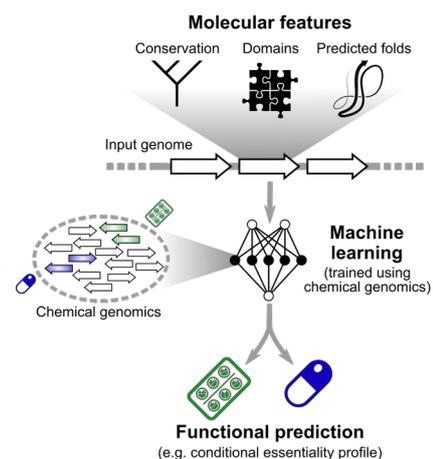


Pangenome wide prediction of gene function – PhD position

The “Microbial Pangenomes Lab” at Twincore/MHH (Hannover, Germany) is looking for a computational biology PhD student to undertake research in the area of microbiology and machine learning. We are looking for a candidate with a master’s degree in either biological sciences or computer science; ideally the candidate would have some prior exposure to computational biology and/or machine learning; the principal investigator is however committed to provide training opportunities to best equip the successful candidate to carry out this project and to help the candidate’s career, in academia or industry. The successful candidate might be able to join the ZIB graduate school (<https://www.mhh.de/hbrs/zib>). Candidates should send an application including a cover letter, a CV and the contact information of at least one reference to: marco.galardini@twincore.de before 04/11/2020.

Project description: Bacterial genomes have a large number of genes that belong to the so-called “accessory genome”, indicating that those genes are present only in very few members of each species. As the function of those genes is largely unknown, there is a pressing need to understand how the accessory genome influences phenotypes. Since molecular laboratory techniques to investigate gene function do not scale well with the tens of thousand of accessory genes belonging to a species’ pangenome, computational methods could be used to predict gene function *in silico*.

Machine learning models trained on the wealth of data available for model organisms and using features extracted from nucleotide sequences as input could be used to improve the current function prediction methods. The project then would involve developing a predictor of gene function for bacterial accessory genes, using a machine learning model trained on data such as chemical genomics. The input of the model would be the genome sequence of an isolate, while the output would be a probability that each input gene is essential for growth in a series of conditions.



The institute: Twincore is a joint venture between Hannover Medical School (MHH) and the Helmholtz Centre for Infection Research (HZI). At Twincore medical personnel and basic research scientists from various disciplines conduct infection research side by side. The institute focus is on translational research, *i.e.* the interface between basic research and clinical development. Internationality is another key feature of the institute: almost half the scientists working at Twincore are from abroad. Read more about the institute here: <https://www.twincore.de/en/about-twincore/>.

The lab: The “Microbial Pangenomes Lab” has been established in October 2020 as part of the Molecular Bacteriology department. The lab is lead my Prof. Marco Galardini and its main research focus are bacterial pangenomes, the influence of genetic variation on phenotypes and the evolution of antimicrobial resistance. The lab has funding for the next 5 years from the RESIST excellence cluster (<https://www.resist-cluster.de/en/>), with the potential for an additional 5-year extension pending a successful review.