

POSTDOCTORAL TRAINING FELLOW
- TRACKING CLONAL EVOLUTION IN COLORECTAL CANCER

We seek a highly motivated Postdoctoral Training Fellow to join the Sottoriva Lab within the Centre for Evolution and Cancer at The Institute of Cancer Research in London (ICR), and work on tracking clonal evolution in colorectal cancer using longitudinal sampling of both patients and model systems.

The Sottoriva Lab (www.sottorivalab.org) focuses on deciphering the mechanisms of cancer progression and treatment resistance in each patient using a rigorous mathematical approach, with the objective of anticipating the future course of the disease. We tackle cancer as a complex system, using rational tissue sampling and cancer genomics as the basis for data generation. We integrate the data with mathematical and computational models of tumour evolution, with the aim of formulating clinically-driven hypotheses and test predictions that will impact the way we treat cancer.

In this project, we sample and profile human colorectal malignancies from clinically annotated cohorts using multi-region and longitudinal sampling. We also follow the evolution of colorectal cancer over time using *in vitro* and *ex vivo* model systems. We analyse the data with state-of-the-art bioinformatics techniques and novel statistical methods. We then integrate the results with mathematical and computational models of colorectal cancer progression and treatment resistance, with the aim of making predictions on the evolution of a tumour.

The successful candidates will focus on understanding and tracking clonal evolution of colorectal cancer at the genomic and epigenomic levels, both from human samples such as circulating tumour DNA (ctDNA), and from model systems. The responsibilities include the development of mathematical models of tumour evolution and drug resistance, and the analysis of whole-genome, whole-exome, targeted sequencing and methylation data.

The successful post will have the opportunity to interact within a multidisciplinary environment of molecular biologists, clinicians, computer scientists and mathematicians. They will have the opportunities to learn about latest approaches to deconvolute the complexity of cancer evolution and will explore new research areas in medicine.

The Institute of Cancer Research, London, is one of the world's most influential cancer research institutes, with an outstanding record of achievement dating back more than 100 years. We provided the first convincing evidence that DNA damage is the basic cause of cancer, laying the foundation for the now universally accepted idea that cancer is a genetic disease. Today, The Institute of Cancer Research (ICR) leads the world at isolating cancer-related genes and discovering new targeted drugs for personalised cancer treatment.

Under the leadership of our Chief Executive, Professor Paul Workman FMedSci, the ICR is ranked as the UK's leading academic research centre. Together with our partner The Royal Marsden, we are rated in the top four cancer centres globally.

The ICR is committed to attracting, developing and retaining the best minds in the world to join us in our mission – **to make the discoveries that defeat cancer.**

The new Centre for Evolution and Cancer within the Institute of Cancer Research is supported by a Strategic Award from the Wellcome Trust. We focus on interrogating clonal evolution in tumours by studying the dynamics of heterogeneous cancer cell populations and their microenvironment. We make use of multi-region genomic profiling, single-cell genetics, computational histopathological analysis and mathematical modelling to reconstruct the past evolutionary history of tumours and predict their future.

The position is offered on a 3 year fixed term contract. The full salary range for the post is £31,023 - £44,337 p.a. inclusive. Starting salary on the scale will be based on previous postdoctoral experience. Starting salary will be based on previous postdoctoral experience.

Informal enquiries can be made to Dr Andrea Sottoriva (andrea.sottoriva@icr.ac.uk). **Please DO NOT send your application via email, formal applications must be submitted online.**

To apply please complete the application form, upload your CV and supporting statement addressing where you meet the person specification and include the names and contact details of two referees at <http://www.icr.ac.uk/jobsearch>.

The Institute of Cancer Research

Job Description

JOB TITLE: Postdoctoral Training Fellow in Tracking Clonal Evolution in Colorectal Cancer

DIVISION & TEAM: Division of Molecular Pathology, Evolutionary Genomics and Modelling Team

GRADE: PDTF

RESPONSIBLE TO: Dr Andrea Sottoriva

LOCATION Sutton, Surrey

OBJECTIVE OF THE POST

We are seeking a highly motivated Postdoctoral Training Fellow with expertise in evolutionary modelling in cancer.

The project involves the study of clonal evolution in colorectal cancers over time during treatment using longitudinal sampling of both patients and model systems. The successful candidate will be responsible for analysing the data based on whole-exome, whole-genome and targeted next-generation sequencing, and designing mathematical and statistical models to interpret the results in light of tumour evolution. The ultimate aim is understanding fundamental underlying dynamics of progression and treatment resistance in childhood malignancies. The candidate will have the opportunity to interact within a heterogeneous environment of biologists, clinicians, computer scientists and mathematicians within the ICR.

SPECIFIC DUTIES AND RESPONSIBILITIES

The duties and responsibilities include the following:

1. Development of mathematical and computational models of tumour evolution.
2. Analysis of cancer molecular data, especially next-generation sequencing.
3. Formulate hypotheses and make predictions that can be tested using genomic profiling and modelling techniques.
4. Interpret the results in light of tumour evolution, tackling cancer as a complex system
5. To design and execute experiments appropriate for projects as directed by Team leader.
6. To interact with the Team Leader and other members to pursue the agreed program of work.

7. To work in a flexible but organised manner.
8. To meet objectives within pre-determined timescales.
9. To stay up to date with the relevant literature.
10. To participate in grant application and publication writing.
11. To familiarize yourself with the ICR's approach towards risk management including its policies and procedures, which require all staff to play an active part in identifying and managing risk.
12. All staff must ensure that they familiarise themselves with and adhere to any ICR policies that are relevant to their work and that all personal and sensitive personal data is treated with the utmost confidentiality and in line with the General Data Protection Regulations.
13. Any other duties which may be required which are consistent with the nature and grade of the post.

This job description is a reflection of the present position and is subject to review and alteration in detail and emphasis in the light of future changes or development.

APPOINTMENT DETAILS

The position is offered on a 3 year fixed term contract. The full salary range for the post is £31,023* - £44,337 p.a. inclusive. Starting salary on the scale will be based on previous postdoctoral experience.

**£ 31,023 - thesis submitted, awaiting PhD award*

In addition to annual performance related pay awards, the salary scales are reviewed to consider any cost of living increases. Annual leave entitlement is 30 days per annum. There is an additional entitlement to 8 bank/public holidays and 3 ICR-set privilege days.

This is a full-time post 35 hours per week, Monday to Friday, based at the ICR site in Sutton, Surrey.

ICR has a workforce agreement stating that the maximum length of employment for Post- doctoral Training Fellows should be no more than 7 years within ICR and no more than 10 years total postdoctoral employment (at ICR and elsewhere). Consequently, you should be aware that the length of contract offered will be limited by this agreement as well as the availability of funding.

Person Specification

Criteria	Essential or Desirable?
Education & Knowledge	
A good first degree in computer science, mathematics, statistics or similar subject	E
PhD** in computational modelling, bioinformatics or similar subject	E
Strong publication record	E
Experience	
Experience in designing and implementing mathematical and computational models of tumour evolution	D
Experience with next-generation sequencing data analysis	D
Experience in phylogenomics	D
Experience with large-scale genomic datasets (e.g. TCGA)	D
Experience in designing and interpreting experiments relevant to the Team's research	E
Skills	
Programming in C, python or equivalent language	E
Programming in R and Shell scripting	E
Familiarity with UNIX environments, especially GNU/Linux	E
Experience in the use of computer clustering and parallelisation	D
Excellent verbal and written communication skills	E
Ability to independently design genomic experiments	E
Excellent organisational skills	E
Ability to work to tight deadlines	E
Strong analytical skills, problem solving and independent thinking	E

General	
Committed and highly motivated	E
Willingness to learn new techniques/approaches	E
Ability to interact effectively with other team members and work as a part of a dynamic team to drive projects forward	E
Ability to follow instructions, protocols and guidance	E
Ability to work with limited supervision	E

***as a minimum requirement candidates must have submitted their thesis by the start date of their employment and been awarded their PhD within the six month probationary period.*