

PROFILE

Passionate about using a knowledge of system dynamics in the context of control & operation to pursue an optimal. Avid learner, with track-record utilising knowledge of first-principles & programming abilities to create impact early in each role.

PROFESSIONAL EXPERIENCE

STING Industries Research Ltd., London | Formerly WECORP Industries Ltd. Defence challenger, startup.

Dynamics & Control Engineer ■ Flight Performance

May. 2021 - Present

- Led the technical development of the craft with a focus on flight performance. Aligned efforts across 5 dynamics & control, perception and propulsion engineers and established cohesive strategy to meet requirements.
- Assisted the development of Systems Engineering V&V workflow. Designed performance quantification & tracking strategy.
- Migration of modifications to open-source flight controller from base version v1.10.1 to v1.12.0 to take advantage of new features & hardware support. Verified behaviour in simulation & flight testing. PX4, Python & C++.
- Implemented potential flow formulation for simulation of near-boundary aerodynamics in full-system model. Gazebo, C++.
- Currently, building upon PX4 flight controller to:
 - Implement a disturbance observer to improve control accuracy in enclosed environments.
 - Dynamically adjust control allocation to overcome near-surface thrust characteristics, manufacturing inaccuracy & damage.

Simulation Software Engineer ■ Autonomy

Jun. 2019 - Dec. 2020

- Designed MIL, SIL, HIL simulation workflows to streamline development for multiple engineers. Matlab/Simulink, Gazebo.
- Developed electro-mechanical model of propulsion system, to inform requirements for motors/propellers. Matlab/Simulink.
- Architected & implemented targeting solution comprising of inference, frame transformation and setpoint publishing across different tracking modes. Co-ordinated collaboration from a number of technical stakeholders. ROS, Python.
- Designed experiments to generate data for the selection of model parameters, formalising knowledge of system behaviour.
- Authored, maintained, tested payload module interface (state machine). ROS, C++.
- Assisted in hardware & software troubleshooting efforts during testing & user demonstrations. Linux, ROS, Python, C++.

Williams Grand Prix Engineering, Oxford | Formula 1 Team. 7 Drivers', 9 Constructors' Championships.

MEng Thesis ■ Vehicle Dynamics & Simulation, Driver-in-Loop Simulator

Jan. - Jun 2019

- Developed model for drivers' effect on performance, specifically around certain non-linearities in the aerodynamic response.
- Developed custom lap simulator to quantify driver-affected performance. Matlab.

Industrial Placement ■ Vehicle Dynamics & Simulation

Aug. 2017 - Sep. 2018

- Projects completed with the Aerodynamic Concepts Group & Fuel Systems. Developed methods to predict relative performance potential in design proposals to provide a recommendation on priority.
- Implemented new techniques for comparing performance across coupled setup changes & in tyre-saving conditions.
- Created suspension component models from rig test data, to increase correlation with response seen on-track. Matlab.
- Maintained model parameter database, used for simulation and setup specification. Liaised with a number of technical stakeholders to determine requirements and ensure data was in-place as development continued, and before race weekends.
- Boosted reliability of metrics generated for Vehicle Dynamics 'pre-event' sensitivities report. Automated for speed. Matlab.
- Generated sensitivities, monitored competitors & reacted to general simulation requests in support of the weekend sessions.

Imperial College Aeronautics Department, London | FSAE Concept Design. Group Design Project, Y3

Technical Director/Project Manager

Jun. - Jul. 2017

- Guided 22 person team using sensitivity-driven approach to design Top 10 scoring FS car under strict time constraints.

EDUCATION

Imperial College London

London

Aeronautical Engineering ■ Masters of Engineering (M.Eng), Upper Second Class (2:1)

Aug. 2014 - Jun. 2019

- MEng. Thesis: Quantification of Driver Effect Around Significantly Non-Linear Aerodynamics
- **Awards:** Highest Project Grade: High Performance Computing (97%) ■ Highest Performance Index: Group Design Project (Y1)
- **Responsibilities:** Vice Captain, 2016-18 - Imperial College (IC) Gliding Society ■ Webmaster, 2016-17 - IC Aeronautics Society

Inverurie Academy

Inverurie, Aberdeenshire

3 Advanced Highers: Maths, Physics, Chemistry (A1, A1, A2) ■ 5 Highers ■ 8 Standard Grades

Aug. 2008 - July. 2014

PROJECTS

✉ kieran.dwn

✉ **insight** | Project creator. Source-agnostic telemetry viewer. Flexible workflow for complex system data.

Nov. 2020 - Present

- Prototyped in Python, using Qt graphic framework. To be open-sourced after migration to C++.

MOOC | Autonomous Flight (Udacity) ■ Uni. of Colorado (Boulder): Spacecraft Dynamics & Control ■ Stanford: Machine Learning

- Attitude Description & Determination ■ Non-linear Control ■ Lyapunov Stability ■ Kalman Estimation ■ 3D Motion Planning

HOBBIES

Gliding ■ Photography (Category Winner, NUPS London Photohunt 2014) ■ Skiing/Snowboarding ■ Cycling