Technische Universität Berlin

FG MANAGEMENT IM GESUNDHEITSWESEN/
DEPT. HEALTH CARE MANAGEMENT

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Master Thesis

In collaboration with Siemens Corporate Technology and Siemens Healthcare

Applications for label-free resistive-pulse cytometry: A market analysis

Basic Information

Have you almost completed your studies and are preparing your master thesis? If you are interested in preparing your master thesis in collaboration with Siemens, you are welcome to send your application to the contact person listed below.

With the great experience and knowledge within a wide range of areas, Siemens offers an excellent opportunity for co-operation on your master's thesis including a payment and the opportunity to spend a research period at the Department of Mechanical Engineering, University of California, Berkeley.

Closing date for applications: 15.04.2012

Please send your application to:
Technische Universität Berlin
FG Management im Gesundheitswesen
H80, Straße des 17. Juni 135
10623 Berlin

Background and objective of the Master Thesis

Cell characterization by the identification of membrane components is an essential element in disease diagnosis and monitoring. A number of methods have been developed to characterize cells for size, shape, and specific cell-surface markers. However, current methods for cell analysis are subject to restrictions. Traditional approaches often require advanced preparation, including exogenous labeling of cells, which leads to added incubation time, additional costs, and the possibility of modifying cell physiology and function. Additionally, data analysis can change when the available number of cells to be screened is on the order of just a few hundred or less (*Chapman and Sohn 2011*).

An innovative label-free method of characterizing and screening cells based on the Coulter-counter technique of particle sizing is the basis of your master thesis. Individual cell transiting - a micro channel (or ‘‘pore’’) - causes a downward pulse in the measured DC current across that ‘‘pore’’. Pulse magnitude corresponds to the cell size, pulse width to the transit time needed for the cell to pass through the pore, and pulse shape to how the cell traverses across the pore (i.e., rolling or tumbling). When the pore is functionalized with an antibody that is specific to a surface-epitope of interest, label-free screening of a specific marker is possible, as transient binding between the two results in longer time duration than when the pore is unfunctionalized or functionalized with a nonspecific antibody.

While this method cannot currently compete with traditional technology in terms of throughput, there are a number of applications for which this technology is better suited than current commercial cytometry systems. Applications include the rapid and nondestructive analysis of small cell populations (<100), which is not possible with current technology, and a platform for providing true point-of-care clinical diagnostics, due to the simplicity of the device, low manufacturing costs, and ease of use.

In your Master Thesis you will concentrate on identifying (1) pre-clinical and clinical areas for using the new method (i.e. disease entities or indications) and (2) competing diagnostic instruments or methods for the various pre-clinical and clinical areas. A market analysis should provide an informative basis for the above mentioned points.

Reference:

Chapman MR and Sohn LL (2011): Label-Free Resistive-Pulse Cytometry. Methods in Cell Biology. 102:127-57.

Contact

For further questions please contact:
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Requirements

- Master applicants in industrial engineering and management especially with a specialization in health technologies at the Berlin University of Technology or
- Master applicants at Berlin School of Public Health
- Applicant should be interested in the Master Thesis listed above.
- Good English language skills
- performing well on exams
- Master thesis should start by August 2012 at the latest
- A positive overall assessment of the applicant after a short interview