

Pegah Kamousi

Curriculum Vitae

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Education

2007-Present **Ph.D. candidate in Computer Science**, *University of California, Santa Barbara*.
Advisor: Prof. Subhash Suri. GPA: 3.98.

Interests: Algorithms and Complexity, Stochastic Combinatorial Optimization, Computational Geometry under Uncertainty

2002-2006 **B.S. in Computer Engineering**, *Sharif University of Technology*, Tehran, Iran.
Thesis: Design and Implementation of a Syntactic Analyzer and Semantic Interpreter for Persian.
Advisor: Prof. G. Ghassemsani.

Teaching and Work Experience

2009-Present **Research Assistant**, *Applied Algorithms Lab*, UC Santa Barbara, CA.

Winter 2009 **Teaching Assistant**, *Computational Complexity*, UC Santa Barbara, CA.

Winter 2009 **Teaching Assistant**, *Theory of Languages and Automata*, UC Santa Barbara, CA.

Winter 2009 **Teaching Assistant**, *Data Structures and Algorithms*, UC Santa Barbara, CA.

Summer 2008 **Teaching Assistant**, *Foundations of Computer Science*, UC Santa Barbara, CA.

Spring 2008 **Teaching Assistant**, *Data Structures in JAVA*, UC Santa Barbara, CA.

Fall, Winter 2007 **Teaching Assistant**, *Theory of Languages and Automata*, UC Santa Barbara, CA.

2006-2007 **Software Engineer Intern**, *Mika Company*, Tehran, Iran.

Winter 2006 **Teaching Assistant**, *Operating Systems*, Sharif University, Tehran, Iran.

2003-2004 **Editor of Mathematics and Physics Tutorials**, *Amoozesh Educational Institute*, Tehran, Iran.

Research

2008-Present **Research Assistant**, *Applied Algorithms and Computational Geometry Lab*.

Advisor: Prof. Subhash Suri.

During my PhD, I have worked on various problems in combinatorial and geometric optimization over stochastic data. We have considered many classical geometrical and graphical problems over stochastic input, and found out that some problems remain easy under the stochastic model, while some otherwise tractable problems become intractable in such setting. For the latter case, we have designed approximation algorithms and heuristics to estimate the desired output.

- *Stochastic Minimum Spanning Trees*: Given a set of *stochastic* objects, such as points in a Euclidean space or nodes of a graph, each present with a certain probability and absent otherwise, what is the *expected* weight of the minimum spanning tree? We have developed hardness and inapproximability results, as well as randomized and deterministic approximations for this problem. Our results have applications in sensor networks, vehicle routing, and many other network problems.
- *Stochastic Closest Pair and Nearest Neighbor Search*: Given a set of stochastic points, we developed hardness results and approximation algorithms for the expected distance between the closest pair of *present* points. We also developed a data structure to pre-process the points, such that given a query point we can find the expected distance to its closest neighbor in logarithmic time. This problem has applications in numerous fields such as data mining, pattern recognition, computer vision and DNA sequencing.
- *Minimum Substring Capacity*: This is part of a research on genome sequencing in collaboration with the data mining group. Given a random string, each of whose indices probabilistically assumes a value from the alphabet, what is the distribution of the smallest substring of a given size? We developed a dynamic programming algorithm to compute this distribution.
- *A Priori Traveling Salesman Tour with Stochastic Neighborhoods*: Given a set of disks with random (Gaussian) radii, we developed approximation algorithms to find the optimal (in expectation) a priori tour that visits all the disks, that is, and order on the disks that minimized the expected length of the tour. This problem has direct applications in robotics, specially route planning in noisy environments.

2006-2007 **Bachelor Thesis, Sharif University of Technology.**

Advisor: Prof. Gholamreza Ghassemsani.

Syntactical Analysis and Semantic Interpretation of Persian Language Persian is a language with many complex syntactical constructions and ambiguities. We developed a system for morphological and syntactical analysis of Persian, ambiguity resolution and mapping the parse trees to logical representation, which can then be re-encoded to the target language. The system was developed in Java and was later used in a translation software for Persian.

Papers

- Pegah Kamousi, Timothy M. Chan and Subhash Suri, **The Stochastic Closest Pair Problem and Nearest Neighbor Search**, *In Proc. 12th Algorithms and Data Structures Symposium (WADS), Lecture Notes in Computer Science*, volume 6844, pages 548-559, 2011.
- Pegah Kamousi, Timothy M. Chan and Subhash Suri, **Stochastic Minimum Spanning Trees in Euclidean Spaces**, *In Proc. the 27th Symposium on Computational Geometry (SoCG 2011)*, pp.65-74.
- Pegah Kamousi and Subhash Suri, **Stochastic Minimum Spanning Tree and Related Problems**, *In Proc. SIAM ALENEX/ANALCO Workshop – Analytic Algorithmics and Combinatorics (ANALCO11)*.
- Pegah Kamousi, Timothy M. Chan and Subhash Suri, **Closest Pair and the Post Office Problem for Stochastic Points**, *Computational Geometry, Theory and Applications (CGTA) Journal* (submitted).

- Pegah Kamousi, Timothy M. Chan and Subhash Suri, **Stochastic Minimum Spanning Trees in Euclidean Spaces**, *Discrete and Comp Geometry Journal* (submitted).
- Yang Li, Pegah Kamousi, Subhash Suri and Xifeng Yan, **Minimum Substring Partitioning**, *The 2012 ACM-SIGMOD Conference on Management of Data* (submitted).

Posters and Presentations

- **Combinatorial and Stochastic Optimization over Stochastic Input**, *The 2011 Santa Barbara Control Workshop: Decision, Dynamics and Control in Multi-Agent Systems*, June 2011 UC Santa Barbara, CA
- **The Stochastic Closest Pair Problem and Nearest Neighbor Search**, *WADS11*, Aug. 2011, Polytechnic Institute of New York University, Brooklyn, NY
- **Stochastic Minimum Spanning Tree and Related Problems**, *ANALCO11*, Jan. 2011, San Francisco, CA
- **Combinatorial Optimization under Uncertainty**, *Graduate Student Workshop on Computing*, Oct. 2009 (GSWC09), UC Santa Barbara, CA

Awards and Positions

- Graduate Division Dissertation Fellowship, UC Santa Barbara, 2011
- Best Paper Award for the paper *Stochastic Minimum Spanning Trees in Euclidean Spaces*, Dept. of Computer Science, UC Santa Barbara, 2011
- Travel Grant for Women in Theory Workshop, Princeton, NJ, 2010
- President of the Women in Computer Science Group, UC Santa Barbara, 2011-2012
- Vice President and Social Chair of the Iranian Graduate Student Association, UC Santa Barbara, 2010

Computer skills

Languages	MATLAB, CVX, C, C++, Java
Platforms	UNIX, Windows
Tools	Word, Excel, Eclipse, MS .Net.

Languages

English	Fluent
Persian	Fluent
French and German	Beginner

Other Interests

Photography, Painting
 Philosophy of mind, Philosophy of Science, Cognitive Science and Psychology
 Rock Climbing, Sailing