

A day in the life of a bioinformatician



Dr James Campbell studied applied biology at the University of the West of England and went on to receive a PhD for a study of the utilization of glycoprotein substrates by gram-positive pathogenic bacteria. James then joined a proteomics research company focusing on biomarker discovery and the development of quantitative mass spectrometry methods, before moving to The Institute of Cancer Research, London. Since then, James has worked with the next generation sequencing facility and helped set up the bioinformatic analysis pipelines for the Tumour Profiling Unit. He currently leads the Bioinformatics Facility of the ICR's Cancer Research UK Centre, supporting research groups across the institute. Lorenza Giannella (Training Manager, Biochemical Society) spoke to him about his work.

How did you get into science?

I have always been fascinated by science and took physics, chemistry and biology as A-levels. I went on to study biology as an undergraduate and in particular focused on molecular genetics and biochemistry. I gained my PhD studying microbial proteomics and during this time, needed to learn how to run a webserver and program computers to process the data I was generating. In those days, there weren't really university courses where you could train as a bioinformatician and there weren't many biologists who had learned how to program. This combination of skills led me into bioinformatics.

Can you describe a typical day?

Most of the analyses I run use a high performance computing cluster. The first thing I do is to connect to one of our clusters over the network using a software terminal so I can check the status of the analyses

running. Much of my work involves writing code to automate data processing or to analyse and visualize data. The other aspects of my work are meeting with other researchers to define the aims and scope of new projects or writing reports to describe the findings of completed projects.

What is your advice for someone who would like to pursue a career as a bioinformatician?

Bioinformatics is a broad term that could mean different things to different people. One thing that is common to most bioinformaticians is the need to program in several computer languages. Perl and Python are both very popular general purpose languages that are used to automate the processing of data sets. R is a specialized language suited to statistical data analysis and data visualization. A lot of people I know have taught themselves to program by reading books and practicing. Aside from a technical

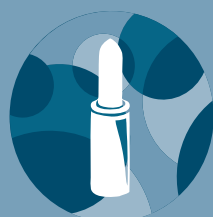
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ability, a good knowledge of biology and data analysis approaches is needed so that the right questions can be asked of data sets in order to extract information and make inferences.

What inspires you about your job?

Biology is a fascinating subject to study and with modern technologies we are able to generate vast amounts of data. It's rewarding to be involved in the analysis of all these available data. ■

The Biochemical Society runs an online course on R, called 'R for Biochemists 101', starting in September.

Register your interest at bit.ly/RforBiochemists101Sept18.

Job profile

A bioinformatician uses their scientific knowledge and information technology expertise to collect and interpret data generated by research. Bioinformaticians create and maintain databases of biological information, develop and use mathematical models for statistical analysis, carry out dynamic simulations and pattern analysis. Sometimes, they are known as biostatisticians or computational biologists, and they can work in different settings, such as the NHS, research institutions or industry.

Qualifications and key skills

Bachelor's degrees in bioinformatics are not offered by many institutions. The most common route into the profession is a Bachelor's degree in a life science, medicine or health-related topic, such as biology, biochemistry or biomedical science, and specialization during a postgraduate degree, such as a Master's degree, MPhil or PhD in bioinformatics. A doctorate is not necessary to pursue this career, but may sometimes be preferred.

Additional competencies include the ability to use complex technology and programming languages, attention to detail and excellent communication skills to collaborate with other researchers and team members.

Responsibilities

Bioinformaticians apply technological resources to answer biological questions in life sciences, medicine and health-related fields. They develop systems, databases and methodologies to collect and analyse data for clinical or research purposes. Bioinformaticians generally work as part of a multidisciplinary team. With further training and/or experience, a bioinformatician can progress into a leadership role.

Salary

Salaries in this area can vary depending on qualifications, experience and work settings. They are typically in the region of £28,000 – £50,000 per year.



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