XIAOHAN XUE

Mattenstrasse 26, 4058 Basel, CH
xiaohan.xue@bsse.ethz.ch | Linkedin | Website

EDUCATION

Oct. 2018 – present	D.Sc., Neuroscience, Department of Biosystems Science and Engineering, ETH Zurich (expected graduation in Jun 2023) Supervisor: Prof. Dr. Andreas Hierlemann
Sep. 2015 – Mar. 2018	M.Eng., Microsystem Engineering, School of Mechanical Engineering, Northwestern Polytechnical University
Sep. 2011 – Jun. 2015	B.Eng., Mechatronic Engineering, School of Mechanical Engineering, Northwestern Polytechnical University

RESEARCH EXPERIENCE

Doctoral Researcher Oct. 2018 - present
ETH Zurich *Basel, CH*

- Development of multi-modal approaches and analysis tools of:
  - sub-cellular Calcium imaging and high-density microelectrode array recordings to probe synaptic connectivity and dendritic functions.
  - fast Voltage imaging and high-density microelectrode array recordings for high-throughput validation of spike sorting algorithms.

  (ERC Advanced Grant "neuroXscales")
- Involved in several collaborating projects:
  - Imaging and reconstruction of neurons to construct single-neuron models.
  - Study of stimulus-induced STDP in *in-vitro* neural networks with high-density microelectrode arrays.
  - Calcium imaging data handling and interpretation in *in-vitro* models for the investigation of stress impact in neuroendocrine system.
  - Exploring the capability of network bursting controls by means of optogenetics and high-density microelectrode arrays.

Undergraduate & Graduate Researcher Aug. 2014 - May. 2018
Northwestern Polytechnical University *Xi'an Shaanxi, CN*

- Development of low-cost and photolithography-free microfabrication method of surfaces with switchable wettability and applications in fluidics control.
- Microfabrication and calibration of flexible shear-stress sensors. Designed the calibration platform and carried out experiments in wind tunnels and underwater environments at four collaborating institutes.

  (National Instrumentation Program of China)

TEACHING & SUPERVISION

2015 – 2017	TA – Advanced MEMS	Northwestern Polytechnical University
2018 – present	TA – Lab practicals – Neuronal Imaging and Pharmacology test TA – Microtechnology	ETH Zurich
2022	Xuqing Zhang, Master thesis	ETH Zurich
2022	Janus Mosbacher, Master project	ETH Zurich

SELECTED HONOURS & AWARDS

2014 – 2017	The First Prize Scholarship to Outstanding Student
2014	Admission to Master Program without entrance examination (top 5%)
2013	Special Kenna-Mechanical Engineering Third Prize and First-Class Scholarship
2013	Champion of 2013 Chinese Robot & Robocup Competition

LICENSES & CERTIFICATIONS

Jul. 2022	Computational Neuroscience	Neuromatch Academy
Dec. 2022	IBM Applied AI Specialization	Coursera

PUBLICATIONS

Journals

1. **Xue, X.***, Buccino, A. P.*, Kumar, S. S., Hierlemann, A. & Bartram, J. (2022). Inferring monosynaptic connections from paired dendritic spine Ca^{2+} imaging and large-scale recording of extracellular spiking. Journal of neural engineering, 19(4), 046044.
2. Kumar, S. S., Gänswein, T., Buccino, A. P., **Xue, X.**, Bartram, J., Emmenegger, V., Hierlemann, A. (2022). Tracking axon initial segment plasticity using high-density microelectrode arrays: A computational study. Frontiers in neuroinformatics, 105.
3. Buccino, A. P., Yuan, X., Emmenegger, V., **Xue, X.**, Gänswein, T., Hierlemann, A. (2022). An automated method for precise axon reconstruction from recordings of high-density micro-electrode arrays. Journal of Neural Engineering, 19(2), 026026.
4. **Xue, X.**, Sun, B., Wang, B., Ma, B., Jiang, C. (2019). A thermoresponsive film applicable to diverse substrates for controllable sessile droplets motion. Progress in Organic Coatings, 132, 449-454.
5. Wang, B.*, **Xue, X.***, Liu, X., Neužil, P., Ma, B., Yuan, W., Luo, J., Jiang, C. (2018). Switchable wettability applicable to nonplanar surfaces. Applied Materials Today, 13, 271-275.
   *equal contributors

Conferences

1. **Xue, X.**, Buccino, A. P., Kumar, S. S., Hierlemann, A. & Bartram, J. Paired spine Ca^{2+} imaging and large-scale extracellular HD-MEA recordings for the identification of monosynaptic connections, Dendrites: Dendritic anatomy, molecules and function, May 23-26, 2022, Heraklion, Greece, Booklet of Abstracts, p. 32.
2. **Xue, X.**, Buccino, A. P., Kumar, S. S., Hierlemann, A. & Bartram, J. High-throughput ground-truth validation of neuronal spike sorting algorithms, 12th International Conference on Microelectrode Arrays for Life Sciences (MEA Meeting), July 06-08, 2022, Tübingen, Germany, Booklet of Abstracts, p. 128-129.
3. **Xue, X.**, Buccino, A. P., Kumar, S. S., Hierlemann, A. & Bartram, J. A novel multimodal approach for probing synaptic connectivity and properties", FENS Forum, July 09-13, 2022, Paris, France, Booklet of Abstracts, p. 3200.
4. **Xue, X.**, Lummen, T. T., Hierlemann, A. & Bartram, J. Investigating dendritic signals evoked by natural patterns of presynaptic activity. Society for Neuroscience (SfN) Meeting (Neuroscience 2019) (pp. 737-18). Society for Neuroscience (SfN).
5. Sun, B., Ma, B., Yan, Y., Jiang, C., Yuan, W., **Xue, X.**, Liu, G., Fang, Y. (2017). A flexible hot-film shear stress sensor array and its application to airfoil separation detection. 2017 IEEE SENSORS (pp. 1-3). IEEE.

Preprints & Manuscripts in submission

1. Buccino, A. P., Damart, T., Bartram, J., Mandge, D., **Xue, X.**, Zbili, M., Gänswein, T., Jaquier, A., Emmenegger, V., Markram, H., Hierlemann, A. & Van Geit, W. (2022). A multi-modal fitting approach to construct single-neuron models with patch clamp and high-density microelectrode arrays. bioRxiv.

2. Bartram, J., Franke, F., Kumar, S. S., Buccino, A. P., **Xue, X.**, Gänswein, T., Schröter, M., Kim, T., Kasuba, K. C., Hierlemann, A. A detailed input-output characterization of single neurons reveals the synaptic basis of spontaneous spiking in recurrent networks. *In submission*
3. Gazorpak, M., Hugentobler, K.M., Paul, D., Kretschmer, M., Fischer, V., Mompart, S., Matthis, K., Rudolf, R., **Xue, X.**, Privitera, M., Hierlemann, A., Bohacek, J., Germain, P., Carreira, E.M., Gapp, K. Harnessing PROTAC technology to combat stress hormone receptor activation. *In submission*

SCIENTIFIC TALKS

- Probing synaptic connectivity and functions by combined Ca^{2+} imaging and micro-electrode array recordings. 2nd In-Vitro 2D & 3D Neuronal Networks Summit, Zurich, Switzerland, Apr 7, 2022.
- Probing synaptic connectivity by combined Ca^{2+} imaging and microelectrode array recordings. 7th BEL– PEL Conference on Emerging Topics in Science, Basel, Switzerland, Nov 19, 2022.

SKILLS

- **Programming**
  Python, MATLAB
- **Data analysis**
  Time-series, Statistical Analysis, Image Processing, Multi-electrode Data Analysis, Machine Learning
- **Engineering & Laboratory**
  Confocal Microscopy, Big Data Acquisition, Cell Culturing, Microtechnology, Sensors
- **Productivity**
  LaTeX, ImageJ, Huygens, Adobe Illustrator, Solidworks, AutoCAD, MS Office

LANGUAGES

- **Chinese**
  Mother tongue
- **English**
  Full professional proficiency
- **German**
  Elementary