PhD Scholarships Available

Title of Project	Supervisor's Details	Project Description
Modelling and nonlinear signal processing of deep brain signals.	A/Prof Paul Meehan (07) 3365 4320 or email Meehan@uq.edu.au	The area of research includes the investigation, modelling and nonlinear signal processing of deep brain signals for cognition analysis. (1PhD)
Advanced Rail corrugation Measurement System	A/Prof Paul Meehan (07) 3365 4320 or email Meehan@uq.edu.au or Dr Bill Daniel on (07) 3365 3584 or email billd@uq.edu.au	Analysis and development of an innovative software module for on-board vibration based estimation of rail profiles. Requires application and development in nonlinear modelling and control estimation under noisy conditions. (1PhD)
Rail squat detection	A/Prof Paul Meehan (07) 3365 4320 or email Meehan@uq.edu.au or Dr Bill Daniel on (07) 3365 3584 or email billd@uq.edu.au	Modelling and investigation of the conditions under which the rolling contact nonlinear fatigue rail surface phenomenon occurs. The aim is to predict the conditions and parameter ranges under which rail squats occur to provide insight into subsequent control. Materials based PhD also required. (2PhD + 1Postdoc/RA)
Millipede Forming	A/Prof Paul Meehan (07) 3365 4320 or email Meehan@uq.edu.au or Dr Bill Daniel on (07) 3365 3584 or email billd@uq.edu.au	Development of the analysis and predictive modelling for the newly invented process of continuous press forming of flat strip to arbitrarily shaped product. State of the art research is required to model and understand the critical process parameters of this new nonlinear process and their effects on shaped product. Experimental and optimal tooling design research will subsequently be performed. (2PhD + 1Postdoc/RA)
Optimal dragline slew dynamics	A/Prof Paul Meehan (07) 3365 4320 or email Meehan@uq.edu.au or Dr Bill Daniel on (07) 3365 3584 or email billd@uq.edu.au	Draglines are billion dollar robotic-like machines which are the bottle-neck to productivity in open cut mining. The aim of this research is to investigate the potential to improve dragline dynamic performance limitations based on nonlinear dynamic modelling, stability theory, estimation and optimisation of dynamic slew trajectories. (1PhD)
Prediction Modelling & Analysis of Machine Tool Chatter while machining Titanium Alloys	A/Prof Paul Meehan (07) 3365 4320 or email Meehan@uq.edu.au or Dr Bill Daniel on (07) 3365 3584 or email billd@uq.edu.au	The machining of specialised materials such as Titanium alloys is prone and limited by chatter. Chatter is a vibration instability phenomenon that depends on the machine tool dynamics, tool and workpiece interface and fixtures. The focus of this research project will be to develop, tune and experimentally validate a predictive model for machine tool chatter of titanium alloys and to develop a sensitivity table for enhancement of the productivity envelope based on identified critical process parameters. (1PhD)
Predictive Modelling of the Incremental Forming Process	A/Prof Paul Meehan (07) 3365 4320 or email Meehan@uq.edu.au or Dr Bill Daniel on (07) 3365 3584 or email billd@uq.edu.au	Incremental sheet forming (ISF) is a new flexible manufacturing process in which complex 3D shapes are formed from a sheet of metal using a simple moving tool (stylus). The non-specialised tool may be used to form an infinite variety of highly complex shapes in the same manner an artist is unrestricted with a simple brush. The project aim is to investigate and develop mechanics based predictive models for the nonlinear contact mechanics, localised plastic strain dynamics and tool trajectory to facilitate product design & optimisation. (1PhD)