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 with Prof. Eric Klavins.
• A trained engineer with 10+ 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, Django, React
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.

• Conducted research and continuous software development 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.

• 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 SeafoodCheck, 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

2019 **Synthetic Bistability and Differentiation in Yeast**
Yaoyu Yang, J. Nemhauser, E. Klavins, *ACS synthetic biology*

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

2018 **Software for Synthetic Biology Foundries: Overview and Challenges**
Invited Talk, *International Workshop in Bio-Manufacturing Automation*, Boston, WA

2016 **Synthetic bistability and antibiotic resistance memory in *S. cerevisiae***
Talk, *Molecular Programming Project Workshop*, Boston, 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

2016-2017 Co-founder**, Shanghai Jiao Tong University Alumni Association of Seattle,** Seattle

2013-2015 Volunteer**, Engineering Discovery Days**, School of Engineering, UW, Seattle, WA

2014-2015 Volunteer**, Science Explorers**, UW & Sanislo Elementary School, Seattle, WA

2008-2009 President**, Green Friends Association**, Shanghai Jiao Tong University, Shanghai