Oguz Kaya

Assistant Professor at Université Paris-Sud/Paris-Saclay
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EDUCATION

Ph.D., Computer Science
ROMA Team, Laboratoire de l'Informatique du Parallélisme (LIP)
École Normale Supérieure de Lyon, Lyon, France - September 2017

M.S., Computational Science and Engineering
Georgia Institute of Technology, Atlanta, GA - August 2014

B.S., Computer Science
Bilkent University, Ankara, Turkey - May 2010

RESEARCH OUTLOOK

Parallel and High Performance Computing

- High performance parallel matrix and tensor computations
- Load balancing and partitioning methods for parallel algorithms

Combinatorial Scientific Computing

- Combinatorial problems in sparse (multi)linear algebra
- Graph and hypergraph partitioning and their applications

Theoretical Computer Science

- Design and complexity analysis of combinatorial algorithms

WORK EXPERIENCE

Assistant Professor September 2018 - Current
ParSys Team
LRI, Université Paris-Sud/Paris-Saclay, Orsay, France

Post-doctoral Researcher November 2017 - August 2018
HiePACS Team
INRIA Bordeaux, Bordeaux, France

- Worked on tensor-based methods in the solution of high dimensional problems.

Software Engineering Intern June 2014 - September 2014
Philanthropy Engineering Team
Palantir Technologies Inc., Palo Alto, US

- Worked as a full-stack software engineer in a philanthropy project which aims to end homelessness in 25 major US cities. Performed the front-end and back-end design and implementation using state-of-the-art HTML 5.0 technologies (Backbone / Backbone-forms / Marionette / Less / Handlebars) and Java.
- Developed (in Groovy/Java) a software to automatically migrate a Salesforce database into the Palantir platfrom with incremental database updates.

Research Intern May 2013 - December 2013
cuSPARSE CUDA Sparse Matrix Library and Algorithms Team
NVIDIA, Santa Clara, US

- Developed (in C++) parallel sparse direct solver for shared and distributed memory environments.

- Developed (in C++) partitioning and coarsening routines for GPU-based parallel algebraic multigrid solver (AmgX).

Visiting Researcher Summer 2012
École Normale Supérieure de Lyon, Lyon, France
- Designed and implemented (in C and MATLAB) a hybrid fill-reducing ordering algorithm.
- Developed (in C) hypergraph partitioning-based fill-reducing ordering methods.

Research Assistant August 2011 - May 2013
Georgia Institute of Technology, Atlanta, US
- Developed (in C) graph algorithms for DARPA ADAMS (Anomaly Detection at Multiple Scales) project to detect insiders threats within a corporate database of computer usage activity.

Research Assistant January 2011 - August 2011
Georgia Institute of Technology, Atlanta, US
- Developed (in C and MATLAB) ordering methods for ILU preconditioners.

Software Engineer in Test Summer 2008
HAVELSAN A.S., Ankara, Turkey
- Implemented (in Java) test tools for validating messaging among various modules of the software infrastructure of an aircraft design.

TEACHING EXPERIENCE

Teaching Assistantship Spring 2017
Bases de l'Architecture pour la Programmation (12h)
Université Claude Bernard Lyon 1, Lyon, France

Teaching Assistantship Fall 2016
Distributed Parallel Algorithms and Programming (28h)
ENS Lyon, Lyon, France

Teaching Assistantship Fall 2016
Architecture et Système (24h)
Université Claude Bernard Lyon 1, Lyon, France

Teaching Assistantship Fall 2009
Algorithms and Programming II (24h)
Bilkent University, Ankara, Turkey

Teaching Assistantship Summer 2008
Algorithms and Programming I (24h)
Bilkent University, Ankara, Turkey

Assistant Coach Summer 2005
Summer School for National Olympiads in Informatics (80h)
Middle East Technical University, Ankara, Turkey

SOFTWARE

HyperTensor
A high performance parallel sparse tensor factorization library (C++11)
- Supports shared (OpenMP) and distributed memory (MPI) parallelism for sparse tensor factorization.
- Provides PaToH hypergraph partitioning interface for tensor partitioning.

TECHNICAL SKILLS

Programming Languages: C++, C, MATLAB, Python, Java
Libraries: OpenMP, MPI, CUDA

HONORS AND AWARDS

- Awarded Severo Ochoa Mobility Grant, Barcelona Supercomputing Center, Barcelona, Spain, 2018.
- 1st-Place Winner, 2. HPC Hackathon at Barcelona Supercomputing Center, Barcelona, Spain, 2017.
- 1st-Place Winner, 1. HPC Hackathon at Barcelona Supercomputing Center, Barcelona, Spain, 2016.
- Awarded SIAM Student Travel Award for the SIAM PP'16 Conference, Paris, France, 2016.
- Awarded INRIA CORDI-FRM Scholarship (2014-2017), Inria, France, 2014.
- Awarded the best senior project prize: *havadiSec: A news recommendation system for the front pages of news portals*, Bilkent University, 2010.
- High Honor Student, Bilkent University, 2005 - 2010.
- Awarded National and Bilkent University Scholarships, 2005 - 2010.
- Ranked 38th in University Admissions Exams among 2M students, 2005.
- Awarded bronze medal in the *International Olympiads in Informatics (IOI)*, Novy Sacz, Poland, 2005.
- Awarded bronze medal in the *National Olympiads in Informatics*, Ankara, Turkey, 2004.
- Ranked 2nd in the *Regional Olympiads in Informatics*, Istanbul, Turkey, 2004.

PUBLICATIONS

[1] **Oguz Kaya** and Yves Robert. "Computing dense tensor decompositions using optimal dimension trees". *Algorithmica*.

[2] **Oguz Kaya**, Ramakrishnan Kannan, and Grey Ballard. "Partitioning and communication strategies for sparse non-negative matrix factorization". In the *Proceedings of the 47th International Conference on Parallel Processing (ICPP18)*.

[3] **Oguz Kaya** and Bora Uçar. "Parallel CANDECOMP/PARAFAC decomposition of sparse tensors using dimension trees". *SIAM Journal on Scientific Computing*, issue 1, vol. 40, pp. C99-C130, 2018.

[4] **Oguz Kaya**. "A parallel nonzero CP decomposition algorithm for higher order sparse data analysis". *The International Conference on Advanced Communications and Computation (INFOCOMP '17), Special Track on Parallel Sparse Tensor Decompositions* (%27 acceptance).

[5] **Oguz Kaya** and Bora Uçar. "High performance parallel algorithms for the Tucker decomposition of sparse tensors". *The International Conference on Parallel Processing (ICPP16)* (%21.2 acceptance).

[6] **Oguz Kaya** and Bora Uçar. "Scalable sparse tensor decompositions in distributed memory systems". *The International Conference for High Performance Computing, Networking, Storage, and Analysis (SC15)* (%22 acceptance).

[7] Ted Senator, +33 more authors. "Detecting insider threats in a real corporate database of computer usage activity". In the *Proceedings of the* 19^{th} *ACM SIGKDD International Conference on Knowledge Discovery and Data Mining* (2013).

[8] Emre Varol, Fazli Can, Cevdet Aykanat, and **Oguz Kaya**. "CoDet: Sentence-based containment detection in news corpora". In the *Proceedings of the 20th ACM International Conference on Information and Knowledge Management* (2011).

UNDER REVIEW

[1] **Oguz Kaya** and Yves Robert. "Computing dense tensor decompositions using dimension trees". (Submitted to Algorithmica on December 22, 2017).

TECHNICAL REPORTS

[1] **Oguz Kaya**, Enver Kayaaslan, Bora Uçar, and Iain Duff. "Fill-in reduction in sparse matrix factorization using hypergraphs". Technical report.

[2] **Oguz Kaya**, Enver Kayaaslan, and Bora Uçar. "Minimum quasi-clique edge cover and vertex partition problems are NP-hard". Technical report.

INVITED TALKS

[1] "Computing sparse tensor decompositions using dimension trees".
SIAM Conference on Parallel Processing for Scientific Computing, Tokyo, Japan - March 2018.

[2] "High performance parallel Tucker decomposition of sparse tensors".
Parallel Matrix Algorithms and Applications, Bordeaux, France - July 2016.
SIAM Conference on Parallel Processing for Scientific Computing, Paris, France - April 2016.

[3] "Scalable sparse tensor decompositions in distributed memory systems".
Workshop on Tensor Decompositions and Applications, Leuven, Belgium - January 2016.
Sparse Days in St. Girons, St. Girons, France - July 2015

PROFESSIONAL SERVICE

[1] Reviewer for the 32^{nd} *International World Wide Web Conference (WWW 2018).*

[2] Reviewer for the 31^{st} *International Parallel and Distributed Processing Symposium (IPDPS 2018).*

[3] Reviewer for the 29^{th} *International Parallel and Distributed Processing Symposium (IPDPS 2016).*

[4] Reviewer for the 28^{th} *International Parallel and Distributed Processing Symposium (IPDPS 2015).*

[5] Reviewer for the 27^{th} *International Conference for High Performance Computing, Networking, Storage, and Analysis (SC15)*

[6] Program committee member for the 4^{th} *International Workshop on High Performance Computing for Big Data (HPC4BD 2017)*

PROFESSIONAL MEMBERSHIPS

SIAM member

COURSES TAKEN

Advanced Classical Probability, Statistical Methods, Numerical Linear Algebra, Iterative Methods, Automata and Formal Languages, Algorithms, Computability and Algorithms, Randomized Algorithms, Computational Science and Engineering Algorithms, Computational Geometry, Parallel Computing, Introduction to High Performance Computing, High Performance Computing: Tools and Applications, Modeling and Simulation, Object-Oriented Software Engineering, Operating Systems, Database Management Systems