Edmond ABDOU  (Gareth Vio)

THE DESIGN OF FATIGUE-CONSTRAINED AEROSPACE STRUCTURES USING TOPOLOGY OPTIMISATION

The objective of this thesis is to consider the application of Topology Optimisation in the conceptual design of aerospace structures constrained against fatigue failure. The Bidirectional Evolutionary Structural Optimisation (BESO) method of topology optimisation is combined with fatigue analysis in order to formulate suitable fatigue-design constraints for such problems.

Khalid ALI  (Paul Briozzo)

ANALYSIS OF APOLLO S1-C WATER IMPACT

Water impact analysis of Apollo S-IC rocket booster using explicit finite element code LS-DYNA. The purpose of this research is to provide information on the damage inflicted and see if structure is recoverable.
Manar AL KAMMESSY  
**INTEGRATION AND TESTING OF AN ORTHOPAEDIC DEVICE**

design and integration of an Orthopaedic using various sensors in order to analyse the performance of a knee in the rehabilitation of patients.

Ming Kai CHEA  
(Prof Liyong Tong / Dr Srinivas Vasista (DLR)) 
**PRESSURE ACTUATED MORPHING WINGLET**

Morphing winglets have the potential to improve aerodynamic efficiency at different flight conditions and alleviate structural loads. This thesis presents a novel approach of designing a morphing winglet, by tailoring the stiffness/ flexibility requirements of a pressure actuated compliant mechanism through topology optimisation and manufacturing using polyjet 3D printing.

Niki Lisa CROW  
(Michael Kirkpatrick) 
**RENEWABLE AND NUCLEAR ENERGY TECHNOLOGIES FOR AUSTRALIA**

This thesis attempts to show in a matlab model that it is possible to meet the Australian energy demand using only nuclear, solar, wind energy generation technologies and pumped hydro or biomass for load-levelling. Case studies are given for a few cities on the east coast of Australia.

Xiangyun DAI  
(Stefan Williams) 
**TIME SERIES ANOMALY DETECTION AND FORECASTING**  
(Major Industrial Project)

Using Machine Learning techniques to detect anomalies and make predictions on streaming data. Integrating the solution for predictive maintenance

Chiara DELLA MARTA  
(Philip Boughton) 
**A NOVEL BIORESORBABLE SPINAL FIXATION SYSTEM FOR An ALIF Cage**

Implant loosening is a common long term health problem associated with spinal fusion that can potentially be mitigated through innovative spinal fixation technology. This thesis investigated a novel fixation system that is both unique and bioresorbable.

Lydia DRABSCH  
(Stefan Williams) 
**HIGH ACCURACY RELATIVE POSITIONING OF MULTIPLE GPS RECEIVERS**
Using raw GPS data to solve for the instantaneous relative position between a network of GPS receivers. The algorithm is implemented in a simulated environment as proof-of-concept. The purpose of this study is to investigate techniques for increasing the accuracy of GPS without the need for additional hardware or pre-calibration.

Brodie David ELLIOTT (Philip Boughton)

DEVELOPMENT OF AN AIR-QUALITY MONITORING SYSTEM

Stripe Rust is a serious disease which effects the yield of crops around the world, notably wheat. Given the limitations of current treatments, our team focused on developing a UAV Spore Trap to detect and map out concentrations of spores in the air around crop fields.

Ruben FITZSIMONS (Ali Haydar Göktoğan)

WIRELESS LIVESTOCK MONITORING USING SMART EARTAGS

A robust smart eartag design is presented, using recent advancements in Internet of Things (IoT) technologies to provide a solution to the agricultural challenge of monitoring livestock. This smart eartag is designed and produced, employing energy harvesting, long range RF communications using LoRa and power optimised system operation to enable long term deployment.

Michael FORRAI (Robert Fitch)

COMMUNICATION PLANNING FOR DECENTRALISED MULTI-ROBOT COORDINATION

A decentralised, communication-aware planning algorithm is proposed to coordinate a multi-robot team for scenarios with severe bandwidth constraints.

Tianqi FU (Nicholas Williamson)

SHAPE OPTIMIZATION OF INTEL HEATSINK USING NUMERICAL SIMULATION

Heatsink model will be generated and put into ANSYS for simulation, to understand its performance. Then perform shape optimization to improve the performance while maintain cheap and easy to manufacture. The purpose of this study is to improve the heatsink performance to make it more useable and energy efficient.

Riley Martin GREEN (Stefan Williams)

MERGING THE DIGITAL AND ANALogue VISUAL WORLD USING MACHINE LEARNING AND IMAGE RECOGNITION
(Major Industrial Project)
This thesis aims to provide a platform where the user can leverage and merge the optimal OCR (Optical Character Recognition) or IR (Image Recognition) service for their needs. This will enable reading of handwriting, real-time video analysis, sentiment analysis and tagging of images; all using Machine Learning and Neural Networks.

Max HARDWICK-MORRIS          (Qing Li)

VALIDATION OF A SMART NAVIGATION SYSTEM FOR DELIVERING OPTIMAL TOTAL HIP ARTHROPLASTY (MIP)

Accuracy of acetabular cup placement in total hip arthroplasty is vital in reducing the risk of dislocation, impingement, edge loading, prosthetic wear and osteolysis. Navigation systems are required to improve the accuracy with which these cups are placed and this paper seeks to validate a new, smart navigation system.

Sajad HASSAN                    (Matthew Cleary)

FIRE SUPPRESSION

Aerial fighting is common in bushfires where suppressant are being dropped from an altitude. But a new technique proposed by engineers is by dropping gliders that contain the suppressant to distinguish the fire. Assuming that we are able to add the droplet of suppressant (water) in the fire plume, then we must investigate at what point in the plume the droplet shall be added for most effective extinguishment. This new notion of fire suppression requires modelling the droplet interaction with fire plume such as it effects on the flow structure, kinetic energy, gas temperature, and reaction rate of reacting plume, and heat absorption by the droplet.

Michael James HOLMES          (Ali Haydar Goktogan)

AN OPEN-SOURCE CAMERA CALIBRATION AND OBJECT TRACKING FRAMEWORK

An open-source multi-target tracking system has been constructed from the OpenCV computer vision suite using Python, implementing a novel extrinsic calibration method scalable to large, convex regions with rudimentary localisation. Implemented as a low-cost, simple-to-setup solution for student use in field robotics and motion capture.

Padriac HOOPER                 (Hala Zreiqat)

A TOUGH, BIODEGRADABLE BIOMATERIAL FOR TREATMENT OF HEART FAILURE

The development of a tissue-engineered biomaterial for heart failure, an epidemic disease affecting 23 million people worldwide and the leading cause of hospitalization for the elderly. The biomaterial is a tough, biodegradable elastomer called PGS. Its key properties, namely mechanical, degradation and biocompatibility, have been optimized through chemical synthesis methods.
Tousif Islam (Michael Kokshoorn, Ed Nebot)

Development of autonomy in an RC car

The purpose of this thesis is to develop low cost Autonomy for an RC car using rudimentary sensor technology and documenting the processes required.

Eugene KIM (Xiaofeng Wu)

HISA: A HYPERSPECTRAL IMAGING SATELLITE FOR AUSTRALIA.

This study presents the mission planning and preliminary system design for commercially viable 100kg class microsatellite. The primary mission is centred on the application of hyperspectral imagery to address compelling agricultural and environmental problems specific to Australia. The technical mission requirements for maximum utility and data throughput are presented.

Siyi LI (Philip Boughton)

IMPACT OF DIFFERENT PROCESSING CONDITIONS IN THREE DIMENSIONAL PRINTING TITANIUM IMPLANT

Titanium is currently considered as the most attractive metallic materials for biomedical applications due to their excellent mechanical properties, corrosion resistance, and biocompatibility. This study will focus on how 3D processing methods (SLS and SLM) will effect on microstructure, mechanical properties and biocompatibility of titanium and compare to the traditional modelling titanium.

Benjamin James Richard LINDSAY (Greg Roger)

A NOVEL DEVICE FOR THE TREATMENT OF PLANTAR FASCIITIS

Plantar fasciitis, one of the most prevalent soft tissue disorders of the foot. While current treatment modalities have shown some success, a widely used systemic approach to the injury does not exist. This thesis follows the design and justification of an affordable and effective treatment option.

Alex Gurbir Singh MAVI (Andrew Ruys)

THE EFFICIENT AND SUSTAINABLE TRANSPORT OF CADAVER KITS USING HYDRAULIC MECHANISM

As Cadaver kits that carry dead tissue and cells are increasingly used in research and development, there is a need to transport these cells and the kits in which they are stored in, more efficiently and safely. This project creates a solution to a better transport mechanism that is more effective and efficient than the current industry standard, identifying key factors of transport such as sustainability, economic viability and safety.
PRODUCT SPECIFIC VISUALIZATION UPDATE
(Major Industrial Project)

The Patient Specific Visualisation report (PSV) is a document that provides assistance to surgeons in correctly placing the acetabular cup and femoral head during a total hip replacement. It is currently not fully utilised and so the aim of the project was to implement changes in order to increase the effectiveness of the report.

DEVELOPMENT AND MANUFACTURING OF MODEL TURBINE BLADES

To explore various possibilities in preparing a concept design of propeller blades for a wind turbine with best efficiency and manufacture them for the purpose of teaching in a module for The University of Sydney, Australia.

THE TRANSIENT BEHAVIOUR OF VAPOR COMPRESSION CYCLE

Moving boundary formulation have been developed for simulating the dynamics behaviour of a typical vapour compression cycle. This model is used to investigate the behaviour of the transient performance characteristics over a range of system parameters.

DEVELOPMENT OF IOP MEASUREMENT DEVICE FOR THE SMART PHONE

To develop a highly accessible, dynamic intraocular pressure measurement device for the smart phone as a diagnostic tool. The focus of the study will be on optimisation of mechano-optic sensor designs for the best sensitivity and safety.

CYTOTOXICITY OF β-TRICALCIUM PHOSPHATE NANOPARTICLES ON PDGFRα-EXPRESSING CARDIAC PROGENITOR CELLS

β-Tricalcium Phosphate Nanoparticles (β-TCP-NPs) have the potential to provide a sustained therapeutic stimulus at the injured tissue. However, the effects of β-TCP-NPs on PDGFRα-expressing cardiac stem/progenitor cell population (PDGFRα-CPC) and heart repair are not known. This study aims to examine the effects of β-TCP-NPs on PDGFRα-CPC proliferation and viability.
FSAE CHASSIS ANALYSIS, COMPLIANCE AND MANUFACTURE

The purpose of this study is to analyse the race car's Aluminium Honeycomb chassis. With the intention of testing and modifying components in order to ensure the design will comply to FSAE's strict before and after the chassis manufacture.

EVALUATING THE EFFECTS OF OMEGA-3 POLYUNSATURATED FATTY ACIDS (PUFAs) ON BREAST CANCER CELLS (MDA-MB-231)

Epidemiological studies have shown that dietary consume of omega-3 Polyunsaturated Fatty Acids (PUFAs) confirm a beneficial effect in the amelioration of tumor growth and progression, including breast cancer. The two predominant PUFAs, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) which found in cold water fish as well as fish oil supplement restrain breast cancer cell growth in vitro and in animal model. A studies on the effect of omega-3 PUFAs on breast cancer were proposed to investigate more on this matter.

CONTROL OF A MAVLINK-EQUIPPED UAV THROUGH MATLAB

The development of an interface to allow for MATLAB based control of a UAV that is MAVLINK compatible.

APPLICATION OF TENSORFLOW IN DELIVERY OF LIQUID APPLICATION MANAGEMENT (Major Industrial Project)

Creating a deep neural network using tensorflow and scikit learn libraries, integrating them into Splunk as an interfacing tool and then plugging the results into a chatbot that will talk to people over Skype to act upon the predictions from the model.

INVESTIGATING THE FEASIBILITY OF A NOVEL NON-THERMAL CARDIAC ABLATION DEVICE (MIP)
Non-thermal techniques, such as synergistic electrolysis and electroporation, offer advantages over thermal techniques for minimally invasive treatment of atrial fibrillation. Advantages include precision, reduced surgery times and lower complication rates. Bench-top and large animal experiments were used in this feasibility study to develop a novel non-thermal cardiac ablation device.

Conrad ROMANOWSKI  
ULTRASOUND LOCALISATION SYSTEM FOR ARCHAEOLOGICAL EXCAVATION
A system of ultrasound sensors and transmitters were used to set up a localisation system for an archaeological dig site. Its purpose is to accurately and quickly record the positions of any artefacts.

Jackson SHIELDS  
AUTONOMOUS BATHYMETRIC MAPPING WITH A USV
Develops a system to conduct bathymetric surveys using an Unmanned Surface Vessel. Focuses on planning, control and mapping capabilities to ensure surveys are complete and efficient.

Alex SNEDDON  
UNDERSTANDING THE INFLUENCE OF MECHANICS OF THE TUMOUR MICROENVIRONMENT ON ANTI-MIGRATORY CANCER DRUGS
Cell and tissue mechanics play an important regulatory role in cancer development and progression, as well as its therapy. The purpose of this study is to determine the role of stiffness of the tumour microenvironment on the efficacy of an anti-migratory Omega-3 molecule-based cancer drug.

Willy Pratama Tangtra  
TEMPERATURE DISTRIBUTION IN SOLAR REACTOR
Using tomogrophy techniques to approximate the temperature distribution of a diffusion flame under concentration solar radition. The purpose of this study is to gain a better understanding on how high energy solar flux may effect the particles inside a flame.

Hoang Thai TONG  
ACTIVE HEAT TRANSFER TECHNOLOGY
By utilizing active heat transfer technology whereby the heat transfer component is a non-stationary rotating component. The aim of this project is to develop a detailed description of active heat transfer technology realized through the combination of heat pipe technology and a multiple disk Tesla type pump.
HYPOXIC PRECONDITIONING OF ADIPOSE STEM CELLS FOR BONE TISSUE REGENERATION

The microenvironment where stem cells are found provide signals conducive to the maintenance of stem cell properties, proliferation and differentiation. The physiological niche of stem cells is hypoxic and oxygen tension, or lack thereof, plays a key role in determining stem cell fate. The purpose of this study is to quantitatively determine the effect of preconditioning cells with hypoxia to maximise osteogenic differentiation for use in cell-based bone tissue engineering.

NUMERICAL SIMULATION TO OPTIMISE SPACING

Global energy markets are moving away from fossil fuels and towards Renewable Energy options. Tidal Energy is a clean and reliable alternative. This thesis improves the efficiency and output of tidal arrays by optimising the spacing between turbines.

COMPUTATIONAL FLUID DYNAMICS OF HUMAN VELOPHARYNX IN HEALTHY AND OBSTRUCTIVE SLEEP APNOEA SUBJECTS: EFFECT OF CURVATURE-BASED SURFACE ROUGHNESS

A previous study showed significant differences in curvature-based surface roughness (CBSR) between healthy and OSA subjects. This computational fluid dynamics study demonstrated the contribution of CBSR to velopharynx airflow properties. Elevated pressure in the airflow regime and increased airway resistance were found with increasing CBSR.

A HAND-HELD DEVICE FOR 3D SCENE RECONSTRUCTION

3D mapping of arbitrary terrain is typically both a time consuming and expensive venture. This seminar presents a hand-held device that accurately builds 3D models of arbitrary environments in real time, using hardware with a combined total value of less than 1000 AUD.

DRIED FOOD CONTAINER DESIGN FOR COLES

Dried Food container design for Coles Supermarket. That can fill out the crumbs and easy to maintain so it can be save millions for Coles each year for maintenance.
Siqi YI (Stewart Worrall, E Nebot)

DEEP LEARNING BASED VISUAL PERCEPTION FOR INTELLIGENT TRANSPORTATION SYSTEMS

Convolutional neural networks are trained and evaluated to facilitate the computer visual perception for autonomous vehicles. The purpose of this study is to explore state-of-the-art deep learning algorithms and ways of deploying them to solve computer vision problems in traffic.

Brandon YOU (Lin Ye)

ALUMINIUM BASED EMI PAINT

Conductive paint has been a popular solution for EMI. This thesis focuses on the construction of aluminum-based coating and its advantages against other commercial coatings.

CAPSTONE PROJECT B / Extended / Dissertation B

Saad ALLANA (Matthew Dunn)

DESIGN AND MANUFACTURE OF A STEADY LAMINAR CO-FLOW BURNER FOR MEASURING SOOTING PROPENSITY OF LIQUID FUELS

The purpose of this study is to research and investigate different engineering designs of liquid fed-burners. To propose an improved and more sustainable burner design, which will be a steady laminar co-flow repeatable liquid-fed burner that can be used in the laboratory for more accurate and viable experimental results.

Mengjie BAI (Qing Li)

ORTHODONTIC BIOMECHANICS MODELLING

Orthodontic is a popular treatment to improve individuals' life quality by recovering the malocclusion to the normal occlusion. This study is aimed to investigate optimal orthodontic biomechanics model to assist every specific patient in silico.

Junhao CHEN (Colin Dunstan)

PROSTHETIC FOR RETINA
Using the neuromodulation technology to create a retinal prosthetic for blind people with damaged retina by stimulating the optic nerve. The presentation will introduce the current treatment and give possible improvement by a concept design.

Jialun CHENG (Lin Ye)

ENERGY ABSORPTION OF SHEAR THICKENING FLUID
To explore the type of energy absorption of shear thickening fluid with related experiments and theories.

Edward Alejandro CORTES CARRASCAL (Doug Auld)

DESIGN OF A HIGH PRESSURE RESERVOIR AND COMPRESSOR SYSTEM TO DRIVE A SUPERSONIC NOZZLE
This project will be focused in the design of a high pressure reservoir to suit the testing of the existing supersonic nozzle in the laboratory and the study of the supersonic flow of air for research purposes.

Rohit DESHMUKH (Matthew Dunn)

A STUDY ON THE EFFECT OF RECIRCULATING AIR ON THE AIR AGE USING CFD
Using Fluent the effect of the return/recirculating air on mean air age is investigated. The purpose of the study is to explore how return air affects the flow of the air, the flow rate, the room air age. The relation between the mass flux, return air and age is examined.

Rui DING (Xiaofeng Wu)

THE CONTROL SYSTEM DESIGN AND SIMULATION FOR A STRATOSPHERE AIRSHIP
Design a stratosphere airship control system and then Simulate the airship model in Simulink to examine the performance of designed control system. The study is aimed to find a solution which can stabilize the airship flight state when disturbances happen in the stratosphere environment as soon as possible.

Xing FAN (Qing Li)

NON-LINEAR FINITE ELEMENT IN ORTHODONTIC
CAD a dental bracket, analyse its related issue by using finite element method. CT scan, Segmentation, CAD, FEA.
Franz FORSTER (Andrei Lozzi)

RESEARCH OF DIFFERENT TYPES OF CONNECTING RODS, WITH REGARD TO THEIR SPECIFIC BEHAVIOUR UNDER DIFFERENT STRESS AND LOAD CONDITIONS

Beside some previous publishing, there are some gaps between Science and Industry when it comes to the most appropriate design for connecting rods. Beside highlighting types and features, some investigations are not considering the results of the static approach. Moreover it is to evaluate, why different companies and manufacturer using different design approaches.

Qingchao FU (Xiaofeng Wu)

MEMS THRUSTER

MEMS thrust based solid propellant propulsion was developed. The structural design and fabrication process of thruster, as well as the approach of propellant injection are presented.

Yuan GAO (Lin Ye)

DEVELOPMENT OF A MECHANICAL INDENTATION TECHNIQUE FOR DETECTING TUMOR IN SOFT TISSUE

Making the models to simulated the soft tissue containing tumors, and research the mechanical response of different stages of breast cancer by the scratch test.

Qichao HAO (Nicholas Williamson)

OPTIMIZATION OF TROMBE WALL BY INVESTIGATING THE FLOW IN ENCLOSURES

This report investigates the natural convection flow in the enclosures and provide a guidance for engineer to design the Trombe Wall. This report focuses on the cooling down condition and get the transient results by the commercial software Fluent.

Md Nazmul HAQUE (Assaad Masri)

COMBUSTION OF BIODIESEL IN ENGINE

Characterization of dilution system for measuring engine emissions and comparison of emissions for different biodiesel fuels.

Zhende HU (Lin Ye)

Ware Of Drilling Tool For CFRP Composites
By drilling hundreds of holes in carbon fiber board, observe changes of tools. The aim of the project is to find a scientific theoretical law for wearing of the drilling tool.

Fang JI (Philip Boughton)

**BIOACTIVE GLASS DEVELOPMENT**

Tracing back to the history of bioactive glass, we design excellent bioactive glass scaffold using advanced fabrication methodology. Designed scaffold will has no buckling stability and bear strong compressive strength.

Sheng JIANG (Matthew Dunn)

**THE EFFECTS OF SOLAR RADIATION ON THE FLAME STABILIZATION**

**PROGRESS REPORT**

The primary objective of this work is to elucidate the underlying physics behind the excellent stability and emissions performance of the selected combustor. The approach is to experimentally characterize velocities, species mixing, heat release and flame structure in an atmospheric pressure combustor with the help of various optical diagnostic techniques: Laser-Induced Fluorescence (PLIF), Laser Induced Fluorescence (LIF).

Haoyang LI (Qing Li)

**DESIGN ANALYSIS OF CAR CRASHWORTHINESS**

Car crash simulation data obtained by presys and ls-dyna in rear-end collision scenario, and design optimization based on such data.

Tangyu LI (Michael Kirkpatrick)

**ANALYSING THE THERMAL ENVIRONMENT OF SCI-TEC LIBRARY BY NUMERICAL AND EMPIRICAL METHOD**

The Sci-Tec library of our university is conditioned by two interesting air conditioning systems: Displacement ventilation and chilled beams. In this study, the thermal environment of Sci-Tec library is analyzed by both the experimental and numerical methods.

Ting LI (Qing Li)

**DENTAL IMPLANT**

Design a suitable kind of dental implant; optimize parameters, for example: diameter length and shape investigate mechanical response.
Wensi LI (Xiaofeng Wu)

STRUCTURE OF HYPERSONCTRAL SATELLITE

Using Solidworks to design structure of hyperspectral satellite and do thermal analysis and vibration analysis.

Gechen LIU (Lin Ye)

ANALYSIS OF HOLE DRILLING AND TOOL WEAR OF CFRP USING DAGGER DRILL

This topic is a research about hole drilling and tool wear of the dagger drill bit. Thrust force, torque, temperature change, and delamination will be discuss in the presentation.

Shuai LIU (Lin Ye)

THERMAL FORMING OF THERMAL PLASTIC COMPOSITES

Understanding the behaviour of thermal plastic composites when thermal forming, and research on some potential methods to improve the quality and accuracy.

Shuai LIU (Lin Ye)

ENERGY ABSORPTION OF CELLULAR STRUCTURE

Using cola cans to text how boundary conditions between cans will affect energy absorption.

Hongjia MU (Lin Ye)

ENERGY ABSORPTION CAPACITY OF COMPOSITE TUBES

Uniaxial crushing tests have been conducted on different types of CFRP tubes. The purpose is to understand the effect of composite types on the energy absorption. The FEM tests have also been included.

Mohammed NASR (Li Chang)

VACUUM TRIBOLOGY OF POLYMERIC NANOCOMPOSITES

The objective of this study is to examine and investigate the tribological behavior of high performance polymeric materials such as polyetheretherketone (PEEK) and Epoxy in vacuum condition.

Amr OMAR (Michael Kirkpatrick)
FUEL CELL - GAS TURBINE POWERED BY SOLAR TOWER

Thermo-economic evaluation and optimization of hybrid system for hydrogen production by steam reforming and power generation using gas turbine and Solid Oxide Fuel Cell by utilizing solar tower as heat source.

Shuijing PING (Xiaofeng Wu)

REAL TIME LOCATION SYSTEM (RTLS) OF INDOOR AIRSHIPS USING ULTRA WIDEBAND RADIO (UWR)

Introduce the technology and algorithm of navigation systems.

Chenxu WANG (Simon Ringer)

NOVEL PROPERTY PROFILES FOR STRUCTURAL PROPERTY RELATIONSHIPS IN METALLIC SYSTEMS

Density functional theory (DFT) is the available approach to analyse the electronic structure of materials. Atomically complete models of material sample can create hybrid data which can be used to directly inform simulations for structure-property relationships. This project will generate all possible configurations and calculate the property of atoms by DFT.

Kaidi WANG (Lin Ye)

CHARACTERISATION OF ARTIFICIAL MATERIALS SIMULATING SOFT TISSUES AND TUMOUR

Using bean starch gels to simulate soft tissue and tumour, exploring the mechanical indentation characteristics by varying the size, location and elastic modulus of the "tumour". The purpose of this study is to provide material-wise foundation to the development of a palpation device.

Pengfei WANG (Lin Ye)

THE EFFECTS OF RECIRCULATED COOLING SYSTEM FOR CASING DETECTING TOOLS

To solve the problem of high temperature and high pressure, the design of structure should be considered. Relying on the properties of metallic materials is to solve the problem caused by high temperature in the oil well. However, especially for high temperature, approaches adopted can effectively and conveniently to deal with the challenge of high temperature. Not only the selection of materials and design of structure will be paid attention, but also methods and approaches of cooling system should be focused.
Rungang WANG          (Matthew Dunn)

THERMAL COMFORT IN AN OFFICE EQUIPPED WITH CHILLED BEAMS

Using computational fluid dynamics (CFD) package as a tool to evaluate the thermal comfort of passive chilled beams system and active chilled beam system in an office room. The purposes are to compare the thermal comfort performance of different air conditioning systems and explore the best suitable system for an mid-size office.

Suning WANG         (Xiaofeng Wang)

HIGH ALTITUDE BALLOON DESIGN FOR NEAR SPACE SCIENTIFIC MISSIONS

Huge latex balloon is used to carry experiment instruments to do scientific research and other missions. Altitude control system design will be discussed in this capstone.

Junhua WEI             (Lin Ye)

THERMAL-SELF HEALING PERFORMANCE OF THERMOPLASTICS

A research on the self-healing efficiency of Polycaprolactone (PCL).

Kun XIAO             (Nicholas Williamson)

NUMERICAL MODELLING OF NATURAL CONVECTION IN BUILDING INTEGRATED PHOTOVOLTAIC

Using commercial CFD package to implement 3D LES modelling and 2D RANS modelling respectively. Investigating the effect of radiation on flow characteristics and heat transfer. Predicting the Nussel number in terms of Rayleigh number and aspect ratio for such kind of application.

Qiong YAN            (Xiaofeng Wu)

SMART STURCTURE DESIGN OF VISIONAL REALITY (VR) TECHNOLOGY BASED UNMANNED AERIAL VEHICLE (UAV)

It is an innovative aerial vehicle, with the majority of the operation done on Unmanned remotes. Recently a group of engineers has expressed interest in designing, and produce this Unmanned airship. I am focus the smart design of airship. This design combines the flapping wing feature of ornithopters and the buoyancy body of airships.

Omar Zazou              (Michael Kirkpatrick)

COMPUTATIONAL FLUID DYNAMICS ANALYSIS OF A STADIUM
Using a CFD simulation to assess the effect of weather on thermal comfort in a stadium and the airflow on the stadium's pitch.

HAIQING ZHANG (Lin Ye)

FATIGUE OF FBG SENSOR

Using FEA analysis software and experiment to evaluate the fatigue property of FBG sensor, and the precision of FBG sensor should be determined after the fatigue test.

Hongrui ZHANG (Qing Li)

CRASHWORTHINESS DESIGN FOR LIGHTWEIGHTING STRUCTURES

Using LS-Dyna to optimize size and shape of holes on tube component for achieve maximum specific energy absorption.

Mudi ZHANG (Lin Ye)

NIGHT GLOWING PAINT WITH THE GLOWING PARTICLES

Glowing paint is a new type of eco-friendly materials, which can absorb the light or other electromagnetic radiation energy. After that, the luminous paint will release the stored energy in the form of light which is used for night lighting or safety signs.

Rui ZHANG (Michael Kirkpatrick)

TROMBE WALL

Analyse heat transfer features of a 2D room with Trombe Wall by using Ansys. The fluid includes both laminar flow and turbulent flow. The purpose of this capstone is to verify that Trombe Wall could effectively change the inner thermal environment.

Xiaoyun ZHANG (Colin Dunstan)

THE EFFECTS OF OMEGA-3 FATTY ACIDS AND 5-AMINOLEVULINIC ACID ON MDA-MB-231 BREAST CANCER CELLS

Breast cancer is the second common cancer among women in the world. Over past years, many studies suggested that omega-3 fatty acids (FAs) has the potential inhibitory effects on tumor proliferation and metastasis. However, the therapeutic uses of omega-3 FAs hasn't been applied clinically. 5-aminolevulinic acid (5-ALA) has been used on treatment of cancer for decades. This study investigated the individual and combined actions of Omege-3 FA analogues (CPs) and 5-ALA on proliferation, migration and invasiveness of MDA-MB-231 breast cancer cells.

Yunduo ZHAO (Xiaofeng Wu)
DEVELOPMENT AND APPLICATION OF FPV (FIRST PERSON VIEW)

TECHNOLOGY IN WEBVR

Using Raspberry Pi (Linux based microcomputer) and fisheye camera to create a 4G connection to the internet after running image algorithm. Users can view VR effect streaming webpage on mobile phone browser.