

Yi Huang

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Objective

To obtain a *full-time* position for *innovative* and *marketable* solutions in large-scale distributed systems.

Summary

- Specialized in the combination of **Web services** for service-oriented architecture (SOA), **Publish/Subscribe messaging middleware** for event-driven architecture (EDA) and **Internet/Grid computing** for heterogeneous resources integration.
- Hands-on experience in designing XML-based distributed systems that are reliable, scalable, secure and loosely-coupled.
- Implemented various specifications in the Web services stack (including WSRF, WS-Eventing and WS-Notification).
- Strong research skills with over 10 refereed publications in major conferences/journals and 1 pending patent.
- Strong Java programming skills for rapid prototyping with performance/memory optimizations.
- Experienced in developing, deploying and testing Internet-scale applications, such as on PlanetLab.
- Experienced in improving prototype systems to the production level with high reliability and scalability requirements.

Education

Ph.D., Computer Science (advisor: Dr. Dennis Gannon)
September 2002 - present (expected September, 2007)
Indiana University - Bloomington

Master of Science, Computer Science (advisor: Dr. Robert Van Engelen)
Master of Science, Financial Mathematics
June 1999 - August 2002
Florida State University

Work Experience

- 5/2006-8/2006 **Research Intern (full-time)**
T.J. Watson Research Center, IBM
- 5/2005-8/2005 **Research Intern (full-time)**
T.J. Watson Research Center, IBM

- 7/2004-present **Research Assistant (50% FTE)**
Extreme! Computing Lab, IU
- 1/2004-7/2004 **Research Assistant (50% FTE)**
Community Grids Lab, IU
- 9/2002-12/2003 **Associate Instructor (50% FTE)**
Department of Computer Science, IU
- 1/2001-8/2002 **Web Application Developer (50% FTE)**
Learning Systems Institute
- 6/2000-9/2001 **Software Developer (hourly contractor)**
University Club, FSU
- 9/1999-12/2000 **Teaching Assistant (50% FTE)**
Department of Mathematics, FSU
- 11/1997-6/1999 **Product Development Engineer (full-time)**
R&D Center, SONY Ericsson Mobile Communications
- 10/1995-5/1997 **Telecommunication Support Engineer (hourly contractor)**
Waterman Nissen & Co.

Selected Recent Projects

- **A Scalable Service-Oriented Architecture for Wide-Area Publish/Subscribe Brokering (Ph.D. Dissertation)**
 - Addressed the content-based (e.g. XPath) XML publish/subscribe challenge from a service-oriented perspective in order to achieve all three dimensions of scalability (load scalability, geographic scalability and administrative scalability)
 - Solved integration challenges with a layered model analogous to the TCP/IP model and the integration models of heterogeneous databases.
 - Solved scalability challenges with a specialized Web service-based global XML dissemination service that can achieve efficient content-based message filtering even for encrypted messages. (service analogous to the postal service that can achieve "separation of concerns" and "economy of scale" for Internet-scale XML message dissemination).
 - Deployed a prototype system to over 300 machines on the PlanetLab global testbed and evaluated it in a real WAN setting.
- **The WS-Messenger Middleware and the LEAD Workflow System (current projects since 1/2004)**
 - Architected and led the development of the WS-Messenger project, a production-level Web service-based XML publish/subscribe middleware.
 - Designed a novel mediation approach to reconcile conflicts between WS-Eventing and WS-Notification specifications.
 - Achieved efficient content-based XML message filtering using XPath expressions.
 - Dramatically improved reliability and scalability with various stress tests using

- billions of XML messages for real-world heavy-duty environments.
 - o Successfully interoperated with other implementations, including C++ and C# implementations.
 - o Created GUI tools and Web-based administration interfaces for management, debugging and firewall testing.
 - o Responsible for the critical communication foundation in the 11-million-dollar LEAD project to enable dynamic BPEL workflow orchestration for real-time weather changes.
 - o System used in over 10 SOA and Grid projects and has over 10 external citations in related papers.
 - o **Languages/Tools:** Java, SOAP, XML pull parser, XPath, MySQL, Tomcat, Servlet, axis, axis2, JMS, openJMS, activeMQ, Eclipse, JBuilder, JProbe profiler, JProbe memory debugger, wireshark, TCPMon, YFilter, C#, Visual studio, .NET, cvs, svn.
- **Semantic Correlation Analysis for Asynchronous Web Services (pending patent of IBM)** (summers in 2005 and 2006)
 - o Designed and implemented a novel deterministic correlation algorithm that can automatically discover conversation patterns among asynchronous Web service messages.
 - o Fine-tuned to high accuracy using real-world Web service applications.
 - o Prepared patent filing materials. This algorithm is currently a pending patent.
 - o Integrated this algorithm into an Eclipse-based visualization tool (WS-Navigator) which displays interactions among Web services. WS-Navigator is a part of the IBM product named IBM Tivoli Composite Application Manager for SOA (ITCAM for SOA).
 - o **Languages/Tools:** Java, Eclipse, IBM RAD, SOAP, XML (DOM), IBM Websphere application server, IBM MQ, Delphion patent database.
- **MobileChef Portal for PDA (2nd place award)** (1/2004-5/2004)
 - o Led the design and development of a customized course management web portal (chef) for the small PDA screen.
 - o Worked in a consulting environment with business considerations, such as user surveys and marketing strategies.
 - o Won 2nd place team in the Mobility Competition (sponsored by Hewlett-Packard/UITs) with most advanced features.
 - o **Languages/Tools:** Java, JBuilder, JSP, servlet, Jetspeed Web portal, Tomcat.
- **NaradaBrokering Messaging System (security framework and interconnection with GT3)** (9/2002 - 12/2003)
 - o Assisted in the design of a security framework for the NaradaBrokering messaging system to ensure message security in publish/subscribe systems.
 - o Implemented a secure key management module based on the PKI technology.
 - o Developed a NB-Globus project that integrates NaradaBrokering with Globus Toolkit 3.
 - o **Languages/Tools:** Java, JBuilder, DOM, WS-Security, XML-Signature, XML-Encryption, XKMS, SAML, SSL, PKI.

- **SSL and SSL Proxy Support for SOAP/XML Web Services (Master's project)** (4/2001 - 8/2002)
 - Designed and implemented the SSL security support for the gSoap toolkit, the most popular C/C++ Web service toolkit.
 - **Languages/Tools:** C, C++, gcc, XML, SSL, tcpdump, ssldump.
- **"ePlan" Web Application** (1/2001-8/2002)
 - Successfully developed a dynamic web application for on-line human performance consulting with a team of researchers, interface designers, and graphic designers.
 - **Languages/Tools:** ASP, ActiveX, COM, SQL server, stored procedures.

Selected Teaching Experience

- Taught, tutored and graded the graduate-level "Service Architectures and Science" course (35 students).
- Guided students to build scientific computing portals using tools and technology for Service-oriented Architecture (SOA), including WS-Messenger.

Patent

- "Semantic Correlation for Flow Analysis in Messaging Systems", (submitted) by W. D. Pauw, R. Hoch, and **Y. Huang**.

Book Chapter

- "Building Grid Portals for e-Science: A Service Oriented Architecture", by D. Gannon, B. Plale, M. Christie, **Y. Huang**, S. Jensen, N. Liu, S. Marru, S. L. Pallickara, S. Perera, S. Shirasuna, Y. Simmhan, A. Slominski, Y. Sun, and N. Vijayakumar, Chapter in "*High Performance Computing and Grids in Action*", IOS Press, 2007. (*to appear*)

Refereed Journal/Conference Publications

1. "Discovering Conversations in Web Services Using Semantic Correlation Analysis", by W. D. Pauw, R. Hoch, and **Y. Huang**, Proc. of International Conference on Web Services (ICWS), 2007.
2. "Internet-Scale Web Services-based Event Notification Systems", by **Y. Huang**, Proc. of PhD Student Symposium in 4th International Conference on Service Oriented Computing (ICSOC), 2006. (*acceptance rate: 44.4%*)
3. "WS-Messenger: A Web Services based Messaging System for Service-Oriented Grid Computing", by **Y. Huang**, A. Slominski, C. Herath, and D. Gannon, Proc. of IEEE International Symposium on Cluster Computing and the Grid (CCGrid), 2006. (*acceptance rate: 23.7%, invited for journal extension by International Transactions*)

on Systems Science and Applications)

4. "A Comparative Study of Web Services-based Event Notification Specifications",
by **Y. Huang** and D. Gannon,
Proc. of ICPP Workshop on Web Services-based Grid Applications (WSGA), 2006.
5. "A Flexible and Efficient Approach to Reconcile Different Web Services-based Event
Notification Specifications",
by **Y. Huang** and D. Gannon,
Proc. of International Conference on Web Services (ICWS), 2006. (*acceptance rate: 18%,
invited for journal extension by International Journal of Web Services Research*)
6. "A Framework for Secure End-to-End Delivery of Messages in Publish/Subscribe
Systems",
by S. Pallickara, M. Pierce, H. arshawardhan Gadgil, G. Fox, Y. Yan, **Y. Huang**,
Proc. of IEEE/ACM International Conference on Grid Computing (GRID), 2006.
(*acceptance rate: 20%*)
7. "Building web services for scientific grid applications",
by G. Kandaswamy, L. Fang, **Y. Huang**, S. Shirasuna, S. Marru, and D. Gannon,
IBM Journal of Research and Development, vol. 50, 2006.
8. "Cooperating Services for Data-Driven Computational Experimentation",
by B. Plale, D. Gannon, **Y. Huang**, G. Kandaswamy, S. L. Pallickara, and A. Slominski,
Computing in Science & Engineering, vol. 7, 2005.
9. "Service Oriented Architectures for Science Gateways on Grid Systems",
by D. Gannon, B. Plale, M. Christie, L. Fang, **Y. Huang**, S. Jensen, G. Kandaswamy, S.
Marru, S. L. Pallickara, S. Shirasuna, Y. Simmhan, A. Slominski, and Y. Sun,
Proc. of International Conference on Service Oriented Computing (ICSOC), 2005.
10. "Applying Mobile Technology to Portal-Based Course Management Systems",
by **Y. Huang** and C.-T. Chang,
Proc. of World Conference on E-Learning in Corporate, Government, Healthcare, &
Higher Education (E-Learn), 2004.
11. "Implementing a Prototype of the Security Framework for Distributed Brokering Systems",
by Yan, Y., **Y. Huang**, G. Fox, S. Pallickara, M. Pierce, A. Kaplan and A. Topcu,
Proc. of the International Conference on Security and Management (SAM), 2003.

Selected Awards

- 2nd place team in the Indiana University Mobility Competition (sponsored by Hewlett-Packard/UITs).
- Travel award from USENIX for OSDI WORLDS workshop.
- Travel award from IBM Research for ICSOC PhD Symposium.

Professional/Social Activities

- Invited to present at University of Chicago.

- Presented 3 times at system seminars in Indiana University.
- Member of ACM, IEEE, IEEE Service Computing Community.
- Reviewer for Transactions on Internet Research.
- Chair of the department student association.
- Team lead of the software engineering project team which is the only team to finish software integration in the whole class.
- Technical lead of the mobile competition team.
- Volunteer for IBM EXITE and IGNITE camps to ignite middle-school students' interest in science and technology.
- Presenter/attendee of ICWS 2007, OSDI & WORLDS workshop 2006, ICSOC 2006, ICWS 2006, ICPP2006 and WSGA workshop, CCGrid 2006, SC2005, E-Learn 2004 and OOPSLA 2001.

Technical Skills

- **Tools**
 - Java, SQL, Visual Basic, ASP, JavaScript, Visual C++, C, C++, JMS, log4J, Junit, ant, cvs, svn, various debuggers and network protocol analyzers.
- **Web Services & Grid**
 - XML, XML schemas, SOAP, WSDL, Web services, XPath, XSLT, XHTML, CSS, Portal.
 - WS-Notification, WS-Eventing, WSRF, OGSA, OGSF, GT3, GT4.
 - GSI, WS-Security, XML-Signature, XML-Encryption, XKMS, SAML, SSL, PKI, Kerberos.

References

Available upon request.

Latest version available at <http://www.cs.indiana.edu/~yihuan/resume/index.html>.

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