Yue Hao

Bioinformatics · PhD

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Education

North Carolina State University (NCSU)
Raleigh NC, USA

Bioinformatics, Ph.D. — *Aug 2017 - May 2020*

- Doctoral Committee: Dr. Gavin Conant, Dr. Jeff Thorne, Dr. Hamid Ashrafi, Dr. Reade Roberts and Dr. J. Chris Pires
- With Teaching & Communication Certificate and Writing Certificate from the Graduate School
- GPA 4.00

University of Missouri - Columbia (MU)
Columbia MO, USA

Bioinformatics — *Aug 2014 - Aug 2017*

- Doctoral study
- Transferred to NCSU in August 2017

University of Missouri - Columbia (MU)
Columbia MO, USA

Biological Engineering, M.S. — *Jul 2014*

- Proficiency areas: bioelectronics & instrumentation; biophotonics
- With Graduate Certificate in Cellular/Molecular Neuroscience
- GPA 4.00

East China University of Science and Technology (ECUST)
Shanghai, China

Biological Science, B.S. — *Jul 2012*

- Overall GPA 3.78/4.00, ranking 1/60; major GPA 3.97/4.00, ranking 1/60
- Participated in the Collaborative Academic Exchange Program with MU, Aug 2011 - Jul 2012

Research Experience

Graduate Research Assistant
Raleigh NC

Bioinformatics Research Center, NCSU — *Aug 2017 - Present*

- Advisor: Dr. Gavin Conant
- Studying the evolution of polyploidy genomes such as *Brassica rapa* and *Brassica oleracea*.
- Modeling biased fractionation in allopolyploidy genomes using likelihood-based methods.
- Investigated mammalian evolution using synteny-based comparative genomics and phylogenetics approaches.

Graduate Research Assistant
Columbia MO

Informatics Institute, MU — *Aug 2014 - Aug 2017*

- Advisor: Dr. Gavin Conant
- Studied dosage-induced selective constraints in *Arabidopsis thaliana* and post-polyploidization *Brassica rapa* using population level genetic variation data and metabolic network modeling.
- Studied the effect of diet on *ovine* gut microbial metabolic networks.

Graduate Research Assistant
Columbia MO

Dalton Cardiovascular Research Center, Department of Biological Engineering, MU — *Jan 2012 - Jul 2014*

- Advisor: Dr. Kevin Gillis
- Optimization of impedance measurements for pathogen detection with microfluidic devices.
- Measurement of Ca^{2+}-triggered exocytosis using microchip electrochemical microeletrodes.
- Whole-cell patch-clamping for $[Ca^{2+}]_i$ calibration and capacitance measurements.
- Design and fabrication of a high-throughput multi-well microelectrode microchip device.
- High-throughput multi-channel amplifier and "Ca Clamp" software testing.

Undergraduate Research Assistant
Shanghai, China

Department of Biotechnology, ECUST — *Jun 2010 - Jul 2011*

- Advisor: Dr. Suxia Li
- Mutation and characterization analysis of lipase and trypsin.
- Optimization of trypsin expression condition.

Publications

* Undergraduate trainees

8. **Hao Y**, Lee HJ*, Baraboo M*, Burch K*, Maurer T*, Somarelli JA and Conant GC. 2020. Baby genomics: tracing the evolutionary changes that gave rise to placentation. *Genome Biol Evol* **12**(3): 35-47

7. Fu R, Gillen AE, Sheridan RM, Tian C, Daya M, **Hao Y**, Hesselberth JR and Riemondy KA. 2020. clustifyr: An R package for automated single-cell RNA sequencing cluster classification. *F1000Research* (In review)

6. Schoonmaker A, **Hao Y**, Bird DM and Conant GC. 2020. A single, shared triploidy in three species of parasitic nematodes. *G3 Genes Genom Genet* **10**(1): 225-233

5. An H, Qi X, Gaynor ML, **Hao Y**, Gebken SC, Mabry ME, McAlvay AC, Teakle GR, Conant GC, Barker MS, Fu T, Yi B and Pires JC. 2019. Transcriptome and organellar genome sequencing elucidates the origin and diversification of allotetraploid *Brassica napus*. *Nat Commun* **10**(1): 2878

4. Osman EY, Bolding MR, Villalón E, Kaifer KA, Lorson ZC, Tisdale S, **Hao Y**, Conant GC, Pires JC, Pellizzoni L, and Lorson CL. 2019. Functional characterization of SMN evolution in mouse models of SMA. *Sci Rep* **9**: 9472

3. **Hao Y**, Washburn JD, Rosenthal J*, Brandon N*, Lyons E, Edger PP, Pires JC and Conant GC. 2018. Patterns of population variation in two paleopolyploid eudicot lineages suggest that dosage-based selection on homeologs is long-lived. *Genome Biol Evol* **10**(3): 999-1011 (Runner-up of the SMBE 2019 Best Student Paper Award)

2. Emery M, Willis MS, **Hao Y**, Barry K, Oakgrove K, Peng Y, Schmutz J, Lyons E, Pires JC, Edger PP and Conant GC. 2018. Preferential retention of genes from one parental genome after polyploidy illustrates the nature and scope of the genomic conflicts induced by hybridization. *PLoS Genet* **14**(3): e1007267

1. Wolff SM, Ellison MJ, **Hao Y**, Cockrum RR, Austin KJ, Baraboo M*, Burch K*, Lee HJ*, Maurer T*, Patil R, Ravelo A, Taxis TM, Truong H, Lamberson WR, Cammack KM and Conant GC. 2017. Diet shifts provoke complex and variable changes in the metabolic networks of the ruminal microbiome. *Microbiome* **5**: 60

Teaching Experience

Guest Lecturer
NCSU

BIO310 Quantitative Biology
Spr 2020

- Supervisor: Dr. Gavin Conant
- Taught lectures about topics such as genetic drift.
- Developed an interactive exercise of genetic drift simulation.

Graduate Teaching Assistant
MU

Department of Biological Engineering
Oct 2012 - May 2014

- Supervisor: Dr. Kevin Gillis
- **BioEn 4380/7380** - Applied Electronic Instrumentation, Spr 2013 & Spr 2014
  Developed a new lab involving light and motor control using Arduino microcontroller.
- **BioEn 4070/7070** - Bioelectricity, Fall 2012 & Fall 2013

Lab Assistant
ECUST

Department of Biotechnology
Spr 2011

- Supervisor: Dr. Suxia Li
- Lab assistant for the undergraduate course **Molecular Biology Experiments.**

Conference Presentations

Botany 2019 *Tucson AZ*

Oral Poresentation *Jul 2019*

Hao Y, Colle M, Edger PP, Pires JC and Conant GC. "Statistically modeling preferentially gene retention after the paleopolyploidy events in the tribe Brassiceae"

The Society for Molecular Biology and Evolution (SMBE) Conference *Manchester, UK*

Poster *Jul 2019*

Hao Y,Lee HJ, Baraboo M, Burch K, Maurer T, Somarelli JA and Conant GC. "Baby genomics: tracing the evolutionary changes that gave rise to placentation"

The Society for Molecular Biology and Evolution (SMBE) Conference *Yokohama, Japan*

Poster *Jul 2018*

Hao Y, Emery M, Willis MS, Washburn JD, Rosenthal J, Brandon N, Barry K, Oakgrove K, Peng Y, Schmutz J, Edger PP, Lyons E, Pires JC and Conant GC. "Preferential retention of homeologs from a single parental subgenome after polyploidy is shaped by functional interactions and dosage-based intrinsic selective constraint"

The Evolution Conference *Portland OR*

Oral Presentation *Jun 2017*

Hao Y, Burch K, Maurer T, Lee HJ, Baraboo M and Conant GC. "Baby genomics: tracing the evolutionary changes that gave rise to placentation"

The Plant and Animal Genome (PAG) XXV Conference *San Diego CA*

Poster *Jan 2017*

Hao Y, Washburn J, Rosenthal J, Nielsen B, Edger P, Pires JC and Conant GC. "Quantification of selective constraint in the polyploid genomes of *Arabidopsis thaliana* and *Brassica rapa*"

The Plant and Animal Genome (PAG) XXIV Conference *San Diego CA*

Poster *Jan 2016*

Hao Y, Burch K, Maurer T, Lee HJ, Baraboo M and Conant GC. "Baby genomics: tracing the evolutionary changes that gave rise to placentation"

Campus Talks

3rd Genomic Sciences and Biomathematics Symposium *NCSU*

Oral Presentation *Feb 2020*

Hao Y and Conant GC. "Ancient whole genome duplications in early vertebrates"

2nd Genomic Sciences and Biomathematics Symposium *NCSU*

Oral Presentation *Feb 2019*

Hao Y, Washburn JD, Rosenthal J, Brandon N, Edger PP, Lyons E, Pires JC and Conant GC. "Patterns of population variation in two paleopolyploid eudicot lineages suggest that dosage-based selection on homeologs is long-lived"

1st Genomic Sciences and Biomathematics Symposium *NCSU*

Oral Presentation *Apr 2018*

Hao Y, Emery M, Willis MS, Barry K, Oakgrove K, Peng Y, Schmutz J, Lyons E, Pires JC, Edger PP and Conant GC. "Preferential retention of genes from one parental genome after polyploidy illustrates the nature and scope of the genomic conflicts induced by hybridization"

Missouri Informatics Symposium *MU*

Poster and Lightning Talk *Apr 2016*

Hao Y, Washburn JD, Pires JC and Conant GC. "The role of population level genetic variations in the *A. thaliana* metabolic network"

Animal Science Graduate Research Forum *MU*

Poster *May 2015*

Hao Y, Lee HJ, Baraboo M and Conant GC. "Baby genomics: tracing the evolutionary changes that gave rise to placentation"

Missouri Informatics Symposium *MU*

Poster *Apr 2015*

Hao Y, Lee HJ, Baraboo M and Conant GC. "Baby genomics: tracing the evolutionary changes that gave rise to placentation"

Awards

Jan 2019	Triangle Center for Evolutionary Medicine Graduate Fellowship, $7500
Apr 2018	SMBE Young Investigator Travel Award, $2000
May 2015	First Place in Poster Presentations, Animal Science Graduate Research Forum, MU
Apr 2015	Second Place in Poster Presentations, Missouri Informatics Symposium
2009-2010, 2010-2011, 2011-2012	National Scholarships, Ministry of Education of China, ¥8000/year
Apr 2012	Excellent Senior Student Award, Shanghai Municipal Education Commission
Jun 2012	Outstanding Student in Science and Engineering, ECUST
2008-2009, 2009-2010, 2010-2011	Excellent Student Awards, ECUST

Skills

Programming Perl, Python, R, SAS, SQL, HTML, LaTeX
Data Science Bioinformatics, Statistics, Genomic Data Analysis, Network Analysis, MySQL Database Management
Other Science Communication, Project Management, Event Planning

Professional Development

Preparing the Professoriate 2019-2020 Fellow
NCSU

The Graduate School
2019-2020

- An immersive mentoring, teaching, and future faculty preparation experience for exceptional doctoral students and postdoctoral scholars.

NSF Decoding Science Program
MU

with Dr. Shelly Rodgers and Dr. Jack Schultz
Fall 2016

- A 10-week skill-based science communication training program with workshops and oral presentation rehearsals.

Preparing Tomorrow's Leaders for Science
MU

College of Agriculture, Food and Natural Resources
2015-2016

- A program for elite graduate students in sciences to equip them with essential interpersonal, leadership and communication skills.

Service and Leadership

Steering Committee Member
cgmonline.co

Chinese Genomics Online Meet-up
Jan 2018 - Jan 2020

- Organizing series of scientific and educational webinars.
- Writing and editing blog posts about professional development and scientific topics for the Chinese Genomics community.

Director of Programming
MU

Mizzou Graduate Professional Council (Student Government)
May 2015 - Dec 2016

- Held the 33^{rd} Graduate Research and Creative Activities Forum for MU graduate and profressional students.
- Organized various professional development and social events for MU graduate and professional students.

President
MU

MU Informatics Institute Graduate Student Organization
May 2016 – Dec 2016

- Involved in strategic planning for the Missouri Informatics Symposium.
- Organized weekly Informatics journal club.

Vice President
MU

MU Informatics Institute Graduate Student Organization
Sep 2015 – May 2016

- Served on the organizing committee for the annual Missouri Informatics Symposium in spring 2015 and 2016.
- Organized social events for Informatics graduate students.