

Research Interests:

Computational biology, machine learning, bio-inspired computing, artificial intelligence, network analysis, decision-theory and big data.

Research Experiences:

IRTA Post-doctoral Fellow, **Biostatistics Branch**, National Institutes of Health/National Institute of Environmental Health Sciences, DHHS, Research Triangle Park, North Carolina, USA

Method for analyzing genome-wide protein binding patterns from ChIP-seq data **May 2012 to Present**

- Proposed and implemented T-KDE toolbox, to identify the locations of constitutive binding sites.
- T-KDE, which combines a binary range tree with a kernel density estimator, is applied to ChIP-seq data from multiple cell lines.
- T-KDE can identify genomic “hot spots” where several different proteins bind and, conversely, cell-specific sites bound by a given protein.

Identifying functional relevance of CCCTC-binding factor (CTCF) protein **May 2011 to Present**

- Analyzing chromatin immunoprecipitation followed by massively parallel sequencing (ChIP-seq) data from ENCODE.
- Analyzing CTCF's genomic distributions, transcriptional environment, and epigenomic environment.
- Predicting CTCF binding sites in ChIP-seq data.

Post-doctoral Researcher, **Biomedical Engineering**, University Of Tennessee, Knoxville, Tennessee, USA

Machine learning-based approach for immune system and drug design **September 2010 to May 2011**

- Developed game-theoretic approach for drug design.
- Developed game-theoretic approach for immune-virus game.

Immune-inspired computational model **September 2010 to May 2011**

- Developed immune-inspired game theory for irregular warfare.

Plant-based sensor network for nanoparticles toxicity study **September 2010 to May 2011**

- Developed and submitted a NSF proposal.
- Developed a plant-based sensor-network for characterizing, monitoring, and understanding the environmental impact of both naturally occurring and man-made nanoparticles.

Graduate Research Assistant, **Electrical Engineering and Computer Science**, University Of Tennessee, Knoxville, Tennessee, USA

Anomaly detection in unknown environments using wireless sensor networks and a mobile robot (Partly funded by Oak Ridge National Laboratory) **January 2006 to August 2010**

- Designed and implemented a variety of distributed machine learning algorithms on a hierarchical resource-constrained sensor network.

Indoor wireless localization for mobile robots **May 2004 to December 2005**

- Designed and implemented wireless indoor positioning system to locate mobile robots using triangulation and fingerprinting.

Graduate Research Assistant, Computer Science, **Minnesota State University**, Mankato, Minnesota, USA

Bluetooth network simulator (Individual study research project) **Summer 2003**

- Developed Bluetooth network simulation software that simulated the behavior of a Bluetooth PicoNet with 1 to 7 slaves by using JavaSimulation package (a Java package for process-based discrete event simulation).

Text-to-Speech Synthesis for Mandarin Chinese

2002 to 2003

- Researched text-to-speech synthesis for Mandarin Chinese.

Professional Experiences:**Midwest Wireless Corporation** (now Alltel Corporation), Mankato, MN, USA*Software developer***May 2003 to August 2003**

- Developed a framework monitoring the SMSC (short messaging) server including short messages from phone-to-phone (NOKIA7160), phone-to-PC and PC-to-phone; and service messages push to the phone.

SpeechGear Inc (U.S. Naval Research funded project), Northfield, MN, USA*Software developer***July 2002 to May 2003**

- Designed and developed multiple interfaces for voice-enabled dictionary running on PDAs (Windows CE) using Java and eMbedded Visual Basic/C++.

DataPlanIT Consulting, Mankato, MN, USA*Software developer***January 2002 to May 2002**

- Web design and development for surrounding businesses using ASP.

J.D.Edwards Company (now Oracle Corporation), Denver, CO, USA*Intern software developer***Summer 2001**

- Wrote testing cases and suites for the MetaData software using JUnit.
- Documented test cases and developers' programs.

Hairs Supply Company, Chicago, IL, USA*Software developer***September 2000 to December 2000**

- Designed and developed an e-commerce website that sells hair supplies using ASP.

Visible Edge Company, Mankato, MN, USA*Intern software developer***Summer 2000**

- Upgraded and maintained the Performance Look Up System (PLUS) for Minnesota High Schools.
- Programmed and debugged for PLUS using Visual Basic.

Teaching Experiences:**The University of Tennessee**, Knoxville, Tennessee, USA*Teaching Assistant***August 2003 to present**

- CS100: Introduction to Computer Science (for non-majors)
 - *Responsibilities*: teach lab sessions, grade homeworks and exams, coordinate with other lab TAs, and tutor students
 - *Programming*: HTML, JavaScript and basic algorithms
- CS102: Introduction to Computer Science (for majors)
 - *Responsibilities*: teach lab sessions, grade homeworks and exams, coordinate with other lab TAs, and tutor students
 - *Programming*: C++
- CS302: Fundamental Algorithms
 - *Responsibilities*: grade homework and tutor students
- CS365: Programming Languages and Systems
 - *Responsibilities*: prepare lecture notes, teach lab session, maintain class webpage, grade labs and homeworks
 - *Programming*: Java, Python and Perl

- CS530: Computer Systems Organization
 - *Responsibilities*: grade homework and tutor students
- CS594: Data Mining Practices and Principles
 - *Responsibilities*: grade homework and tutor students

The Oak Ridge Associated Universities, Oak Ridge, Tennessee, USA

Research Facilitator

July 2008

- Mentored a team of high school students on how to solve challenging navigation problems using a Vex Robotics Kit; sponsored by Appalachian Regional Commission and Oak Ridge Associated Universities.

The Minnesota State University, Mankato, Minnesota, USA

Teaching Assistant

August 2001 to 2002

- CS100: Introduction to Computer and Computing
 - *Responsibilities*: teach lab sessions and grade labs
 - *Programming*: Microsoft Office 2000, HTML and JavaScript

Publications:

Refereed Journal Publications:

- **Y. Li**, D. M. Umbach, and L. Li “T-KDE: A method for analyzing genome-wide protein binding patterns from ChIP-seq data”, *BMC Genomics*, 15:27 doi:10.1186/1471-2164-15-27, 2014.
- **Li, Y.**, Huang, W., Niu, L., Covo, S., Umbach, D.M., and Li, L. “Characterization of constitutive CTCF/Cohesin loci: a possible role in establishing topological domains in mammalian genomes”, *BMC Genomics*, 14:553 doi:10.1186/1471-2164-14-553, 2013.
- S. Lenaghan, **Y. Li** (co-first author), H. Zhang, J. Burris, C. Stewart, L. E. Parker, and M. Zhang, “Monitoring the Environmental Impact of TiO₂ Nanoparticles Using a Plant-based Sensor-network”, *IEEE Transactions on Nanotechnology*, PP(99). doi: 10.1109/TNANO.2013.2242089. 2013.
- **Y. Li**, S. Lenaghan, and Mingjun Zhang. “A Data-driven Predictive Approach for Drug Delivery Using Machine Learning Techniques”, *PLoS ONE*, 7(2): e31724. doi:10.1371/journal.pone.0031724. 2012.
- **Y. Li** and L. E. Parker, “Nearest Neighbor Imputation Using Spatial-Temporal Correlations in Wireless Sensor Networks”, *Information Fusion*, ISSN 1566-2535, <http://dx.doi.org/10.1016/j.inffus.2012.08.007>. 2012.

Refereed Conference Papers:

- **Y. Li**, M. Thomason and L. E. Parker, “Detecting Time-Related Changes in Wireless Sensor Networks Using Symbol Compression and Probabilistic Suffix Trees”, to appear in *IEEE International Conference on Intelligent Robots and Systems (IROS)*, Taipei, Taiwan, 2010.
- **Y. Li** and L. E. Parker, “Detecting and monitoring time-related abnormal events using a wireless sensor network and mobile robot”, in *Proceedings of IEEE International Conference on Intelligent Robots and Systems (IROS)*, 2008.
- **Y. Li** and L. E. Parker, “A spatial-temporal imputation technique for classification with missing data in a wireless sensor network”, in *Proceedings of IEEE International Conference on Intelligent Robots and Systems (IROS)*, 2008.

Refereed Symposia, Lightly-Refereed Conference and Workshop Papers:

- **Y. Li** and L. E. Parker, “Intruder detection using a wireless sensor network with an intelligent mobile robot response”, *IEEE SoutheastCon*, April 2008.
- **Y. Li** and L. E. Parker, “Classification with missing data in a wireless sensor network”, *IEEE SoutheastCon*, April 2008.
- **Y. Li** and S. Case, “Text-to-Speech Synthesis for Mandarin Chinese”, in *Proceedings of the Midwest Instruction and Computing Symposium (MICS)*, April 2003.

Papers under Review:

- **Y. Li**, M. Thomason, and L. E. Parker, “Sequential Anomaly Detection Using Wireless Sensor Networks”, submitted for journal publication, 2012.

Posters:

- **Y. Li**, D. M. Umbach, and L. Li, “Analysis of Genome-wide Protein Binding Patterns Using Kernel Density Estimators”, the Biology of Genomes, May 7-11, 2013.
- **Y. Li**, W. Huang, D. M. Umbach, S. Covo, and L. Li, “Constitutive CTCF/Cohesin Loci in Transcriptionally Complex Environment”, Science Day, NIEHS/NIH, 2012.
- **Y. Li**, J. Wu, S. C. Lenaghan and M. Zhang, “An Immuno-Inspired Game Theoretic Computational Framework for Irregular Warfare”, Naval Science & Technology Partnership Conference, 2010.

Technical Reports:

- **Y. Li**, “Indoor positioning using 802.11b for mobile robots”, Distributed Robotics Laboratory, Department of Electrical Engineering and Computer Science, University of Tennessee, December 2005.

Presentations:

- “Identifying Constitutive Binding Sites Using Kernel Approach”, Biostatistics Branch retreat, National Institute of Environmental Health Sciences, NIH, 2012.
- “Study Complex Biological Systems: Network Modeling and AI-based Analysis”, Guest lecture: Systems Biology and Complex System Theory, November, 2010, University of Tennessee, Knoxville, USA.
- “Environment monitoring using Wireless Sensor Networks”, Guest lecture: Artificial Intelligence, November, 2009, University of Tennessee, Knoxville, USA.
- “Intruder detection using a wireless sensor network with an intelligent mobile robot response”, the IEEE Southeast Conference, April 4 - 6, 2008, Alabama, Huntsville, USA.
- “Classification with missing data in a wireless sensor network”, the IEEE Southeast Conference, April 4 - 6, 2008, Alabama, Huntsville, USA.
- “Exploring the impact of mobility in wireless sensor network”, Oak Ridge National Laboratory, September 25, 2006, Tennessee, Oak Ridge, USA.
- “Exploring the impact of mobility in wireless sensor network — progress and experimental results”, Oak Ridge National Laboratory, December 20, 2006, Tennessee, Oak Ridge, USA.
- “Text-to-Speech synthesis for Mandarin Chinese”, Midwest Instruction and Computing Symposium, April 11-12, 2003, Minnesota, Duluth, USA.

Awards and Honors:

- Winner of the Fellows Award for Research Excellence (FARE) competition at the National Institutes of Health (2014)
- Best poster presentation of the Science Day at the National Institute of Environmental Health Sciences (2013)
- Upsilon Pi Epsilon (UPE) International Honor Society for the Computing Sciences (2008)
- Best Graduate Teaching Assistant Award (2006)
- SARIF Summer Graduate Research Assistantship (2004, 2007)
- International Student Endowment Fund Scholarship (1999 to 2001)
- Dean’s List, Minnesota State University (1998 to 2001)

Technical Skills:

- **Programming:** Java, JDBC, NesC, C/C++, eMbeddedVB/C++, VB, Perl, Python, JSP, ASP, SQL, PL/SQL, XML, WML, and Assembly for IBM80x86
- **Applications:** L^AT_EX, B_IT_EX, Player/Stage, Matlab, R, WEKA, Oracle, MySQL, Orion server, Microsoft Office, and other common productivity packages for Windows and Linux platforms
- **Operating Systems:** Microsoft Windows CE/XP/7, TinyOS and Linux

Education:

The University of Tennessee, Knoxville, Tennessee, USA

Ph.D., Computer Science, Spring 2010

- GPA: 3.77/4.00
- Advisor: Professor Lynne E. Parker
- Dissertation title: Anomaly detection in unknown environments using wireless sensor networks
- Committee: Professors Michael Berry, Hairong Qi, Michael Thomason and Wesley Hines

M.S., Computer Science, Fall 2006

- GPA: 3.77/4.00

Minnesota State University, Mankato, Minnesota, USA

M.S., Computer Science (January 2002 to May 2003)

- GPA: 4.00/4.00

B.S., Computer Science, Fall 2001

- Cum Laude

Service:

Paper reviewing:

- PLoSOne, 2011, 2012, 2013, 2014
- Sensors (ISSN 1424-8220), 2010
- IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems (IROS), 2006, 2008, 2009, 2010
- IEEE International Conference on Robotics and Automation (ICRA), 2006 to 2007
- IEEE Intelligent Systems, 2006
- Journals of Robotics and Autonomous Systems (JRAS) 2005

Robotics activities:

- Software judge for First LEGO League (FLL) robotics competition in TN and NC (2004-2014)
- Tour for Tennessee Junior Science & Humanities Symposium (2010)
- Robot demonstration for NSF campus tour (2008)
- Robot demonstration for local middle school and high school students (2005-2010)
- Maintain and update autonomous robots' operating systems, software and hardware
- Maintain a Wiki-based laboratory manual

Others:

- United Way fund allocation committee, Knoxville (2005 to 2008)
- President of Chinese Student and Scholar Association, MNSU (2001)
- Director of Activities of International Student Association, MNSU (2000)
- Peer Leader for Intentional Student Orientation, MNSU (2000)
- Vice President of Taiwan Student Association, MNSU (1999)

Personal:

- **Gender:** Female
- **Immigration status:** U.S. Permanent Residence
- **Citizenship:** P.R. China
- **Languages:** English and Chinese (Mandarin)