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

**Theme: Semiconductor Materials**

**- Sub-Theme: Multi-Agent AI System for Self-Improving Materials Discovery**

Data-driven materials innovation that usually demands higher level of target properties has been inherently hindered by scarce and imbalanced data distribution since most of the chemical space remains unexplored. To overcome this issue, it is time to shift paradigm to enhance AI’s self-evolving capabilities by reducing the data dependency. In this context, the significance of data analysis, knowledge inference, reasoning, hypothesis generation, and experimental design is increasing compared to conventional AI functions of recognition and prediction. Recently, a multi-agent AI system which consists of specialized agents collaborating across various developing stages is offering a new possibility.

This calls for proposals (CFP) that demonstrate the practical feasibility and technological value of the multi-agent AI system in materials discovery. We are interested in research that addresses key challenges as follows (but not limited to):

* Validate the effectiveness of multi-agent approach by showing its superiority to conventional AI or human-driven workflows in at least one functional material field of organic, inorganic, or hybrid. The main efficacy would be in the overcoming of data scarcity and imbalance.
* Propose a novel architecture tailored for materials discovery, which includes more than two specialized agents in data analysis, inference, reasoning, hypothesis generation, prediction, experimental planning, simulation, and decision-making and operates collaboratively in a closed-loop manner. The multi-agent system should highlight how mutual interactions enable iterative learning and self-refinement throughout the discovery process.
* Present technological progress through concrete examples of materials discovery or acceleration of scientific findings.

※ *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*