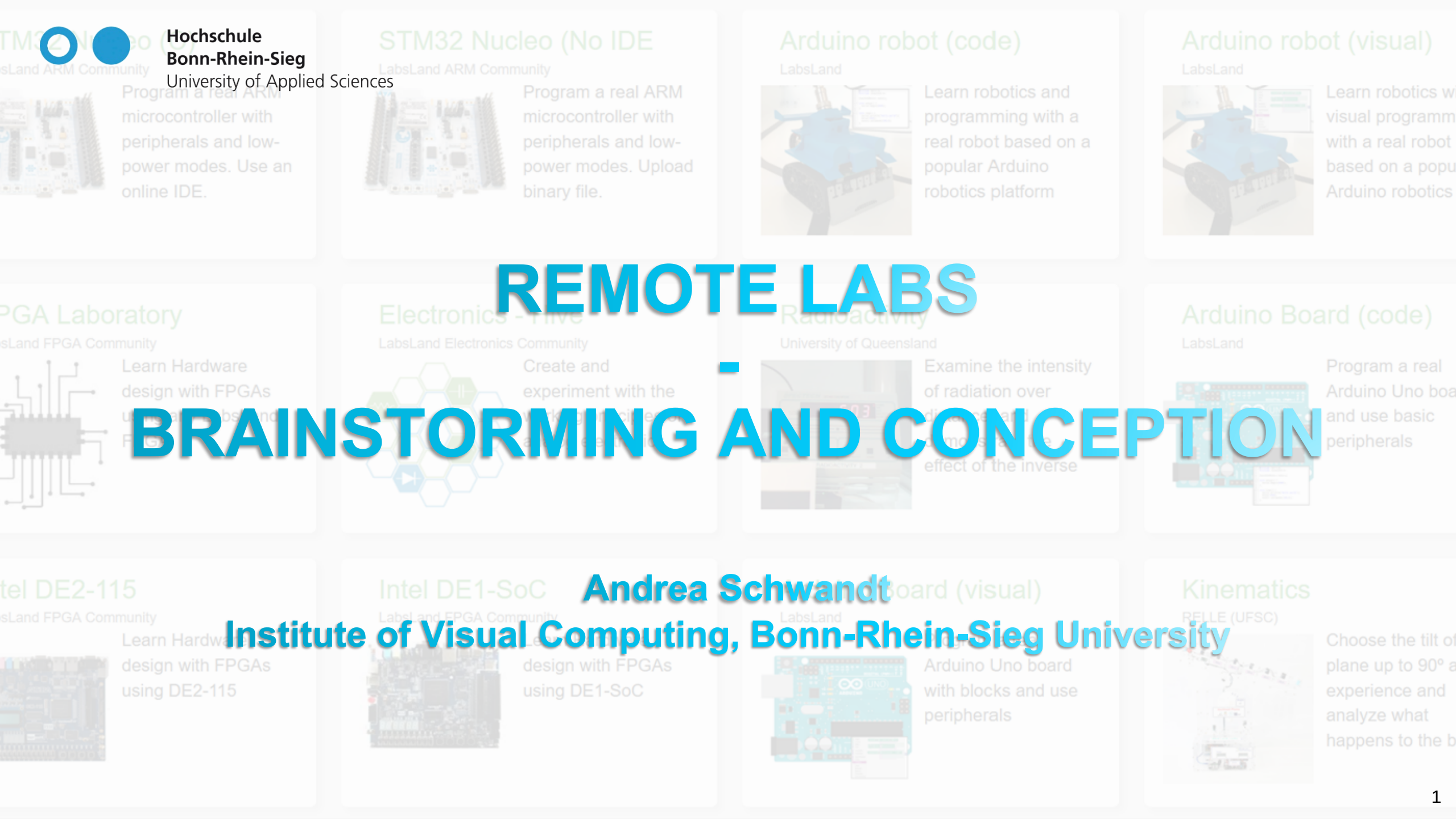




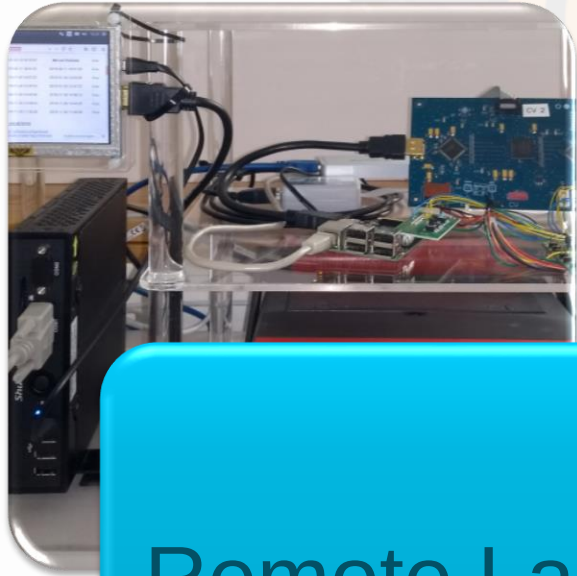
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REMOTE LABS

BRAINSTORMING AND CONCEPTION

Andrea Schwandt

Institute of Visual Computing, Bonn-Rhein-Sieg University



Remote Lab
Examples



Require-
ments for a
Successful
Remote Lab



Integration
into your
Course

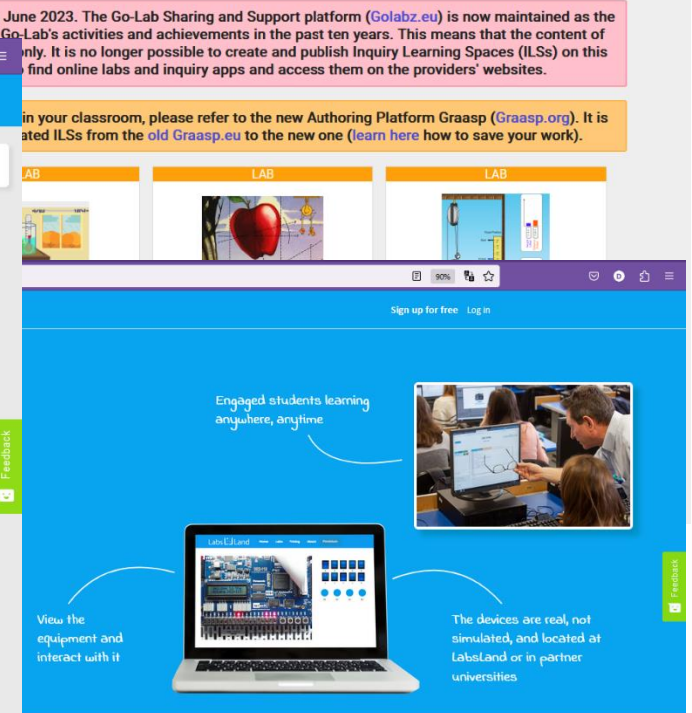
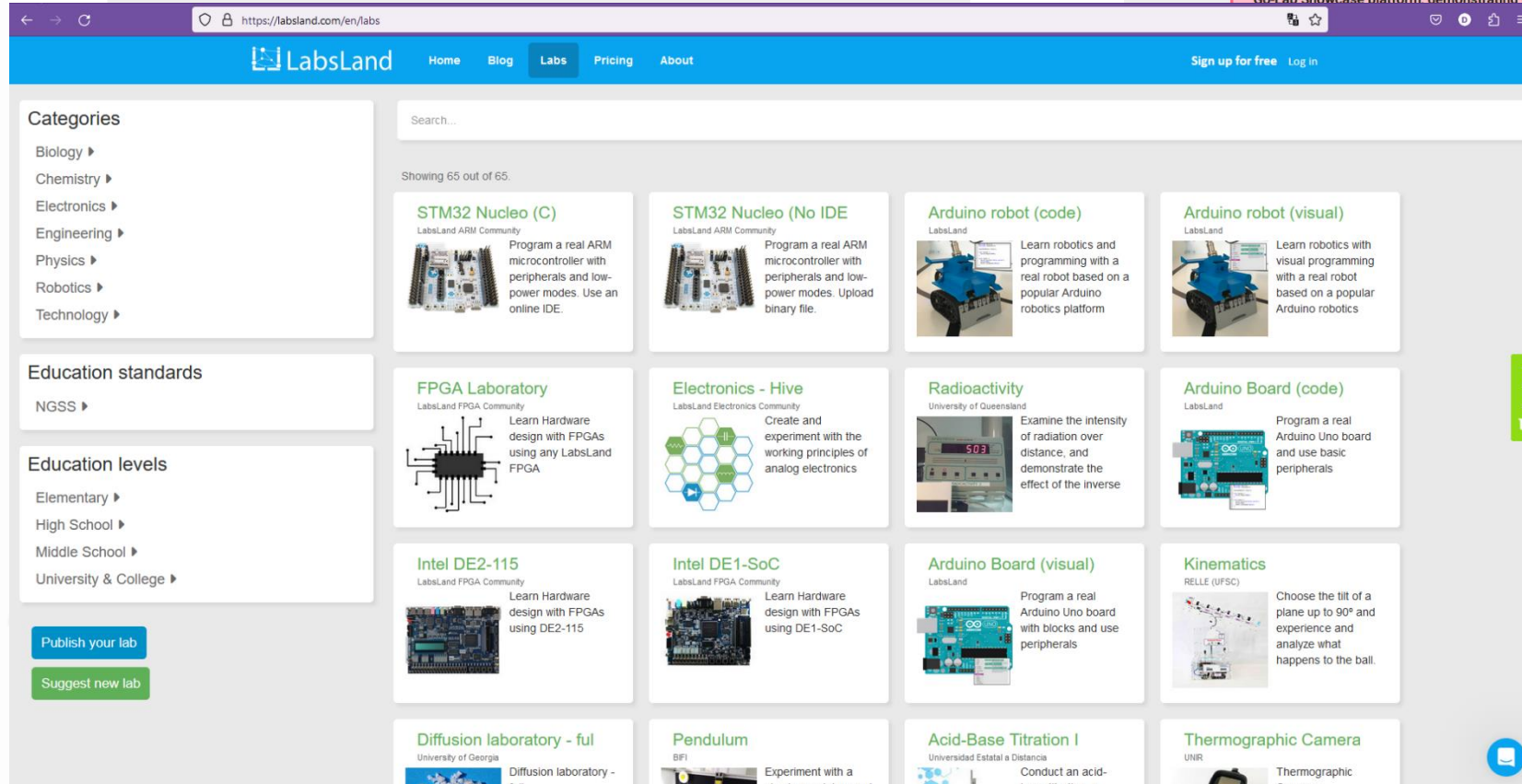
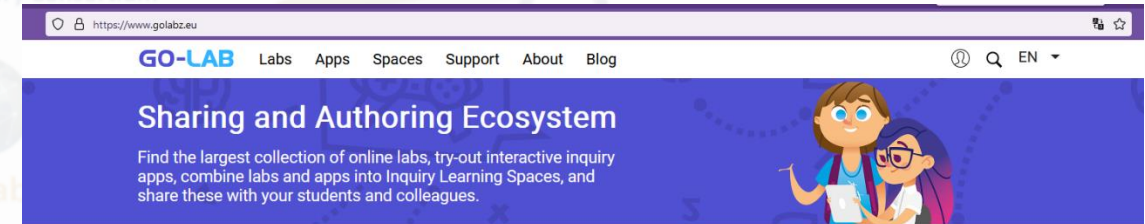


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REMOTE LAB EXAMPLES



Remote Labs worldwide...



LabsLand is a global network of remote laboratories, that connects institutions to equipment located worldwide.



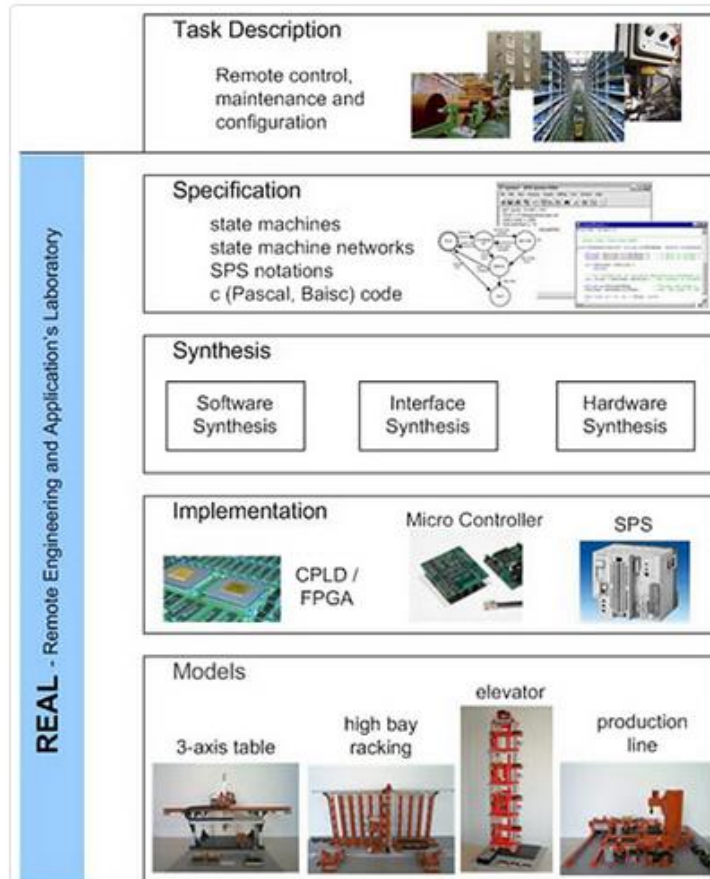


Fig 2.: Overview of the GOLDI system

MIXED REALITY IN LABS



Virtuelle Welten alleine oder im Team erkunden und Aufgaben lösen.

» Weiterlesen

TELEOPERATIVE PRÜFZELLE



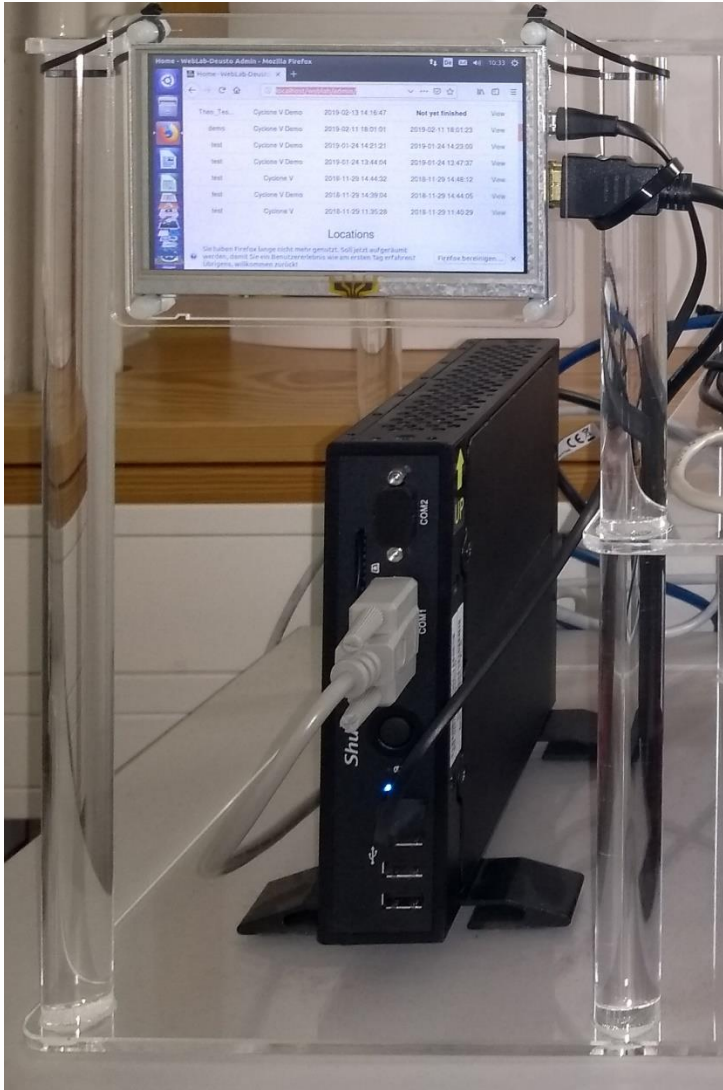
Untersuchen Sie unterschiedliche Materialverhalten unter verschiedenen Belastungszuständen.

» Weiterlesen



An einem echten Auto testen, wie Elektromobilität funktioniert.

» Weiterlesen





Cyclone V Demo (FPGA experiments)

[Finish](#)

[Start Experiment 1: Inverting Signals](#)[Start Experiment 2: Sharpening Filter](#)[Start Experiment 3: Lane Detection](#)

FPGA Core Current:

43.64 mA

(Core Supply Voltage is 1.1 V)

⏪

<

Select Input Image

>

⏩



Durchsuchen... Keine Datei ausgewählt.

Upload your own input image now

SW 0 * ☐ OFF

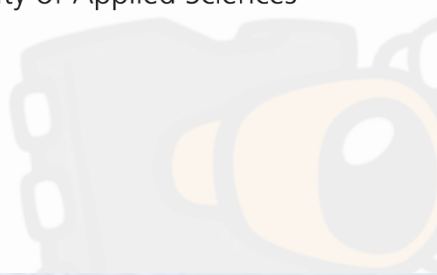
SW 1 * ☐ OFF

SW 2 * ☐ OFF

00:00:50

*only active in full experiment for registered users

[Program Default Design](#)[Update Output Image and Core Current](#)[Update Core Current Only](#)



Benutzer-Interface

Live-Bild



Kraft-Weg-Verlauf



Messdaten-Export

Kamera-Auswahl



Parameter-Anpassung



Global Online Laboratory Consortium



2019 Online Lab Award

GOLC



WHAT ARE THE REQUIREMENTS FOR A SUCCESSFUL REMOTE LAB?

Please, take a view minutes to think about it and discuss it with your colleagues!



FPGA ViSiON

slido



What are the requirements for a successful Remote Lab?



FPGA ViSiON

① Start presenting to display the poll results on this slide.

Some Requirements for a Successful Remote Lab

- straightforwardness of the user interface
- high and reliable availability
- easy accessibility

- **high level of experimental freedom**

FPGA ViSiON





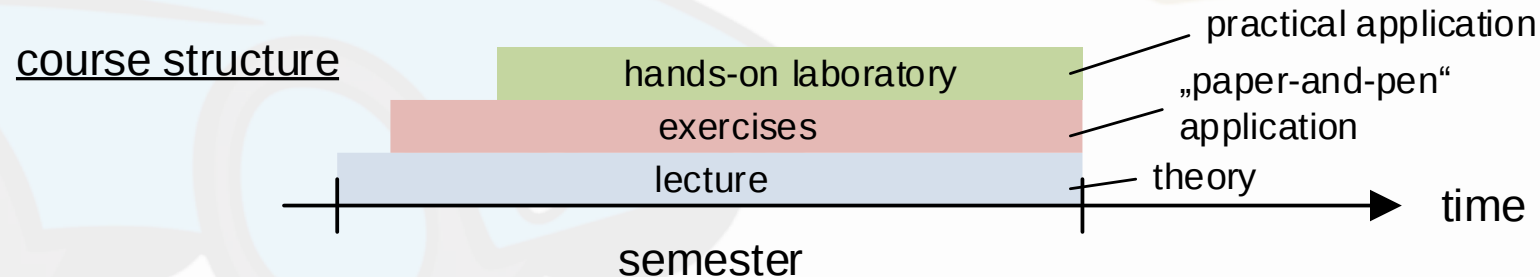
INTEGRATION INTO YOUR COURSE



Approach to Using the Remote Lab and Video Lectures

Course structure

- Teaching course often have lecture, exercises and hands-on labs
 - Exercises and hands-on labs start after some theory
 - Lecture and exercises can be combined or lecture includes interactivity



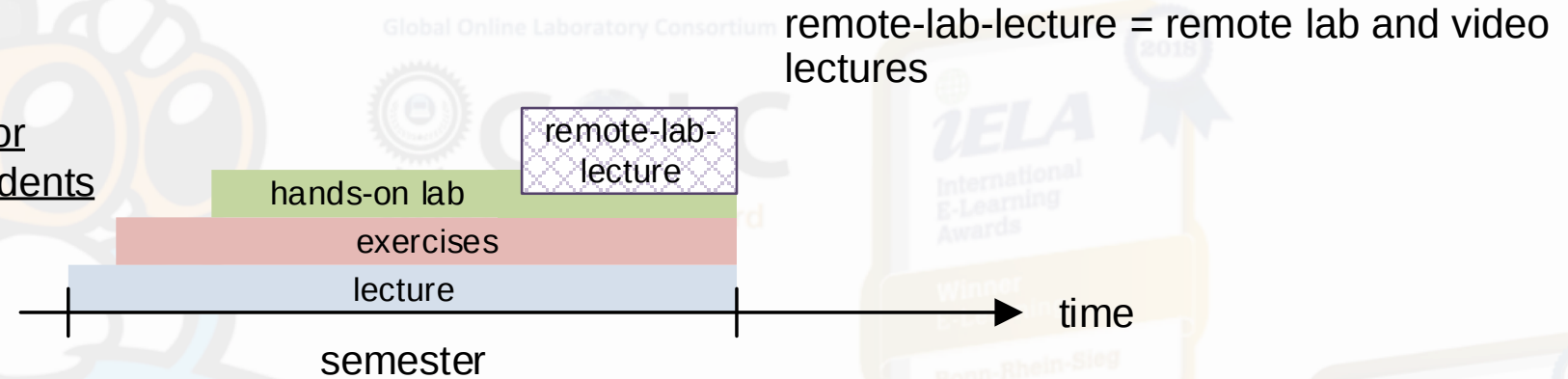
- Remote lab and video lectures provide additional insight for students
 - ⇒ Supplemental topic corresponding to 1 or 2 weeks of course (with 3 ~ 6 hours per week)
 - ⇒ Optional content as elective or for advanced students





Scenarios for Usage in Course

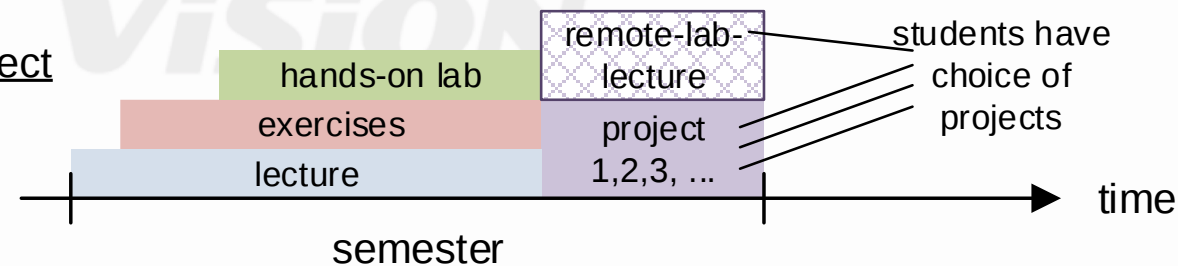
optional for
advanced students



optional content
after semester



final
design project





... IT'S TIME FOR A FIRST BRAINSTORMING

...

[https://miro.com/app/board/uXjVMioJdtk=
=?share_link_id=269149424802](https://miro.com/app/board/uXjVMioJdtk=/?share_link_id=269149424802)



FPGA Vision