



Advanced manufacturing Capacity Buildup and Technology Platforms at EPFL

Vivek Subramanian, EPFL

Bruno Studach, EPFL

General Strategy

Vision

- Provide a focal point for micromanufacturing excellence and knowledge creation

People

- Hiring of faculty and staff to focus on advanced manufacturing
 - Vivek Subramanian, Professor – Hired in 2018
 - Bruno Studach, Operational Director, M2C – Hired in 2018
 - New Assistant Professor (Daryl Yee, PhD Caltech, Postdoc MIT, starting in March 2023)

Infrastructure

- Established a shared lab in Microcity, Neuchatel to support advanced micromanufacturing, led by Prof. Subramanian
 - Several new tools purchased and installed, including state of the art multi-material printing, ink characterization, and structural metrology tools.
- Leveraged other funding sources to assemble a world-leading platform for additive micromanufacturing, open to partners and to outside users.
 - SFA funds augmented capabilities in a strategic way to allow for realization of a comprehensive capability.

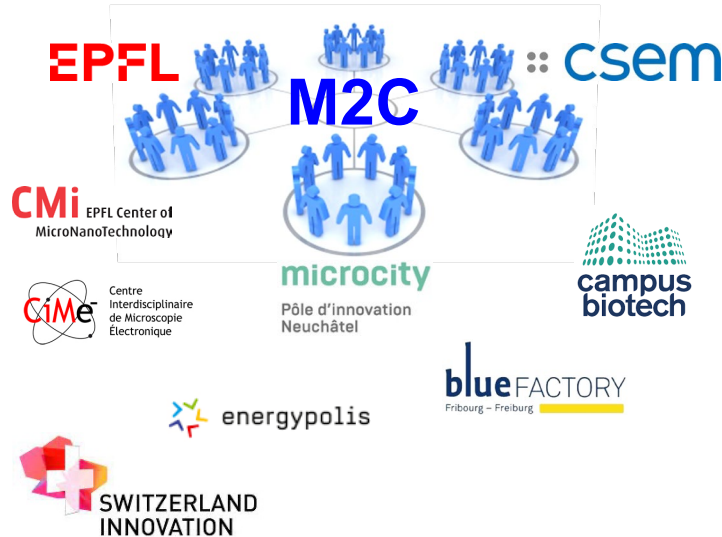
Ecosystem

- Form ties to industry and partners, including CSEM, other academic institutions, and companies to leverage our combined expertise and capabilities.

M2C: A center of excellence for manufacturing science and technology in a dense & rich ecosystem

A natural focal point for leveraging on the multidisciplinary capabilities of **EPFL** and **CSEM** and their respective networks in the innovation pole of Neuchâtel...

Strategic Focus Area
Advanced Manufacturing



- 4 major teaching & research institutions: EPFL, CSEM, HE-Arc, UniNe
- 2 professional training organizations CPLN and CIFOM
- Professional associations: FHS, Micronarc, ARCM
- Foundations for microengineering: FSRM
- Over 1'000 researchers, 7'000 students & 6'000 apprentices
- 800 annual technology transfer projects,
- Around 40 startups (many in microengineering industrial applications)

...as well as with **EPFL** labs & competence centers in Lausanne and in its other campuses

**Vivek Subramanian**

- Professor, Institute of Electrical & Microengineering (IEM)
- Associate Director, IEM
- Scientific Director, M2C

Research Portfolio

- Manufacturing of integrated functional microsystems
- Printable Materials
- Additive processing of functional systems

**Bruno Studach**

- Operational Director, M2C

Portfolio

- Establish the M2C equipment platform
- Leading industry engagement initiatives

**Daryl Yee, starting in 2023**

- Assistant Professor, Institute of Electrical & Microengineering (IEM)

Research Portfolio

- Focuses on materials and processes for rapid 3D fabrication
- Supported by SFA funds during initial period



- In 2020, the M2C started to make significant investments to acquire equipment and instruments to be installed in Neuchâtel EPFL campus and CSEM premises.

Strategic Focus Area
Advanced Manufacturing

- Material preparation

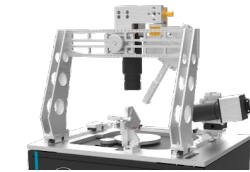


Metal powder fabrication
(SFA Funds)

- Fabrication & processing tools



High Resolution LPBF 3D metal printers
(EPFL Funds)



Cobotic micromanipulator
(EPFL Funds)



Tunable HP fs laser
(EPFL Funds)

- Characterization



High Res. X-Ray Micro CT scanner
(EPFL Funds)

Covering the value chain of advanced manufacturing

- This equipment complements the existing research infrastructure in EPFL and CSEM laboratories, including the instruments in EPFL shared facilities, started in 2019.

- We have invested in people, platforms, and ecosystem
 - Hiring of 2 professors and 1 operational director have allowed us to establish a strong presence in micromanufacturing research
 - A large platform of shared equipment has been established using a combination of SFA and EPFL funds
 - Metal processing
 - Femto-second laser processing
 - Micromanufacturing of 3D printed functional systems
 - Characterization of raw materials and functional microstructures
 - A center for industry outreach and collaboration has been established through M2C.

