

## JOB OFFER

Position in the project:	Volunteer – Msc student
Scientific discipline:	Bioinformatics
Job type (employment contract/stipend):	voluntary
Number of job offers:	4
Remuneration/stipend amount/month (“X0 000 PLN of full remuneration cost, i.e. expected net salary at X 000 PLN”):	Voluntary work
Position starts on:	November/December 2020
Maximum period of contract/stipend agreement:	12 months
Institution:	International Centre for Cancer Vaccine Science, University of Gdańsk, Poland
Project leaders:	prof. Theodore Hupp, prof. Robin Fahraeus
Project title:	<i>International Centre for Cancer Vaccine Science</i>  <i>Project is carried out within the International Research Agenda Programme of the Foundation for Polish Science</i>
Project description:	The International Centre for Cancer Vaccine Science (ICCVS) is an innovative new partnership between the University of Gdańsk and the University of Edinburgh addressing a major challenge in cancer medicine. The ICCVS based at the University of Gdańsk, supported by the Foundation for Polish Science, aims to create a world-leading research cluster in the discovery, characterization and translation of molecular mechanisms in cancer immunological science. We are now seeking biology or biotechnology students to use world-renowned resources alongside a team of scientists generating datasets in the fields of cancer immunology, virology, vaccinology, antibody technologies, mass spectrometry, computational science, analytical chemistry, protein science, cell signaling and veterinary science.
Key responsibilities include:	We are searching for 4 bioinformatics masters students to join the group with background strength in computer science, statistics, biophysics, or biology. The applicant will to join a multidisciplinary team of bioinformaticians working on different aspects of neoantigen discovery at the International Center for Cancer Vaccine Science. We

work on projects related to emerging diseases like COVID19 and cancer.

The successful candidate will work in a collaborative team of biologists and data scientists on the integrative analysis of genomics, transcriptomics and proteomics datasets. Projects can include aspects of methods development, pre-processing and univariate statistical analyses, integrative systems biology, machine-learning and neoantigen discovery. Analysis of these data will be performed on cutting-edge IT infrastructure.

Potential projects, among others:

**Project 1:** There are two types of T-cell stimulating vaccines, representing a new class of immunotherapy against cancer and other emerging diseases. Personalized vaccines are tailored to the specific patient in question, whereas general vaccines aim to create an immune-response broadly in the population. The proposal Optimal T-Cell stimulating vaccine design involves the selection of the right peptide cocktail to stimulate a vaccine in a patient. But, how to find the right peptide cocktail is not yet well developed. Algorithms to predict affinity to MHC-Class I molecules are now well established, and there are early attempts at understanding immunogenicity. What we propose is an iterative process to converge on the best antigens for a specific population. State of the art algorithms would propose a series of cocktails given what is known about a population. Then our own in-house algorithms will be used to score peptides from the COVID-19 or ASFV genome to intelligently develop a series of vaccine cocktails. These will then be tested for immunogenicity using experimental approaches within the population. The results of the test would be used to update the algorithm to produce a score tailored for the population. A statistician or highly-computational person is required to develop a project aimed at understanding the theoretical limitations of such an approach in the context of specific pathogens. The aim of the theoretical study is to identify the optimal experimental design under specific pathogen contexts. How large the cocktails be, what experimental design would lead to the fastest convergence on the best vaccine cocktail, what are the parameters to be tuned. The student would be required to develop the theory in experimental design for T-Cell vaccine therapies.

**Project 2:** Cancer immunotherapy is a new type of treatment that can regenerate the cancer-fighting properties of the immune-system. Immunotherapy has

changed the outlook for patients with advanced cancers who have failed with the standard of care. However, many patients do not respond. A common reason is that cancers co-opt normal metabolism and in-so-doing cripple T cells. The comprehensive characterization of metabolomes has received very little attention from the computational community. Through this deeply computational project the student will apply state of the art artificial intelligence techniques to advance the field of metabolomics and progress in the high-demand field of computational mass-spectrometry.

**Project 3:** Immunotherapies represent ground-breaking new therapeutic options for cancer treatment. However, patients respond differently to these therapies, which is partially related to patient-specific heterogeneity in antigen-recognition. HLA-typing is one way to understand these differences. The established standards for HLA genotyping rely on targeted DNA sequencing techniques. Few options exist to call HLA-types from short-read sequencing data. A methodology for HLA-typing from these data would enable a re-examination and re-interpretation of existing cancer data. The student will assess tools for haplotype calling from short-read sequencing data and for patient-specific haplotype or multi-patient haplotype family calling. The student will apply these tools in high-throughput against existing datasets with the end goal of applying machine-learning to predict patient response to immunotherapies.

**Project 4:** Antibodies can represent powerful and novel immunotherapies. However, a hurdle to overcome in the generation of a synthetic antibody is the immunogenicity of the final product. The project being developed merges bioinformatic and laboratory methods to re-engineer antibody sequences for safe therapeutic use in different species. "Caninizing" mAbs of murine origin supports the use of canine model as a superior alternative to murine research with the premise of safer, more efficient and affordable therapeutics for both human and veterinary cancer patients. The team is aiming at an automated algorithm for antibody design based on a proprietary sequence library. The student would be required to support this project by developing a large database of existing antibody structures for the development of GANS aimed at converting antibodies from one sequence space (mouse) to another (human). The tool would later be developed for dog, as more evidence emerges for the success for the too in data-rich regions.

<p>Profile of candidates/requirements:</p>	<p>Candidates willing to apply with either of the following skill sets and willing to gain experience in the other should apply.</p> <ul style="list-style-type: none"> <li>• We are seeking undergraduates in their final year of study or Masters students from Computer Science, Bioinformatics and informatics to engage in data science projects at the international Centre for Cancer Vaccine Science.</li> <li>• Other assets include: Experience using compute clusters in the linux environment, R programming, python programming, and experience with tools commonly used in molecular dynamics simulations.</li> </ul>
<p>Required documents:</p>	<ul style="list-style-type: none"> <li>• CV</li> <li>• Motivation letter</li> <li>• certificate of Master's student status in Computer Science, Data-science, statistics, biophysics, biology, medicine, biotechnology or related sciences.</li> <li>• documents confirming the scientific achievements or qualifications of the candidate, in particular copies of publications, language certificates, certificates confirming the award of an academic award, internship or membership in scientific clubs/associations, oral presentations and posters on conferences, scientific fellowships, international trainings etc.</li> </ul>
<p>We offer:</p>	<ul style="list-style-type: none"> <li>• The ICCVS is housed in state-of-the-art facilities at the UG with facilities for mass spectrometry, virology, protein biochemistry, vaccine technology and bioinformatics.</li> <li>• Students will have the opportunity to develop skills in machine learning and high performance computing. The center has access to Cyfronet Prometheus (~55, 000 cores) and CI TASK Tryton (~38, 000 cores) clusters, which are consistently represented among the top 500 super computers in the world.</li> <li>• ICCVS researchers will have joint supervision with scientists at the University of Edinburgh, within strategic platforms for stem cell science, phenotypic drug screening, synthetic biology, computational science, structural biology, veterinary medicine, and optical imaging (<a href="http://www.optima-cdt.ac.uk">www.optima-cdt.ac.uk</a>)</li> </ul>

	<ul style="list-style-type: none"> <li>The ICCVS provides an exceptional opportunity for motivated students to work in an international multidisciplinary training environment to tackle major challenges at the interface between basic cancer discovery science and translational medicine.</li> </ul>
Please submit the following documents to:	<a href="mailto:iccv@ug.edu.pl">iccv@ug.edu.pl</a>
Application deadline:	15.11.2020
For more details about the position please visit (website/webpage address):	<a href="http://www.iccv.ug.edu.pl">www.iccv.ug.edu.pl</a> Contact: <a href="mailto:iccv@ug.edu.pl">iccv@ug.edu.pl</a>

### **Consenting clause**

„I consent to the processing of my personal data by the University of Gdańsk contained in the application documents for the needs necessary to carry out the recruitment procedure, including the competition for the position PhD student. in University of Gdańsk, International Centre for Cancer Vaccine Science, in accordance with the General Data Protection Regulation of 27 April 2016.

In addition, I declare that I have been informed of the possibility of withdrawing consent at any time and that its withdrawal does not affect the legality of the processing which was carried out on the basis of consent before its withdrawal.”

### **Information clause**

In accordance with the General Data Protection Regulation of 27 April 2016 hereinafter referred to as GDPR, we inform that:

1. The Administrator of your personal data is the University of Gdansk with headquarters in (80-309) Gdańsk, ul. Jan Bażyński 8.
2. The administrator of personal data has appointed the Data Protection Officer, which can be contacted on the phone number (58) 523 24 59 or e-mail address: [poin@ug.edu.pl](mailto:poin@ug.edu.pl).
3. Your personal data will be processed in order to carry out the recruitment process for the position PhD student. in University of Gdańsk, International Centre for Cancer Vaccine Science,
4. The legal basis for the processing of your personal data for the purposes of recruitment is art. 6 par. 1 lit. c GDPR – processing is necessary to fulfill the legal obligation incumbent on the administrator resulting in particular from art.118 a of the Law on Higher Education and art. 221 of the Act - Labor Code. A premise that legalizes the processing of personal data voluntarily provided by the candidate, going beyond the scope of data indicated in art. 221 of the Act - Labor Code will be art. 6 par. 1 lit. a GDPR - consent of the data subject.
5. Providing your personal data by yourself, after making a decision about joining the recruitment process is obligatory in the scope specified in art. 22<sup>1</sup> of the Labor Code and the Law on Higher Education and conditions the possibility of applying for employment and possible further employment. In the case of providing personal data going beyond the above law - providing your personal data by yourself is voluntary but it determines the possibility of participation in the recruitment process
6. Your personal data will be processed on behalf of the data controller by authorized employees only for the purposes referred to in par. 3.
7. Your personal data will be kept for the period necessary to achieve the objectives set out in paragraph. 3. In the case of a negative result of your recruitment, your data will be deleted immediately after the recruitment is completed, unless the law requires the archiving requirement within the specified scope - for the time specified in these provisions.

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8. Your personal data will not be disclosed to third parties, except as provided for by law. In the case of submission of application documents by electronic means, the recipient of your data may be an entity acting on behalf of the administrator, ie an entity that is the operator of the postal service.
  9. Under the rules laid down in the provisions of the GDPR, you are entitled to:
    - a. the right to access the personal data,
    - b. the right to rectify them when they are inconsistent with the real state,
    - c. the right to remove them, limit processing and transfer data - in cases provided for by law,
    - d. the right to object to data processing,
    - e. the right to lodge a complaint to the supervisory body - the President of the Office for Personal Data Protection, when you think that the processing of your personal data violates the provisions on the protection of personal data.