**Global Research Outreach\_2025\_Call for Proposal**

**Theme: New Computing**

**- Sub-Theme: Semiconductor (CMOS) Bio-Interface and System**

The convergence of semiconductor and biotechnology offers a transformative pathway for future breakthroughs in health, life sciences, and intelligent bio-systems. Real-time, scalable interaction between electronic circuits and biological entities such as biomolecules, organoids, or living cells is opening new possibilities in diagnostics, therapeutics, biocomputing, and beyond. At the heart of this convergence are CMOS-based bio-interfaces, which are high-density, low-noise, and biocompatible platforms capable of sensing, stimulating, and processing biological signals with unprecedented precision and scale. By integrating front-end biosensing and manipulation components (e.g., CMOS microelectrode arrays, or opto-electrical arrays) with intelligent back-end signal processing and system-level integration, these platforms aim to unlock new functionalities across diverse biological domains. Future systems must overcome key challenges in biocompatibility, data fidelity, multi-modal transduction, and integration of electronic and fluidic architectures.

We are particularly interested in research that explores impactful applications, including but not limited to the examples below, and addresses the core enabling technologies necessary to realize them:

* Integrated bioelectronic platforms for drug discovery, high-throughput screening, real-time cellular monitoring, and programmable synthetic biology platforms
* Biosensing and molecular diagnostic systems with high sensitivity, specificity, and biocompatibility
* Organoid-on-chip and organ-on-chip systems with feedback control for modeling and regulating complex physiological functions
* Neural and brain-computer interfaces enabling stable, high-resolution recording and stimulation
* Biocomputing platforms and molecular processing systems that perform logic operations, memory storage, and adaptive control within biological environments
* Core enabling technologies including high-density CMOS bio-interfaces, multimodal sensing and stimulation, long-term biocompatible materials, integrated bio-sensing and control layers, and molecular interaction mechanisms at the bio-electronic interface

※ *The topics are not limited to the above examples and the participants are*

 *encouraged to propose the original idea.*

※ *Funding: Up to USD 150,000 per year*