NICHOLAS WOYTOWITZ

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Summary

Research scientist with over 2 years of experience in pharmaceutical development, academic research, and computer aided drug design. Proven track record of developing technologies and improving processes which help companies identify and capture new market opportunities. Strong academic background with expertise in data science, molecular biology, computer-aided drug design and protein engineering. Highly organized: thriving in fast-paced, demanding environments.

Education and Training

Master of Science: **Biotechnology**   **Expected in 05/2022**
New York University   **New York**, NY
Focus in Computer Aided Drug Design

Bachelor of Science: **Neurobiology and Physiology**   **12/2018**
University of Maryland - College Park   **College Park**, MD

Professional Experience

GeneCentrix Inc.   **12/2021 to Current**
New York, NY
Research Scientist

- *Ligand discovery*: Implemented a python-based, high-throughput, peptide-protein flexible molecular docking platform identifying lead candidates for further development in a pharmaceutical co-development program with AbbVie
- *Computational chemistry*: Rationally engineered peptide chains *in situ* in 3D structure optimizing predicted affinity Correlated results with *in vitro* measurements using ELISA, SPR and FACS
- *Target validation*: Employed data science and machine learning techniques to analyze drug target expression in transcriptomes
- *Database management:* Utilized SQL and PostgreSQL to create and manipulate databases for maintenance purposes for HistoReceptomics—GeneCentrix's drug profiling software
- *Machine learning engineering:* Incorporated a machine learning model to predict drug target affinities drawing on concepts from deep learning, graph mining, natural language processing, and regression

Bucha Bio, INC   **06/2021 to 12/2021**
New York, NY
Microbial Strain Engineer

- *Protein engineering*: Engineered computational model of an edited cellulose synthase operon for bacterial strain *K Xylinus,* and conducted a recombinant DNA experiment increasing production of bacterial nanocellulose yield three-fold
- *Genetic engineering*: Conducted research and development project to boost crystallinity of nanocellulose, imbuing the finished product with a higher tensile strength
- *Business Development:* Engaged in client outreach and relations, as well as participated in discussions with prospective clients and investors speaking on behalf of the biological research and development program

Graduate Projects

New York University, Tandon School of Engineering   **01/2021 to 05/2022**
New York, NY
Machine Learning Applications in Bioinformatics *(January 2022 to May 2022)*
Dr. Taiwo A Togun

- Utilized stacked autoencoders and a biased support vector machine for development of enhanced drug target protein screening algorithm by better encoding biochemical traits to target proteins
- Trained and tested a series of supervised and unsupervised machine learning models utilizing cross validation techniques to enhance predictive capacity for identifying target druggability
- Finalized a model which identified hundreds of potentially druggable proteins from a list of 5892 previously considered to be non-druggable using data generated from the European Bioinformatics Institute's EMBOSS PepStat calculator

Computer Aided Drug Discovery and Design *(September 2021 to December 2021)*
Dr. Timothy Cardozo
- Investigated the interaction between the Nurr1 nuclear receptor and chloroquine, a known allosteric modulator of Nurr1 function, by docking chloroquine using Molsoft ICM-Pro
- Conducted a chemical similarity search and docked a 1700 FDA approved druglike compounds discovering compound T1095 which had a greater then 2-fold increase in binding affinity
- Improved binding affinity another 50% using ICM-Pro's ligand builder function to rationally add chemical elements to increase affinity in the allosteric regulatory site

Computer Aided Biologic Design *(January 2021 to May 2021)*
Dr. Timothy Cardozo
- Optimized affinity of the CDRH3 loops in the scFV region of human monoclonal antibody 222 (mAb 222) for SARS-CoV-2 and major variants using Molsoft's ICM-Pro Software
- Built 3D structural representations of enhanced monoclonal antibodies via rational protein design using homology modeling and Monte-Carlo plus minimization strategies for each the wild type, the K417T variant, and the K417N variant.
- Cross referenced and designed a monoclonal antibody that effectively neutralized each variation of SARS-CoV-2

Genetic Engineering *(January 2021 to May 2021)*
Dr. John Katsigeorgis
- Employed CRISPR/ Cas9 protocol for phosphoribosyl aminoimidazole carboxylase (ADE2) genetic silencing in S. cerevisiae
- Built recombinant DNA vectors via Gibson, and PCR assembly for microbial transformation and study of antibiotic resistance
- Developed siRNA for genetic silencing of antibiotic resistance genes via RNA interference in E. coli

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Volunteer Experience

Secondary School Teacher | July 2019 – October 2020
- Council on International Educational Exchange, Sa-Nguan Ying School - Suphan Buri, Thailand

University of Maryland Trek Representative | January 2019 – June 2019
- Build On – Lilongwe, Malawi

Undergraduate Research Experience

UPMC Hillman Cancer Center and University of Pittsburgh School of Medicine   **05/2016 to 08/2018**
Pittsburgh, PA
Pharmaceutical Research Assistant
Dr. Edward Chu, Molecular Pharmacology Research Laboratory
- Explored CRISPR CAS9 gene editing potential to manipulate expression patterns of thymidylate synthase, and the role of genetic variance in drug resistance.
- Operated day to day laboratory procedures performing biochemical techniques and analyses and maintaining cell cultures.
- Prepared tables, graphs, fact sheets and written reports summarizing research results for weekly presentations

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Data Science Certification Programs

New York University- Data Science and Machine Learning Bootcamp
- 3 Month python-based program focused on developing the skills to effectively employ machine learning techniques

Springboard Data Science Bootcamp-Machine Learning Specialization
- 500-hour program focused on applying python, SQL, and R to 3 capstone projects

AWS Machine Learning Training and Certification
- Certification program focused on developing applications and deploying models on AWS cloud

Skills & Expertise

Skill Set: ICM-Pro, AutoDock, HADDOCK, Python, R, SQL, MATLAB, SPR, FACS, QCM, CRISPR, AWS, ChatGPT, Tableau, Assays, Cell and Tissue Culture, Western Blot, Protein Purification, PCR, ELISA, Project Management, Microsoft office

Areas of Expertise: Computational Chemistry, Transcriptome Analysis, Genomics, Machine Learning, Data Science, Molecular Immunology, Protein Engineering, Genetic Engineering, Biosensors, Molecular Biology, Neurophysiology, Biochemistry

Python Libraries: Pandas, Numpy, SciKit-Learn, SciPy, PyTorch, Keras, DeepChem, Matplotlib, Seaborn, ScanPy, ChEMBL, TensorFlow, Tableau API, RDkit