

**ALEXANDER TAUFIQ SAFAR**

24<sup>th</sup> May 1989

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**Personal Profile:**

I am a research student at Cardiff University studying nonlinear elasticity. This position, like my previous employment, is a cross between mathematics, engineering and computer science. My future plans involve research into design, manufacture and optimisation of microstructures for biomechanical applications.

**Education and Career Profile:**

**Cardiff University (Applied Mathematics)** *October 2015 – August 2019*

**Research Student** – Supervised by Dr L. Angela Mihai

*Thesis Title: Elastic Analysis of Biogenic Cellular Structures.*

Under the hyper/nonlinear elastic regime we consider cellular tissues and study cell-cell debonding under shear deformation. The model is based on the ripening and dehydration of some fruits and root vegetable cells (such as apples and potatoes) and therefore the models include intercellular pressure from the cell cytoplasm.

We also consider multiscale approaches, creating new material models in the open source software FEBio and developing generative algorithms. We aim for our study to have physical plausibility, mathematical tractability and computational feasibility.

**HBM nCode** *July 2012 – December 2013, June 2014 - January 2015*

**Software Engineer** – Product: nCode Automation

HBM nCode create software for managing timeseries data (vibration, temperature, pressure) for engineering analysis, which is best known for (but not limited to) FEA for detecting fatigue and predicting cycles to failure.

As a software engineer on the nCode Automation product I predominantly worked in data management and processing solutions. In an Agile development environment I experienced the full design lifecycle, from analysis of initial customer requirements to testing solutions for scalability and future proofing. In my most notable project I was subproject manager for creating new functionality in Automation for detecting anomalies in newly collected data, based on 'envelopes' of previous data. This involved writing statistical processes on timeseries data in Python, creating migration tools using Java and SQL (XML outputs) and modifying Automation's functionality and user interface. I was also the system administrator for the Global Powder Metallurgy Database.

**The University of Sheffield** *September 2009 – July 2012*

**Undergraduate** – BSc Mathematics (Hons) –1<sup>st</sup> class degree.

**Dereham 6<sup>th</sup> Form / Northgate High School** *September 2000 – July 2007*

A-Levels Mathematics (A), Electronics (A) and Computing (B)

GCSEs 10 A\* to Bs (including English BB, Science AA and Mathematics A\*)

### **Publications:**

Mihai, L.A. **Safar, A.** and Wyatt, H. 2016. Debonding of cellular structures with fibre-reinforced cell walls under shear deformation. *Journal of Engineering Mathematics*

**Safar, A.** Wyatt, H. and Mihai, L.A. 2017. Debonding of cellular structures under shear deformation. *Presented at: 25<sup>th</sup> Conference of the UK Association for Computational Mechanics, University of Birmingham, Birmingham, UK, 11-13 April 2017.*

**Safar, A.** Wyatt, H. and Mihai, L.A. 2017. Debonding of cellular structures under shear deformation. *Presented at: SIAM UKIE Section – National Student Chapter Conference 2017, NUI Galway, 26 May 2017.*

Wyatt, H. **Safar, A.** Evans, S. and Mihai, L.A. 2017. The elastic behaviour of soft cellular structures under large tensile loading. *Presented at: 7<sup>th</sup> International Conference on Mechanics of Biomaterials and Tissues, Hawaii, USA, 10-14 December 2017.*

### **Academic Presentations:**

- May 2017 SIAM National Student Conference, Galway (**Talk**)  
- £100 award for best presenter  
- £150 travel award by SIAM
- May 2017 SIAM-IMA Three Minute Thesis Competition (**Talk**)  
- Award for second place
- Apr 2017 25<sup>th</sup> UKACM Computational Mechanics, Birmingham (**Talk**)  
- £250 ‘Mike Crisfield’ award for best presenter amongst all postgraduate research students and post-doctoral researchers
- Jan 2017 SIAM UKIE Annual Meeting, Strathclyde (**Poster**)  
- Award for poster contribution  
- £150 travel award by SIAM
- Nov 2016 Applied Mathematics Seminar Series, Cardiff (**Talk**)
- Jun 2016 New Trends in Nonlinear PDEs, Cardiff (**Poster**)
- May 2016 SIAM National Student Chapters Conference, Cardiff (**Poster**)
- Mar 2016 SIAM-IMA Seminar Series (**Talk**)

### **Skills:**

- Programming languages:* Java, Python, MatLab, C++, SQL and XML
- Document preparation:* LaTeX
- Computer Aided Design:* Onshape, OpenSCAD, Autodesk and SketchUp
- Finite Element Analysis:* FEBio and Abaqus
- Signal processing:* nCode GlyphWorks

**Committee Positions:**

September 2016 – Current: SIAM-IMA Student Chapter Treasurer  
May 2017 – Current: Cardiff University Snowsports Club Beginner Captain  
May 2016 – May 2017: Cardiff University Snowsports Club Freestyle Captain  
May 2011 – May 2012: University of Sheffield Snowboard Club Treasurer

**Teaching and Public Engagement:**

*In-School:* 3D printing and computer modelling workshops  
Deformation, geometry and tessellations in the world around us  
*Public Talk:* ‘Science Café’ talk on ‘Why does the apple fall apart?’  
*Tutoring:* Cross-campus mathematics walk-in service  
Mathematics for engineering students  
MA4012 Finite Elasticity  
*Sports Instructor:* Snowboard instructor at Cardiff Ski and Snowboard Centre  
*Meditation Leader:* Cardiff meditation society

**Side Projects:**

Additive manufacture (3D printing) has allowed for new types of materials to be designed that would have previously been impossible to manufacture. I have designed a unique lattice geometry structure that can dramatically reduce and dampen vibrations and impact using its tailorable stiffness. Currently I am working towards publishing a paper on both FEA simulations and physical testing on 3D printed prototypes.

Apr 2017 **Cardiff Spark Ideas - Competition Winner**  
- £500 business funding  
- Continued business support and advice

**Referee:**

PhD Supervisor Dr Angela Mihai – [MihaiLA@cardiff.ac.uk](mailto:MihaiLA@cardiff.ac.uk)