Putting Science Into Standards (PSIS) 2021 Workshop 'Organ on Chip: Towards Standardization'

Breakout session: Interoperability and control systems

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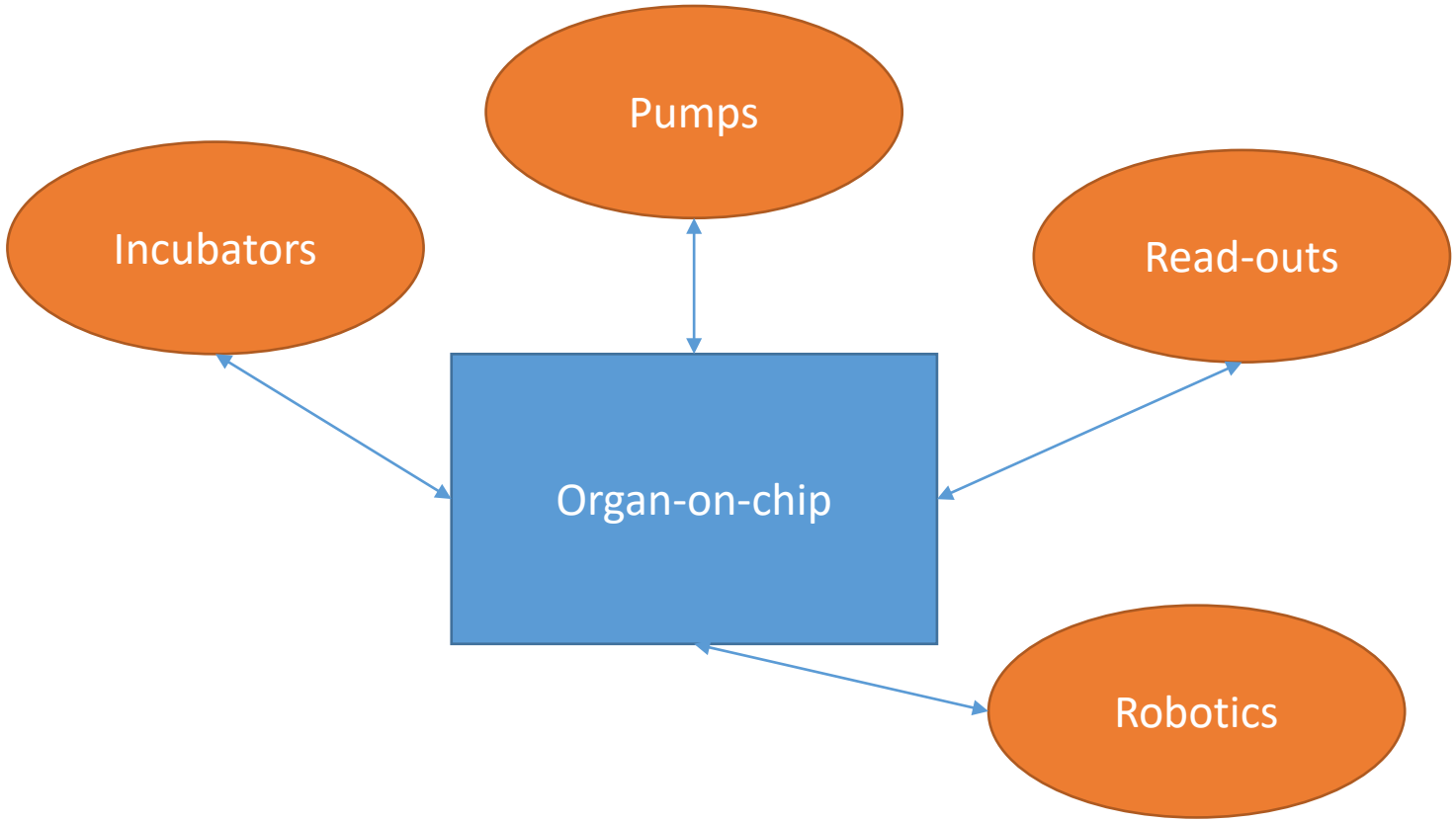
UNIVERSITY OF TWENTE. | Organ-on-Chip Center Twente

CEN CENELEC

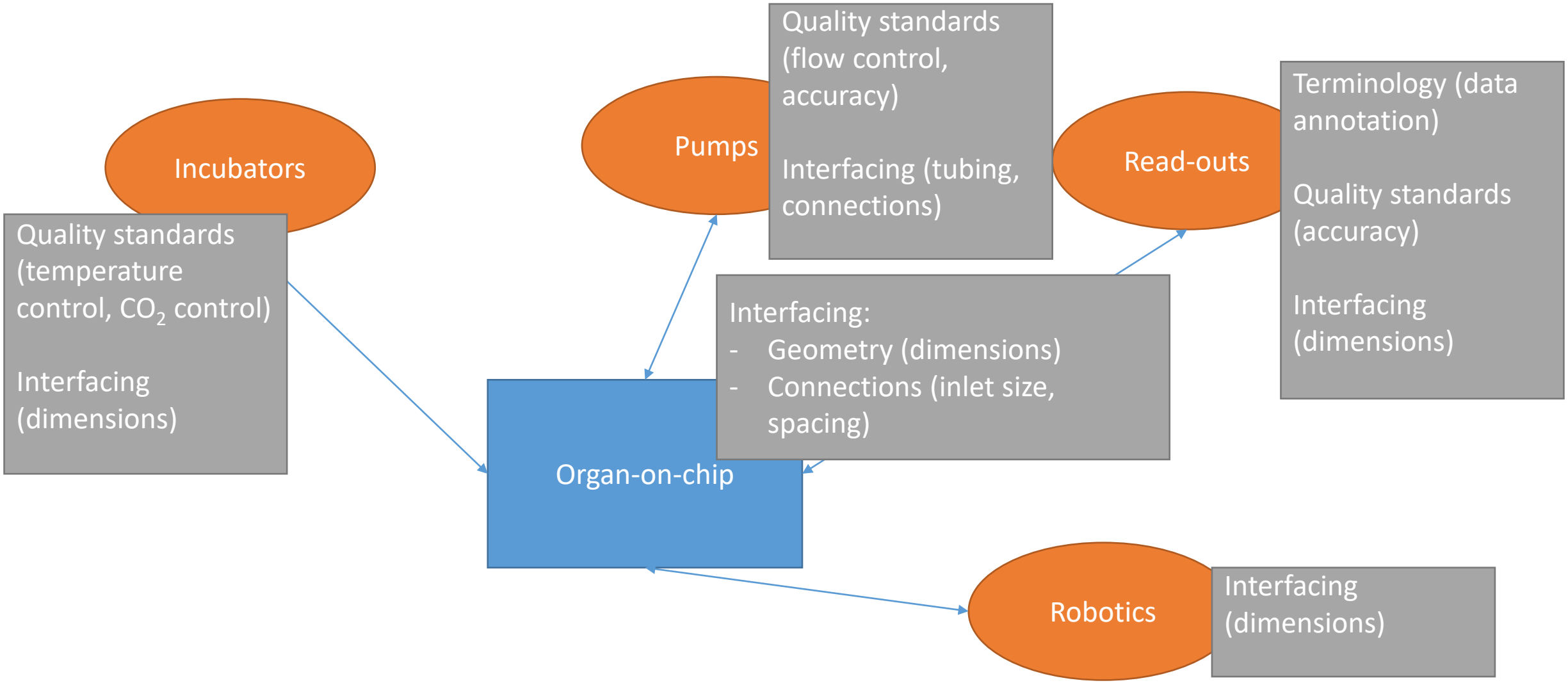
Central challenge for this session

Organ-on-chip devices need to interact with a lot of existing laboratory equipment

- Control
  - Pumps
  - Incubators
- Read-outs
  - Microscopes
  - Electronic read-out systems
- Workflow automation
  - Automated microscopy stages
  - Pipetting robots



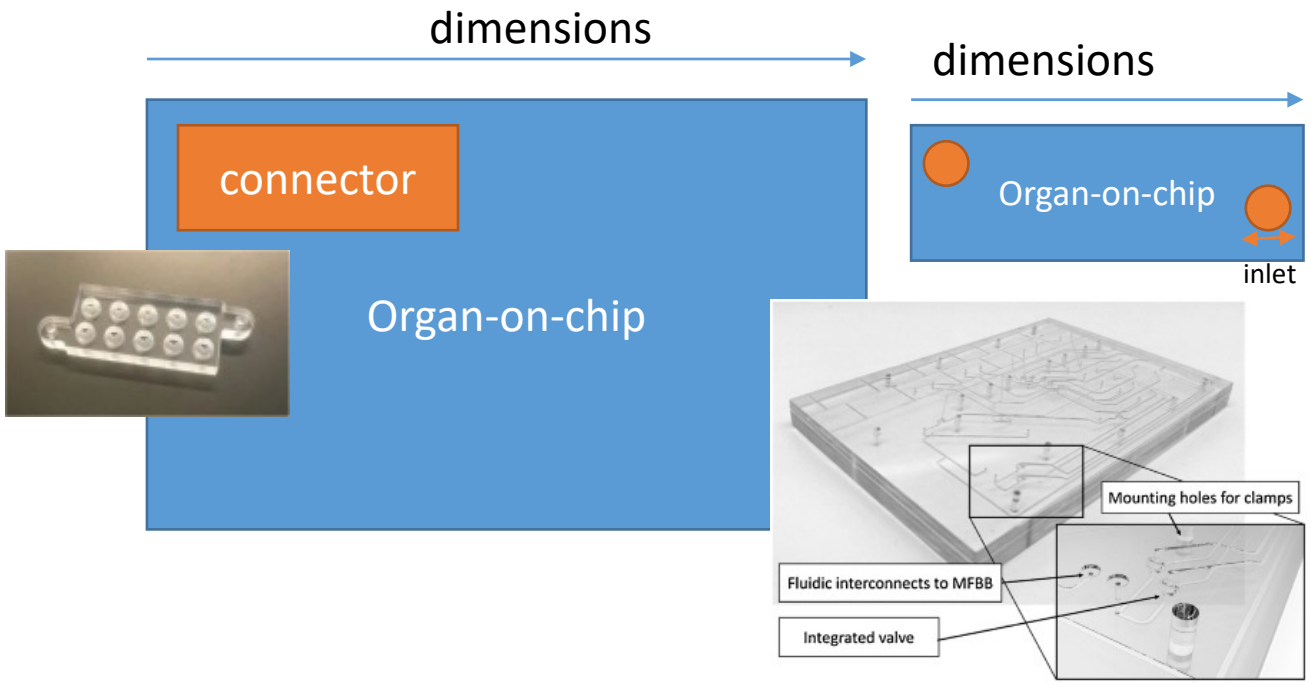
Aspects of standardization



Microfluidic design standards

Also next PSIS session: 'Microfluidics'

- ISO IWA 23:2016 Interoperability of microfluidic devices — Gui[illegible]tch spacing dimensions and initial device classification



Devices:
- Microscope slide dimensions
- Multiwell plate dimensions (ANSI/SLAS microplate standard)

Interfacing:
- Inlet diameter
- Inlet spacing
- Connectors

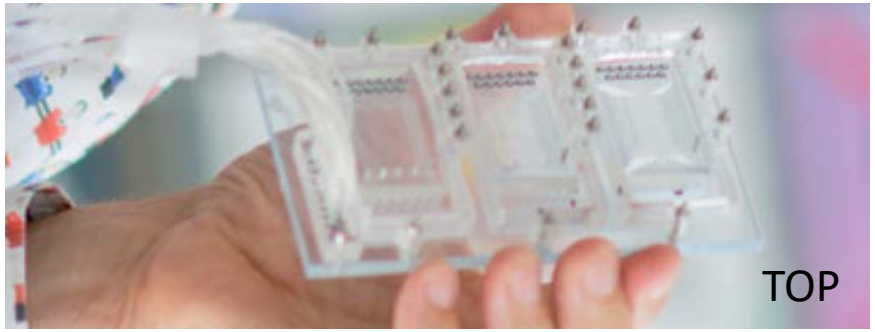
ISO IWA 23:2016 https://www.iso.org/standard/70603.html
Dekker, et al. 2018 https://doi.org/10.1016/j.snb.2018.04.005
https://www.slas.org/education/ansi-slas-microplate-standards/

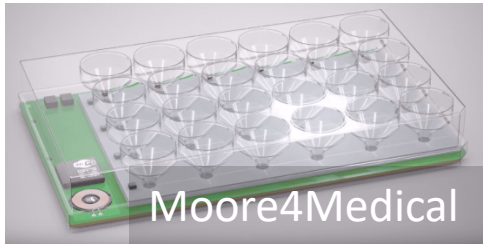
Microfluidic design standards

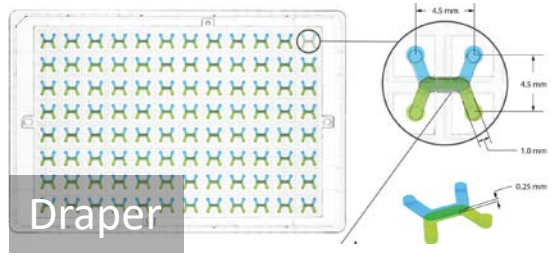
Also next PSIS session: ‘Microfluidics’

Microscope slide dimensions

96 wells plate dimensions







https://www.microfluidic-chipshop.com/
https://ibidi.com/
https://www.mimetas.com/en/home/
https://top.hdmt.technology/
https://www.health-lighthouse.eu/
Azizgolshani, 2021, https://doi.org/10.1039/D1LC00067E

Pumps

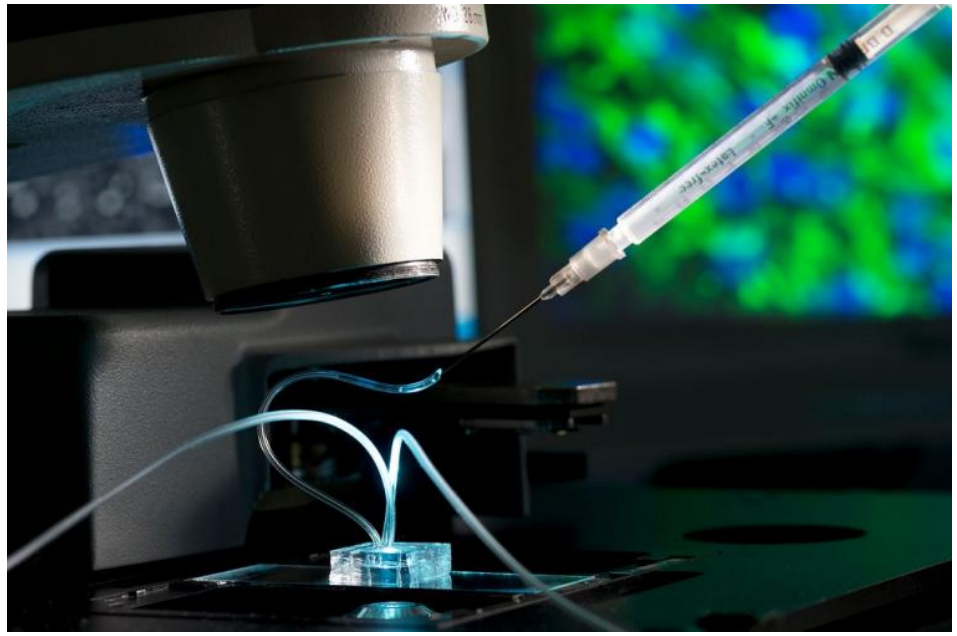
- Syringe pumps
- Pressure driven pumps

- Potential for standardization:
  - Quality standards, precision
  - Sensing of flow rates
  - Connectors? (Luer, other)
  - Tubing (dimensions, materials)
    - Compare with e.g. HPLC chromatography

https://www.elveflow.com/
https://www.harvardapparatus.com/

Read-outs

- Microscopy
  - Interfacing (dimensions)
- Sensors
  - Quality standards (e.g. precision for TEER, MEA, other sensors)
  - Interfacing (dimensions)



https://www.multichannelsystems.com/
https://www.igb.fraunhofer.de/en.html

Robotics and automation

- Automated plate handlers
- Pipetting robots
- High-content imagers

- For all: Interfacing (chip dimensions)

https://www.perkinelmer.com/
https://www.brand.de/

To the panel discussion