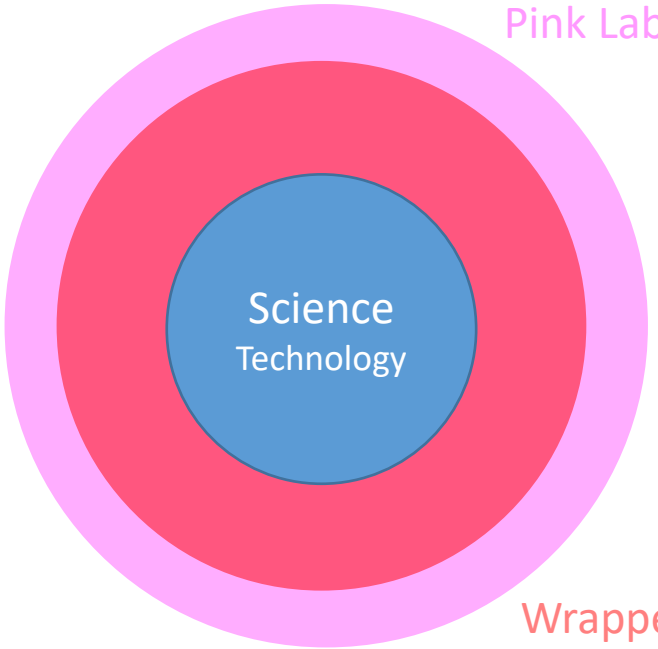
DESIGN THINKING



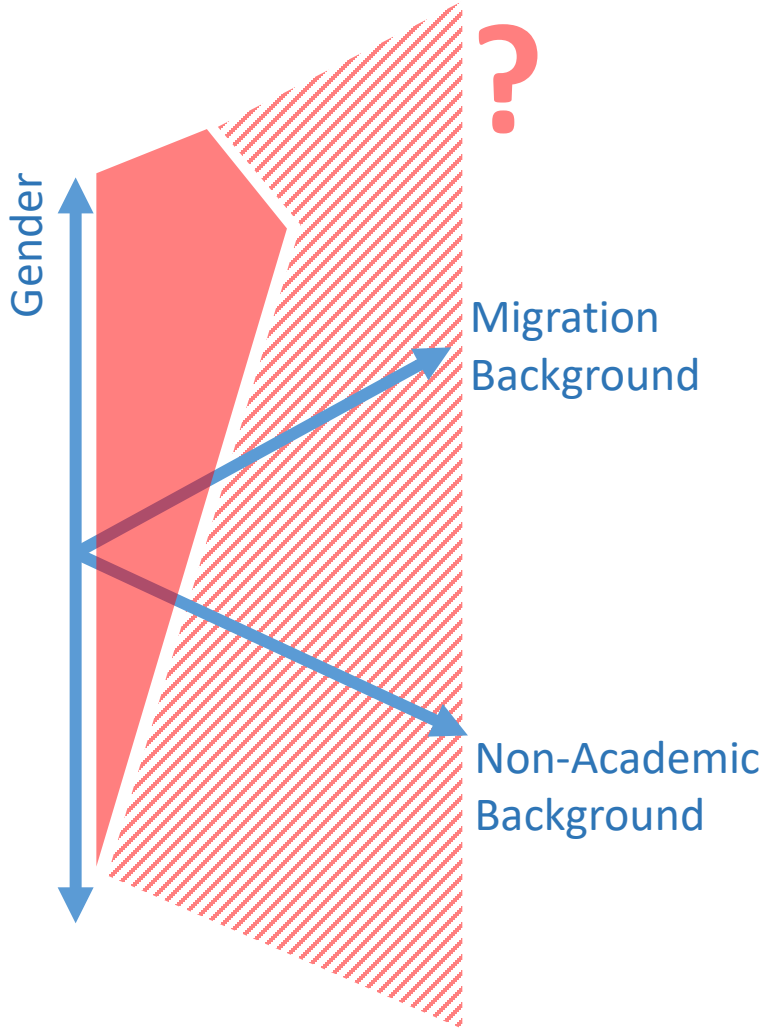


STEM PROMOTION TODAY

So what's the problem?



Wrapper
- Abstraction
- Educational Content
- Edutainment
- Platforms

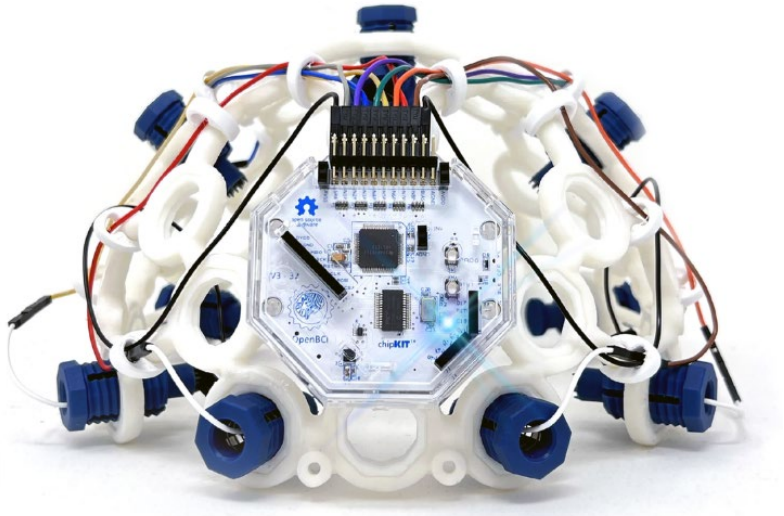


Typical STEM audience
- Boys
- Pre-adolescence
- Academic background
- No migration background
- Strong interest in STEM
  - Problem solving
  - Technology
  - Innovation

Whats the value of STEM education?

BIOSIGNALS

Interdisciplinary



OpenBCI, 3d-printable open Brain Interface
https://openbci.com/

COMICS


the Talk
BY SCOTT ZARANSON & ZACH WEINERSMITH
ACP ZINE 5125
Entanglement
IDENTIFYING MAGNETS
So schmeckt ein Regenbogen!
THE QUANTUM HEIST

EGGNOG AND SOLDERING

Grandmothers to STEM Role Models

„Anlöten“ at Deutsches Museum Nürnberg
by Susanne Grube

PROJECT „MINT HANDS-ON MAKERSPACE“

The MINT Makerspace is financed by the German Federal Ministry for Education and Research (BMBF), grant number 01FP24M09, within the funding profile line "Erhöhung des Frauenanteils im MINT-Forschungs- und Innovationsprozess: Selbstwirksamkeit, Eigeninitiative und Kreativität stärken" (MissionMINT- Frauen gestalten Zukunft) from 2025 until 2028. It also aligns and collaborates with the EU-funded TWINNING Project BioQantSense (101120051) coordinated by the IPB Belgrade.

Canan Gallitschke
Quantum Mini Labs

Johannes Kretzschmar
Technical Management
Lichtwerkstatt

BioQantSense

Funded by the European Union

E-Mail : mint@lichtwerkstatt-jena.de
Instagram : @lichtwerkstattJena
LinkedIn : Lichtwerkstatt Jena

Abbe Center of Photonics
Albert-Einstein-Str. 6
07745 Jena
GERMANY

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