Nathan Mih

(626) 667-4197 | nathan.mih@gmail.com | San Diego, CA 92122
GitHub: github.com/nmih | LinkedIn: linkedin.com/in/nathan-mih

Education

University of California, San Diego: Ph.D. Candidate in Bioinformatics & Systems Biology *2012 – present*

- Anticipated defense date: May 2018

University of California, Irvine: B.S. in Biochemistry & Molecular Biology *2008 – 2012*

Work & Research Experience

UCSD Systems Biology Research Group, Dr. Bernhard Palsson

Graduate Student Researcher *January 2014 – present*

- Developed the Python package *ssbio* (github.com/SBRG/ssbio) for the annotation and use of genome-scale metabolic models with high quality protein structure information. Distributed with a focus on providing reproducible and interactive Jupyter notebook tutorials.
- Integrated detailed protein-level computational chemistry tools with systems-level metabolic modelling approaches. Linked protein sequence variants and drug targets to a metabolic model of the red blood cell to quantify the effect of mutations on ligand binding and consequently, metabolic function.
- Mentored a team of 6 undergraduate students to develop a platform for the whole-cell visualization of *E. coli*.

Graduate Teaching Assistant

- BENG212 - Systems Biology: Network Reconstruction & Functional States (guest lecturer) *Winter 2016, 2017, 2018*
- MED263 - Bioinformatics Applications to Human Disease *Winter 2015*
- BNFO285 - Statistical Learning in Bioinformatics *Winter 2014*

UCI Tsai Lab, Dr. Shiou-Chuan Tsai

Undergraduate Student Researcher *March 2010 – June 2012*

- Learned and applied protein expression, purification, and crystallization techniques to aid in the structural determination of various polyketide synthase (PKS) enzymes.
- Designed primers for PCR site-directed mutagenesis to assist in a study to biochemically characterize protein-protein interactions in PKS subunits.

Matrigen Life Technologies

Webmaster *June 2011 – September 2012*

- Web design and development (HTML/CSS, E-commerce) at matrigen.com.

UCI Residential Networking Services

Senior Residential Network Consultant *June 2011 – June 2012*
Residential Network Consultant *March 2010 – June 2011*

- Provided friendly helpdesk support (in person and remotely) for computer networking and cable television issues to 5000+ university staff and students.
- Diagnosed networking equipment in residential halls and apartment complexes. Assisted in installing replacement switches and replacement wiring at communication closets and end-user ports.
- Involved in the hiring, training and management of new student employees.

Skills

Programming & Databases: Python (scientific analysis & object-oriented programming), R. Basic knowledge of Java, distributed computing (Apache Spark), JavaScript, MATLAB, C#, C++, SQL, Neo4j, XML.

Computational: Git, Bash, Slurm and TORQUE job scheduling, computer networking. Comfortable in Linux, macOS, and Windows.

Bioinformatics: Structural genomics (protein sequence and structure alignments, homology modeling), computational chemistry (AMBER molecular dynamics, docking, VMD), pipeline tools (genome assembly, variant mapping), systems biology (constraint-based analyses).

Biochemical: Protein purification, PCR, cloning, crystallization screening, SDS-PAGE, FPLC, cell culture.

Volunteer Work & Other

UCSD GrAdvantage Leadership & Teamwork Certificate *September 2016 – June 2017*

- Planned and executed a project to create a dialogue program on the UCSD campus as part of a 5-person team. Secured a $10,000 Equity, Diversity, and Inclusion grant for future dialogue programs.
- Learned basic project management skills.

Summer Science Scholars – Math in Flight, a Reality Changers program *July 2016 – August 2016*

- Math tutor for disadvantaged high school students. Assisted in the design and planning of curriculum.

UCSD Undergraduate Bioinformatics Club: Graduate student advisor *May 2013 – June 2015*

San Diego Science Festival: UCSD Bioinformatics booth volunteer *March 2014, March 2015*

KUCI 88.9FM, KSDT @ UCSD: Radio show host, marketing director *April 2011 – September 2017*

UCISAT: Web design and development *January 2012*

UCI Medical Center: 150-hour summer internship in Neurology wing *June 2007 – September 2007*

Grants & Awards

UCSD GSA Travel Grant *Fall 2015*

UCI Excellence in Research Award *2011 – 2012*

Summer Research Fellow, Allergan Inc. *Summer 2011*

UCI ID-SURE Fellow *Summer 2011*

Selected Publications

Brunk E, Sahoo S, Zielinski DC, Altunkaya A, Dräger A, **Mih N**, Gatto F, Nilsson A, Preciat Gonzalez GA, Aurich MK, Prlić A, Sastry A, Danielsdottir AD, Heinken A, Noronha A, Rose PW, Burley SK, Fleming RMT, Nielsen J, Thiele I, Palsson BO. 2018. Recon3D enables a three-dimensional view of gene variation in human metabolism. *Nat. Biotechnol*. http://dx.doi.org/10.1038/nbt.4072.

Mih N, Brunk E, Chen K, Catoiu E, Sastry A, Kavvas E, Monk JM, Zhang Z, Palsson BO. 2018. ssbio: A Python Framework for Structural Systems Biology. *Bioinformatics*. http://dx.doi.org/10.1093/bioinformatics/bty077.

Yang L*, **Mih N***, Yurkovich JT, Park JH, Seo S, Kim D, Monk JM, Lloyd CJ, Tan J, Gao Y, Broddrick JT, Chen K, Heckmann D, Feist AM, Palsson BO. 2017. Multi-scale model of the proteomic and metabolic consequences of reactive oxygen species. *bioRxiv*. https://www.biorxiv.org/content/early/2017/12/02/227892. *Authors contributed equally.

Chen K, Gao Y, **Mih N**, O'Brien EJ, Yang L, Palsson BO. 2017. Thermosensitivity of growth is determined by chaperone-mediated proteome reallocation. *PNAS*. 114:11548–11553. http://www.pnas.org/content/114/43/11548.abstract.

Monk JM, Lloyd CJ, Brunk E, **Mih N**, Sastry A, King Z, Takeuchi R, Nomura W, Zhang Z, Mori H, Feist AM, Palsson BO. 2017. iML1515, a knowledgebase that computes Escherichia coli traits. *Nat. Biotechnol*. 35:904–908. http://dx.doi.org/10.1038/nbt.3956.

Mih N*, Brunk E*, Bordbar A, Palsson BO. 2016. A Multi-scale Computational Platform to Mechanistically Assess the Effect of Genetic Variation on Drug Responses in Human Erythrocyte Metabolism. *PLoS Comput. Biol*. 12:e1005039. http://dx.doi.org/10.1371/journal.pcbi.1005039. *Authors contributed equally.

Brunk E*, **Mih N***, Monk J, Zhang Z, O'Brien EJ, Bliven SE, Chen K, Chang RL, Bourne PE, Palsson BO. 2016. Systems biology of the structural proteome. *BMC Syst. Biol*. 10:26. http://dx.doi.org/10.1186/s12918-016-0271-6. *Authors contributed equally.

Bruegger J, Haushalter B, Vagstad A, Shakya G, **Mih N**, Townsend CA, Burkart MD, Tsai S-C. 2013. Probing the Selectivity and Protein·Protein Interactions of a Nonreducing Fungal Polyketide Synthase Using Mechanism-Based Crosslinkers. *Chem. Biol.* 20:1135–1146. http://www.cell.com/article/S1074552113002792/abstract.