

Yaoyu Yang

Engineer, Researcher, Programmer

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Summary

- Senior Software Engineer at Ginkgo Bioworks to make biology easier to engineer.
- PhD in Electrical Engineering from the University of Washington working with Prof. Eric Klavins.
- A trained engineer with 8 years of experience in software engineering and synthetic biology.
- Strong data analytic skills and extensive experience in mathematical modeling, dynamical system, and machine learning.

Education

2011-2016 University of Washington

Ph.D. in Electrical Engineering

M.Sc. in Electrical Engineering

2010 University of Virginia

Exchange study, Electrical and Computer Engineering

2007-2011 Shanghai Jiao Tong University

B.S. (with First Class Honors) in Automation

Minor in Business Administration

Technical skills

Programming Languages:

Ruby, Python, Java, C++, JavaScript, Swift, R, Matlab/Octave

Web Development:

Ruby on Rails, Jekyll, HTML, CSS, Bootstrap

Software tools:

Git, GitHub, Eclipse, Xcode, UNIX commands

Modeling and data analysis:

numpy, scipy, pandas, machine learning, dynamical system, convex optimization

Experience

Senior Software Engineer

Ginkgo Bioworks, Boston, MA

2017-present

- Design and implement software for keeping track of samples, laboratory workflows, and instrument.
- Design and implement software for automating laboratory protocols on liquid handlers and other instruments.
- Design and implement software for analyzing data from instruments and correlating with experimental designs.

Graduate Researcher

Klavins Lab, University of Washington (UW), Seattle, WA

2011-2016

- Designed, built and tested a novel inducible genetic bistable switch and an antibiotic resistance memory in yeast. Performed mathematical modeling using dynamical system, experimental design, construction of novel yeast strain through Aquarium, data gathering using scientific instruments, and automated data analysis pipeline with self developed open source Python package.
- Conducting research and continuous software development with Ruby on Rails in building a software system called Aquarium, which enables researchers executing molecular biology workflows in the "cloud". Committed a net of more than 12,000 lines of code. Built 20 high-quality, reproducible workflows for constructing and testing novel plasmids and yeast strains in Aquarium. Used by more than 100 researchers and technicians at UW and MIT. In production use at UW BIOFAB, a university cost center using Aquarium technology.

- Designed and implemented a yeast cell microscopy image segmentation and tracking software in Matlab.
- Interrogated frequency response for a synthetic auxin signaling pathway in yeast. The approach was using a microfluidic device called CellASIC to grow the yeast cell, where one can control the system precisely with different frequencies of auxin inputs and observe using fluorescence microscopy over time. Generated a Bode plot describing the frequency response of signaling pathway.

Independent App Developer

Self, Seattle, WA

2015-present

- Developed CatchOneBus, a personalizable bus real-time arrival info app written in JavaScript on Pebble smart watch platform. Serving 6 metropolitan areas like New York, Seattle, etc. Interacting with APIs from 6 different transit agencies in real time. Received very positive feedbacks from current users and high demand from users outside the current serving areas. Named one of the 15 Best Pebble Smartwatch Apps of 2015 by PC Magazine.
- Developed FishToxicity, a 5-star reviewed iOS app written in Swift for checking mercury levels in fish using data from FDA, targeting pregnant women and parents with young kids, supporting both English and Chinese language.

Teaching Assistant

University of Washington, Seattle, WA

2014

- Worked as TA for Laboratory Methods in Synthetic Biology class.
- Organized to teach 16 students learn lab skills ranging from running a PCR to transforming DNA into *E.coli* and yeast.
- Developed a majority of the training protocols and workflows in Aquarium lab operating system.

Undergrad Researcher

Shanghai Jiao Tong University, Shanghai, CHINA

2009-2011

- Worked on spectrum resources allocation in cognitive radio networks.
- Invented an optimal online auction-clearing algorithm to achieve maximized revenue for primary spectrum users in a dynamic spectrum auction setting.
- Published an original paper in a leading conference.

Publications

- 2017 (expected) **A Novel Yeast Bistable Switch and an Antibiotic Resistance Memory**
Yaoyu Yang, J. Nemhauser, E. Klavins, Manuscript in preparation
- 2015 **Optical Trapping on Two-Dimensional Photonic Crystal and Cell Viability Characterization**
P Jing, J Wu, GW Liu, EG Keeler, **Yaoyu Yang**, SH Pun, LY Lin, *Optical Trapping*
- 2012 **Engineering with Auxin: Characterization of a Synthetic Signal Processing Toolbox**
SS Jang, KA Havens, JM Guseman, EP Jerome, N Bolten, BL Moss, K Oishi, **Yaoyu Yang**, M Gander, T Gu, JL Nemhauser, E Klavins, *Abstract, Q-bio*
- 2011 **Online Market Clearing in Dynamic Spectrum Auction**
Yaoyu Yang, J Wu, C Long, B Li, *GLOBECOM*

Presentations

- 2016 **A Novel Bistable Switch in Yeast and Application towards Growth Rate Switch**
Poster and Lightning Talk, *Molecular Programming Project Workshop*, Seattle, WA
- 2015 **Design and Construction of a Bistable Switch in Yeast**
Poster, *SEED (Synthetic Biology: Engineering, Evolution & Design)*, Boston, MA
- 2014 **Design and Analysis of a Plant Hormone induced Oscillator in Yeast**
Talk, *CSHA Synthetic Biology*, Suzhou, China
- 2013 **Frequency Domain Signal Processing in Biological System.**
Poster and Lightning Talk, *Molecular Programming Project Workshop*, Oxnard, CA

Awards

- 2011 **Shanghai Outstanding Graduate** (awarded to students excelled in both academic and community service, less than 3% of total graduates), Shanghai Municipal Government
- 2010 **Weidmuller Scholarship**, Shanghai Jiao Tong University, Shanghai, CHINA
- 2008-2010 **Academic Excellence Scholarship**, Shanghai Jiao Tong University, Shanghai, CHINA
- 2007 **Outstanding Freshman Scholarship**, Shanghai Jiao Tong University, Shanghai, CHINA

Leadership & Volunteer Services

- 2016-current Co-founder, **Shanghai Jiao Tong University Alumni Association of Seattle**, Seattle
- 2013-2015 Volunteer, **Engineering Discovery Days**, School of Engineering, UW, Seattle, WA
- 2014-current Volunteer, **Science Explorers**, UW & Sanislo Elementary School, Seattle, WA
- 2008-2009 President, **Green Friends Association**, Shanghai Jiao Tong University, Shanghai