

Wei Lu

150 S. Woodlawn Ave. Bloomington, IN 47405-7104
Tel: (626)759-8154[M]; Email: welu@cs.indiana.edu

Research Interests

My research interests lie at the intersection of parallel and concurrent programming, XML and the Service Oriented Computing, and high performance computing. I am particularly interested in the multicore programming. My thesis research strives to devise such approaches to help the softwares, particular the XML processing and Web Service Orchestration (BPEL), to utilize the multicore resource efficiently. The overarching goal of my research is to build the appropriate programming methods (e.g., languages, compilers or libraries) which can greatly reduce the complexity and improve the productivity of developing high-performance parallel/concurrent software on the multicore platform.

Education

Indiana University Bloomington, IN
Ph.D. candidate in Computer Science 2002-Now
Thesis title: *Exploit Multicores for the Service Oriented Computing - Towards Parallel XML Processing and Conucurrent Services Orchestration*
Adviser: Prof. Dennis Gannon

Indiana University Bloomington, IN
M.S. Computer Science 2007
GPA: 3.98/4.0

Zhejiang University Hangzhou, China
M.S. Computer Science 2000
Thesis title: *A Roughtset based data-mining toolkit*
Adviser: Prof. Zhaohui Wu

Professional Appointments

Research Assistant 2003-Now
Computer Science Department, Indiana University Bloomington, IN
Working in the Extreme! computing laboratory directed by Prof. Dennis Gannon on multiple projects, including parallel XML processing, concurrent workflow engine on multicores, parallel component architecture, binary XML and high performance web service infrastructure.

Research Co-op Summer 2006
IBM Almaden Research Center San Jose, CA
Working with Laura Anderson in Almaden Information Service group, designed and developed an automatic enterprise policy compliance-checking tool.

Research Co-op Summer 2005
Argonne National Lab Chicago, IL
Participated in the virtual workspace project, a system for building virtualization on Grid computing, in the Distributed Systems Laboratory. worked on building the secure virtual machine on the Grid space.

Research Scientist 2000 - 2002
Zhejiang University Hanzhou, China
Working in National Grid Lab on Grid database integration project.

Research Assistant 1997 - 2000
Zhejiang University Hanzhou, China
Working with Prof. Zhaohui Wu on the project of data-mining on medicine databases.

Teaching Appointments	<i>Associate Instructor</i>	<i>2002-2003</i>
	Indiana University, Computer Science Department Teaching undergraduate level Introduction of Computer Science course.	Bloomington, IN
	<i>Instructor</i>	<i>2001</i>
	Zhejiang University, Computer Science Department Provided undergraduate level Software Engineering course for a class of 60 students	Hangzhou, China
Honors & Awards	Best paper award by High Performance Computing Symposium 2007	
	Assistantship award by Computer Science Department, Indiana University 2002-2007	
	Scholarship of Excellent Graduate Student by Zhejiang University 2000	
	Scholarship for excellence in Computer Science by Procter & Gamble 2000	
Research Projects	Concurrent Service Orchestration on Multicore: Conducting exploratory research on the role of event-driven and join-pattern concurrent programming model in building the WS-BPEL workflow engine on multicore CPUs. The project, developed in C#, focuses on how to express the concurrent logic of the service orchestration by using the join-pattern and other high-level coordination constructs and how to achieve the high scalability for the service-as-component software on multicore/manycore CPUs.	
	Parallel XML Processing on Multicore: Investigating the parallel algorithms for the XML processing tasks on multicore CPUs. Developing a C# library, ParaXML, to parallelizing number of XML tasks, including traversing, serialization, signature and parsing. Also devised the first parallel XML parser(i.e, PXP) in C++.	
	Integration of Parallel Component and Workflow: Investigated a hybrid solution of integrating the parallel component architecture (CCA) within the web-service enabled workflow system (e.g., Kepler) for scientific applications. The hybridization hinges on the automatically generated web services interface for the CCA components.	
	Binary XML and Generic SOAP processor: Participated in the design and implementing of a binary XML format for high performance scientific computing. Also designed and implemented a high performance SOAP processor in C++ which supports multiple encodings (e.g. binary XML or textual XML) and binding protocols in a generic manner.	
	Secure Virtual Machine on Grid: Member of the virtual workspace team that designed the secure deployment, migration and management of the virtual machines in the context of Grid computing.	
	High Performance Web Service: Designed and implemented a streaming processing for XML Signature validation in which the validation is embedded in the XML parsing in a streaming style by an augmented automaton. Also participated in developing of the scheme specific XML parsing(SSP) technology, which utilizes the schema information to generate the specifically optimized XML parser to achieve the high parsing/validating performance.	
Conference Papers	<ul style="list-style-type: none"> • Wei Lu and Thilina Gunarathne and Dennis Gannon. Developing a Concurrent Service Orchestration Engine in CCR. In <i>Workshop on Multicore Software Engineering (IWMSE) in conjunction with ICSE</i>, Leipzig, Germany, 2008. 	

- Yinfei Pan and Kenneth Chiu and Ying Zhang and Wei Lu. Parallel XML Parsing Using Meta-DFAs. In *3rd IEEE International Conference on e-Science and Grid Computing*, Bangalore, India, 2007
- Wei Lu and Dennis Gannon. Parallel XML Processing by Work Stealing. In *Workshop on Service Oriented Computing Performance In Conjunction with HPDC'07*, Monterey Bay California, June 2007.
- Yinfei Pan, Wei Lu, Ying Zhang, and Kenneth Chiu. A Static Load-balancing Scheme for Parallel XML Parsing on Multicore cpus. In *CCGrid'07 (IEEE International Symposium on Cluster Computing and the Grid)*, Rio de Janeiro - Brazil, May 2007.
- Wei Lu, Kenneth Chiu, Satoshi Shirasuna, and Dennis Gannon. A Hybrid Decomposition Scheme for Building Scientific Workflows. In *HPC'07 (Proceedings of High Performance Computing Symposium, SCS Spring Simulation Multiconference, Norfolk, VA, March 2007. [Best Paper Award]*
- Tharaka Devadithya, Kenneth Chiu, and Wei Lu. C++ Reflection for High Performance Problem Solving Environment. In *HPC'07 (Proceedings of High Performance Computing Symposium, SCS Spring Simulation Multiconference, Norfolk, VA, March 2007.*
- Tharaka Devadithya, Zongde Liu, Nayef Abu-Ghazaleh, Wei Lu, Kenneth Chiu, and Stephane Ethier. BXSA for Fast Processing of Scientific Data. In *HPC'07 (Proceedings of High Performance Computing Symposium, SCS Spring Simulation Multiconference, Norfolk, VA, March 2007.*
- Wei Lu, Kenneth Chiu, and Yinfei Pan. A Parallel Approach to XML Parsing. In *The 7th IEEE/ACM International Conference on Grid Computing*, Barcelona, September 2006.
- Wei Lu, Kenneth Chiu, and Dennis Gannon. Building a Generic SOAP Framework over Binary XML,. In *HPDC'06 (The 15th IEEE International Symposium on High Performance Distributed Computing)*, Pairs, France, June 2006.
- Kenneth Chiu, Tharaka Devadithya, Wei Lu, and Aleksander Slominski. A Binary XML for Scientific Applications,. In *e-science'05 (1st IEEE international conference for e-science and Grid Computing)*, Melbourne, Australia, Dec 2005.
- Wei Lu, Kenneth Chiu, Aleksander Slominski, and Dennis Gannon. A Streaming Validation Model for SOAP Digital Signature. In *14th IEEE International Symposium on High Performance Distributed Computing (HPDC-14)*, July 2005.
- Kenneth Chiu and Wei Lu. A Compiler-based Approach to Schema-specific XML Parsing. In *The First International Workshop on High Performance XML Processing in Conjunction with WWW*, 2004.
- Dennis Gannon and Marcus Christie and Octav Chipara and Liang Fang and Matthew Farrellee and Gopi Kandaswamy and Wei Lu and Beth Plale and Aleksander Slominski and Anuraag Sarangi and Yogesh L. Simmhan. Building grid services for user portals. In *GGF Workshop on Designing and Building Grid Services*, Chicago, 2003.
- Wei Lu and Chang Huang. LatticeDB: An Ontology based Web databases Model. In *Proceedings of the 2002 China National Database Conference*, 2002.
- Xuezhong Zhou and Zhaohui Wu and Wei Lu. TCMMDDB: A Distributed Multi-Database Query System and Its Key Technique Implement. In *Proceedings of the 2001 IEEE Systems, Man, and Cybernetics Conference*, 2001.
- Wei Lu and Zhaohui Wu The Comparison of methods used in KDD, In *Journal of Computer Science, in Chinese*, 2000.

- Wei Lu and Wu zhaowei and Yujun Cai Key Technologies in Distributed Multi-database Query Platform TCMMDB, In *Journal of Engineering Design, in Chinese*, 2000.
- Wei Lu and ZhaohuiWu ZUIMPS: a Case-based Intelligent Multimedia Presentation System, In *Proceedings of the 5th ICYCS (International Conference for Young Computer Scientists)*, 1999.

Technical Reports

- Wei Lu and Dennis Gannon. ParaXML: a Parallel XML Processing Model on Multicore CPUs. Technical Report 662, Computer Science Department, Indiana University 2008
- Kenneth Chiu and Wei Lu. A Compiler-based Approach to Schema-specific XML Parsing. Technical Report 592, Computer Science Department, Indiana University 2004

Posters & Talks

- Towards Parallel XML Processing. Wei Lu and Dennis Gannon, *Midwest Database Symposium*, West Lafayette, Indiana, 2007.
- Parallel XML Processing by Work-stealing. *Workshop on Service Oriented Computing Performance In Conjunction with HPDC-16*, Monterey Bay California, June 2007.
- A hybrid decomposition scheme for building scientific workflows. *HPC'07 (Proceedings of High Performance Computing Symposium, SCS Spring Simulation Multiconference*, Norfolk, VA, March 2007.
- A Parallel Approach to XML Parsing. *The 7th IEEE/ACM International Conference on Grid Computing*, Barcelona, September 2006.
- Ovons: An open automatic enterprise policy compliance-checking tool. Wei Lu and Laura Anderson, *Talk and Poster, IBM Almaden Research Center*, San Jose, 2006.
- Merging CCA within Web Service Oriented Architecture. *Networks and Complex Systems Seminar*, Indiana University, 2006.
- Merging CCA within Web Service Oriented Architecture. *CCA forum 2006*, San Francisco, CA, March 2006.
- Making your workspace secure: establishing trust with VMs in the Grid. Wei Lu and Kate Keahey and Tim Freeman and Frank Siebenlist, *SuperComputing*, Seattle, Washington, 2005.
- A Streaming Validation Model for SOAP Digital Signature. *14th IEEE International Symposium on High Performance Distributed Computing (HPDC-14)*, Research Triangle Park, NC, July 2005.
- Investigating a Streaming Algorithm for SOAP Digital Signature Validation. *Networks and Complex Systems Seminar*, Indiana University, 2005.

Professional Service

Publication Reviewer, e-Science2007, HPDC2007, SAC2006
 Student volunteer, IEEE SuperComputing conference, 2005, Seattle, Washington

References

Available upon request.