Potential Supervisors (School of MIA)

Academic staff research interests are outlined below. Students interested in applying should contact the responsible person to discuss the current research available.

Mechanical / Aeronautical Engineering

Dr M Atkins

Fundamental and applied aerodynamics, flow control, thermofluids in gas turbine engines, thermal-hydraulics in CANDU reactors, particle image velocimetry and planar laser visualization

michael.atkins@wits.ac.za

Mr M Boer

Aircraft design, flight performance estimation, tumble manoeuvre mechanics and flow visualisation.

michael.boer@wits.ac.za

Mr T Frangakis

Bulk materials handling, flow properties of bulk materials, Discrete Element Modelling (DEM), mechanical vibration, simulation of hydro-powered equipment, mechanical design of equipment such as mining machinery.

terrance.frangakis@wits.ac.za

Prof W Ho

Aerodynamics of flapping wings, biomedical engineering especially in the field of biofluids e.g. vascular flow etc., using computational fluid dynamics for industrial applications.

weihua.ho@wits.ac.za

Mr J Jones

Packaging material testing and design. Specific interest in paper and corrugated board packaging. Composite sandwich material testing and characterization. Material Testing and characterization, fracture mechanics, failure investigations and analysis. Engineering Education

john.jones@wits.ac.za

Prof C Law

Experimental and numerical modelling of the aerodynamics, gas dynamics and fluid structure interactions of immersed bodies; Aerospace propulsion looking at air breathing engines, rocket engine

combustors and satellite electrical micro propulsion. Other research areas include systems engineering and Air Traffic Management.

craig.law@wits.ac.za

Prof P Loveday

Vibration, Acoustics and Ultrasound. Guided Wave Ultrasound for Non-Destructive Evaluation and Structural Health Monitoring. Piezoelectric Sensors and Actuators. Numerical Modelling and Measurement.

philip.loveday@wits.ac.za

Dr L Nel

Compressible flows (specifically interactions between supersonic flow phenomena such as shock waves, expansion fans, and vortices) and flow visualisation.

lara.nel@wits.ac.za

Ms L Moloisane

Materials testing and characterisation, Cold Gas Dynamic Spray technology and its applications, materials in nuclear energy systems.

lebogang.moloisane@wits.ac.za

Dr R Paton

Highly transient, compressible gas flows particularly in the field of impulsive motion and vortices, as well as weak shock dynamics and acoustics; computational fluid dynamics modeling and analysis of such gas flows; high-speed comminution and protective clothing development.

randall.paton@wits.ac.za

Mr F Pietra

FEA (Finite Element Analysis) mechanical simulations: non-linear simulations (large deformation, buckling, contacts), non-linear material simulations (plasticity, hyper-elasticity, creep, etc.), Dynamic simulations (Vibrations and Explicit dynamic), APDL (Ansys Parametric Design Language), thermal simulations. Design (mechanical components/structures), optimization, fatigue (theory, experimental activities and related topics: fretting, residual stresses, fatigue related technologies, etc.), composite (design, analysis and manufacturing technologies), innovative manufacturing technologies (friction stir welding, laser shock peening, etc.). Helicopter structure topics (main rotor head and tail rotor head design, landing gear design).

Francesco.Pietra@wits.ac.za

Prof C Polese

Fatigue, Fracture Mechanics and Damage Tolerance analysis of metallic aircraft structures. Conventional and innovative aerospace technologies: Split Sleeve Cold Working, ForceMate, StressWave, Laser Shock Peening, etc., for fatigue life enhancement of metallic components; New welding technologies (Friction Stir Welding, Laser Welding, etc.); Titanium machining and High Speed Machining. Mechanical testing, Finite Element Analysis and processes optimization.

claudia.polese@wits.ac.za

Dr H Roohani

Unsteady compressible fluid dynamics generated by bodies in accelerated motion. Internal combustion engines research with special focus on alternative fuels such as hydrogen and natural gas. Refrigeration and air conditioning systems with special emphasis on solar energy applications in these areas.

hamed.roohani@wits.ac.za

Mr S Schekman

Primarily focus on fluid dynamics and hear transfer with testing in Wind tunnel testing including flow visualization. Turbine blade cooling techniques, aircraft control surfaces, military technology, solar car aerodynamics.

sjouke.schekman@wits.ac.za

Dr T Smit

Prediction and measurement of residual stresses in composite materials. Aircraft performance estimation and applied aerodynamics.

teubes.smit@wits.ac.za

Dr A Storm

Thermodynamic cycle design, focussing on Brayton, Rankine and combined cycles. Alternative energy systems. Combustion systems modelling and design with emphasis on coal combustion.

andre.storm@wits.ac.za

Dr B Smith

Intersection of machine learning (deep learning, reinforcement learning), explainable machine learning and causal inference (counterfactual explanations). Why do ML models make their predictions? Which features in the model are causes of the outcome? How can we use machine learning to generate causal (counterfactual) models?

Bevan.smith@wits.ac.za

Industrial Engineering, Systems Engineering and Engineering Management

Dr A Botha

Strategies, Business Process Improvement (Kaizen, Toyota Way, Theory of Constraints, Simulation), Management of Technology, development of Technology Scenarios, Strategic Planning, evelopment of System Dynamics and Optimisation Models, development of Economic Models for Technology Products, Project Management, Integration of Disparate Business Entities into Synergistic Units

abotha@alum.mit.edu

Ms S Chatur

Theory of Constraints, Process Analysis (Process flow time reductions), and Production management and scheduling systems (Push and Pull systems).

sabrina.chatur@wits.ac.za

Dr M Dewa

Design and development of Digital Assistance Systems (DAS), Systems Engineering (SE), Quality Engineering, Systems modelling and simulation, Project Management (PM), Change Management, Design and development of Information Systems, The Industrial Internet of Things and Engineering Education.

mncedisi.dewa@wits.ac.za

Dr L Doherty

Business ethics, engineering ethics, economics, organisational behaviour (communication, employee motivation & satisfaction, organisational structures, employee morale, organisational culture, communication, leadership, negotiation & conflict resolution, management principles)

lorrainne.doherty@wits.ac.za

Dr B Emwanu

Manufacturing strategy (MS) content, process and context in competitive environments. Linkages with business ecosystems, management and leadership, drivers and constraints of competitiveness, business strategy, performance and metrics, technology and innovation, supply chain, industrial policy, internationalisation and globalisation. Application to Services and other sectors. Strategy formulation and implementation complexities. Modeling firms strategically. Within and between firms, investigating approaches from other disciplines, Economic, cognitive and environmental linkages.

bruno.emwanu@wits.ac.za

Dr D Gonsalves

Addressing large national problems in the area of security; futures and systems approaches, enterprise engineering, systems engineering; complexity and transdisciplinary research.

duarte.paulo.goncalves@gmail.com

Dr B Sunjka

Supply Chain Risk Management - in manufacturing SMME's; Supply Chain Management; Quality Management; Project Management through the application of qualitative research methods.

bernadette.sunjka1@wits.ac.za

Ms B Tladi

Social development efforts, community development, employee engagement, unemployment and underemployment, community development metrics, tri-sector partnerships, private-public partnerships, social value – measurement and indicators thereof, corporate social responsibility, social sustainability, materiality analysis, creating shared value, collective impact

bontle.tladi1@wits.ac.za