



APPLICATION FOR GRADUATE FACULTY MEMBERSHIP

Academic Affairs

Name: Xiang Fu

Department: CIS

Campus phone: (229) 931-2819 Campus email: xfu@canes.gsw.edu

Highest degree held: Ph.d

Is this a terminal degree in your teaching discipline? [checked] Yes [] No

If not, please indicate other justification for graduate faculty membership. See faculty handbook, Section II, B, 1.

N/A

How have you demonstrated exemplary competence in teaching and mentoring of students?

Served as advisor for CS majors. Created CSCI4940 (Capstone Project) in the CS curriculum. Guided students in extracurricular activities such as GSW ACM Chapter. Used project oriented teaching methodology, welcomed by the students.

How have you demonstrated exemplary competence in scholarship and professional activities? See faculty handbook, Section II, B, 3.

Publications in international conferences and journals. Served as committee member for IEEE International Conference on Web Services (ICWS'05), International Conference on World Wide Web (WWW'05).

Attach a current CV.

Based upon the evidence presented, we recommend this candidate for Graduate Faculty Membership.

Paris Peltsverger 9/27/05
Dean Date

Carly Rojas 9/28/05
Vice President for Academic Affairs Date

Nominated by Graduate Affairs on 10/24/05. Curtis Howell
Chair, Graduate Affairs

Elected by General Faculty on

Curriculum Vitae

Xiang Fu

Revised: August 2005

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Education:

- Ph.D. in Computer Science, University of California, Santa Barbara, September 2004.
Thesis: *Formal Specification and Verification of Asynchronously Communicating Web Services*
Advisors: Professor Jianwen Su and Professor Tefvik Bultan
- B.S. in Computer Science, Fudan University, Shanghai, P.R. China, June 1999.

Research Interests:

My research interests lie in the general area of formal methods, software engineering and information systems, including but not limited to: model checking, communicating finite state automata with FIFO, specification realizability analysis, predicate abstraction, Web Services, and Workflow systems.

Experience:

- 8/04—present: *Assistant Professor*, Georgia Southwestern State University, Americus, Georgia:
Taught courses at both undergraduate and graduate levels: Design of Operating Systems, Computer Organization, Computer Architecture, Information Security, Concepts of Programming Languages, Capstone Project, and Distributed Operating Systems.
- 4/01—6/01: *Research Assistant*, University of California, Santa Barbara:
Developed *Web Service Analysis Tool*, a formal specification, verification, and analysis tool for asynchronously composed web services. Designed and implemented a *predicate abstraction module for Action Verifier*. Conducted research on optimization techniques for BDD based symbolic model checking of Vortex Workflows.
- 9/99—3/01: *Teaching Assistant*, University of California, Santa Barbara:
Led discussion sessions and assisted teaching in the following courses: Introduction to Computer Systems, Computer Architecture, Data Structures and Algorithms II, Operating Systems, Design and Analysis of Algorithms.

Publications:

Journal Articles:

- (1) X. Fu, T. Bultan and J. Su. "Realizability of Conversation Protocols With Message Contents.", *To appear in International Journal of Web Services (JWSR)*, vol. 2, no. 4, pp. 68-93, 2005.

- (2) X. Fu, T. Bultan and J. Su. "Conversation Protocols: A Formalism for Specification and Verification of Reactive Electronic Services." Special issue of *Theoretical Computer Science on CIAA'03*, vol. 328, no. 1-2, pp. 19-37, November 2004.

Refereed Conference/Workshop Papers:

- (3) J. Su, T. Bultan, and X. Fu. "Web Service Interactions: Analysis and Design." Invited Paper. In *Proceedings of the Second International Workshop on Semantic and Dynamic Web Processes (SDWP 2005)*, pp. 14-19, Orlando, Florida, USA, July 12-15, 2005.
- (4) A. Betin-Can, T. Bultan, and X. Fu. "Design for Verification for Asynchronously Communicating Web Services." In *Proceedings of Fourteenth International World Wide Web Conference (WWW 2005)*, pp. 413-417, Edinburgh, Scotland, UK, July 6-10, 2005.
- (5) T. Bultan, X. Fu, and J. Su. "Tools for Automated Verification of Web Services." Invited paper. In *Proceedings of the Second International Symposium on Automated Technology on Verification and Analysis (AVTA 2004)*, Farn Wang (ed.), LNCS 3299, pp. 8-10, Taipei, Taiwan, October 31 - November 3, 2004.
- (6) X. Fu, T. Bultan and J. Su. "Model Checking XML Manipulating Software." *Proceedings of the 2004 International Symposium on Software Testing and Analysis (ISSTA)*, pp. 252 – 262, Boston, Massachusetts, July 11-14, 2004.
- (7) X. Fu, T. Bultan and J. Su. "WSAT: A Tool For Formal Analysis of Web Services." *Tool paper, Proceedings of the 16th International Conference on Computer Aided Verification (CAV)*, pp. 501 – 504, Boston Massachusetts, July 11-14, 2004.
- (8) X. Fu, T. Bultan and J. Su. "Realizability of Conversation Protocols with Message Contents", *Proceedings of the 2004 IEEE International Conference on Web Services (ICWS)*, pp. 96 – 103, San Diego, California, July 6 – 9, 2004.
- (9) X. Fu, T. Bultan and J. Su. "Analysis of Interactive BPEL Web Services." *Proceedings of the 13th International World Wide Web Conference (WWW)*, pp. 621 – 630, New York, NY, May 17-22, 2004.
- (10) X. Fu, T. Bultan and J. Su. "A Top-Down Approach to Modeling Global Behaviors of Web Services." *Workshop on Requirements Engineering and Open Systems (REOS)*, Monterey, CA, September 2003.
- (11) X. Fu, T. Bultan and J. Su. "Conversation Protocols: A Formalism for Specification and Verification of Reactive Electronic Services." *Proceedings of the 8th International Conference on Implementation and Application of Automata (CIAA)*, LNCS 2759, pp. 188 – 200, Springer. Santa Barbara, July 2003.
- (12) T. Bultan, X. Fu, R. Hull and J. Su. "Conversation Specification: A New Approach to Design and Analysis of E-Service Composition." *Proceedings of the 12th International World Wide Web Conference (WWW)*, pp. 403 – 410. Budapest, Hungary, May 2003.
- (13) X. Fu, T. Bultan and J. Su. "Formal Verification of E-Services and Workflows." *Proceedings of International Workshop on Web Services, E-Business, and the Semantic Web (WES), in conjunction with the 14th International Conference on Advanced Information Systems Engineering (CAiSE)*, LNCS 2512, pp. 188 – 202, Springer. Toronto, Canada, May 2002.
- (14) X. Fu, T. Bultan, R. Hull and J. Su. "Verification of Vortex Workflows." *Proceedings of the 7th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS)*, LNCS 2031, pp. 143 – 157, Springer. Genova, Italy, April 2001.

Software Systems Developed:

- (1) **Web Service Analysis Tool.** An automatic verifier which supports LTL model checking as well as the realizability/synchronizability check for asynchronously composed web services. Web Service Analysis Tool accepts inputs specified using popular web service standards such as BPEL4WS and WSDL, translates them to an intermediate representation called "guarded finite state automata" where the realizability/synchronizability check is conducted, and verifies LTL properties through the use of back end model checkers such as SPIN. Unlike its predecessors, Web Service Analysis Tool handles full semantics of XML based data, which allows verification of web services at a much greater detail.
- (2) **Predicate Abstraction Module of Action Verifier.** A model abstractor which is seamlessly integrated into Action Verifier. The abstractor takes an integer program as input, and generates a Boolean program which simulates the input and preserves all ACTL* properties.

Presentations:

- (1) "Realizability of Conversation Protocols with Message Contents", Presented at the 2004 IEEE International Conference on Web Services (ICWS), San Diego, California, July 2004.
- (2) "Analysis of Interactive BPEL Web Services." Presented at the 13th International World Wide Web Conference (WWW), New York, NY, May 2004.
- (3) "Conversation Protocols: A Formalism for Specification and Verification of Reactive Electronic Services." Presented in the 8th International Conference on Implementation and Application of Automata (CIAA), Santa Barbara, USA, July 2003.
- (4) "Formal Verification of E-Services and Workflows." Presented in the International Workshop on Web Services, E-Business, and the Semantic Web (WES), Toronto, Canada, May 2002.
- (5) "Verification of Vortex Workflows." Presented in the 7th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), Genova, Italy, April 2001.

Awards:

- President's Work Study Award, 2000 – 2003 (Summer).
- UCSB Tuition Fellowship, 1999 – 2001.
- UCSB Graduate Student Travel Grant, 2004.

Professional Activities:

- Program Committee Member of the 2005 IEEE International Conference on Web Services (ICWS).
- Program Committee Member (Poster Session) of the 14th International World Wide Web Conference (WWW 2005)

- **Reviewer:** *Journal of Theoretical Computer Science, IEEE Transactions on Knowledge and Data Engineering (TKDE), 5th International Conference on Web-Age Information Management (WAIM'04), 4th International Conference on Web Engineering (ICWE'04), 1st International Symposium on Applications of Constraint Databases (CDB'04), 6th Asia Pacific Web Conference (APWEB'04), 8th Symposium on Spatial and Temporal Databases (SSTD'03), 3rd International Conference on Web-Age Information Management (WAIM'02).*
- ACM member.

References

- **Prof. Boris Peltsverger**
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