Garth Pearce

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EDUCATION

University of New South Wales	PhD	Aerospace Engineering	**2010**
University of New South Wales	BE	Aerospace Engineering	**2006**
University of New South Wales	BSc	Physics	**2006**

PROFESSIONAL ACTIVITIES

- Research Program Manager for Manufacturing Processes, Sovereign Manufacturing Automation for Composites CRC (2022 – Present)
- Associate Professor of Mechanical and Aerospace Engineering, School of Mechanical and Manufacturing Engineering, UNSW Sydney (2010 – Present)
- Deputy Head of School (Education), School of Mechanical and Manufacturing Engineering, UNSW Sydney (2019 – 2022)

RESEARCH INTERESTS

My research exploits both simulation and experiment to explore the multiscale mechanics of composite materials. I investigate the relationships between composite constituents, manufacturing methods, microstructure and structural properties. With this knowledge, my research team build tools to efficiently design composite structures for improved structural integrity, stability and response to extreme conditions.

A strong industry connection is fundamental to my research. I have fostered relationships with organisations across the composites manufacturing sector (Boeing, Lockheed Martin, Omni Tanker) as well as defence and national research organisations (DSTG, ANSTO, German Aerospace Centre). I develop material models and design tools which my partners are using to shorten product develop cycles and reduce design risk.

Key research areas:

- Multiscale Modelling of Composite Materials and Structures
- Automated Manufacture of Advanced Composites
- Composite Vessels for Dangerous Goods Transport
- Crashworthiness and Dynamic Failure of Composites

MAIN SCIENTIFIC PUBLICATIONS

- Islam, M. S., Benninger, L. F., Pearce, G., & Wang, C. H. (2021). Toughening carbon fibre composites at cryogenic temperatures using low-thermal expansion nanoparticles. Composites Part A: Applied Science and Manufacturing, 150.
- Zhemin Cai, Ameen Topa, Luke P. Djukic, Manudha T. Herath & Garth M.K. Pearce 2021, 'Evaluation of rigid body force in liquid sloshing problems of a partially filled tank: Traditional {CFD}/{SPH}/{ALE} comparative study', Ocean Engineering, vol. 236, pp. 109556, doi:10.1016/j.oceaneng.2021.
- Pearce, G.M., Johnson, A.F., Thomson, R.S. & Kelly, D.W. 2010, 'Experimental investigation of dynamically loaded bolted joints in carbon fibre composite structures', Applied Composite Materials, vol. 17, no. 3, pp. 271-291
- Pearce, G.M., Johnson, A.F., Thomson, R.S. & Kelly, D.W. 2010, 'Numerical investigation of dynamically loaded bolted joints in carbon fibre composite structures', Applied Composite Materials, vol. 17, no. 3, pp. 329-346
- Saif Al Ghafri, Stephanie Munro, Umberto Cardella, Thomas Funke, William Notardonato, J. P. M. Trusler, Jacob Leachman, Roland Span, Shoji Kamiya & Garth Pearce et al. 2022, 'Hydrogen Liquefaction: A Review of the Fundamental Physics, Engineering Practice and Future Opportunities', Energy & Environmental Science,
- Zhang, J., Liu, M., Pearce, G., Yu, Y., Sha, Z., Zhou, Y., Yuen, A.C.Y., Tao, C., Boyer, C., Huang, F., Islam, M., Wang, C.H.; Strain stiffening and positive piezoconductive effect of liquid metal/elastomer soft composites; (2021) Composites Science and Technology, 201.
- Hou, T., Pearce, G. M. K., Prusty, B. G., Kelly, D. W., & Thomson, R. S. (2015). Pressurised composite tubes as variable load energy absorbers. Composite Structures, 120, 346-357.
- Xie Li, Sonya A. Brown, Mathew W. Joosten & Garth M. Pearce 2022, 'Tow wise modelling of non-conventional automated fibre placement composites: short beam shear study', Composites Part A: Applied Science and Manufacturing, vol. 154.
- Xie Li, Jonathan Dufty & Garth M Pearce 2021, 'Automation of tow wise modelling for automated fibre placement and filament wound composites', Composites Part A: Applied Science and Manufacturing, vol. 147.
- G.M.K. Pearce, A. Mukkavilli, N.T. Chowdhury, S.H. Lim, B.G. Prusty, A. Crosky & D.W. Kelly 2018, 'Strain Invariant Failure Theory - Part 1: An extensible framework for predicting the mechanical performance of fibre reinforced polymer composites', Composite Structures