



## Curriculum Vitae

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## EDUCATION

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8/2018–Present **PhD in Biological Science(Computational Biology/Bioinformatics)**  
**Agency for Science Technology and Research, A\*STAR,**  
**Bioinformatics Institute x National University of Singapore**  
GPA: 4.17/5

2014 – 2018 **Bachelors in Biological Science**  
**Nazarbayev University, Kazakhstan**  
Biotechnology and Molecular Biology track  
GPA: 3.51/4

2011–2014 **High School Diploma**  
**Nazarbayev Intellectual Schools (IB accredited), Astana (Kazakhstan)**  
Biology and Chemistry intensive course  
GPA 5/5, National Standardized Test (125/125)

## PROJECTS

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8/2018 – Present **PhD project, “Biomolecular evolution and adaptation to extreme environments (pH, salt, temperature) through prism of bioinformatics.”**

Agency for Science Technology and Research, Bioinformatics Institute (A\*STAR, Singapore)  
Supervision of Tan Zhen Wah and Igor Berezovsky, Alexander Kraih and Peter Bond

### Database and Annotation Integration:

- Developed a comprehensive database of 9306 organisms, integrating environmental annotations (temperature, pH, salinity) by mining and organizing complex annotation data from multiple sources. Able to work with both structured and unstructured data types.

### Data Management and Analysis:

- Managed the entire data lifecycle, including collection, annotation, and quality assessment, and used advanced visualization techniques to present complex data, facilitating actionable insights using scipy,pandas, matplotlib, seaborn, Biopython and other packages.  
- Analyzed over 32 million proteins/genomes using Python, R, and Linux

### Pipeline and Coding:

- Automated the integration of annotations with sequence data using REST API and JSON,XML data parsing.  
- Designed and implemented a sophisticated pipeline with Blast+ to filter unannotated membrane proteins from a dataset.  
- Built a comprehensive annotation pipeline using Blast+ for 2827 proteins, identifying sequence homologs across various environmental groups (thermophilic, mesophilic, acidic mesophilic, halophilic).

### Genomic and Proteomic Analysis:

- Uncovered molecular adaptation patterns to extreme environments such as thermophilic, psychrophilic, halophilic, acidophilic, and alkaliphilic conditions. This allowed me to study protein stability, folding, aggregation, stability vs activity tradeoff concepts within realms of natural evolution.  
- Conducted in-depth genomic and proteomic analyses to understand the interdependence of DNA, RNA and protein adaptations within the Central Dogma of Biology.  
- Performed Multiple Sequence Alignment (MSA) to analyze amino acid substitutions from mesophiles to extremophiles.

### Protein Design and Simulation:

- Designed proteins in silico, developing successful mutant candidates and tools for predicting thermostability using Molecular Dynamics (MD) simulation methods.  
- Evaluated the impact of mutations on protein stability using FoldX and further enhanced protein design by developing novel thermostability prediction methods using MD simulation.

### Skills and Optimization:

- Used scikit-learn (machine learning package) for multivariate statistical analysis (PCA), linear regression based models, learned to optimize simulation performance locally and on supercomputers.

- 6/2017 – 7/2017 **Senior Honors Thesis Project, “Identification of the geographic origin of Salmonella”**  
Nazarbayev University, School of Science and Technology, Department of Biology
- Developing molecular typing method for identification of geographic origin of Salmonella Enteritidis based on multiple locus variant analysis (MLVA)
  - Implementing in silica PCR to create database of VNTR repeats for generating MLVA scheme for "generating geographic passports for bacteria"
- 6/2017 – 7/2017 **Directed Study in Biology Project “Camel DNA identification in meat products”**  
Supervision of Christian Schoenbach (Kumamoto University/Nazarbayev University) and Ruslan Kalendar (University of Helsinki/National Center for Biotechnology), Astana
- Analysis of the genome of Camus Bactrians for the subject of differences from other Camelidae family members and other mammals
  - Primer design for Camel DNA identification from other mammals based on casein gene
  - Identifying and classifying repeats on camel DNA based on Variable number tandem number repeats (VNTR)
  - Learned FastPCR program, primer analyzing tools, multiple sequence analysis (MSA), BLAST
- 1/2017 – 4/2017 **Bioinformatics Project on Inflammatory bowel disease (IBD)**  
Nazarbayev University, School of Science and Technology, Department of Biology
- Studied the association of Metals with IBD through protein-protein and protein- metal interactions.
  - Investigated the regulatory mechanisms of metals within the IBD pathways. - Predicted antagonistic and synergistic properties of metals.
  - Learned to use biological databases (NCBI), ExpASY; learned to work with PYMOL and STRING database
- 7/2016 – 4/2017 **Research on Spider Venom**  
Supervision of Olena Filchakova, Nazarbayev University, Astana (Kazakhstan)
- Antimicrobial testing of spider venom on various bacterial cell types
  - Learned to prepare reagents; Lawry and Bradford Assays; to prepare nutrient media/gels and handle Bacterial cells from growth to its proper storage; SDS-PAGE
- 8/2016 – 11/2016 **Eco-Village Project by Chevron, Astana (Kazakhstan)**
- Analyzed bioenergy sources and production processes (plant crops, algae, and microalgae-based fuels) and investigated current technologies from scientific articles.

## PUBLICATIONS

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- 02/2024 **Current Research in Structural Biology journal, research article**  
“Living in trinity of extremes: genomic and proteomic signatures of halophilic, thermophilic, and pH adaptation”  
DOI: [10.1016/j.crstbi.2024.100129](https://doi.org/10.1016/j.crstbi.2024.100129)
- 07/2023 **Protein Engineering Gordon Research Conference, Rhode Islands, USA**
- Networking to industry and academia representatives
  - Presented a poster
- 02/ 2023 **Biophysical Society Annual meeting, Conference in San Diego, USA**
- Presented a poster. “Adaptations of proteins, RNA and DNA to extreme temperatures, salinity and pH”
  - Student Research Achievement Award
- DOI: <https://doi.org/10.1016/j.bpj.2022.11.2513>

## AWARDS

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- 2/2023 **Student Research Achievement Award (SRAA)**  
Biophysical Society, USA  
Physical Cell Biology Subgroup
- 08/2018 **SINGA Scholarship Awardee, Singapore**
- 4/2017 **Certificate CUP Challenge Finalist**  
Changallenge by KPMG, KIMEP University, Almaty (Kazakhstan)
- Solving business case by KPMG & generating development strategy for KIMEP University
- 3/2017 **MARS Challenge, 2nd Place Winner**  
Changallenge, MARS, Astana (Kazakhstan)
- Solving business case for MARS company in sales & developing marketing strategy

## ACCOMPLISHMENTS

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- 11/2015 **Field trip to Astana wastewater treatment plant of "Astana Su Arnasy"**  
Nazarbayev University AIChE Student Club  
- Observed technology of plant technologies of water purification
- 2014 **Certificate in Leadership**  
by AIESEC, Astana (Kazakhstan)  
AIESEC is a global platform for young people to explore and develop their leadership potential. It is a non-political, independent, not-for-profit international organization run by youth and recent graduates of institutions of higher education. Its members are interested in world issues, leadership, and management.
- 12/2013 **Attending Christmas lectures by Dr. Alison Woolard**  
Royal Institution of Great Britain, London (United Kingdom)  
- Was selected as the best student to attend the **extensive activities at L'Oréal Young scientist Centre in genetics & commercial chemistry**

## WORK EXPERIENCE

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- 9/2021 – 11/2021 **Product Manager, created workshop on Data Science**  
ICAE, International center for advanced education (early stage start up), Almaty  
- Within one month created the course "Gem of Data Science" that included application of Machine learning algorithms in Business (for example book recommendation systems for users, optimisation of flight routes for airline company)  
- Competitor analysis, creating course curriculum up to market demands  
- Communication with keynote speakers and course lecturers.  
- Was promoted as Business analyst.
- 4/2021 – 5/2021 **Sales Team Representative**  
Remoteam.io (Remofirst, USA)  
- Developed customer acquisition strategy  
- Marketing strategy
- 1/2018 – 3/2018 **Sales Manager**  
Levi Strauss & Co., Astana (Kazakhstan)  
- Learned about materials, fabrics, and patented technologies  
- Retail sales (performed at the top of weekly sales volume chart)
- 1/2018 **Administrator**  
Lego School, Astana (Kazakhstan)  
- Guiding customers and potential clients through the program  
- Organizing schedules  
- SMM, designing posters, creating questionnaires
- 8/2016 – 11/2016 **Project management, Time and Scope Manager**  
Harvard Project for Asian and International Relations, Astana (Kazakhstan)  
- Defining and ordering activities, developing & controlling schedule (Gantt Chart)  
- Creating work breakdown structure, decomposition  
- Collecting requirements and changing requests  
- Estimating resources and durations
- 8/2016 – 11/2016 **Eco-Village Project by Chevron, Astana (Kazakhstan)**  
- Designed the model of the ecologically sustainable village, estimated available resources, calculated costs, and computed efficiency.

## PERSONAL SKILLS

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- Languages** Kazakh (Native), Russian (Native), English (Fluent), French (Beginner)
- Hobbies** - Art. Winner in international ecological art and local competitions  
- Business. Founded Marketing Agency (2021). Participated in start-ups and incubator programs (2021)
- Additional trainings** - Strategic marketing course at Coursera, 2018  
- Product management course at EdX, Boston University, 2020