

Yangruirui ZHOU

Email: yrrzhou@bu.edu

Tel: (+1) 857-763-9402

Boston, MA

EDUCATION

Boston University, Boston, MA

09/2020-Present

Ph.D. student, Department of Engineering

GPA: 3.91/4.00

- Research focus on microfluidic CAD tools and algorithms in synthetic biology applications.

University of Electronic Science and Technology of China (UESTC), Chengdu, China

09/2016-06/2020

B.E, Department of Software Engineering (*Elite program*)

GPA: 3.94/4.00 (Rank: 6/740)

- Senior Thesis: Analysis of Postoperative Applications of Pose Tracking Algorithms.

University of California, Santa Barbara, CA

01-03/2019

Exchange Program

Relevant Coursework: Advanced Data Structure and Algorithms, Advanced Discrete Mathematics, Computational Synthetic Biology, Discrete Stochastic Modelling, Machine Learning, Hybrid System, Artificial Intelligence.

SKILLS

Programming language: Python, C/C++, Typescript, HTML, Linux Shell.

Tools: NetworkX, Tensorflow, Pytorch, Latex, Adobe Illustrator, Fusion 360.

Manufacturing (microfluidics): CNC Milling, Laser Cutting.

EXPERIENCE

Research Assistant | Boston University, CIDAR lab

Boston, MA | 09/2020-Present

Supervisor: Prof. Douglas Densmore

- Conduct the development of CAD tools for microfluidic devices that can be easily used for biology researchers.
- Implement algorithms with specific constraints and requirements.
- Create and standardize microfluidic benchmark data set (synthesized or manually designed) for design algorithms.
- Design microfluidic devices with multiple experiment modes for a project aiming to research the strategy in cell-cell communication.

Collaborative Research Assistant | MIT, Voigt lab

Boston, MA | 11/2022-Present

Supervisor: Prof. Christopher Voigt

- Conduct a new genetic circuit partitioning method for the implementation of a cryptographic hash algorithm using a cellular system, adhering to specific biological constraints.

iGEM Team Member | UESTC (Wiki: <https://2019.igem.org/Team:UESTC-Software>) Chengdu, China | 05-10/2019

- Developed an upgraded mapping method for DNA sequence to protein and demonstrated its superiority over other existing methods.
- Designed and implemented an innovative filtering model that significantly improved the accuracy of reflections between the iGEM registry and UniProt Database to over 95%. Additionally, the model successfully increased the number of these reflections by nearly 400%.

Student Research Internship | UCSB, Four "I"s lab

Santa Barbara, CA | 06-08/2019

Supervisor: Prof. Matthew Turk and Prof. Tobies Hollerer

- Read through the paper talks about the existing best pose tracking algorithm and programmed it on local computer.
- Compared this algorithm with the new algorithm proposed by 2 PhD students using the same benchmark data set.

Yangruirui ZHOU

Email: yrrzhou@bu.edu

Tel: (+1) 857-763-9402

Boston, MA

RESEARCH

Neptune

- Reorganized and completed all the related algorithm code repositories left by another graduated student.
- Mentored the undergraduate student to design benchmark data set, fix and develop the GUI of Neptune and interact with another design tool "3DuF".

Oriole

- Developed a sub-graph partitioning algorithm and tested it with more than 1000 benchmarks. Improved the accuracy of partitioning result more than 30%.
- Successfully achieved accurate partitioning results for a large netlist (with over 100 members) while considering size and communication constraints within a matter of minutes.

Vespa

- Implemented the algorithm which can give 100% correct validation answer without time restriction.
- Designed real-world and synthesized microfluidic devices, create a data set for these new benchmarks that can be beneficial to many auto design algorithms in the future.

Partitioning of a 2-bit hash function across 65 communicating cells

- Expedited the gene circuit partitioning process by providing computational support for a synthetic biology paper that implemented a cell-based imitation of the MD5 algorithm.
- With the best performance achieved by "Oriole," the total number of cells required for the circuit was reduced to 63, compared to the manual partitioning approach which typically required 65 cells.

AWARDS & HONORS

Most Outstanding Students of UESTC 2019 (成电杰出学生, 10/5000 in UESTC, 1/740 in department)	12/2019
iGEM "Gold medal" and "Best Software Project"	11/2019
Outstanding Graduates Award of UESTC	10/2019
"Wu Liang Ye" Enterprise Scholarship (2/740 in Software Engineering department)	09/2019
"Internet +" Innovation and Entrepreneurship Competition for College Students in Sichuan, Gold Award	08/2018
International Software Testing Qualifications Board (Certified Tester) [Foundational Level]	10/2016

PUBLICATIONS

- [1] [IWBDA'22] A Conceptual Interactive Microfluidic Design and Control Workflow
- [2, Submitted] [ICCAD'23] Constraint-based Design Validation of Continuous-Flow Microfluidic Device

ACTIVITIES

- [1] Harvard Chinese Life Science Annual Symposium (HCLS'23) 06/2023
- [2] Engineering Biology Research Consortium (EBRC'23) 06/2023
- [3] International Workshop on Bio-Design Automation (IWBDA'22) 10/2022