

Interdisciplinary imaging platform (IDIP) for biomedical research

Authors:

Lele Xu¹, Kelly Veerasammy¹, Dhwanit Dave¹, Feng Li², Xin Chen³, Yuanhua Chen², Salma Kassem¹, Maeva Coste¹, Mona Tayarani-Najjaran¹, Paola Colon De Leon¹, Areej Niaz¹, Yuki Chen¹, Sheng Zhang¹, Jorge Morales⁴, Rinat Abzalimov¹, Tai-De Li¹, Tong Wang¹, Xi Huang³, Yuanquan Song², Rein Ulijn¹, Ye He¹

1. Advanced Science Research Center, The Graduate Center of CUNY, New York, NY;
2. The Children's Hospital of Philadelphia, University of Pennsylvania, Philadelphia, PA
3. The Hospital for Sick Children, University of Toronto, Toronto, Canada;
4. City College of New York, CUNY, New York, NY

Abstract

The rapid development of imaging technologies has played a key role in our understanding of biology and biomedicine. Mass spectrometry imaging (MSI) such as MALDI MSI and TOF-SIMS have been greatly demanded in the biomedical research field due to their unique ability to profile individual molecules in complex biological samples in situ. However, each imaging techniques has its own advantage and limitation. Therefore, it turns promising to integrate MALDI with multiple interdisciplinary imaging to propel biomedical research. ASRC at CUNY has been an imaging hub with its unique capacity to house 6 multi-disciplinary imaging facilities and a broad spectrum of imaging capacities within one building. In the past five years, we have been dedicated to developing the Interdisciplinary imaging platform (IDIP) integrating optical imaging, EM, AFM, and Raman imaging, with a central focus on MALDI mass spectrometry imaging. The IDIP has greatly enabled us to addressing challenging questions in both nanomaterial research and metabolic and mechanical regulations during development such as neuron-glia interaction and brain-gut axis, and in various human diseases including multiple sclerosis (MS), spinal cord injuries, and brain tumor.