Why Master in Neuro-X?

- Increasing number of Master programs in neuroengineering at academic institutions
  - ETHZ
    - Master in Neural Systems & Computation
    - Interdisciplinary Master in Brain Sciences
  - TU München: Elite Master Program in Neuroengineering
  - Imperial College: MRes Neurotechnology
  - Stanford University: NeuroTech Master
  - UCLA: Master of Engineering in Translational Medicine
  - University of Freiburg (DE): Master in Neurobiology and Neurotechnology
  - Geneva: Master in Neuroscience
Why Master in Neuro-X?

- Increasing number of Master programs in neuroengineering at academic institutions
- Increase visibility of EPFL neuro-related teaching, building on success of specialization in neuroscience & neuroengineering, and minor in neuroprosthetics
- Educate future professionals for neuro-related fields ranging from research to applications of neurotechnology in industry and healthcare
- Neuro-X brings together foundational disciplines that shape brain research
  - Science, Computation, and Engineering

Master in Neuro-X

- X=intersection: being at the crossroads of disciplines
- X=eXpansion: exploiting synergies by combining disciplines
- X=eXploration: explore horizons for new needs and trends
Three contributing schools

IC  SV  STI
Three core disciplines

computational neurosciences

neurosciences

neuro-engineering
Core courses (31 ECTS)

### Computational Neurosciences

- **Fall**
  - Machine Learning (Jaggi/Flammarion) CS-433
  - Computational neuroscience: Biophysics (Schurmann/Romani) BIOENG-450
- **Spring**
  - Computational neuroscience: Neuronal Dynamics (Gerstner) BIO-465

### Neuroscience

- **Fall**
  - Neuroscience: Cellular and Circuit Mechanisms (Petersen/Crochet) BIO-482
  - Neuroscience: From Molecular Mechanisms to Disease (Graeff/Schneider/Lashual) BIO-480
- **Spring**
  - Neuroscience: Behavior and Cognition (Sandi/Blanke/Herzog) BIO-483

### Neuroengineering

- **Fall**
  - Neural Signals and Signal Processing (Van De Ville/Micera) NX-421
  - Neural Interfaces (Lacour/Shoaran) NX-422
- **Spring**
  - Translational Neuroengineering (Hummel/Blanke/Micera/Courtine) NX-423
Computational neurosciences

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Updated
Neuroengineering

- computational neurosciences
- neurosciences
- neuro-engineering

Signals
Interface
Translation

NEW
Neural Signals and Signal Processing (Van De Ville/Micera)
NX-421

NEW
Neural Interfaces (Lacour/Shoaran)
NX-422

NEW
Translational Neuroengineering (Hummel/Blanke/Micera/Courtine)
NX-423
# Neuroscience profile

## Computational Neurosciences
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  - (Gerstner)
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Computational profile

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Neuroengineering profile

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neuro-engineering

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New Master in Neuro-X (120 ECTS)

- Master’s thesis: 30 ECTS
- Core courses: 31 ECTS
- Options: 30 ECTS
- Project in social and human sciences: 6 ECTS
- Internship: 8 ECTS
- Semester project: 8 ECTS
- Scientific, industry, clinical project: 7 ECTS
New Master in Neuro-X (120 ECTS)

- Areas
  - Technology
  - Data science and machine learning
  - Imaging and image analysis
  - Scientific thinking
- Other core courses
- Minor

- Options
  - 30 ECTS

- Master's thesis
  - 30 ECTS

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  - 6 ECTS

- Internship
  - 8 ECTS

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Minor in Neuro-X (30 ECTS)

- Impact: replaces two existing minors
  - *Minor in Neuroprosthetics*
  - *Minor in Computational Neurosciences*

- Coordinators:
  - *Silvestro Micera (STI)*
  - *Friedhelm Hummel (SV)*

- Structure
  - Block core courses (20)
  - Block optional courses (3)
  - Project in Neuro-X (7)
Titles and admission conditions

- **Official titles**
  - Master of Science (MSc) in Neuro-X
  - Ingénieur en Neuro-X (neuro-X-ing. dipl. EPF)

- **Consecutive Master:**
  - STI: Electrical Engineering (EE) + Microengineering (MT)
  - IC: Systems and Communications (SC)
  - SV: Life Science Engineering

- **Admission** by application for other sections and external students
Section in Neuro-X (SNX)

- **Adjoint**: Ms. Hind Klinke (starting May 1)
- **Pedagogical advisor**: Ms. Iris Capdevila

**Teaching** committee
- Student delegates
- Hilal Lashuel
- Alexander Mathis

**Advisory** committee
- Giovanni Cherubini (IBM Zürich)
- Claude Clement* (BioAlps)
- Vincent Delattre* (Onward Medical)
- Naveed Ejaz (MindMaze)
- Michael Herzog
- Mahsa Shoaran
- Friedhelm Hummel
- Jean-François Fischer* (Consultant)
- Tobias Kober** (Siemens Healthineers)
- Nathalie Virag* (Medtronic)

*EPFL alumni, **EPFL PhD
Thanks!

Master in Neuro-X

April 29, 2022