Cross-Disciplinary Fellowships [XDF]

Do you wish to grow your analytical skills to make the next breakthrough in biomedical research?

We are seeking up to 8 fellows who have acquired strong data analytical and/or computational skills from their doctoral studies in physics, mathematics, computer science, engineering, or similar.

Our pledge: We will train you to become a leader in Quantitative Biomedicine.

Our request: You will need to want to solve the most pressing questions in biomedicine.

If you have these analytical skills and seek to broaden your scientific horizons and make a real impact on people's health then please do apply.
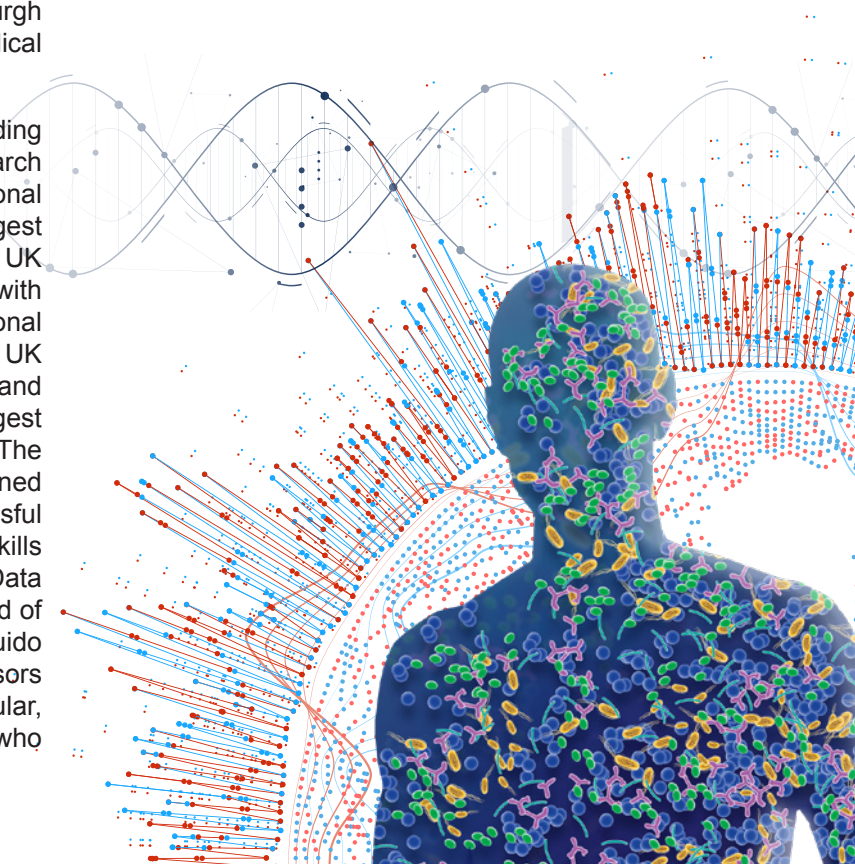
BACKGROUND

The beginning of the 21st century has seen enormous advances in science and technology. With the completion of the Human Genome Project and implementation of multiple "Big Data" approaches in biomedical sciences, there is now a pressing need to train a new generation of mathematically-minded biomedical scientists who will be able to bridge the gap between life sciences and mathematics/physics/informatics, and efficiently link modern biomedical research with big data research technologies. To address this need a pioneering Cross-Disciplinary Post-Doctoral Fellowships programme (XDF) has been initiated at the University of Edinburgh with matching financial support from the Medical Research Council.

The University of Edinburgh is one of the world's leading research universities (ranked 4th in UK for its research power) and is at the forefront of both computational sciences and health sciences. Informatics is the largest and strongest computer science department in the UK (1st for research power according to REF2014), with particular strengths in data science and computational biology. Clinical medicine has been ranked 4th in the UK (research power) with the MRC Institute of Genetics and Molecular Medicine (IGMM) being one of the biggest biomedical research establishments in the country. The XDF Programme lead, Professor Ponting, was trained first in particle physics before pursuing a successful career in biomedicine, so knows first-hand the skills necessary for Fellows to transition into "Big Data Biomedicine". The programme will be led by a board of Directors, including Professors Jane Hillston and Guido Sanguinetti (School of Informatics) and Professors Margaret Frame and Tim Aitman (School of Molecular, Genetic and Population Health Sciences/IGMM), who will provide Fellows with diverse perspectives.

PURPOSE

The fellowships are aimed at early-career quantitatively trained scientists, whose ambition is to achieve an independent career in data-driven computational biomedicine. Fellows will follow a personalised training and research programme to become truly cross-disciplinary leaders in quantitative biomedicine. Fellows will gain analytical and computational expertise, and an in-depth appreciation of biomedical and health research. Fellows will be motivated to address biomedical questions, to apply and train others in their previously acquired analytical/computational skills, and to learn the strengths and limitations of biomedical science methods. Fellows will propose a well-developed, important and innovative biomedical project only after substantial relevant training.

Fellowships are funded jointly by the MRC and the University of Edinburgh. Fellows will receive mentorship from both computational and biomedical scientists, and will be offered office space in both Informatics and IGMM. Where appropriate, the research may also be conducted in collaboration with an industrial partner and/or the NHS. After their initial year, the Fellow will conduct original research and produce material for peer-reviewed publications and for dissemination at national and international level.

FREQUENTLY ASKED QUESTIONS

Q: From what scientific backgrounds do you wish to recruit these Fellows?

A: From physics, chemistry, mathematics, statistics, engineering, computer sciences or similar. If you have a PhD in one of these disciplines and are motivated to follow a biomedical career, then apply: we are open-minded if you are.

Q: Can I apply if I have already worked at the computational/life sciences interface?

A: Yes. Previous experience in computational life sciences is not a problem. Skills and motivation are most important.

Q: Can I apply if I am not a UK citizen?

A: Yes, applications from suitably qualified candidates from all around the world will be considered.

Q: Can I still apply, even after some years after my PhD?

A: Yes. We will always consider individuals' personal motivations and circumstances.

Q: Do you need applicants to have already pursued biomedical research?

A: No. However, we will be looking specifically for scientists whose desire for this career change is well motivated and thought-through.

Q: Will successful applicants be trained in biomedical concepts and skills?

A: Yes, from lab-based protocols, basic molecular/cellular concepts, and evolutionary principles, to next generation sequencing, electronic health records and high-throughput drug screening.

Q: How will Fellows be trained?

A: In a person-centred manner according to skill or knowledge gaps, taking advantage of existing on-line and University courses, with one-to-one tutorials, seminars, and as part of a training cohort.

Q: Why are these Fellowships being offered now?

A: Biology and medicine are awash with very large data sets needing to be transformed into knowledge and hypotheses. Importantly, statistics and informatics have progressed to a level where such data sets can be analysed at scale creating the potential for significant breakthroughs. Analysis of such data will require team science and individuals with rare skills, each spanning traditional disciplines: a) recasting and linking data into usable forms; b) translating the jargon, tenets and assumptions of one discipline into another; and, c) identifying the optimal analytical approach and experimental design with which to answer the most important biomedical questions. There is a yawning skills gap, which this Fellowship scheme seeks to begin to close.

Q: What type of project will Fellows eventually pursue?

A: The projects will be chosen to match each Fellow's research interests and expertise in analysing available data sets. Possible examples include: (1) genetic algorithms used with multiparametric high content phenotyping screening; (2) deep learning of retinal images from people with diabetes; (3) integration of multi-omic data from patients in order to define illness trajectories; (4) statistical modelling from population data to predict response to treatment; (5) text mining integrative analyses of GP notes and prescription data; (6) deep convolutional neural networks to learn protein-DNA binding sites; (7) machine learning to predict the impact of somatic mutations on the cancer epigenome; (8) estimation of cancer risk and drug targets for chemoprevention; (9) statistical modelling of a Scotland-wide ovarian cancer dataset; (10) predictions of individuals' responses to cancer immunotherapy, and, (11) high content image analysis of biomedical data (e.g. images of pathology sections).

Q: What level of independence will Fellows eventually have?

A: Eventually, Fellows are expected to take a leading role in their chosen project, taking advantage of the skills, interests and expertise of a cross-disciplinary research team.

Q: What financial support will Fellows receive during the programme?

A: Fellows will receive postdoctoral-level salary linked to their skills-base and experience.

Q: What expectations are there for Fellows after the 4 years?

A: Fellows are expected to successfully apply for independent Fellowships or positions following their 4 year XDF.

HOW TO APPLY

If you are interested and would like learn more about the XDF-Programme please visit the Programme website:

www.xdf.training

You can apply for one of the Fellowships at:

www.indeed.co.uk/viewjob?jk=e7bbb96ca8cfbd45&from=tp-serp&tk=1c7ghq6bf9290dkc