TOP FORM

Emerging applications in the electronics, aerospace, automotive, and biomedical sectors are driving industry demand for products and components with enhanced performance and lower costs. Trends in customised and high precision manufacturing and new technologies are adding to the complexity of engineering components.

In such a dynamic environment, FTG focuses on near-net shape or net shape material processing technologies, such as hybrid metal forming, liquid-state processing, polymers, composites, and powder processing, to create dimensionally accurate parts with superior mechanical properties. In doing so, our aim is to minimise the development time in a process chain, reduce manufacturing costs, and optimise cost-benefits.

FTG’s portfolio of technologies is constantly being developed and refined to serve the changing industry needs. The group carries out collaborative cutting-edge research with academic institutions, co-develops processes and products with companies, transfers technology, and conducts training for the manufacturing industry.

Core Competencies

- **Metal Forming and Liquid-state Processing**
  - Spin forming of advanced materials
  - Liquid forging for high-quality, light-weight materials with complex feature parts
  - Microforming of metallic components
  - Cold forging and combined stamping/forging for light weight and high strength alloys

- **Polymer and Composites Processing**
  - Processing and application development for biopolymer and nanoblends
  - Natural fibre and cellulose-based composites manufacturing technologies
  - Precision Injection Moulding/ Micro-moulding & Polymer Micro-structuring

- **Heat treatment of high-strength materials**

- **Mouldflow analyses and Process Simulation**

- **Film/Foam processing technologies**

- **Powder Processing**
  - Powder Injection Moulding (PIM) of high performance super alloys
  - Powder Over Injection Moulding of dissimilar materials and 3D profile internal features
  - Processing of porous/Nano-structured materials
Technologies Available for Transfer

Metal Forming and Liquid-state Processing
- Advanced spin forming of light-weight aluminium alloys
- Combined stamping forging of aluminium alloys
- Cold forging and microforming of stainless steels, alloy steels, copper, and aluminium alloys
- Liquid forging and casting of aluminium and magnesium alloys

Polymer and Composites Processing
- Injection and micromoulding of plastic components with expansion-compression moulding
- Extrusion compounding of nanocomposites, biodegradable polymers, and polymer recycling
- Natural fibre composite processing/pre-preg composites
- Resin Transfer Moulding (RTM) of composite and nanocomposites

Powder Processing
- Powder Injection Moulding (PIM) and micropowder injection moulding of stainless steel, titanium and alloys, nickel super alloy, tungsten carbide, zirconia, and refractory ceramic
- Powder Over Injection Moulding of complex structures with internal features/channels

Target Industries
- Aerospace • Automotive • Biomedical • Electronics
- Marine • Metal Forming • Oil & Gas • Polymer
- Precision Engineering

Major Facilities
Metal Forming and Liquid-state Processing
- Hydraulic press 400T, 200T, and 50T with counter pressure
- Cold forging Aida press (630 T)
- Cold rotary forming machine
- Aida 110T Servo Press for multi modes forming steps
- SCHMIDT ServoPress 420 for Microforming
- DEFORM 2D/3D
- Liquid forging hydraulic press with full robotic automated production cell
- Magma filling and solidification simulation software

Polymer and Composites Processing
- Expansion compression moulding machine
- Two-shot micromoulding machine
- Mouldflow simulation for polymers
- Walk-in composite curing oven
- Leistritz twin screw extruder
- Fully electrically driven 55-ton injection moulding
- High temperature resin transfer moulding for composites
- Haake MiniLab II Mini-compounder with MiniJet II mini-injection system
- Film Extruder

Powder Processing
- AVS high temperature sinter-HIP vacuum furnace
- Thermal Technology LCC furnace
- Double-barrel injection moulding machine

Research Partners
- Auckland University (NZ)
- Data Storage Institute (DSI)
- Imperial College London (UK)
- Institute of High Performance Computing (IHPC)
- Institute of Materials Research and Engineering (IMRE)
- Liège University (Belgium)
- Loughborough University (UK)
- Madrid Institute for Advanced Studies of Materials (Spain)
- Nanyang Technological University (NTU)
- National University of Singapore (NUS)
- The University of Sheffield (UK)
- Toyota Central Research Lab (Japan)
- TU Delft (Netherlands)
- University of Sydney (Australia)
- Warwick Manufacturing Group (UK)

Industry Partners
- Aavid Thermalloy
- Advanced Materials Technologies
- AEI Corporation
- Amtek Precision Technology
- Avantium
- Bio-scaffold International
- Bosch
- Broadway Industrial Group Limited
- Cardinal Health Singapore
- Diethelm Keller Aviation
- Dou Yee Technologies
- Dynacast
- Dynaglass Reinforced Plastic
- Fagerdala
- Fotronics Incorporation (S)
- Goodrich Aerostructures Service Centre-Asia
- Hamworthy
- Innobrace Orthodontics
- Inter-Asia Marine Services
- JCS-Vanetec
- Kaiser Precision Engineering
- Light 10 Labs
- MediPurpose
- Micropoint
- MMI Holdings
- Nanoscience Innovation
- Pacific Forest Products
- Philips Consumer Lifestyle
- Rayco Technologies
- Rolls-Royce
- Schlumberger
- Seiko Instruments Singapore
- Seksun Corporation
- Shimano (S)
- Singapore Airlines
- Solvay Group Rhodia Asia Pacific
- ST Kinetics
- Stamford Tyres
- Supreme Components
- Tata Consultancy Services Asia Pacific
- York Transport Equipment (Asia)

For enquiries, please contact:
Mr Steven Tong Kin Kong, Group Manager (FTG)
Email: steven@SIMTech.a-star.edu.sg