

PIIN WORKSHOP #3 ON iPSC-RELATED SYSTEMS

The Purdue Institute for Integrative Neuroscience (PIIN) invites you to participate in the third workshop in our ongoing series on iPSC-related systems. The workshop series is designed to:

- identify challenges in the iPSC/organoids space that could be addressed by capitalizing on engineering expertise on campus, and
- create teams of Purdue faculty members equipped to solve these problems.

Selected teams will receive pilot funding from PIIN as part of the Institute's strategic initiatives (RFA to be released later this month).

BACKGROUND

Over the past decade, advances in the area of iPSC technologies have revolutionized neuroscience research by providing access to powerful models relevant to human neurobiology and neuropathology. At the same time, there are a number of persistent challenges in the iPSC field, including limitations in the efficiency and reproducibility of cell differentiation, as well as technical hurdles and costs associated with producing iPSC-derived organoids of high physiological relevance.

Examples of technologies with a strong presence at Purdue that could be leveraged to solve challenges in this field include:

- materials engineering and microfluidics
- high-throughput and high-content screening (e.g., for molecular or physiological markers)
- single-cell analytical methods (e.g., scRNAseq, cell type-specific biosensing)
- computational tools (e.g., closed-loop systems to control cell fate; algorithms to map neuronal network connectivity)

WORKSHOP DETAILS

The workshop will be held on **June 14, 2023 from 3-5 pm in NLSN 1195**. Coffee and snacks will be provided.

The program will consist of brainstorming sessions around the following two topics related to organoid models, both of which emerged as important challenge areas during our previous workshops in this series:

(1) INNOVATIVE COMPUTATIONAL TOOLS FOR ORGANOID DEVELOPMENT AND CHARACTERIZATION

- deep functional characterization of organoids (e.g., with biosensor readouts) at different stages of differentiation
- mapping neuronal network connectivity
- integration and analysis of large datasets from 'clinical-trial-on-a-chip' studies (e.g., see: <https://www.mdpi.com/2674-1172/1/1/3/htm>)

(2) USE OF ORGANOID MODELS FOR DRUG DISCOVERY RELEVANT TO CNS DISORDERS

- advantages/disadvantages of organoids versus 2D iPSC-derived cultures for drug discovery

- technological advances to address current challenges (e.g., organoid heterogeneity, immaturity, lack of a physiologically relevant microenvironment, absence of suitable mechanical properties; see: <https://www.cell.com/action/showPdf?pii=S1934-5909%2823%2900129-7>)

To plan for the event, we would be grateful if you registered [here](#) by Tuesday, June 13 – although registration isn't mandatory to attend, and we will keep the registration link open.

UNABLE TO ATTEND?

Discussion summaries will be made available after the workshop.

Please contact Chris Rochet (jrochet@purdue.edu) or Christina Stober (cstober@purdue.edu) if you have questions.