Xiang Ji

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EDUCATION

Doctor of Philosophy in Bioinformatics and Statistics	*December 2017*

North Carolina State University, Raleigh, NC

> Dissertation: Phylogenetic approaches for quantifying interlocus gene conversion

> Committee: Jeffrey Thorne, Eric Stone, Nadia Singh, and Sujit Ghosh

Master of Science in Material Science and Engineering	*September 2013*

North Carolina State University, Raleigh, NC

> Thesis: Laser Interference Lithography for Fabrication of Gas Sensors

> Committee: John Muth, Lew Reynolds, Michael Kudenov, and Jon-Paul Maria

Bachelor of Science in Physics	*July 2011*

Peking University, Beijing, China

> Advisor: Jia-sen Zhang

Bachelor of Science in Economics (Double Major)	*July 2011*

Peking University, Beijing, China

RESEARCH INTERESTS

Development of statistical molecular evolution models that extract knowledge from data, development of more efficient computational algorithms that help draw inference of the models, and distribution of software that perform the inference.

RESEARCH EXPERIENCE

Postdoc Project	*Spring 2018 – now*

Advisor: Marc Suchard

Department of Biomathematics, University of California, Los Angeles, CA

- Novel linear time scalable gradient algorithm of phylogenetic likelihood with respect to branch-specific parameters
- Hamiltonian Monte Carlo method
- C implementation in BEAGLE and Java implementation in BEAST

Dissertation Project	*Fall 2013 – Fall 2017*

Advisor: Jeffrey Thorne

Bioinformatics Research Center and Department of Statistics

North Carolina State University, Raleigh, NC

- Develop the first phylogenetic model that can quantify interlocus gene conversion in multigene family evolution
- Implementation in Python of the approaches into freely available software
- Lead to successful NSF grant award (DEB 1754142)

Consulting Project	*Spring 2016*

Employer: Jenny Qiu-yun Xiang

Bioinformatics Research Center and Department of Statistics

North Carolina State University, Raleigh, NC
- De novo assembly of genotyping-by-sequencing reads into DNA sequences
- Population structure analysis
- Species distribution study of past and future over North America

Collaborative Project   *Fall 2013 – Spring 2014*

Collaborator: Kuangyu Wang

Bioinformatics Research Center and Department of Statistics

North Carolina State University, Raleigh, NC
- Data mining of solvent accessibility information from protein coding genes in several species

Master Thesis   *Fall 2011 – Spring 2013*

Advisor: John Muth

Department of Material Science and Engineering

North Carolina State University, Raleigh, NC
- Derivation of laser interference lithography theory and Matlab implementation of simulation
- Experimental setup of the laser interference lithography in clean room
- Fabrication of ozone gas sensor
- Gas sensor characterization

Undergraduate Thesis Project   *Fall 2010 – Fall 2011*

Advisor: Zhiping Zhou

School of Electronics Engineering and Computer Science

Peking University, Beijing, China
- Optimization of surface plasmon source doping location inside a waveguide

Undergraduate Research Project   *Fall 2009 – Fall 2011*

Advisor: Jia-sen Zhang

School of Physics, Peking University, Beijing, China
- Fortran implementation of 3D surface plasmon light scattering simulation
- Plasmonic lens design with rectangular-shaped slots for sharp focus
- Fabrication of the lens on 200nm gold thin film on glass
- Experimental characterization

WORKING & TEACHING EXPERIENCE

Postdoc Researcher   *January 2018 - now*

Advisor: Marc Suchard
- Develop and implement novel phylogenetic algorithms
- Mentor PhD student in the department of Biomath
- Collaborative work in Center for Viral Systems Biology (https://cvisb.org/) and ARCTIC network (http://artic.network/)

Research Assistant   *Fall 2013 – Fall 2017*

Advisor: Jeffrey Thorne
- Development of phylogenetic approaches for quantifying interlocus gene conversion in multigene family evolution

Teaching Assistant, Lab instructor   *Fall 2012*

Department of Material Science and Engineering

North Carolina State University, Raleigh, NC
- Teach computational laboratory on thin film interference to MSE undergraduates

Teaching Assistant   *Summer 2012*
Department of Material Science and Engineering
North Carolina State University, Raleigh, NC
- Help design a new MSE undergraduate course on data analysis and experimental design

PUBLICATIONS

Ji, X., Thorne, J. L. (2019) A phylogenetic approach disentangles the tract length and initiation rate of interlocus gene conversions. *under review*.

Zhou, W., **Ji, X.**, Obata, S., Pais, A., Dong, Y., Peet, R., Xiang, Q., (2018) Resolving relationships and phylogeographic history of the Nyssa sylvatica complex using data from RAD-seq and species distribution modeling. *Molecular Phylogenetic and Evolution*, 126, 1-16.

Ji, X. (2017). Phylogenetic approaches for quantifying interlocus gene conversion. Doctoral Dissertation

Ji, X., Griffing, A., & Thorne, J. L. (2016). A phylogenetic approach finds abundant interlocus gene conversion in yeast. *Molecular Biology and Evolution*, 33(9), 2469-2476.

Wang, K., Yu, S., **Ji, X.**, Lakner, C., Griffing, A., & Thorne, J. L. (2015). Roles of Solvent Accessibility and Gene Expression in Modeling Protein Sequence Evolution. *Evolutionary Bioinformatics online*, 11, 85.

Ji, X. (2013). Laser Interference Lithography for Fabrication of Gas Sensors. Master Thesis

Han, X., **Ji, X.**, Wen, H., & Zhang, J. (2012). H-shaped resonant optical antennas with slot coupling. *Plasmonics*, 7(1), 7-11.

Xiao, G., **Ji, X.**, Gao, L., Wang, X., & Zhou, Z. (2012). Effect of dipole location on profile properties of symmetric surface plasmon polariton mode in Au/Al2O3/Au waveguide. *Frontiers of Optoelectronics*, 5(1), 63-67.

CONFERENCE PRESENTATIONS

ORAL PRESENTATIONS

Ji, X. (2018, September). *Large-scale molecular epidemiology for viruses: efficient algorithms and new models.* Oral session presented at the Taishan Forum on Viral Infectious Diseases, Taishan Medical University, Tai'an, Shandong Province, China.

Ji, X. (2017, August). *Phylogenetic approaches for quantifying interlocus gene conversion.* Oral session presented at the Quest for Ortholog 5 Meeting, University of Southern California, Los Angeles, CA, US.

POSTER PRESENTATIONS

Ji, X. (2017, July). *Phylogenetic approaches for quantifying interlocus gene conversion.* Poster session presented at the Society of Molecular Biology and Evolution Meeting, Austin, TX, US.

Ji, X. (2014, June). *A Phylogenetic approach for quantifying interlocus gene conversion.* Poster session presented at the Evolution Meeting, Raleigh, NC, US.

Invited Talks

Large-scale molecular epidemiology for viruses	UCLA	11/08/2018
Phylogenetic approaches for quantifying interlocus gene conversion	Zhejiang University	09/18/2018
Phylogenetic approaches for quantifying interlocus gene conversion	Chinese Academy of Sciences	09/04/2018
Phylogenetic approaches for quantifying interlocus gene conversion	CGM online	05/30/2018
Phylogenetic approaches for quantifying interlocus gene conversion	Duke University	02/15/2018
Phylogenetic approaches for quantifying interlocus gene conversion	Temple University	04/25/2017

Awards

Tuition scholarship	SISMID[1]	2018
NIEHS Fellowship[2]	North Carolina State University	2015
Graduate Fellow	SAMSI[3]	2014
Tuition scholarship	SISG[4]	2013
University Graduate Fellowship	North Carolina State University	2011

Funding

My dissertation project leads to NSF grant award (DEB 1754142)

Synergistic Activities

Professional service – I have reviewed manuscripts for *Molecular Biology and Evolution*.

Software – My software for studying interlocus gene conversion is freely available at
https://github.com/xji3/IGCexpansion

Outreach – I served as treasurer on the ASSIST[5] student leadership council in 2012 and 2013. I participated in the Magnet Fair at South Raleigh Magnet High School as an ASSIST center graduate representative in 2012.

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[1] SISMID: Summer Institute in Statistics and Modeling in Infectious Diseases at University of Washington at Seattle
[2] The funds were matched through North Carolina State University
[3] SAMSI: The Statistical and Applied Mathematical Sciences Institute
[4] SISG: Summer Institute in Statistical Genetics at University of Washington at Seattle
[5] ASSIST: The Center for Advanced Self-Powered Systems of Integrated Sensors and Technologies