Tuncay Tekle | Curriculum Vitæ

✉ tuncay@cs.stonybrook.edu

Interests

High-level programming languages and efficient implementations. Algorithm design and generation of efficient algorithms from specifications. Query optimization and complexity analysis. Utilizing research and hands-on expertise to make software better in the retail industry via high-quality code that is reliable, fast, and maintainable.

Education

Stony Brook University **Stony Brook, NY**
PhD in Computer Science *2005-2010*
Thesis: Efficient Datalog Queries with Time and Space Complexity Guarantees
PhD advisor: Annie Liu

Sabancı University **Istanbul, Turkey**
BSc in Computer Science (Minor in Mathematics) *2001-2005*
High Honors

Experience

Current

Stony Brook University **Stony Brook, NY**
Visiting Assistant Professor *2016-present*
Working on research problems in the areas of programming languages, databases, and algorithms; focusing on generation of efficient implementations from rules, in particular Datalog. Giving guest lectures, helping write grant proposals, lead group discussions, supervise Ph.D. students.

Columbus Consulting
Principal *2014-present*
Consulting for large US retailers on new data-intensive software solutions, and analysis and improvement of existing tools. Completed/ongoing projects for the following clients: Ralph Lauren, J. Crew, Gordmans, At Home Décor.

Past

Stony Brook University **Stony Brook, NY**
Adjunct Assistant Professor *2014-2016*
Discussions of research problems in the areas of programming languages, databases, and algorithms; focusing on generation of efficient implementations from rules, in particular Datalog.

LogicBlox
Consultant *2010-2013*

Three main projects delivering solutions to large retailers:
- Carhartt: Technical lead in the design and implementation of a planning solution.
- Walgreens: Optimization of a forecast engine.
- Crate & Barrel: Technical lead in the management of data, and implementation of a markdown optimization solution.

Stony Brook University **Stony Brook, NY**
Research Assistant, Advisor: Annie Liu *2006-2010*
Main researcher of the following projects:
- Development of a method for automatic time and space complexity analysis for on-demand evaluation of Datalog queries in tabled top-down evaluation engines.
- Development of a method for bottom-up evaluation of Datalog queries to achieve the same complexity as on-demand evaluation.
- Establishment of the precise relationship of on-demand evaluation and bottom-up evaluation of Datalog queries.
- Development of a novel combination of transformations for generating efficient implementations of graph queries for querying programs.
- Development of a method for generating specialized rules and programs from Datalog rules for on-demand analysis with respect to queries.
- Implementation of these transformations and analyses in Python, and interfacing the implementation with the XSB logic programming system.

Contributed to the following projects:
- Development of a may-alias analysis for a full dynamic object-oriented language.
- Development of a framework for efficient query-based debugging that allows powerful queries, and utilizes program transformations and analyses for efficiency.
- Development of a systematic method for deriving efficient algorithms from rules and precise time complexities for the analysis of the SPKI/SDSI trust management framework.

Sabancı University **Istanbul, Turkey**
Undergraduate Researcher, Supervisor: Hüsnü Yenigün *2005*
One of the main researchers of the following project:
- Development of a method for generation of shorter input sequences for testing finite state machines.

Teaching

Sabancı University **Istanbul, Turkey**
Part-time Faculty Member *2014-present*
Teaching the following class for the Data Analytics MSc program:
- DA 505, Introduction to Data Modeling and Processing.

Stony Brook University **Stony Brook, NY**
Supervision help *2008-2010*

Helped supervise the following students:

- Anu Kulkarni. Graph query applications. M.S. research project. 2009-2010.
- Ling-Ling Zhang. Security policy analysis for a national electronic health record service. High school student research project. Summer 2009 (admitted to Stanford University, Early Action, December 2009).
- Andrew Gaun. Analysis and modeling of a rule-based distributed access control policy. M.S. research project. 2008-2009.

Stony Brook University **Stony Brook, NY**

Teaching Assistant *2005-2006*

Responsibilities included holding recitations, assisting students, and grading coursework for the following courses:

- Fall 2005: CSE 373, Analysis of Algorithms. Instructor: George Hart.
- Fall 2005: CSE 502, Computer Architectures (graduate). Instructor: Tzi-Cker Chiueh.
- Spring 2006: CSE 213 Foundations of Computer Science II. Instructor: Leo Bachmair.
- Spring 2006: CSE 320, Computer Architectures. Instructor: Tzi-Cker Chiueh.
- Fall 2006: CSE 308, Software Engineering. Instructor: Rob Kelly.
- Fall 2006: CSE 310, Data Communication and Networks. Instructor: Hussein Badr.

Honors and Awards

Graduate Fellowship, Computer Science Department, Stony Brook University, 2005.
Graduated with High Honors, Sabancı University, 2005.
Merit Scholarship, Sabancı University, 2001-2005.

Ph.D. Dissertation

- K. Tuncay Tekle. Efficient Datalog Queries with Time and Space Complexity Guarantees. *Dissertation for the degree of Doctor of Philosophy in Computer Science*. September 2010.

Book Chapters

- David Maier, K. Tuncay Tekle, Michael Kifer, David S. Warren. The History of Datalog. To appear in *Declarative Logic Programming: Theory, Systems, and Applications*.

Journal Publications

- K. Tuncay Tekle, Yanhong A. Liu. Precise complexity guarantees for pointer analysis via Datalog with extensions. Theory and Practice of Logic Programming, 16(5-6):916-932, September 2016. Cambridge University Press.

Conference Publications

- K. Tuncay Tekle, Yanhong A. Liu. Precise complexity guarantees for pointer analysis via Datalog with extensions. In *Proceedings of the 32nd International Conference on Logic Programming (ICLP) 2016*, pages 916–932, New York City, USA, October 2016.

- K. Tuncay Tekle, Yanhong A. Liu. More efficient datalog queries: subsumptive tabling beats magic sets. In *Proceedings of the ACM SIGMOD International Conference on Management of Data 2011 (SIGMOD)*, pages 661–672, Athens, Greece, June 2011.
- K. Tuncay Tekle, Yanhong A. Liu. Precise complexity guarantees for efficient Datalog queries. In *Proceedings of the 12th International ACM SIGPLAN Symposium on Principles and Practice of Declarative Programming (PPDP)*, pages 35–44, Hagenberg, Austria, July 2010.
- Michael Gorbovitski, Yanhong A. Liu, Scott D. Stoller, Tom Rothamel, K. Tuncay Tekle. Alias analysis for optimization of dynamic languages. In *Proceedings of the 6th Symposium on Dynamic Languages (DLS)*, pages 27–42, Reno, NV, USA, October 2010.
- K. Tuncay Tekle, Michael Gorbovitski, Yanhong A. Liu. Graph queries through Datalog optimizations. In *Proceedings of the 12th International ACM SIGPLAN Symposium on Principles and Practice of Declarative Programming (PPDP)*, pages 25–34, Hagenberg, Austria, July 2010.
- Michael Gorbovitski, K. Tuncay Tekle, Tom Rothamel, Scott D. Stoller, Yanhong A. Liu. Analysis and transformations for efficient query-based debugging. In *Proceedings of the 8th IEEE International Working Conference on Source Code Analysis and Manipulation (SCAM)*, pages 174–183, Beijing, China, September 2008.
- K. Tuncay Tekle, Katia Hristova, Yanhong A. Liu. Generating specialized rules and programs for demand-driven analysis. In *Proceedings of the 12th International Conference on Algebraic Methodology and Software Technology (AMAST)*, pages 346–361, Urbana, IL, USA, July 2008.
- Katia Hristova, K. Tuncay Tekle, Yanhong A. Liu. Efficient trust management policy analysis from rules. In *Proceedings of the 9th International ACM SIGPLAN Symposium on Principles and Practice of Declarative Programming (PPDP)*, pages 211–220, Wrocław, Poland, July 2007.
- K. Tuncay Tekle, Hasan Ural, M. Cihan Yalcin, Husnu Yenigun. Generalizing redundancy elimination in checking sequences. In *Proceedings of the 20th International Symposium on Computer and Information Sciences (ISCIS)*, pages 915–926, Istanbul, Turkey, October 2005.

Technical Reports

- K. Tuncay Tekle, Yanhong A. Liu. Precise complexity guarantees for pointer analysis via Datalog with extensions (extended version). arxiv (arXiv:1608.01594). 2016.

Papers in Preparation

- K. Tuncay Tekle, Yanhong A. Liu. Precise complexity guarantees for efficient Datalog queries. In preparation for submission to Journal of the ACM (J.ACM).
- K. Tuncay Tekle, Yanhong A. Liu. Graph queries through Datalog optimizations. In preparation for submission to ACM Transactions on Database Systems (TODS).

Presentations in Conferences and Workshops

- Precise complexity guarantees for pointer analysis via Datalog with extensions
  - 32nd International Conference on Logic Programming, ICLP 2016, New York City, USA, October 18, 2016.
- More efficient datalog queries: subsumptive tabling beats magic sets.
  - ACM SIGMOD International Conference on Management of Data, SIGMOD 2011, Athens, Greece, June 13, 2011.
- Precise complexity guarantees for efficient Datalog queries.
  - 12th International ACM SIGPLAN Symposium on Principles and Practice of Declarative Programming, Hagenberg, Austria, July 26, 2010.
- Graph queries through Datalog optimizations.
  - 12th International ACM SIGPLAN Symposium on Principles and Practice of Declarative Programming, Hagenberg, Austria, July 26, 2010.
- Generating specialized rules and programs for demand-driven analysis.
  - 12th International Conference on Algebraic Methodology and Software Technology, Urbana, IL, USA, July 28, 2008.
- Efficient trust management policy analysis from rules.
  - 9th International ACM SIGPLAN Symposium on Principles and Practice of Declarative Programming, Wrocław, Poland, July 14, 2007.

Talks at Universities and Research Divisions

- Efficient algorithms with precise complexity guarantees via queries in Datalog and extensions.
  - Stony Brook University, Stony Brook, NY, October 28, 2016.
- Demand-driven Datalog query evaluation.
  - LogicBlox, October 18, 2016.
- Efficient Datalog queries with time and space complexity guarantees.
  - Sabancı University, Istanbul, Turkey, September 17, 2012.
  - LogicBlox, Atlanta, USA, July 7, 2010.
- Precise complexity guarantees for efficient Datalog queries.
  - New Jersey Programming Languages and Systems Seminar, Stevens Institute of Technology, April 9, 2010.

Other Presentations

- Precise complexity guarantees for efficient Datalog queries.
  - Graduate Research Conference, Computer Science Department, Stony Brook University, March 20, 2010.
- Graph queries through Datalog optimizations.
  - Graduate Research Conference, Computer Science Department, Stony Brook University, March 25, 2009.
- Generating specialized rules and programs for demand-driven analysis.

- Graduate Research Conference, Computer Science Department, Stony Brook University, March 28, 2008.

Posters

- Efficient trust management policy analysis from rules.
  - Annual Greater New York City Area Security and Privacy Day, Stony Brook University, May 30, 2008.
- Generating specialized rules and programs for demand-driven analysis.
  - North East DB/IR Day, Stony Brook University, May 10, 2007.
- Graph queries through Datalog optimizations.
  - IBM Programming Languages Day, Yorktown Heights, New York, May 7, 2009.

Professional Activities

Program committee:

- 2nd Workshop on the Resurgence of Datalog in Academia and Industry (Datalog 2.0).

Refereeing:

- ACM Transactions on Programming Languages and Systems (TOPLAS)
- Formal Aspects of Computing (FAOC)
- Journal of Functional Programming (JFP)
- Declarative Logic Programming: Theory, Systems, and Applications.
- ACM SIGMOD-SIGACT-SIGART Symposium on Principles of Database Systems (PODS)
- ACM SIGPLAN Symposium on Partial Evaluation and Semantics-based Program Manipulation (PEPM)
- ACM SIGPLAN/SIGBED Conference on Languages, Compilers and Tools for Embedded Systems (LCTES)
- ACM Symposium on Applied Computing (SAC)
- International Conference on Compiler Construction (CC)
- International Conference on Logic Programming (ICLP)
- International Workshop on Logic-based Program Synthesis and Transformation (LOPSTR)
- International Workshop on Software and Compilers for Embedded Systems (SCOPES)
- International Conference on Runtime Verification (RV)
- Asian Symposium on Programming Languages and Systems (APLAS)
- International Conference on Database Theory (ICDT).

Personal Information

- Born: Jan 8, 1985 — Antalya, Turkey.
- Marital status: Single.
- Citizenship: Turkey.

References

- Prof. Y. Annie Liu
  Stony Brook University
  liu@cs.sunysb.edu
- Prof. David S. Warren
  Stony Brook University
  warren@cs.sunysb.edu
- Prof. Michael Kifer
  Stony Brook University
  kifer@cs.sunysb.edu
- Molham Aref
  CEO, LogicBlox
  molham.aref@logicblox.com
- Jon Beck
  Columbus Consulting
  jbeck@columbusconsulting.com
- Assoc. Prof. Hüsnü Yenigün
  Sabancı University
  yenigun@sabanciuniv.edu