# Nick McCleery

Multidisciplinary engineer and technical leader with more than a decade of experience spanning Formula One and engineering-led software startups. Combines cross-domain technical and commercial experience with a track record of bringing complex hardware and software systems from concept to production.

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## Selected Experience

### **Zoo**: Staff Engineer in Residence | Jan 2025 - Oct 2025 — Belfast, UK & Los Angeles, USA

Helped steer product through a mix of strategic, cross-functional guidance and hands-on technical execution. Highlights include:

- Drove the development of a 2D geometric constraint solver, owning the mathematical formulation and numerical approach.
  - Built a comprehensive Python prototype to validate the approach, implementing graph-based system decomposition, symbolic substitution, SVD-based state analysis, and Tikhonov regularisation.
  - Contributed to the production Rust solver, adding regularisation, refining constraint definitions, improving solve performance, and extending the `newton_faer` library with sparse QR factorisation to support nonlinear least-squares problems.
- Built a 2D computational geometry pipeline to convert SVG into Zoo's proprietary CAD language.

### **Anneal**: Founder & CEO | Jan 2021 - Jul 2024 — Belfast, UK & Dublin, Ireland

Founded Anneal, a software startup that developed and brought to market a collaboration and operations platform for the advanced engineering sector. Motivated by a desire to address issues I'd encountered during my time in motorsport, Anneal let engineers collaboratively plan, discuss, and review concepts, designs, and drawings—reducing administrative overhead and accelerating product development.

Leading both technical and commercial efforts, I brought Anneal from concept to V1 delivery, validating then building a complex, domain-specific system with features including CAD/drawing review, workflow management tools, schematic editors, and search.

- Made proactive attempts to de-risk product through early customer discovery and rapid prototyping.
- Architected and built a multi-tenant web app (Vue, Flask, PostgreSQL) deployed via AWS.
- Defined the product roadmap and delivered the majority of the V1 codebase: infrastructure, front-end, back-end, CI/CD etc.
- Led go-to-market efforts: branding, website, content marketing, sales.
- Recruited and managed a cross-functional team of five.
- Built and oversaw operational systems: managed fundraising, budgeting, financial modelling.
- Wrote all website copy, produced pitch and sales decks, designed branding.
- Assembled furniture, cleaned desks, managed servers, refilled the coffee machine.

### **Quant Insight**: Backend Engineer & Lead Developer | Nov 2019 - Jan 2021, Consultant - Jan 2022 — Belfast/London, UK

Led development of Qi's back-end platform, enabling relatively large scale computation of asset valuation and macroeconomic sensitivity data for institutional investors.

- Contributed to PCA-based algorithm development in collaboration with researchers from the University of Cambridge and Princeton.
- Led the 'productionisation' and optimisation of core analytics methods, significantly improving compute efficiency.
- Delivered a critical data provider migration under tight time constraints: developed interface libraries, data comparison tooling, and reporting pipelines that operated across a universe of approx. 6000 instruments over a 10-year horizon; changes reduced data costs by six figures annually.
- Built a data ingestion pipeline and provider abstraction layer to support new data sources and formats.
- Identified and proposed a refactor to reduce compute costs by approximately 75%.
- Designed microservices using AWS Lambda and implemented internal/external APIs with AWS Chalice.
- Supported enterprise customers with system integration and mathematically oriented queries about underlying algorithm methodology to help reinforce system adoption and client satisfaction

### **B-Secur**: Senior Algorithm Engineer | Jan 2019 - Nov 2019 — Belfast, UK

At B-Secur, reporting to the Chief Scientific Officer, I led the development of novel signal conditioning and analysis methods for ECG data, contributing to the core functionality behind biometric identification and health monitoring libraries now used in popular wearables.

- Designed and implemented all non-trivial ECG signal conditioning strategies, including custom filter design and analysis techniques adapted from research literature.
- Served as project maintainer: managed releases, reviewed code, and provided technical leadership to the algorithm team.
- Shaped algorithm development framework/architecture and provided guidance on data pipeline and storage design.
- Improved internal tooling and engineering workflows, including expanded CI/CD pipelines, static analysis tools, and automated reporting.
- Delivered internal training on digital signal processing and computation to cross-functional teams.

### **Force India Formula One Team**: Vehicle Science Engineer | Jan 2017 - Jan 2019 — Silverstone, UK

Reporting to the leader of the Vehicle Dynamics Team, I developed both on-car mechanical systems and off-car software systems, while also contributing significantly to traditional/analytical vehicle dynamics work.

- Led front axle novel suspension system development: concept generation, simulation development, design space exploration, prototype system specification, development testing, and event support for production systems.
- Delivered ground-up, clean sheet redevelopment the Vehicle Dynamics analysis software suite primarily written in MATLAB—delivering a comprehensive performance analysis toolkit with custom metrics, analysis methods, GUI, and data architecture. MATLAB tooling was augmented with C#/.NET 4.6 tools for automated data post-processing.
- Planned and managed full-car pre-season rig testing: handled delayed part delivery, adapted test plans, and managed data acquisition and car setup.
- Identified root cause of long-standing (10+ years) mechanical correlation issues through development of large-scale optimisation routine, interrogation of instrumentation systems, and dogged refusal to accept poor predictions of mechanical system behaviour.
- Overhauled bump rubber characterisation procedure, including test methodology and analysis software redevelopment.
- Specified suspension characteristics including heave/roll rates, setup options, and setup procedures.
- Completed wide-ranging technical studies with formal reporting—covering aerodynamic efficiency, powertrain strategy, competitor benchmarking, and future regulation analysis which the FIA specifically requested I perform.
- Provided regular trackside support: car performance analysis, suspension setup optimisation, and fault investigation.

### **Force India Formula One Team**: Junior Strategy & Performance Engineer | Jan 2016 - Jan 2017 Silverstone, UK

Reporting to the Chief Race Engineer, I contributed to both vehicle performance optimisation and race strategy development, with a focus on improving analysis tools and operational efficiency.

- Supported every event of the season: gathered strategic parameters, ran simulations, analysed pit-stop practice and performance, and performed cross-car and driver comparisons.
- Developed new pit-stop performance assessment methods, including sensor specification and clean-sheet software tooling—introducing novel processing techniques, metrics, and automated reporting.
- Built new tools and methods to support in-event driver performance analysis, including processing of logged telemetry and the generation of tailored visualisations and reports.
- Conducted critical reviews of existing tools and workflows, leading to the complete redevelopment of several strategy analysis and reporting systems—significantly improving delivery speed and robustness.

### **Mercedes AMG HPP**: Mechanical Engineer, Graduate | Sep 2014 - Jan 2016 Brixworth, UK

On return to the Mercedes F1 programme, rotated across Mechatronics, Test Operations, Build Support, and Mechanical Engineering—gaining broad exposure to mechanical design, manufacturing methods, and mechatronic systems.

- Redesigned significant powertrain cooling subsystems, reducing one key circuit's pressure drop by around 40%.
- Developed a numerical methodology and associated software for assessing interchangeability of components manufactured using a complex, multi-step process. Used developed tools to perform large-scale study and subsequently steer manufacturing and assembly decision making.
- Built CATIA V5 macros for in-model text creation (part marking) and accurate camshaft positioning within DMU assemblies.
- Adapted and implemented paper-based fluid property models to improve simulation fidelity and design confidence.
- Designed or contributed to the design of a variety of smaller powertrain components: fuel pump housings, oil tanks, water pipes etc.

Was then offered a permanent Engineer-level role part way through the programme.

### **Mercedes AMG HPP**: Performance Development Engineer, Intern | Sep 2012 - Sep 2013 Brixworth, UK

Joined the V8 Performance Application team at Mercedes' Formula One powertrain division, supporting powertrain development through hands-on development work, extensive data analysis, and internal software development.

- Conducted dynamometer-based engine tests and flowbench analysis for system performance and lifecycle studies.
- Authored and distributed post-race reports covering vehicle and powertrain performance.
- Built and maintained telemetry-based data analysis tools in MATLAB/Simulink.
- Developed a combined simulation/analysis tool to assess on-track performance vs. theoretical vehicle potential.
- Created a calibration management package to improve version control and deployment of calibration items.

Part way through the placement, was then invited to rejoin the company as a graduate engineer; becoming one of the first to bypass the standard recruitment cycle.

## Education

- **Queen's University Belfast**
  - BEng, Mechanical Engineering, 1st Class Honours
- **Royal Belfast Academical Institution**
  - A-Level: Mathematics, Physics, French
  - AS-Level: Further Mathematics

## Awards

- **IMechE Institution Project Award**: Awarded by The Institution of Mechanical Engineers for the development of an electric vehicle battery management system protocol and software simulation suite.
- **2014 & 2015 Formula One World Championship**: Part of the wider 2014 & 2015 Constructors' and Drivers' winning Mercedes team.

Additional recognition includes various regional and business-focused awards, e.g., NI's 30 Under 30, Ulster Business 'Ones to Watch', Catalyst Best Business Software Start-Up, Business Post's Start-Up of the Month etc.

## Languages

Native English speaker with some proficiency in French (CEFR B2, A-Level), and limited proficiency in both Italian (CEFR A2) and German (CEFR A1).

## Core Skills

- Software Engineering
- Software Architecture
- Cloud Infrastructure
- Scientific Computing
- Numerical Methods
- Signal Processing
- Data Analysis & Visualisation
- Analytical Mechanical Engineering
- Simulation
- Vehicle Dynamics
- Team & Product Management
- Technical Communication

## Tech

- **Languages:** Python 3.6 - 3.12, Python 2.7, TypeScript, JavaScript, MATLAB, Visual Basic, SQL (+ some C, C++, C#, Julia, Dart)
- **Infra:** AWS (VPC, EC2, S3, Lambda, RDS, IAM, CloudFormation), Docker, Docker Compose, GitLab CI, GitHub Actions (+ some GCP, Kubernetes, Terraform, Cloudflare)
- **Web Stack:** Vue 2, Vue 3, Flask, FastAPI, Auth0, HTML & CSS, Tailwind, Bootstrap, Hugo (+ some React, Clerk)
- **Databases:** PostgreSQL, MySQL, DynamoDB (+ some MongoDB, Weaviate, OpenSearch, SQLite)
- **Libraries:** Three.js, Eigen, SciPy, Numpy, SQLAlchemy etc.
- **Domain Specific Software:** CATIA, Onshape, Simulink, Photoshop, Illustrator, Excel, ATLAS (F1), System Monitor (F1)

## Interests

- Cars
- Motorcycles
- Running
- Writing
- DIY
- Cooking
- Foreign Languages
- Music Production
- Music