# Yuanye Chi

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## Education

- **Tufts University** — Massachusetts, USA
  *Master of Computer Science; GPA: 3.8/4.0* — *Sept 2020 – Present*
  ***Courses:*** *Algorithms, Networking, Software Testing, Statistical Bioinformatics in R, Computational Theory, Network Security, Machine Learning, Computational Biology, Software Engineering(in progress), Molecular Biology(in progress)*

- **Tongji University** — Shanghai, China
  *Bachelor of Applied Chemistry; GPA: 4.4/5.0* — *Sept 2016 – Jul 2020*
  ***Courses:*** *Data Structure, C/C++ Programming, Java Language Programming, Web Programming, Linear Algebra, Advanced Mathematics, Chemo Informatics, Biochemistry, Inorganic Chemistry, Organic Chemistry, , Analytical Chemistry, Physical Chemistry, Spectrometric Identification*

## Experience

- **Research Student** — Tufts University
  *Bioinformatics and Computational Biology Research Group* — *Mar 2022 - Present*
  - **RNA-Seq analysis from scratch**: Analyzed preterm umbilical cord blood RNA-Seq dataset with several labeled conditions from scratch. Did alignment by two-pass STAR/RSEM. Made differential expression analysis by DESeq2/limma-voom. Applied DEG enrichment analysis and gene set enrichment analysis(GSEA) to find interesting pathways related to common preterm diseases.
  - **Customize leading edge analysis based on GSEA result**: Developed further leading edge analysis algorithm based on Resnik semantic score to find hidden connection among result pathways when lacking differential expression genes.

- **Software Develop Engineer** — Tengwow, Inc.
  *Backend Development Team* — *Feb 2020 - June 2020*
  - **Order system development**: Designed and Implemented order system docking with Tencent SaaS API based on Springboot which are successfully rolled out to several enterprises.
  - **Testing function implementation**: Implemented daily testing on all APIs in order system based on Cucumber to eliminate hidden risks.

- **Research Intern** — Palmap, Inc.
  *Indoor navigation algorithm R&D team* — *Jun 2019 - Sep 2019*
  - **Navigation algorithm optimization**: ptimized indoor navigation A star algorithm by leveraging stairs constraints and shrank 60% of the graph size on average.
  - **Server caching implementation**: Implemented Redis and CDN to successfully relieve server stress.

- **Research Assistant** — Tongji University
  *Analytical Chemistry Laboratory* — *Sep 2018 - Jun 2020*
  - **Rapid protein prediction based on near infrared spectrum(NIR)**: Developed an algorithm including spectrum preprocessing, automatic wavelength selection, coarse filtering by distances and partial least squares discriminant analysis(PLSDA). The whole algorithm is implemented in C# as well as corresponding graphical interface and other user-related functions. It is still used with a portable spectrometer in the lab.
  - **Formula extraction from natural flavor based on gas chromatography–mass spectrometer (GCMS)**: Developed an algorithm first align and check chromatography peaks and then compare related top 3 mass spectrometer signals. All possible components in complex natural flavors will be ranked by their scores. This algorithm gets a really low RMSE on sample data. Also, implemented a graphical user interface based on QT5 package.

## Projects

### Bioinformatics

- **Ported and Restructured Mummichog(a high throughput metabolomics analyzer)** — Tufts University
  *Solo Project* — *Oct 2021 - Dec 2021*
  - **Ported Mummichog from Python to R**: Ported Open-Source Project Mummichog from Python to R to find out target metabolic network from thousands of mass spectrometry data without a priori identification of metabolites like MS-MS analysis by doing module analysis and pathway analysis.
  - **Restructured Mummichog**: Used tidy data form to restructure program. Instead of handling various dictionaries and lists in Python, made operations on the same dataframe in R.

## Computer Science

- **High Performance HTTPs Proxy** — Tufts University
  *Group Leader* — *Sept 2020 - Dec 2020*
  - **Developed proxy by C**: Developed an Https proxy doing load balance, Ad filtering, content searching, rate limiting using C language.
  - **Added Advanced Features**: Implemented HashMap to do caching. Used Openssl to decrypt/encrypt SSL connection. Handled string processing by purely regex. Designed a p2p network to speed up fetching.
- **High School Mobile Exercising Platform** — Tongji University
  *Solo Project* — *Mar 2019 - May 2020*
  - **Client Development**: Designed two client sides based on Android allowing 1)teachers to upload and review homework and 2)students to finish homework.
  - **Server Development**: Did Cleaning on questions in more than ten latest exercise books and store them into SQLite database. Utilized Java Spring and Mybatis as server.

## Chemistry

- **Analyzing plasticizers content in plastic food packages using GCMS** — Tongji University
  *Group Leader* — *Mar 2018 - May 2018*
  - **Prepared Samples**: Organized group members to collect dozens of food contact packages and prepared the samples by soaking in several kinds of food mimics.
  - **Quantitative analysis based on GCMS**: Measured release amount of DEHP, DBP and DEP by GCMS with internal standard method.

## Honors and Awards

- **Professional scholarship** — Tongji University
  *Second-class(10%)* — *2018*
- **First-class Scholarship for Outstanding Merit** — Tongji University, *2019*
- **Shanghai Innovation and Entrepreneurship Training Program** — Shanghai Scitech Entrepreneurship Center, *2018*
- **Chemistry Experiment Invitation Competition** — Shanghai Municipal Education Commission
  *First-class(4th)* — *2019*

## Skills

- **Programming Languages**: R, Python, Java, C, SQL, Shell, JavaScript, HTML
- **Frameworks&Tools**:
  - **Bioinformatics**: STAR, RSEM, DESeq, Limma-voom, GSEA, ClusterProfiler
  - **Development**: Flask, Spring(boot), Cucumber, Git, PostgreSQL, MongoDB, SQLite, Docker
  - **Machine Learning**: TensorFlow, Keras
- **Chemical Experiments**:
  - **Experimental skills**: Operations in inorganic/organic/analytical/physical chemistry
  - **Instrumental skills**: Operation of Chemical instruments like GCMS, HPLC, various spectrometers, NMR, AES
  - **Spectral analysis**: Spectral analysis of infrared spectrum, mass spectrum, NMR spectrum(1D)