Samuel Thompson MEng (Hons)

Data Scientist + Analyst, Mechanical Engineer

A Mechanical Engineer by training using machine learning to revolutionise the way we design. Currently exploring the capabilities of Artificial Intelligence (AI) methods within the ballistic domain; using neural networks to identify trends in experimental data where analytical methods fall short.

Libraries: numpy, pandas, keras, SciPy, matplotlib +

Education

SEP 2017 – Current

PhD Candidate
The University of Edinburgh

Primary Project: Researching the capabilities of machine learning within the ballistic domain. Focused on developing Generative Adversarial Networks (GAN) capable of generating new ballistic data.

Highlights

- Published a book chapter and two academic papers on AI/Machine Learning in ballistics
- Presented my AI research on ballistics at the AUXDEFENSE 2020 Conference
- Supervised a Master's student and developed a comprehensive AI/Python training manual using JupyterBook and Jupyter Notebooks
- Curated bespoke training sets and trained Multi-Layer Perceptron (MLP) to predict the Ballistic response of multi-layer armour systems. Validated the results with experimental Data and FEM models.
- Successfully trained a GAN capable of generating new ballistic data and predicting key engineering properties.

Secondary Project: Using the truss-like Discrete Element Method (DEM) to improve the way We model the propagation of cracks.

- Developed complete meshing algorithm for DEM truss-like elements in MATLAB
- Used MATLAB's App Designer to create a complete GUI and solver to allow the user to define loading scenarios and evaluate deflections and stress distributions.

SEP 2012 – SEP 2017

MEng (w. Hons) Mechanical Engineering (1st Class)
The University of Edinburgh

- 1st Class Master's Degree (76 % overall)
- Senior Discipline Class Representative for Mechanical Engineering
- Runner up at Engineers Without Borders (EWB) UK Finals
- Developed excellent proficiency with MATLAB

Master Thesis: *Low Energy Impact on Non-Homogenous Slender Structures*

Developed an algorithm in MATLAB to study the complete mechanical response of wind turbine blades subjected to bird strike impact.

SEP 2005 – SEP 2012

Ashton Sixth Form College
Darnton Rd, Ashton-under-Lyne OL6 9RL

- A Level: Maths, Physics, Biology
- AS Level: Chemistry

West Hill High School
Stamford St, Stalybridge SK15 1LX

- Prize for Outstanding Academic Achievement

Publications

OCT 2019

An Artificial Intelligence-based Hybrid Method for Multi-Layered Armour Systems
State of the Art and Future Trends in Material Modelling, pp 381-400
F. Teixeira-Dias, S. Thompson, M. Paulino

NOV 2020

Ballistic Response of armour plates using Generative Adversarial Networks
Expert Systems and Applications, pp 381-400
S. Thompson, F. Teixeira-Dias, M. Paulino, A. Hamilton

Conferences

JUL 2020

AUXDEFENSE 2020 – 2nd World Conference on Advanced Materials for Defence
Moved online due to COVID-19.

JUL 2020

School of Engineering Research Conference 2019
John McIntyre Centre, Pollock Halls of Residence

Personal Info

Phone
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E-mail
smarkthompson@outlook.com

Website
samph4.github.io/

GitHub
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LinkedIn
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Technical Skills

MATLAB, Python, Jupyter, HTML5, SQL

●●●●○ Advanced

Machine Learning

●●●●○ Advanced

Data Visualisation

●●●●● Expert

Microsoft Office

●●●●● Expert

numpy, pandas, keras, fastai, PyTorch, matplotlib,

Soft Skills

Hobbies + Interests

Enjoy competing in Brazillian Jiu-Jitsu, swimming, yoga, and fitness.

References

Dr Filipe Teixeira-Dias
f.teixeira-dias@ed.ac.uk

Mr Jon Hildreth
jon@jphildreth.com

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Experience

JAN 2018 – Current

Undergraduate Teaching Assistant *Academia*
The University of Edinburgh

Provided teaching support on several University undergraduate courses. This would regularly involve marking students' assignments and presentations, leading group tutorials and preparing teaching documentation to assist learning and elaborate on complicated concepts.

Supporting courses: Dynamics 4, Mechanical Design 3, Numerical Methods and Computing 2

Dynamics 4: Understanding the core aspects of advanced dynamic analysis, dealing with system modelling, dynamic response and vibration analysis, structural dynamics, and wave propagation.

Mechanical Design 3: Lead group discussions about product design and encourage students' to brainstorm together to solve unique engineering challenges. This course had a large practical element and I would assist students in engineering workshops as they build and design unique domestic wind turbines and other energy-capturing devices.

Numerical Methods and Computing 2: Helping students use MATLAB to obtain the numerical solution of differential equations and using MATLAB to optimise bridge designs for Civil Engineering students.

JAN 2016 – AUG 2016

Project Engineer at J P Hildreth Ltd *Pharmaceutical, Food Manufacturing*
Ware, Hertfordshire, UK

Primary Project: Lead Project Engineer on the design and installation of a Vacuum Transfer System to support the manufacture of a new development drug to treat chronic disease for GlaxoSmithKline (GSK). Created a Project Investment Proposal (PIP) to secure £150,000 funding |to complete the project.

Key Responsibilities:

- The lead engineer in regular meetings and discussion with GSK staff including Operators, Product Owners, Stream Directors and Engineering Directors to assure that their requirements have been satisfied.
- Authored the User Requirement Specification (URS) that details each of the key aspects that the design must satisfy.
- Hosted Managing Directors of key suppliers to discuss design proposals and establish scope of supply.
- Maintained regular communication with suppliers to further discuss and iterate upon designs.
- Managed the project through the project life cycle from a concept to the end of the design and planning stage.
- Assured design meets European ATEX standards for explosive atmospheres.

Secondary Project: Performed a complete Critical Device Assessment (CDA) on a water Purification plant and tablet Coater in GSK's manufacturing facility in Ware, Hertfordshire.

- The lead engineer in regular meetings and discussion with GSK staff including Operators, Product Owners, Stream Directors and Engineering Directors to assure that their requirements have been satisfied.
- Authored the User Requirement Specification (URS) that details each of the key aspects that the design must satisfy.

NOV 2010 – JUL 2012

Sales Assistant at ThisIsPulp *Retail, Event Management*
Manchester Arndale, Manchester, UK

Shop floor assistant and stockroom co-ordinator for an alternative clothing store. Role would also involve adopting safe and efficient techniques to keep guests safe during band signings.

Projects

Personal Info

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Website
samph4.github.io/
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Technical Skills

MATLAB, Python, Jupyter, HTML5, SQL

●●●●○ Advanced

Machine Learning

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References

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