Henry Cox

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About me

I am excited about modern technology and I want to use my knowledge and skills to make a positive difference. I collaborate well and build trusting relationships with my peers. I thrive when presented with a challenge as I enjoy working outside of my comfort zone; problem solving; and, learning new skills. 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 more about me below, at my website or please contact me directly.

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_3K) 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 2nd 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 2nd year undergraduate teaching labs. I was responsible for up to 9 pairs of students simultaneously, spread over 4 different physics experiments. As well as teaching the students, I also conducted interview assessments and gave constructive feedback. I enjoyed building rapport with the students and developing my managerial skills; guiding students towards solutions and helping new demonstrators to find their feet.

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

I also managed 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. This involved travelling offshore and finding the optimum solution to problems which arose as the work was completed.

As part of my involvement with the BP graduates, I organised a technical poster competition which featured over 100 entrants and 20 judges from within BP.

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 voted by the University Water Polo team to be the captain of the Men's Water Polo Second Team for two years running. Within this role, I mentored other university students and helped provide a support network within the team.

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 in September 2014.

IT Support Officer
Bath RUH NHS Trust – June 2011 to Sept 2011

I worked at the Bath Royal United Hospital to support the IT department in delivering their new patient and care management system. Firstly, I learnt how to use the system and had to understand how the different types of users interacted with the system (e.g. checking in patients, ordering prescriptions). I then worked one-on-one with all levels of staff to teach them how to use it and transition over to the more technical computer system, when they were used to dealing with physical hard copies of patients records. The system was deployed successfully across the hospital through working collaboratively as a team and overall it was an amazing experience to see how technology can modernise the health sector and improve patient care.

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 1st 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_3K/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 2014
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
- 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 1st prize for my presentation and 2nd 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)