

## SHORT TERM FELLOWSHIP AT WELLCOME TRUST SANGER INSTITUTE, UK

### Summary:

The Wellcome Trust Sanger Institute is a premier institute in the field of computational biology and bioinformatics. As a part of short term fellowship in foreign institute, funded by DHR I was able to visit the prestigious institute and be a part of their esteemed, rigorous and ethical research. In my short stay of one month I was able to gain a lot of insights on current hotspots of biological research and an effective way to conduct research and have viable solutions in combating global issues. Research work was streamlined on two major aspects:

1. Whole genome next generation sequencing of bacterial pathogens.
2. Correlation of bioinformatics to genomics and application to health sector.

The work experience helped me to better gauge the effect the bacterial pathogens to global community and the harm of anti-bacterial resistance that effects healthcare.

During the tenure of this fellowship, major focus laid on aspects on performing the whole generation sequencing of pathogens on WHO priority list, analysis of sequenced samples, determining SNP's and effect on pathogenicity.

The visit also was fruitful in various other aspects of academics and research. An opportunity to having met other global leaders in research and chances of getting collaborations in various aspects of biological science and technology.

My visit has yielded in getting in contact with other institutes like European Bioinformatics Institute (EBI) and University of Cambridge, which will only help us getting more collaborative projects inclined with national interest.

This will lead to getting academic collaborations guiding our students to carry out research in our country leading to brain gain, young and efficient manpower in field of academics and research.

I would use this opportunity to thank Department of Healthcare and Research, Ministry of Women and family welfare for providing me an opportunity and provide sufficient funds. Such programs will definitely encourage research-oriented minds to learn, adopt and implement advanced techniques, in-turn leading to form a highly motivated work force to address healthcare issue prevailing in our country in an effective manner.

## **Wellcome Trust Sanger Institute:**

Academic visit to the institute was from 2<sup>nd</sup> of July 2018 to 30<sup>th</sup> of July constituting to a span of 4 weeks I was mentored by Prof. Stephen Bentley, Department of Microbial Genomics. My accommodation was arranged as a paying guest with a rental agreement of payment based on weekly basis.

During the first week of my tenure at the institute I was introduced to the institute as a visiting scientist and given access with the same credentials.

I was able to establish myself at Prof. Stephen's lab and have a good rapport with other lab mates engaged in various levels of research in the field of bacterial genomics.

An induction program where I was presented with an opportunity to meet researchers from various other departments of the institute. I was also given an opportunity to introduce my work and provide them a glimpse of research work being carried at my institute.

The first week proved fruitful in gaining knowledge about the institute, various departments and the quality of research work being carried out in individual labs. I also could gauge the quantum of new research methods that can be learnt and implemented.

During the second week of visit, I was able to work as a team initially and gain hands on knowledge of various new techniques and technologies in the field of Whole genome sequencing and analysis.

I was able to work hands-on on the various advanced sequencing tool like nanopore sequencer and its ability to transform the current trend in bacterial pathogen studies. The various analysis pipelines for sequence alignment, gene annotation, SNP's detection was shared which were better and efficient.

I was able to access all of these pipelined and also gain access for a short period of time for my lab students back in India to utilise and adapt the same for our research purposes.

During the same week I was also able to visit other labs in sanger and understand other aspects of pathogen studies and look for potential collaborations.

The major takeaway can be summarised into the following:

1. To work on a tool namely Phandango and contribute in development and debugging Phandango being an interactive web application, available free allowing fast exploration of large scale population genomics datasets combining multiple genomic analysis methods in an intuitive manner.
2. Induction on pathogen informatics and remotely working from India on advanced analysis to determine structural variance in organism which are pathogenic in nature.
3. Meeting with Prof David Antherson group on the NIHR PROJECT GRANT, which potentially deals to provide actionable data for public health policy to control high-risk bacterial pathogens and against anti-microbial resistance.

The third week of my stay allowed me to visit other major institutes like European Bioinformatics Institute (EBI) and University of Cambridge.

At the EBI, I was able to meet and engage with many team leaders and learn from various tools that are at our behest. The team leaders were very supportive and enthusiastic in collaborating at various levels to tool development and research.

The major taking points involved:

1. Successful collaboration with Prof Daniel Zerbino on different aspects of computational biology, which has both short and long-term projects.
2. Potential research tie-ups with Dr. Sameer from PDB-e on structural biology and creating python notebooks has ensured a continued collaboration.

I was also able to interact with administrators at University of Cambridge who were friendly and promising in starting various online courses in India.

In the fourth week, I was able to assimilate a lot of knowledge with respect to techniques and technology in various domains of computational biology. Gain access to sanger developed and in house bioinformatic pipelines. Opportunity to engage and build potential research collaborations with Sanger institute and EBI.