

# CHENG, YUQI

Bldg. No.12 China Agricultural Univ. West Campus, No. 2 Yuanmingyuan West Rd, Haidian Dist, Beijing, China 100083

✉: chengyuq@cau.edu.cn | ☎: 086-18903215357

## EDUCATION & QUALIFICATION

China Agricultural University (CAU) | Beijing, China

- Bachelor of Science Degree, Biological Science 09/2016-07/2020
- GPA: 3.90/4.00 Ranking 2/80 Among the Whole Grade
- Bachelor of Engineering Degree, Data Science and Big Data Technology (Dual Major) 09/2018-07/2020
- GPA: 3.82/4.00
- GRE: Total 324: V 154/170 (64%), Q 170/170 (96%), AW 3.0/6.0 (15%) 08/2019
- Gold Medal in iGEM Competition (International Genetically Engineered Machine Competition) 11/2019
- Merit student of Beijing 12/2019
- Baosteel Scholarship (Top 3 among all the senior students of CAU) 10/2019
- 1<sup>st</sup> Class Scholarship for Academic Excellence 11/2019, 12/2018, 12/2017
- National Scholarship 12/2018
- First Prize of Beijing College Students Biology Competition 05/2019, 06/2018
- Jin Long Yu Scholarship 12/2017

## RESEARCH EXPERIENCE

Study on Co-expression Network of Hexaploidy Wheat Gene Based on Transcriptome Big Data

Supervisor: Weilong Guo

Group Leader

12/2018-06/2020

- RNA-seq Simulation and Process evaluation:
  - Simulated the RNA-seq data using Flux-simulator, achieved error model and non-error model files
  - Used STAR to align them with IWGSC v1.1 (wheat genome) in different parameters and programmed with python to make statistical analysis, find the best STAR alignment parameters.
- Building co-expression network based on public data:
  - Collected transcriptome data (SRA file) of hexaploid wheat, and checked the data quality with FastQC, cleaned the data with trimmomatic, used STAR to align them with IWGSC v1.1
  - Used HTSeq to count the align result and calculate FPKM with Python
  - Averaged and combined gene expression values of homology groups to form an expression matrix of homology groups with Python (pandas, numpy)
  - Used WGCNA (R package) to clean data (goodSamplesGenes, hclust), selected a soft threshold to establish a adjacency matrix and turn it to topological matrix, used dynamic clipping method clip trees and plotted it, calculated the eigenvectors within each module and drew correlation heatmap
- Built interactive website based on shiny to visualize co-expression network and make it easier to query the gene's module location.

Primary Study of the Membrane Receptor of Verticillium dahliae Asp-f2 Like Protein

Supervisor: Junsheng Qi

Group Leader

11/2017-12/2018

- Knocked out the gene with Overlap PCR, designed DNA primers and constructed prokaryotic expression vector
- Detected the transformation of targeted DNA into E. coli using colony PCR and agarose gel electrophoresis, checked the protein expression level with Western blot and got purified protein using affinity chromatography method
- Infected the arabidopsis and cotton with bacteria, detected the wilting effect, collected and analyzed experimental data and proposed to use water loss rate to analyze the wilting phenotype

Research upon Phenotypic Diversity of Papilionaceae in Xiaolongmen

Supervisor: Zhaohui Liu

Group Leader

07/2017-08/2017

- Planned the project including confirming the indexes that would study
- Employed SPSS to calculate the coefficient of variation, and ANOVA and PCA to analyze the indexes
- Calculated the Pearson correlation coefficient between different indexes with SPSS and analyzed the possible relationships between different characters
- Made clustering analysis upon papilionaceae germplasm resources of different positions using K-means method and analyzed their similarity and difference
- Calculated the Shannon-weaver and estimated the diversity of papilionaceae

## MATHEMATICAL MODELING EXPERIENCE

Team Leader of Model Analysis in iGEM

03/2019-10/2019

- Organized seminars to discuss and confirm the competition theme, and designed the gene circuit
- Decision model design: used AHP to provide quantitative decision basis, improved the RI value and independently designed a new algorithm for RI value
- Dynamic Model Design:
  - Population Dynamics Model: regression-fitted the population density variation using Logistic Regression, independently designed the first order difference algorithm to promote the accuracy of parameters, and achieved the algorithm using MATLAB
  - System Dynamics Model: gave a mathematical expression for the whole pathway with ODE, and used MATLAB to achieve and predict the changing of intermediate and final product and the final product yield
- Conducted marketing analysis using Linear Regression method, visualized the data with R, and analyzed the marketing potential and status-quo of cellulose, providing quantitative analytic basis for human practice
- Used HTML to complete the typography, layout and modification for web page

Team Leader in "Minsheng Cup" Mathematical Contest in Modeling-Shanghai and Shenzhen Index Volatility Analysis and Stock Valuation Modeling Based on Mathematical Model and Machine Learning 05/2019

- Achieved 3<sup>rd</sup> Prize
- Used python crawler to capture data of Shanghai and Shenzhen index fluctuations within half a year, used R to preprocess the Shanghai and Shenzhen index time series data, build VAR model and, made Multiple Regression Analysis
- Independently made factor analysis using SPSS for fundamental indicators, divided training sets and test sets, build BP neural network model with MATLAB and momentum gradient descent method, and used training sets and test sets to test their generalization performance, and K-means clustering (SPSS) to construct a valuation level measurement model

Team Leader in 2018 MCM/ICM-Does climate change really have influence on Regional Stability?

02/2018

- Achieved Honorable Mention
- Pre-processed and analyzed data using SPSS, and built up the graph

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- Built the BP neural network model, implemented the model using MATLAB, verified the accuracy of algorithm using 10-fold Cross Validation method, and analyzed the data using trained BP neural network model
- Independently completed the English-written paper using LaTeX

## MAIN ACTIVITIES

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### After iGEM academia & research committee

02/2020-10/2020

*Committee member*

- Connect iGEM alumni all over the world
- Conduct dry lab instruction to 2020 iGEM teams from different countries

### Student Union of College of Biological Sciences, China Agricultural University

07/2017-08/2019

*Director in Secretary Department (also known as Decision Supporting Center)*

- Responsible for daily internal affairs of Student Union
- Statistically analyzed the number of participants and feedback information of various activities of the Student Union, and provides data analysis support for the decision-making of other departments.
- Innovatively built a staff selection system based on the AHP decision model, leading the staff selection mechanism of the Student Union to the era of data-driven decision making

### Volunteering Teacher in Yihai Hope Primary School

07/2018-08/2018

- Taught in mathematics and sports, initiated their first flag class and organized the first flag raising ceremony

### Freshmen Advisor for Grade 2019

08/2019-06/2020

- Organized orientation, and provided suggestions for their course selecting and university study planning and also psychological counseling service

### Striker of Football Team of College of Biological Science

09/2016-present

- Partook in annual CAU Football Match and won the second place in team for 2019 CAU Football Match

## ADDITIONAL

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Language: Chinese (Native), English (Fluent), Japanese (Basic)

Computer: Python, R, MATLAB, C, Linux shell, SPSS, LaTeX, SQL, HTML

Other Skills: Go, Football