

# Baozhu Cai

 E-mail: [caibz@fudan.edu.cn](mailto:caibz@fudan.edu.cn)

 Website: <https://leonacai.github.io>

## Research Experience

---

- **State Key Laboratory of Genetic Engineering of School of Life Science of Fudan University** (2016 – 2019)

**Position:** Research assistant

Shanghai, China

**Team Leader:** [Feng Zhang](#)

**Research theme:** Genetic analysis of reproductive system disease, birth defect and cancer in bioinformatics methods

### Project:

#### 1. Built a Whole Exome Sequence data analysis platform on Parallel Virtual Machine

#### 2. Programmed a script for analysis trio's WES data

#### 3. Premature Ovarian Failure (POF)

- Asked the patient's history and record with Dr. Zhang Xiaojin
- Used Array Comparative Genomic Hybridization (aCGH) and Whole Exome Sequencing (WES) to find disease causes. (Wet and dry experiments)
- Programmed an enrichment script for the disease-causing variants

#### 4. Tumor

- Used aCGH to compare with tumor tissue and peri-cancer tissue to find the pathogenic mutation near the gene *SLC18A1*. (Wet and dry experiment)
- Built an RNA-Seq data analysis platform on Parallel Virtual Machine and annotated it.
- Programmed an enrichment script for Annotated RNA-Seq data for the trophoblastic tumors' disease-causing variants.

#### 5. Syndrome

- Analyzed WES data of a trio and an identical twins' family to find the Crouzon syndrome's disease-causing variants. And found a novel mutation in *FGFR2* is the disease-causing mutation. (To be submitted) (2019 - present)
- Re-annotated the WES data with different databases and found the Shprintzen-Goldberg syndrome's (SGS) pathogenic mutations.

- **Hainan University** (2011 – 2014)

**Position:** Undergraduate Researcher

Hainan, China

- **Team Leader:** Prof. Zhiqiong Tan

**Research theme:** Determined the anti-microbial activity of *Bacillus subtilis* B25.

- **Team Leader:** Prof. Xudong Yu

**Research theme:** Found the medicinal and health value of *Muntingia calabura* L.

## Publications

---

1. Xi Yang, Xiaojin Zhang, Jiao Jiao, Feng Zhang, Yuncheng Pan, Qiqi Wang, Qing Chen, **Baozhu Cai**, Shuyan Tang, Zixue Zhou, Siyuan Chen, Hao Yin, Wei Fu, Yang Luo, Da Li, Guoqing Li, Lingyue Shang, Jialing Yang, Li Jin, Qinghua Shi, Yanhua Wu. "Rare variants in FANCA induce premature ovarian insufficiency." *Human genetics* (2019): 1-10.
2. Zhang, Ling, Ximing Xu, Kaiqiang Sun, Jingchuan Sun, Yuan Wang, Yang Liu, Nan Yang, Chengqiu Tao, **Baozhu Cai**, Guodong Shi, Feng Zhang, Jiangang Shi. "A de novo mutation in DHD domain of SKI causing spina bifida with no craniofacial malformation or intellectual disability. " *American Journal of Medical Genetics Part A* 179.6 (2019): 936-939.
3. Qiqi Wang, Da Li, **Baozhu Cai**, Qing Chen, Caihua Li, Yanhua Wu, Li Jin, Xiuxia Wang, Xiaojin Zhang, Feng Zhang. "Whole exome sequencing reveals SALL4 mutations in premature ovarian insufficiency: an update on genotype-phenotype correlations." *Human genetics* 138.1 (2019): 83-92.
4. Qing Chen, Qi-Qi Wang, **Bao-Zhu Cai**, Xiao-Jun Ren, Feng Zhang, Xiao-Jin Zhang. "Analysis of the fragile X mental retardation 1 premutation in Han Chinese women presenting with primary ovarian insufficiency." *Reproductive and Developmental Medicine* 1.1 (2017): 9.
5. Xu, Jing, Ling Zhang, Qiyu Liu, Luyao Ren, Ke Li, **Baozhu Cai**, Yunke Huang et al. "Identification of cell cycle dependent methotrexate resistance in placenta site trophoblastic tumors." (2020).
6. Wang, Lingbo, et al. "Joint utilization of genetic analysis and semi-cloning technology reveals a digenic etiology of Müllerian anomalies." *Cell Research* (2019): 1-4.

## Education

---

**Hainan University** (2010 – 2014)

**Hainan, China**

- B.S. in Agriculture with three-year Agriculture Scholarships (2010 - 2013)
- Average score: 85.5/100 (the last two years)

**No.1 High School of Lanzhou Oil Refining and Chemical Complex** (2007-2010)

**Gansu, China**

## Independent Coursework

---

- Coursera
  - Specializations

- Bioinformatics with Honors (6 courses) (05/2021 – 01/2022)

University of California, San Diego

- Finding Hidden Messages in DNA (Bioinformatics I)
- Genome Sequencing (Bioinformatics II)
- Comparing Genes, Proteins, and Genomes (Bioinformatics III)
- Molecular Evolution (Bioinformatics IV)
- Genomic Data Science and Clustering (Bioinformatics V)
- Finding Mutations in DNA and Proteins (Bioinformatics VI)
- Bioinformatics Capstone: Big Data in Biology

- Cancer Biology (3 courses) (07/2021 - 10/2021)

Johns Hopkins University

- Introduction to the Biology of Cancer
- Understanding Cancer Metastasis
- Understanding Prostate Cancer

- Genomic Data Science (6 courses) (04/2021 – 10/2021)

Johns Hopkins University

- Introduction to Genomic Technologies
- Python for Genomic Data Science
- Algorithms for DNA Sequencing
- Command Line Tools for Genomic Data Science
- Bioconductor for Genomic Data Science
- Statistics for Genomic Data Science

- Mathematics for Machine Learning (10/2021 – 01/2022)

Imperial College London

- Mathematics for Machine Learning: Linear Algebra
- Mathematics for Machine Learning: Multivariate Calculus
- Mathematics for Machine Learning: PCA

- Reasoning, Data Analysis, and Writing (4 courses) (04/2016 – 11/2016)

Duke University

- Think Again: How to Reason and Argue
- English Composition I
- Data Analysis and Statistical Inference

- Reasoning, Data Analysis, & Writing Final Project
- Machine Learning (Grade Achieved: 98.43%) (02/2021 – 05/2021)
 

Stanford University
- Grammar and Punctuation (Grade Achieved: 94.41%) (02/2016 – 03/2016)
 

University of California, Irvine
- Fundamentals of Immunology: Innate Immunity and B-Cell Function (Grade Achieved: 100%) (11/2021 – 01/2022)
 

Rice University
- Introduction to Genetics and Evolution (Grade Achieved: 76.6%) (10/2021 – 07/2021)
 

Duke University
- Datawhale (2020 – 2022)
  - Natural Language Processing with transformer
  - Machine Learning
  - Computer Systems: A Programmer's Perspective (3<sup>rd</sup> Edition)
  - Hands-on Data Analysis (with Excellent Team Leader)
  - Mathematics for Machine Learning

## **Skills**

---

C; Python; R; Python; Perl

- Language C - National Computer Rank Examination certificate - Language C

## **Leadership Experience and Honors**

---

- The student union of Hainan University, 05/2011 - 06/2012
 

Hainan, China

  - Vice President
- The Agriculture Scholarship, 2010 – 2011
 

Hainan University
- The Agriculture Scholarship, 2011 – 2012
 

Hainan University
- The Agriculture Scholarship, 2012 – 2013
 

Hainan University

- *"Challenge Cup" National College Student Curricular Academic Science and Technology Works Competition* candidate, 2013  
Hainan University

## Others

---

Study at home (English and Programming) (2014-2016)

Gansu, China