

Kaixiong (Calvin) YE

Assistant Professor

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EDUCATION

PhD, 2010 – 2015, Nutritional Genomics, Division of Nutritional Sciences, Cornell University, Ithaca, NY
Committee: Zhenglong Gu (Chair), Kimberly O'Brien, Tom Brenna, James Booth, Jason Mezey

BS, 2004 – 2008, Biology, Wuhan University, Wuhan, China

PROFESSIONAL & RESEARCH EXPERIENCE

Assistant Professor: 2018 – present, Department of Genetics, University of Georgia

Assistant Professor: 2018 – present, Institute of Bioinformatics, University of Georgia

- Genetic adaptation to diet during human evolution;
- Population and comparative genomics of metabolic genes;
- Quantitative genomics of omega-3 and omega-6 long-chain polyunsaturated fatty acids;
- Molecular mechanisms of functional genetic variants;
- Bioinformatics of high-throughput sequencing data;

Post-doctoral Associate: 2015 – 2018, Department of Biological Statistics and Computational Biology, Cornell University (Advisor: Alon Keinan)

- Performed association analysis to examine the role of chromosome X in regulating lipid-related traits and cardiovascular diseases;
- Studied dietary adaptation of *FADS* genes in Europe before and after the Neolithic revolution with analyses on both modern and ancient DNA (Published in *Nature Ecology and Evolution*);
- Studied genetic adaptation to vegetarian diet in Indians (Published in *Molecular Biology and Evolution*);

PhD Student: 2010 – 2015, Division of Nutritional Sciences, Cornell University (Advisor: Zhenglong Gu)

- Analyzed transcriptome and microbiome data to identify the molecular mechanisms underlying the lifespan-extending effect of Konjac Glucomannan Hydrolysate in *Drosophila*;
- Designed and implemented a large-scale data analysis project on mitochondrial heteroplasmy in healthy human individuals (Published in *Proceedings of the National Academy of Sciences*);
- Performed computational analysis, human subject study (recruited 60 volunteers) and molecular experiment to identify a genetic variation associated with enhanced iron absorption (Published in *BMC Genetics*);
- Designed and implemented an evolutionary analysis project, showing that regulatory variations played important roles in human adaptation to local environment (Published in *Genome Biology and Evolution*);

Bioinformatician: 2009 – 2010, Beijing Genomics Institute at Shenzhen, Shenzhen, China

- Performed evolutionary and population genetics analyses in (1) exome sequencing of fifty Tibetans (published in *Science*), (2) maize re-sequencing (published in *Nature Genetics*), (3) rice re-sequencing (published in *Nature Biotechnology*), and (4) goat genome assembly (published in *Nature Biotechnology*);

Research Assistant: 2008 – 2009, Kunming Institute of Zoology, Chinese Academy of Sciences (Advisor: Bing Su)

- Performed experimental verification of structural variations identified in the genome re-sequencing project of *rhesus macaque* (published in *Genome Biology*);
- Performed sequencing and molecular evolution analysis on the 3'UTR of *IQGAP1*, a target gene of miR-124 (Bachelor's thesis);

Research Assistant: 2006 – 2007, Laboratory of Plant Systematics and Evolutionary Biology, Wuhan University (Advisor: Shuangquan Huang)

- Participated in ecological field experiment in the Yunnan-Guizhou Plateau;
- Performed karyotype and ISSR analyses for various populations of *Satyrium ciliatum*;

PEER-REVIEWED PUBLICATIONS (*co-first authors; ^co-corresponding authors)

19. Yuan M, ..., **Sun Y**, ..., **Ye K**, *et al.* zDHHC12-mediated Claudin-3 S-Palmitoylation Determines Ovarian Cancer Progression. (submitted)
18. Beach S, Ong M, Lei MK, Simons R, **Ye K**. Childhood Adversity is Linked to Adult Health Among African Americans via Adolescent Weight Gain and Effects are Genetically Moderated. (submitted)
17. Lei MK, Beach S, Simons R, **Ye K**. Differential expression of FTO mediates the impact of prospectively assessed social adversity on the development of obesity. (submitted)
16. Wang Y, Guo X, **Ye K**, Orth M, Gu Z. Expansion of pathogenic mitochondrial DNA heteroplasmies in Huntington's disease patients. (submitted)
15. Fragoza R, ..., **Ye K**, *et al.* Extensive disruption of protein interactions by genetic variants across the allele frequency spectrum in human populations. *Nature Communication*. 10(1):4141 (2019)
14. Si Y, Liu X, **Ye K**, Bonfini A, Hu X, Buchon N, Gu Z. Glucomanan hydrolysate promotes gut proliferative homeostasis and extends lifespan in *Drosophila melanogaster*. *The Journals of Gerontology, Series A: Biological Sciences and Medical Sciences* doi:10.1093/gerona/gly189 (2018)
13. Zhang R, Wang Y, **Ye K**, Picard M, Gu Z. Independent impacts of aging on mitochondrial DNA quantity and quality in humans. *BMC Genomics* 18, 890 (2017)
12. **Ye K**, Gao F, Wang D, Bar-Yosef O, Keinan A. Dietary adaptation of *FADS* genes in Europe varied across time and geography. *Nature Ecology and Evolution* 1, 0167 (2017)
 - Implemented in [a direct-to-consumer product](#) by Insitome and Helix (a related [blog post](#))
 - Selected Media Reports: [Cornell Chronicle](#), [Medical News Today](#), [Nutrition Insight](#)
11. Kothapalli KSD*, **Ye K***, Gadgil MS, *et al.* Positive selection on a regulatory insertion–deletion polymorphism in *FADS2* influences apparent endogenous synthesis of arachidonic acid. *Molecular Biology and Evolution* 33 (7), 1726-1739 (2016).
 - Highlighted by [Molecular Biology and Evolution](#)
 - Selected Media Reports: [The Washington Post](#), [CBS News](#), [The Metro](#), [The Hindu](#), [Le Monde](#), [The Independent](#), [National Post](#), [Motherboard](#), [Genomeweb](#), [Cornell Chronicle](#), [ScienceDaily](#), [ResearchGate](#)
10. Billing-Ross P, Germain A, **Ye K**, Keinan A, Gu Z, Hanson MR. Mitochondrial DNA variants correlate with symptoms in myalgic encephalomyelitis/chronic fatigue syndrome. *Journal of Translational Medicine* 14 (1), 19 (2016).

Also: Hanson MR, Gu Z, Keinan A, **Ye K**, Germain A, Billing-Ross P. Association of mitochondrial DNA variants with myalgic encephalomyelitis/chronic fatigue syndrome (ME/CFS) symptoms. *Journal of Translational Medicine* 14 (1), 342 (2016).
9. **Ye K***, Cao C*, Lin X, O'Brien KO, Gu Z. Natural selection on *HFE* in Asian populations contributes to enhanced non-heme iron absorption. *BMC Genetics* 16 (1), 61 (2015).
8. Lei R, **Ye K**, Gu Z, Sun X. Diminishing returns in next-generation sequencing (NGS) transcriptome data. *Gene*. 557 (1), 82-87 (2015).

7. **Ye K[^]**, Lu J, Ma F, Keinan A, Gu Z[^]. Extensive pathogenicity of mitochondrial heteroplasmy in healthy human individuals. *Proceedings of the National Academy of Sciences* 111 (29), 10654-10659 (2014).

Also: **Ye K[^]**, Lu J, Ma F, Keinan A, Gu Z[^]. Reply to Just *et al.*: Mitochondrial DNA heteroplasmy could be reliably detected with massively parallel sequencing technologies. *Proceedings of the National Academy of Sciences* 111 (43), E4548-4550 (2014).

➤ Highlighted by [Proceedings of the National Academy of Sciences](#), [American Journal of Human Genetics](#), [Faculty 1000](#)

➤ Selected Media Reports: [Los Angeles Times](#), [Spiegel Online](#), [TheScientist](#), [Cornell Chronicle](#)

6. **Ye K[^]**, Lu J, Raj SM, Gu Z[^]. Human expression QTLs are enriched in signals of environmental adaptation. *Genome Biology and Evolution* 5 (9), 1689-1701 (2013).

5. **Ye K** & Gu Z. Recent advances in understanding the role of nutrition in human genome evolution. *Advances in Nutrition* 2 (6), 486-496 (2011).

4. Xue Z, He Y, **Ye K**, Gu Z, Mao Y, Qi L. A conserved structural determinant located at the interdomain region of mammalian inositol-requiring enzyme 1alpha. *Journal of Biological Chemistry* 286 (35), 30859-30866 (2011).

3. Fang X, ..., **Ye K**, *et al.* Genome sequence and global sequence variation map with 5.5 million SNPs in Chinese rhesus macaque. *Genome Biology* 12, R63 (2011).

2. Lai J, ..., **Ye K**, *et al.* Genome-wide patterns of genetic variation among elite maize inbred lines. *Nature Genetics* 42 (11), 1027-1030 (2010).

1. **Ye K**, Liu K, Zhang L. The inductive effect of ultraviolet radiation on mycosporine-like amino acids (MAAs) in *Microcystis aeruginosa*. *Amino Acids and Biotic Resources* 30 (1), 25-28 (2008).

INVITED REVIEWS, BOOKS & BOOK CHAPTERS

4. **Ye K** & Hu Z. *Who We Are and How We Got Here*. Originally by Reich D. Pantheon Books and Oxford University Press. (2018). Translation into Chinese. Cheers Publishing. (2019)

3. Fu H & **Ye K**. *Why We Get Sick: The New Science of Darwinian Medicine*. Originally by Nesse R & Williams G. Vintage. (1996). Translation into Chinese. Hunan Science & Technology Press. (2018)

2. Gu Z & **Ye K**. New strategies of health management in China. *CAIJING Annual Edition: Forecasts and Strategies*. (2017)

1. Gu Z, **Ye K**, Stover P. Nutritional genomics. In *Genomic Medicine: Principles and Practice, 2nd Edition*, Chapter 12, edited by Kumar D and Eng C, Oxford University Press. 180-209 (2014)

AWARDS & GRANTS

2017 – 2021 NIH/NHGRI 2R01HG006849 (\$1,517,147; PI: Alon Keinan)

2017 Travel Grant Award, The Center for Vertebrate Genomics, Cornell University (\$500)

2017 Young Investigator Travel Award, Society for Molecular Biology and Evolution (\$1,500)

2014 Chinese Government Award for Outstanding Self-Financed Students Abroad, China Scholarship Council (\$6,000)

2014 Genomics Scholarship, The Center for Vertebrate Genomics, Cornell University (\$10,000)

2013 Liu Memorial Award, Graduate School, Cornell University (\$2,750)

2012 – 2014 Conference Travel Grant Awards, Graduate School, Cornell University

2012 – 2013 Seed Grant Award, The Center for Vertebrate Genomics, Cornell University (\$15,000; PI: Zhenglong Gu & Kimberly O'Brien)

2012 – 2013 Seed Grant Award, Division of Nutritional Science, Cornell University (\$2,000)

2012 Travel Grant Award, The Center for Vertebrate Genomics, Cornell University (\$500)
2004 – 2007 Outstanding Academic Performance Scholarship, Wuhan University (\$1,500)

TEACHING EXPERIENCE

University of Georgia:

- Human Genetics, Instructor, Spring 2019
- Directed Study in Research Communication, Instructor, Fall 2019
- Critical Reading of the Primary Scientific Literature, Instructor, Fall 2019

Cornell University:

- Human Genomics, Guest Instructor, Fall 2017
- Topics in Population Genetics and Genomics, Co-organizer, Fall 2016, Summer 2017
- Statistical Genomics: Coalescent Theory and Human Population Genomics, Guest Instructor, Spring 2016
- Human Biology & Evolution, Guest Instructor, Fall 2015
- Integrative Health Studies II, Teaching Assistant, Spring 2014
- Human Biology & Evolution, Teaching Assistant & Guest Instructor, Fall 2013
- Human Anatomy & Physiology, Teaching Assistant, Spring 2013
- Integrative Health Studies I, Teaching Assistant, Fall 2012
- Nutritional Genomics – Evolution and Environment, Teaching Assistant, Spring 2012

MENTORING EXPERIENCE

University of Georgia

Postdoctoral Researchers:

Jingqi Zhou (05/2019-)

Graduates:

Shuang Yang (08/2019-)

Michael Francis (06/2019-)

Yitang Sun (09/2018-)

Undergraduates:

Riya Gohil (lab technician, 07/2019-)

Akash Ronanki (01/2019-)

Haley Chishom (01/2019-)

Briana Sellers (01/2019-)

Emily Álvarez Toucet (Summer 2019)

Kyndal Goss (08/2018-05/2019)

Cornell University

David Wang (undergraduate), 2016-2018

Shiv Madireddy (undergraduate), 2014-2016

Rex Lei (high school student), 2011-2014

CAREER DEVELOPMENT TRAINING

- Graduate Student Mentoring Summit, Graduate School, University of Georgia (09/2018)
- University-wide Teaching Conference, Center for Teaching Innovation, Cornell University (03/2018)
- An Introduction to Evidence-Based Undergraduate STEM Teaching, Center for Integrated Research Teaching and Learning (2017)

- Building Mentoring Skills Certificate Program, Cornell University (2017)
- Intergroup Dialogue Project, Cornell University (2016)
- Postdoctoral Leadership Program, Cornell University (2015-2016)
- Graduate Student Leadership Program, Cornell University (2013)

EDITORIAL RESPONSIBILITY & SCIENTIFIC SOCIETIES

Scientific Journal Reviewer:

Human Molecular Genetics; Mitochondrion; Scientific Reports; BMC Genomics; PLOS ONE; Evolution; Gene; Mechanisms of Ageing and Development; Axios Review; International Journal of Genomics; Genomics, Proteomics & Bioinformatics; Critical Reviews in Clinical Laboratory Sciences; Communications Biology; Biomedical and Environmental Sciences; European Journal of Clinical Nutrition;

Conference Abstract Reviewer:

2019 ASHG;

Scientific Society Member:

The American Society of Human Genetics (ASHG); Society for Molecular Biology and Evolution (SMBE); American Society for Nutrition (ASN);

CONFERENCE & INVITED TALKS

28. Department of Environmental Health Science, University of Georgia, Athens, GA, 03/2018 (Seminar)
27. Department of Foods and Nutrition, University of Georgia, Athens, GA, 01/2018 (Seminar)
26. School of Biological Sciences, Georgia Institute of Technology, Atlanta, GA, 11/2018 (Seminar)
25. Institute of Bioinformatics, University of Georgia, Athens, GA, 08/2018 (Adjunct Seminar: Mining Deep Sequencing Data for the Neglected Parts of the Genome -- mtDNA and chrX)
24. School of Life Sciences, Peking University, Beijing, China, 07/2018 (Seminar)
23. Beijing Genomics Institute, Tianjin, China, 07/2018 (Seminar)
22. School of Public Health, Shanghai Jiao Tong University, Shanghai, China, 07/2018 (Seminar)
21. School of Life Sciences, Central China Normal University, Wuhan, China, 04/2018 (Seminar)
20. The 1st AsiaEvo Conference, Shenzhen, China, 04/2018 (Poster: Dietary adaptation of *FADS* genes in modern and ancient human populations)
19. Fossils and Ancient Genomics Symposium, China National GeneBank, Shenzhen, China, 04/2018 (Poster: Ancient DNA reveals changing genetic adaptation before and after the Agricultural Revolution in humans)
18. Department of Genetics, Texas Biomedical Research Institute, San Antonio, TX, 02/2018 (Seminar: Genetic Adaptation to Diet during Human Evolution and the Future of Personalized Nutrition)
17. Nevada Institute of Personalized Medicine, University of Nevada, Las Vegas, NV, 02/2018 (Seminar: Genetic Adaptation to Diet during Human Evolution and the Future of Personalized Nutrition)
16. Department of Behavioral Health and Nutrition, University of Delaware, Newark, DE, 01/2018 (Seminar: Genetic Adaptation to Diet during Human Evolution and the Future of Personalized Nutrition)
15. Department of Genetics, University of Georgia, Athens, GA, 01/2018 (Seminar: Genetic Adaptation to Diet during Human Evolution and the Future of Personalized Nutrition)
14. The Annual Meeting of the American Society of Human Genetics, Orlando, FL, 2017 (Poster: Recurrent adaptation of different haplotypes in *FADS* genes to plant-based and animal-based diets in a diverse worldwide set of extant and extinct human populations)

13. The Annual Meeting of the Society for Molecular Biology and Evolution, Austin, TX, 2017 (Poster: Adaptation of the *FADS* gene family in Europe: Variation across time, geography and subsistence)
12. The Experimental Biology Meeting, Chicago, IL, 2017 (Poster: Regional dietary adaptation of *FADS* genes in humans: molecular mechanism and functional consequences)
11. Cornell University Chinese Postdoctoral Forum, Cornell University, 2016 (Oral Presentation: Dietary adaptation during human evolution and the discovery of “vegetarian allele”)
10. The Annual Meeting of the American Society of Human Genetics, Baltimore, MD, 2015 (Poster: Natural selection on *HFE* in Asian populations contributes to enhanced non-heme iron absorption)
9. The Annual Meeting of the Society for Molecular Biology and Evolution, San Juan, PR, 2014 (Poster: Extensive pathogenicity of mitochondrial heteroplasmy in healthy human individuals)
8. The Annual Meeting of the American Society of Human Genetics, Boston, MA, 2013
7. The Annual Meeting of the Society for Molecular Biology and Evolution, Chicago, IL, 2013 (Oral Presentation: Human expression QTLs are enriched in signals of environmental adaptation)
6. The 37th Annual Ecology & Evolutionary Biology Graduate Student Symposium, Cornell University, 2012 (Oral Presentation: Human expression QTLs are enriched in signals of environmental adaptation)
5. The Annual Meeting of the American Society of Human Genetics, San Francisco, CA, 2012 (Poster: Human expression QTLs are enriched in signals of environmental adaptation)
4. The 1st International Conference on Genomics in the Americas, Children's Hospital of Philadelphia, 2012
3. The 1st Annual Nutrition Research Symposium, Cornell University, 2012 (Poster: Metabolic Adaptation to Plant-based Diets in Asian Populations)
2. Workshop on Metabolomics by Metabolon, Inc, Bridgewater, NJ, 2011
1. The Annual Meeting of the American Society of Human Genetics, Washington D.C., 2010