**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/) (https://cvisb.org/) and [ARCTIC network](http://artic.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**

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| Tuition scholarship | SISMID[[1]](#footnote-1) | 2018 |
| NIEHS Fellowship[[2]](#footnote-2) | North Carolina State University | 2015 |
| Graduate Fellow | SAMSI[[3]](#footnote-3) | 2014 |
| Tuition scholarship | SISG[[4]](#footnote-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]](#footnote-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.

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