

**INSTITUTE:**

Galway-Mayo Institute of Technology

**RESEARCH AREA:**

Biomedical Engineering

## Dr. Liam Morris: Developing experimental test systems to simulate cardiovascular disease

Excellent Researchers  
Delivering Impact

Biomedical Engineering

**IOTI**

Institutes of Technology Ireland

Dr. Liam Morris joined the lecturing staff at Galway-Mayo Institute of Technology in 2005 and, having secured funding, co-founded the biomedical research centre GMedTech in 2006. Liam's research at the centre seeks to develop physiologically relevant experimental test systems based on medical images for simulating various cardiovascular type diseases that occur in the abdominal aorta, cranial vasculature and coronary arteries.

The ultimate vision of GMedTech is as a Centre of Excellence within GMIT which offers regionally and nationally based medical device companies an advanced product testing service and which works with clinicians in providing surgical training facilities and surgical planning tools. This has been achieved by creating a state of the art testing facility, capable of replicating different bodily functions and diseases.

Liam Morris graduated with a first class honours degree from GMIT in 1998 and continued his studies there at Level 9 with a research masters (1998 – 2000) in the area of Biomedical Engineering. This focused on designing new innovative procedures for the treatment of Abdominal Aortic Aneurysms under the guidance of Dr. Patrick Delassus.

Liam completed a PhD at the University of Limerick (under the supervision of Prof. Tim McGloughlin) in the Biomedical Engineering field and secured an Enterprise Ireland Proof of Concept grant to continue this research as a postdoctoral researcher

(2004-2005). Liam joined GMIT in 2005 and co-founded the GMedTech centre with Dr. Delassus.

To date, Liam has been involved in securing over €4 million in research funds. Grant sources have included: Enterprise Ireland funding for commercialisation projects and an applied research enhancement centre (with a proposal ranked 1st out of all submissions in 2005); HEA Technological Sector Research funding under Strand I (ranked 9th of 180 applicants in 2007) and Strand III (Ranked 1st out of all of the IOTs in 2008); and funding from international bodies (e.g. National Institutes of Health in the USA). →



Dr Liam Morris, GMedTech

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→ Currently, Liam is involved in a research partnership with Professor Don Giddens (Georgia Tech, USA) in a submission for an NIH Exploratory/Development Research grant award. This is focused on developing accurate algorithms which would provide clinicians with much improved visualisation of an implantable 3D stent structure for the treatment of coronary artery bifurcating lesions. Also, the GMedTech group is in discussions regarding possible NRB grant opportunities with three hospitals (UHG, Merlin Park Hospital and Beaumont Hospital).

To date, Liam has graduated two PhD students and has vivas scheduled for two further candidates within the next 6 months. Liam is currently supervising two PhD candidates and a Masters by research student. Liam's work has generated much interest and has been published in international peer reviewed journals. Furthermore, some of this work has been cited by other leading researchers (with over 300 citations to date based on the Scopus database). In recognition of his expertise, Liam is an invited reviewer for leading international journals such as: The Journal of Biomechanics, Annals of Biomedical Engineering and Medical Engineering & Physics.

In 2012, the GMedTech group provided the experimental benchmarking data for the inaugural CFD challenge organised by the American Society for Mechanical Engineer's Bioengineering Fluids committee. This assessed the pressure drops across a giant cranial aneurysm and twenty five numerical based groups worldwide compared their results against GMedTech's experimental data. GMedTech's findings were presented at the 2012 ASME Bioengineering Summer Conference in Puerto Rico and were also published in The Journal of Biomechanical Engineering in February 2013.

Liam will continue to develop his research within the Biomedical Engineering field and grow his group's capability with a view to further developing world class simulator systems for industry device testing, clinical training and surgical planning. This planned growth will naturally further Liam's academic progression within GMIT. ■

## TESTIMONIAL

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**Dr. Liam Morris**

*Galway-Mayo Institute  
of Technology*

*"GMIT have provided an environment, laboratory space and significant funding to develop Biomedical Engineering research within the Institute. GMIT intends to continue its support for the GMedTech centre and its research with the future provision of new enhanced custom built laboratory space."*

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