

Research Officer

Job Title: 'Development of a Human Anatomical Simulation System to Assist the Design and Development of Medical Devices'

Project Title: 'Venous System Simulation Model for Optimisation of Vena Cava Filter Design'

Description: The main objective of this project is to develop an *in vitro* experimental simulation system that will allow development engineers, from a start-up medical device company in Galway, to understand and assess the functional performance of a new medical device, known as a vena cava filter. Assessment of the performance of different filter designs, filters' ability to capture clots, resistance to movement resulting from clot impact and maintenance of blood flow after clot trapping becomes possible using this artificial circulation system. In contrast to many test systems reported in the literature, the proposed simulation system will closely mimic the venous system in the human body as the detailed structure of the vessels will be replicated based on the medical images (MRI) of a group of patients. In addition, the material properties of the vena cava and femoral veins will be replicated through the use of appropriate engineering materials for the vessel models. The circulation flow parameters such as pressure, volume and velocity will be reproduced using a pump system. The deformation experienced by the inferior vena cava from surrounding organs such as the diaphragm will be investigated and simulated within the system. This test system will offer extensive device testing prior to *in vivo* studies and should reduce significantly the number of animal trials required to reach conclusions regarding efficacy and safety of the new filter device.

Research Environment: The researcher will be working under the umbrella of the Galway Medical Technologies (GMedTech) Centre, which was established within GMIT in 2006. The Centre supports the medical device design and development community through both the development of test systems which simulate the various systems in the human body, and the provision of specialised medical device design support. The members of the GMedTech team will support the researcher in his/her project activities. The researcher will be based the GMedTech building, which will be opening in May 2007. Equipment developed and built in the project will be tested and utilised in the laboratory space in the Centre. Equipment will be built utilising GMIT Engineering Workshop staff, and facilities. The researcher will be in a position to utilise the research facilities within the college, such as the Library, and relevant academic staff. Finally, the researcher will have a close working relationship with the industrial partner company.

Requirements/Background: The successful candidate will hold a minimum of Honours Degree in Mechanical or Biomedical engineering. Desirable that candidate also has a post-graduate engineering qualification.

Project Start-Date: June 2007

Project Duration: 2 Year Fixed Term

Conditions: €35,500 per annum starting, plus PRSA payment of 8% of salary.

Further Information on the Project: John Kelly at john.kelly@gmit.ie

Please submit a detailed Curriculum Vitae along with a covering letter clearly indicating the project title to:

**Human Resources Department,
Galway-Mayo Institute of Technology,
Dublin Road, Galway.
Email: hr@gmit.ie
Telephone No.: (091) 742763/742767/742737
Fax No.:(091) 770545**

Latest date for receipt of application is: 12 noon on Friday, 25th May 2007.