

Postdoctoral Associate, SMART CAMP (Ref:
IRG_CAMP_2020_005)
Singapore-MIT Alliance for Research and Technology
(SMART) Centre

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Job Title	Postdoctoral Associate, SMART CAMP (Ref: IRG_CAMP_2020_005)
Department	(Critical Analytics for Manufacturing Personalized- medicine) Inter Disciplinary Research Group
Institution	Singapore-MIT Alliance for Research and Technology (SMART) Centre Singapore, Singapore, Singapore
Date Posted	May 21, 2020
Application Deadline	Jun. 20, 2020
Position Start Date	May 21, 2020
Job Categories	Post-Doc
Academic Field(s)	Mechanical Engineering Engineering Physics Engineering - Other
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Job Description	

Project Overview

SMART CAMP (Critical Analytics for Manufacturing Personalized-Medicine) is a new interdisciplinary research programme in Singapore (CREATE international research campus and innovation hub) and at the Massachusetts Institute of Technology (MIT). SMART CAMP addresses key technology bottlenecks in cell therapy manufacturing: (i) critical quality attributes of safe, effective cell therapy products; and (ii) integrated process analytics to monitor and modulate those attributes. While cell therapies are poised to transform healthcare for both the industry and the patient, there remain many outstanding scientific and technical challenges to significant global impact that this R&D programme

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addresses. This high-impact focus includes measurement and feedback control of processing parameters (process analytic technologies, or PAT) that contribute to cell viability and function during cell proliferation, and the measurement at intermediate and final steps of the cell product properties correlated with positive therapeutic outcomes (critical quality attributes, or CQA).

This interdisciplinary team comprises engineers, biologists, clinicians, manufacturing, and data analytics experts from multiple MIT academic units, and multiple Singapore-based universities, research centres of excellence, and hospitals who are experienced at translational demonstrations of technologies in safety-regulated industries such as cell therapies. As with all postdoctoral associates (PDAs) in SMART CAMP based in Singapore, the PDA will work in a diverse team of experts including several principal investigators (PIs) and PDAs, and receive direct mentorship regarding career development from a pair of who are based in Singapore and at MIT, respectively.

CAMP's unique, enabling and cross-cutting capabilities include cell and clinical biology, microfluidics, real-time optics and spectroscopies, 3D-printed devices, process analytics, data analytics, and bioinformatics. This programme will demonstrate these approaches required of cell-based personalized medicine through three translational testbeds (three Flagship Projects), ultimately facilitating access for more patients to life-saving, approved cell therapies for currently intractable health challenges. These flagship projects will address allogeneic and autologous cell therapy products, including but not limited to cell sources including adult stem/progenitor cells and immune cells for treatment of specific cancers, tissue degeneration, and autoimmune diseases.

Flagship Project 1: Label-free critical quality attributes (CQA) for personalized efficacy of cell therapies, including multivariate analysis of biological and biophysical attributes

Flagship Project 2: Rapid critical quality attributes (CQA) for safety of cell sources & cell therapy products, including process analytic technologies (PAT)

Flagship Project 3: Integrated process analytic technologies (PAT) for cell proliferation and recovery, including in-line and intermittent monitoring to promote efficacy and safety CQA

Job Responsibilities

CAMP Flagship Project 2 - Nanopore sensors for fingerprinting microbial contaminants

One of the key challenges in deploying cell therapies lies in the analytical assays needed to confirm that they are safe for administration. CAMP will develop assays to detect bacterial and viral contaminants in cell therapy products. Nanopore sensors offer rapid, high-throughput, and label-free

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methods for characterizing individual biomolecules and biological structures. Microbes passing through nanopores should have distinct current traces due to cell morphology and surface proteins. This PDA will develop nanopore sensors for fingerprinting microbial contaminants in a label-free manner.

- Design nanopore-based sensors specific to a desired microbe library
- Fabricate pores of the appropriate size and dimensions
- Determine virus and bacteria samples to first evaluate and begin experiments
- Develop algorithms to decode current signals and map to specific contaminants
- Characterize assay characteristics of nanopore-based tools to enable their use in a clinical setting.

Job Requirements

- Ph.D. degree in physics, chemical/mechanical/materials engineering and related disciplines will be considered.
- Experience with nanofabrication and materials characterization (e.g., electron microscopy-based methods.) and a research track record in nanosciences, biotechnologies and/or soft matter are desired.
- Able to work well and communicate ideas effectively in a multidisciplinary team of researchers with different training backgrounds.
- Self-motivated, independent, with superior organizational and analytical skills
- Good track record of publication and scientific output
- Able and committed to work in Singapore

To apply, please visit our website at: <http://smart.mit.edu/careers/career-opportunities>. Interested applicants are invited to send in their full CV/resume, cover letter and list of three references (to include reference names and contact information). We regret that only shortlisted candidates will be notified.

Contact Information

Please reference Academickeys in your cover letter when applying for or inquiring about this job announcement.

Contact Lena Chan
Human Resource
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