

Dr. Liam Morris	
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Research Interest	<p>My main research interest is in assessing cardiovascular diseases and surgical solutions both computationally and experimentally.</p> <p>I co-founded the GMedTech biomedical engineering centre in 2006 which led to the successful funding of the MET gateway in 2016. During this time period I have supervised 10 PhD students to completion and enabled the development of physiologically relevant test systems for simulating cardiovascular type diseases in particular for aneurysms (cerebral, abdominal and thoracic), stroke, coronary artery disease, heart failure and dissections. My research enabled GMedTech/MET to be a Centre of Excellence, within GMIT, that offers regional and national based medical device companies an advanced product testing service and clinicians in providing surgical training facilities and surgical planning tools. I also apply my engineering and clinical knowledge in developing IP. I have secured over €4 million in research funds as lead and co PI.</p> <p>To date, I have published 50 + peer reviewed journal articles, 100+ conference and 3 patents. My research and research group have won 15 awards both nationally and internationally.</p>
Publications	<p>Peer Reviewed Journal Publications</p> <ol style="list-style-type: none"> 1. Lyashevska, O, Malone F, MacCarthy E, Fiehler, J, Buhk J.H, Morris L. Class imbalance in gradient boosting classification. Statistical Methods in Medical Research. 096228022098048, 2020, doi: 10.1177/0962280220980484 2. McHugo, S, Nolke, L, Delassus, P, MacCarthy, E, Morris, L, McMahan CJ. An in-vitro evaluation of the flow haemodynamic performance of Gore-Tex extracardiac conduits for univentricular circulation. Journal of Cardiothoracic Surgery 15 (1), 1-10, 2020 3. McHugo, VS, Nolke, L, Delassus, P, MacCarthy, E, McMahan, CJ, Morris L. The impact of compliance on Stage 2 uni-ventricular heart circulation: An experimental assessment of the Bidirectional Glenn. Medical Engineering & Physics 84, 184-192, 2020 4. Malone, F, McCarthy, E, Delassus, P, Buhk, JH, Fiehler, J, Morris, L. An in vitro assessment of atrial fibrillation flow types on cardiogenic emboli trajectory paths. Proceedings of the Institution of Mechanical Engineers, Part H: Journal of Engineering in Medicine, doi.org/10.1177/0954411920946873, 2020 5. H O'Grady, K Mostafa, H Zafar, D Lohan, L Morris, F Sharif. Changes in left ventricular shape and morphology in the presence of heart failure: a four dimensional quantitative and qualitative analysis.

	<p>International journal of computer assisted radiology and surgery, 1-16, 2019</p> <ol style="list-style-type: none"> 6. F Malone, E McCarthy, P Delassus, JH Buhk, J Fiehler, L Morris, Embolus Analog Trajectory Paths Under Physiological Flowrates Through Patient-Specific Aortic Arch Models, Journal of Biomechanical Engineering 141 (10), 2019. 7. F Malone, E McCarthy, P Delassus, JH Buhk, J Fiehler, L Morris. Investigation of the Hemodynamics Influencing Emboli Trajectories Through a Patient-Specific Aortic Arch Model. Stroke 50 (6), 1531-1538, 2019 8. S Duffy, R McCarthy, M Farrell, S Thomas, P Brennan, S Power, A O'Hare, L Morris, Per-Pass Analysis of Thrombus Composition in Patients With Acute Ischemic Stroke Undergoing Mechanical Thrombectomy, Stroke 50 (5), 1156-1163. 2019 9. MR Elliott, D Kim, DS Molony, L Morris, H Samady, S Joshi, LH Timmins. Establishment of an Automated Algorithm Utilizing Optical Coherence Tomography and Micro-Computed Tomography Imaging to Reconstruct the 3-D Deformed Stent Geometry, IEEE transactions on medical imaging 38 (3), 710-720. 2019 10. F Malone, E McCarthy, P Delassus, P Fahy, J Kennedy, AJ Fagan, L Morris. The Mechanical Characterisation of Bovine Embolus Analogues Under Various Loading Conditions. Cardiovascular engineering and technology, 9 (3), 489-502, 2018 11. HO Grady, H Zafar, K Mostafa, L Morris, F Sharif, 3-Dimensional analysis of the haemodynamics of heart failure (HF) in mid-range-(HF-mrEF), reduced-(HF-rEF) and preserved-(HF-pEF) ejection fraction classification patients. EUROPEAN JOURNAL OF HEART FAILURE 20, 14-14, 2018 12. N Hynes, D Devane, S Sultan, EP Kavanagh, L Morris, D Veerasingam, Hybrid repair versus conventional open repair for thoracic aortic arch aneurysms. The Cochrane Database of Systematic Reviews 2018 (1). 2018 13. Duffy S, · Farrell M, · McArdle K, · Thornton J, · Vale D, · Rainsford E, · Morris L, · Liebeskind D.S, · MacCarthy E, · Gilvarry M. (2016). Novel methodology to replicate clot analogs with diverse composition in acute ischemic stroke. Journal of Neurointerventional. 9 (5), 486-491, 2017 14. F Stefanov, S Sultan, L Morris, A Elhelali, EP Kavanagh, V London, Computational fluid analysis of symptomatic chronic type B aortic dissections managed with the Streamliner Multilayer Flow Modulator, Journal of vascular surgery 65 (4), 951-963, 2017 15. B McDermott, M O'Halloran, E Porter, A Santorelli, L Morris, B Divilly, Anatomically and dielectrically realistic microwave head phantom with circulation and reconfigurable lesions, Progress In Electromagnetics Research B, 2017 16. Hynes N, Sultan S, Elhelali A, Diethrich EB, Kavanagh EP, Sultan M, Stefanov F, Delassus P, Morris L. (2016). Systematic Review and Patient-Level Meta-analysis of the Streamliner Multilayer Flow Modulator in the Management of Complex Thoracoabdominal Aortic
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	<p>Pathology. <i>Journal of Endovascular Therapy</i>. 23(3), 501-12. doi: 10.1177/1526602816636891</p> <p>17. F Stefanov, T McGloughlin, L Morris, A computational assessment of the hemodynamic effects of crossed and non-crossed bifurcated stent-graft devices for the treatment of abdominal aortic aneurysms, <i>Medical engineering & physics</i> 38 (12), 1458-1473 2016</p> <p>18. A Elhelali, L Morris, N Hynes, EP Kavanagh, S Sultan, Open surgical repair, hybrid and endovascular repair of aortic arch pathology: systematic review and meta-analysis, <i>IRISH JOURNAL OF MEDICAL SCIENCE</i> 185, S88-S88, 2016</p> <p>19. F Stefanov, L Morris, A Elhelali, EP Kavanagh, V London, N Hynes, Insights from complex aortic surgery with a Streamliner device for aortic arch repair (STAR), <i>The Journal of thoracic and cardiovascular surgery</i> 152 (5), 1309-1318. e5, 2016</p> <p>20. Finn R, Morris L, (2016). An experimental assessment of catheter trackability forces with tortuosity parameters along patient-specific coronary phantoms. <i>Proc Inst Mech Eng H. Journal of Engineering in Medicine</i>. 230(2):153-65. doi: 10.1177/0954411915623815</p> <p>21. Morris, L. Stefanov, F. Hynes, N. Diethrich. E.B. Sultan, S. (2015). An Experimental Evaluation of Device/Arterial Wall Compliance Mismatch for Four Stent-Graft Devices and a Multi-layer Flow Modulator Device for the Treatment of Abdominal Aortic Aneurysms. <i>European Journal of Vascular and Endovascular Surgery</i>. DOI:10.1016/j.ejvs.2015.07.041</p> <p>22. Morris, L. Fahy, P. Stefanov, F. Finn, R. (2015). The effects that cardiac motion has on coronary hemodynamics and catheter trackability forces for the treatment of coronary artery disease: An in vitro assesement. <i>Cardiovascular Engineering and Technology</i>. 6, (4), 430-449. DOI: 10.1007/S13239-015-0241-y.</p> <p>23. S Sultan, F Stefanov, L Morris, N Hynes, An Experimental Evaluation of the Compliance Mismatch Effects for Four Stent-graft Devices and a Multi-layer Flow Modulator (MFM) Device for the Treatment of Abdominal Aortic, <i>Circulation</i> 132 (suppl_3), A19579-A19579, 2015</p> <p>24. Fahy, P. Malone, F. McCarthy, E. McCarthy, P. Thornton, J. Brennan, P. O'Hare, A. Looby, S. Sultan, S. Hynes, N, Morris, L. An In Vitro Evaluation of Emboli Trajectories within a Three-Dimensional Physical Model of the Circle of Willis under Cerebral Blood Flow Conditions. <i>Annals of Biomedical Engineering</i>, 43(9), 2265 – 2278. 2015.</p> <p>25. N Hynes, A Elhelali, EP Kavanagh, P Delassus, L Morris, S Sultan, Evaluation of the Multilayer Flow Modulator in the Management of Complex Thoracoabdominal Aortic Pathology: A Systematic Review and Metaanalysis, <i>Journal of the American College of Cardiology</i> 66 (15), B330-B330, 2015</p> <p>26. N Hynes, A Elhelali, EP Kavanagh, P Delassus, L Morris, S Sultan, TCT-808 Evaluation of the Multilayer Flow Modulator in the Management of Complex Thoracoabdominal Aortic Pathology: A Systematic Review and Metaanalysis, <i>Journal of the American College of Cardiology</i> 66 (15 Supplement), B330,2015</p> <p>27. A Elhelali, E Kavanagh, V London, L Morris, N Hynes, W Tawfick, S Sultan, Clinicopathological study of atherosclerotic and inflammatory</p>
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	<p>abdominal aortic aneurysms, <i>Irish Journal of Medical Science</i>. 184, S206-S206, 2015</p> <p>28. Ene, F. Delassus, P. Morris, L. (2014). The influence of computational assumptions on analysing abdominal aortic aneurysm haemodynamics. <i>The Proceedings of the Institution of Mechanical Engineers: Part H: Journal of Engineering in Medicine</i>. 228(8), 768-80.</p> <p>29. Fahy, P. McCarthy, P. Sultan, S. Hynes, N. Delassus, P. & Morris, L. (2014). An Experimental Investigation of the Hemodynamic Variations Due to Aplastic Vessels Within Three-Dimensional Phantom Models of the Circle of Willis. <i>Annals of Biomedical Engineering</i>, 42 (1), 123 – 128.</p> <p>30. Fahy P., P. Delassus, P. McCarthy, S. Sultan S, N. Hynes, and L. Morris. (2013) An in vitro assessment of the cerebral hemodynamcis through three patient specific circle of willis geometries.: <i>Journal of Biomechanical Engineering</i>, 136(1), 011007 doi: 10.1115/1.402577.</p> <p>31. Steinman, D.A, Hoi, Y. Fahy, P. Morris, L. et al., (2013). Variability of CFD solutions for pressure and flow in a giant aneurysm: The SBC2012 CFD challenge. <i>Journal of Biomechanical Engineering</i>, 135(2), 021016, doi 10.1115/1.4023382.</p> <p>32. Morris, L. Stefanov, F. & McGloghlin, T. (2013). Stent graft performance in the treatment of abdominal aortic aneurysms: The influence of compliance and geometry. <i>Journal of Biomechanics</i>, 46(2), 383-395.</p> <p>33. Stefanov, F. McGloughlin, T. Delassus, P. & Morris, L. (2013). Hemodynamic variations due to spiral blood flow through four patient-specific bifurcated stent graft configurations for the treatment of abdominal aortic aneurysms. <i>International Journal for Numerical Methods in Biomedical Engineering</i>, 29(2), 179 – 196.</p> <p>34. Callanan, A. Morris, L. & Mcgloughlin, T. (2012). Finite Element and Photoelastic Modelling of an Abdominal Aortic Aneurysm: A comparative study. <i>Computer Methods in Biomechanics and Biomedical Engineering</i>, 15 (10), 1111 – 1119.</p> <p>35. Ene, F. Gachon, C. Delassus, P. Carroll, R. O'Flynn, P. & Morris, L. (2011) In vitro evaluation of the effects of intraluminal thrombus on abdominal aortic aneurysm wall dynamics. <i>Medical Engineering & Physics</i>, 33 (8), 957-966</p> <p>36. Molony, D., Callanan A, Doyle B, Morris L, Walsh M and McGloughlin T, “Geometrical Enhancements for Abdominal Aortic Aneurysm Grafts”, 2008, <i>Journal of Endovascular Therapy</i>, 15 (5), 518-529</p> <p>37. Corbett T, Doyle B, Callanan A, Morris L, Grace P, McGloughlin T. “A review of the In Vivo and In Vitro Biomechanical Behaviour and Performance of Post Operative Abdominal Aortic Aneurysms and Implanted Stent-Grafts ”, 2008, <i>Journal of Endovascular Therapy</i>, 15 (4), 468-484</p> <p>38. Callanan A, Morris L, Badylak SF, McGloughlin T, “Implications of stenting UBM extracellular matrix on strength: An experimental and numerical study”, 2008. <i>Journal of Biomechanics</i> 41, S97-S97.</p> <p>39. Doyle, B.J., Morris L, Callanan A, Kelly P, Vorp D.A and McGloughlin T.M, “3D Reconstruction and Manufacture of Real Abdominal Aortic Aneurysms: From CT Scan to Silicone Model”, 2008, <i>Journal of Biomechanical Engineering, ASME</i>, 130 (3),</p>
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