

## About me

I am excited about the future and I want to use my knowledge and skills to help improve peoples lives. I relish a challenge and enjoy working outside of my comfort zone and learning new skills. I like to meet new people and I endeavor to improve the work of myself and my colleagues, through good working relationships. I am looking for a challenging technical role with room for growth, where I can implement my problem solving and analytical skills in cutting-edge research applications. You can find out about me in more detail at my website: [henrycox.co.uk](http://henrycox.co.uk), or just give me a call/email.

## Experience

### PhD Student – Biological Physics

*The University of Manchester – Sept 2015 to present*

Since starting my PhD I have worked with a synthetic peptide (I<sub>3</sub>K) which forms long fibrils, networks and gels. My work has focused on recording and analyzing images and videos of fibrils using state-of-the-art microscopy and data analysis techniques to further understanding about the physics of these complex and potentially very useful novel biomaterials.

My work has resulted in 3 published articles (with 6 more to come) including my first-author article which featured on the front cover of the peer-reviewed journal *Biomacromolecules*, (DOI: 10.1021/acs.biomac.7b00465). Further information about my research is on the 2<sup>nd</sup> page of my CV.

### Junior Data Scientist

*Evergreen SmartPower – Sept 2018*

I worked with a technical development team to develop Python code to model and predict domestic car charging. I decided on the appropriate statistical tools to use, applied them and presented the results to the wider team, of which none typically perform data science.

### Undergraduate Laboratory Demonstrator

*The University of Manchester – Sept 2015 to June 2018*

Alongside my PhD I also held a teaching role in the 2<sup>nd</sup> year undergraduate teaching labs. As well as teaching the students, I also conducted interview assessments and gave feedback. I enjoyed this role as I like getting to know and building rapport with new people. It has been a good opportunity for me to begin developing my experience as a leader, guiding students towards solutions and helping new demonstrators to find their feet in the role.

### Operations Critical Telecoms Engineer

*BP North Sea – Sept 2014 to Sept 2015*

I worked for a year in Aberdeen supporting the operations- and safety-critical telecommunications equipment installed on BP North Sea assets.

I managed, planned and oversaw the installation of safety critical telecoms equipment offshore. Which included, arranging contractors and completing engineering documentation to ensure 'gate-criteria' were met and the job was delivered on time. During the work, I discussed with the installation managers to ensure problems that arose did not compromise safety offshore.

I developed and implemented an equipment dashboard which was used by telecoms engineers to ensure the safety-critical maintenance procedures were being completed in compliance with BP, national and international standards.

I also organised a technical poster competition which featured over 100 entrants and 20 judges from within BP. At BP I attended training such as on continuous improvement practices as well as offshore safety training.

## Team work

A PhD can be an individual piece of work, however, I enjoy working in a team and have experience working with a wide range of people.

At BP I worked with technicians and oil rig managers offshore as well as onshore planners and specialist contractors to ensure the safe installation of new equipment offshore.

At Bath RUH, I worked with other support officers as we helped and taught all levels of hospital staff on the new IT system.

As a student, I was captain of the Water Polo 2<sup>nd</sup> Team for 2 yrs and organised team fixtures for 1 year.

## Development

I enjoy learning and love the feeling of making progress and bettering myself, through structured learning and personal projects.

I actively seek out opportunities to learn and have organized an external industrial mentor which led to my role at Evergreen.

Throughout my PhD I have met my supervisor weekly, where I am happy to receive constructive criticism in order to further my work. I relish the opportunity to collaborate with researchers from different disciplines and this has resulted in a publication with Warwick University during my PhD.

## Operations Critical Telecoms Intern

*BP Exploration – June 2013 to Sept 2013*

As an intern at BP I completed a project assessing the use of collision avoidance radar onboard BP oil rigs across the world and compared this with the current state of radar technology. I attended the factory acceptance test for new radar and used my knowledge to ensure the test was representative of real-world use (height above sea level for a radar is critical to performance). I presented the results of my work to senior BP engineers in a global telecoms meeting and following my internship I was offered a permanent role as a graduate engineer to start the next year.

## IT Support Officer

*Bath RUH NHS Trust – June 2011 to Sept 2011*

I worked in a major hospital in Bath and supported the IT department as a new patient and care management system was deployed across the hospital. I was then stationed in sections of the hospital where I worked 1-1 with all levels of staff there to ensure they did not come into problems when using the system. I learned to manage my relationships with staff carefully as they were already in a very stressful environment. Overall, it was an amazing experience to see how these health professionals work and the system was deployed successfully.

## My Research

### 1st Author publications (1 published, 1 submitted, 1 in preparation)

I developed techniques to image the 3D network of peptide fibrils in the bulk using STORM super-resolution microscopy, removing surface effects and allowing very high precision measurements of the underlying network structures and processes. This featured on the front cover of *Biomacromolecules* 2017, 18 (11), DOI: 10.1021/acs.biomac.7b00465

My next work used videos of the thermal motion of fibrils in a peptide gel network that I recorded. Through analysis of these, I was able to separate the intrinsic fibril persistence length from stresses imposed on the network, causing fibrils to appear more curved than they are. I then used methods from machine learning to identify the sub-population of stressed fibrils within the sample and quantified their physical properties. This work has been submitted to *Langmuir* and was presented at Manchester Biomaterials Characterisation Workshop 2018 where I won 1<sup>st</sup> prize for my presentation.

I have recently developed this work to decorate the peptides with the thermo-responsive polymer pNIPAM which can modulate stress in the network and this work is currently being prepared for submission in a separate article.

### Co-authored publications (2 published, 2 submitted, 2 in preparation)

Characterisation of the peptide I<sub>3</sub>K/pNIPAM system (in prep.).

STORM imaging/analysis and particle tracking size measurements of cyclical peptide aggregates in collaboration with Perrier group in Warwick (in prep.).

STORM imaging, resolution and contrast measurements of images of peptides with and without graphene oxide surface coatings, *Sci. Rep.* (submitted).

STORM imaging of edge functionalized graphene, *Sci. Rep.* (submitted).

*ACS Applied Materials and Interfaces*, DOI: 10.1021/acsami.6b04939 and DOI: 10.1021/acsami.6b03770 – advice on peptide science, article writing.

## Qualifications

### Master of Physics – MPhys

*The University of Manchester – Sept 2010 to Sept 2015*  
Obtained a first class degree with an average mark of 79%.

### Machine Learning

*Stanford University – Sept 2017*

## Analysis

I have learned and used many different analytical tools and methods such as:

- Regression
- Fourier analysis
- Correlation functions
- Machine Learning
- Non-linear modelling
- PCA
- Anomaly detection
- Statistical inference
- Optimisation algorithms
- Advanced image analysis and object detection
- Monte Carlo simulations

## Programming

I began my PhD with no programming experience, since then I have self-taught in MatLab and produced hundreds of scripts featuring state-of-the-art analysis techniques.

I am familiar with git and developed a library of data analysis tools in Python at my time at Evergreen.

## Community

I attend the Data Science Institute seminars of the University of Manchester and I frequently attend research conferences and, among others, presented at the 2018 RSC Biomaterials Group meeting. I also won 1<sup>st</sup> prize for my presentation and 2<sup>nd</sup> prize for my poster at Manchester Biomaterials Characterisation Workshop.

I also enjoy 5 a side football and completed my first sprint triathlon in 2017 with Manchester Triathlon Club.

### A-Levels

*Frome Community College – Sept 2009 to Sept 2010*

Physics (A), Maths (A\*), Further Maths (B)