

# Dimitrios Kanoulas

## *University Address*

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## *Personal Information*

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## Current Position

Ph.D Candidate, College of Computer & Information Science, Northeastern University

## Research Interests

Computer Vision and Robotics: Stereo & Monocular Computer Vision, Perception Systems, Image Processing, Probabilistic Robotics, Simultaneous Localization and Mapping (SLAM), Computer Graphics.

Algorithms and Complexity: Algorithmic Game Theory, Approximation Algorithms, Combinatorial and Linear Optimization, Design and Analysis of Algorithms.

## Education

### **Ph.D. in Computer Science, September 2010 - May 2013 (Expected graduation)**

College of Computer and Information Science, Northeastern University, Boston, USA.

*Concentration Area:* Computer Vision and Perception, Probabilistic Robotics

*Advisor:* Marsette Vona

*GPA:* 4.0/4.0

### **M.S. in Computer Science, September 2008 - May 2010**

College of Computer and Information Science, Northeastern University, Boston, USA.

*Concentration Area:* Algorithmic Game Theory, Approximation Algorithms

*Advisor:* Rajmohan Rajaraman, *co-Advisor:* Ravi Sundaram

*GPA:* 4.0/4.0

### **Diploma in Computer Science, September 2003 - May 2008**

*(5-year B.Sc. degree with thesis)*

Computer Engineering and Informatics, University of Patras, Patras, Greece.

*Advisor:* Paul G. Spirakis, *co-Advisor:* Haralampos Tsaknakis

*Thesis:* Approximate Nash Equilibrium: “Conducting theoretical and experimental research on optimal algorithms that can result in better approximate Nash Equilibria in bimatrix games.”

*GPA:* 8.43/10 (ranked 5 of 120)

## Theses

**Approximate Nash Equilibrium: “Conducting theoretical and experimental research on optimal algorithms that can result in better approximate Nash Equilibria in bimatrixes games”**, Bachelor’s Thesis, University of Patras, Computer Engineering and Informatics Department, July 2008.

*Advisors: Paul Spirakis and Haralampos Tsaknakis.*

## Conference Publications

**Cache me if you can: Capacitated Selfish Replication in Networks**, Ragavendran Gopalakrishnan, **Dimitrios Kanoulas**, Naga Naresh Karuturi, C. Pandu Rangan, Rajmohan Rajaraman, and Ravi Sundaram.

In the Latin American Symposium on Theoretical Informatics (**LATIN 2012**).

**Curved Surface Contact Patches with Quantified Uncertainty**, Marsette Vona, and **Dimitrios Kanoulas**.

In the 2011 IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS 2011**).

**Performance evaluation of a descent algorithm for bi-matrix games**, Haralampos Tsaknakis, Paul Spirakis and **Dimitrios Kanoulas**,

In the 4th Workshop on Internet and Network Economics 2008 (**WINE 2008**).

## Technical Reports

**Cache me if you can: Capacitated Selfish Replication in Networks**, Ragavendran Gopalakrishnan, **Dimitrios Kanoulas**, Naga Naresh Karuturi, C. Pandu Rangan, Rajmohan Rajaraman, and Ravi Sundaram,

arXiv:1007.2694v2, CCIS, Northeastern University, December 2011.

**Performance evaluation of a descent algorithm for bi-matrix games**,

Haralampos Tsaknakis, Paul Spirakis, and **Dimitrios Kanoulas**, RACTI-RU1-2008-36, CEID, University of Patras, September 2008.

## Professional (Research and Work) Experience

### *Northeastern University, CCIS (2008 - present)*

#### *Research Assistant:*

[Summer 2009, Fall 2009, Spring 2010, Summer 2010, Fall 2010, and Summer 2011]

#### **With Marsette Vona (2010 - present)**

1. Modeling, Sensing, and Mapping Curved Surface Contact Patches
2. Segmentation and Local Feature Extraction for very uneven 3D terrain

#### **With Rajmohan Rajaraman and Ravi Sundaram (2008 - present)**

1. Game Theoretic Model of Distributed Selfish Replication in Networks

#### *Teaching Assistant* for the courses:

1. **”CSU390: Theory of Computation”**: This undergraduate course serves as an introduction to formal models of languages and computation.  
[ Fall 2008, Spring 2009].

2. **"CS4300: Computer Graphics"**: This undergraduate course focuses on fundamental mathematics, algorithms, data structures, and programming techniques that are at the core of modern 2D and 3D graphics applications in practice.  
[Spring 2011].
3. **"CS5010 Program Design Paradigms"**: This graduate course focuses on designing programs, from problem analysis to the development of test suites.  
[Fall 2011, Spring 2012].

### ***INRIA, e-Motion (May 2012 - August 2012)***

**Research Internship:** Vehicle Recognition  
(supervised by Prof. Christian Laugier).

### ***University of Patras, CEID (2007 - 2008)***

**Research Project:**  
Theoretical and experimental research on approximate Nash Equilibrium  
(with Paul G. Spirakis, and Haralampos Tsaknakis).

## **Software**

**Surface Patch Library (SPL)** (in Matlab): [\[link\]](#)  
*SPL includes models of 10 types of curved surface patches and an algorithm to fit them to potentially noisy range sensor data. Uncertainty is quantified throughout using covariance matrices.*

**Approximate Nash Equilibria Library (aNEL)** (in C and Matlab): TBA.  
*Implementation of approximate Nash Equilibrium algorithms.*

## **Conference and Seminar Talks**

"Cache me if you can: Capacitated Selfish Replication in Networks", LATIN, Arequipa. April 2012.

"Curved Surface Contact Patches with Quantified Uncertainty", IROS, San Francisco. Sept. 2011.

"Open Source in Robotics", Ph.D. Student Seminar, Northeastern University, Boston. June 2011

"Capacitated Caching Games", Seminar on Communications, Algorithms, Networking, and Security, Northeastern University, Boston. February 2011.

"Distributed Selfish Replication Problem: A game theoretic approach", Seminar on Communications, Algorithms, Networking, and Security, Northeastern University, Boston. November 2009.

## **Courses**

### **Ph.D. courses, Northeastern University, CCIS, Boston, MA, USA**

Robotic Science and Systems (CS 4610, Fall 2011, Prof. M. Vona),  
Surface Patch Modeling, Perception, and Mapping (CS 8982, Spring 2011, Prof. M. Vona),  
Applied Geometric Representation and Computation (CS 7380, Fall 2010, Prof. M. Vona),

Topics in Articulated Robots (CS 8982, Spring 2010, Prof. M. Vona),  
Intensive Computer Systems (CS 7600, Spring 2010, Prof. P. Desnoyers),  
Algorithmic Power Tools (CS 7880, Fall 2009, Prof. R. Rajaraman),  
Principles of Programming Languages (Intensive) (CS 7400, Fall 2009, Prof. M. Wand),  
Theory of Computation (CS G714, Spring 2009, Prof. R. Rajaraman),  
Gems of Theoretical Computer Science (CS G399, Spring 2009, Prof. E. Viola),  
Advanced Algorithms (CS G713, Fall 2008, Prof. E. Viola),  
Applications of Information Theory to Computer Science (CS G195, Fall 2008, Prof. J. Aslam).

## Selected Projects

**Differential drive implementation on an AVR-based microcontroller board (Pololu Orangutan SVP).** (Fall 2011, Implementation in C).

**Obstacle avoidance and navigation, arm kinematics and grasping, object detection, and visual servoing implementation on a PandaBoard ARM processor running Ubuntu using OpenCV.** (Fall 2011, Implementation in Java/OpenCV).

**Camera calibration, generation of fast 3D wireframe graphics using the pinhole camera model, 3D pose tracking of known objects, sparse pyramid Lucas-Kanade algorithm and Kalman Filter to track image features, and drawing error ellipses for covariance matrices using OpenCV.**  
(Fall 2010, Implementation in C++/OpenCV).

**Simulation of a redundant n-link planar revolute chain robot, using forward and inverse kinematics.**  
(Fall 2010, Implementation in Matlab).

**Implementation of Raibert hopper robot simulator for sloped terrain.**  
(Spring 2009, Implementation in Matlab).

**Implementation of Tsaknakis/Spirakis algorithm for approximate Nash Equilibria.**  
(Spring 2008, Implementation in C, Matlab and CPLEX).

**Lempel.Ziv compression algorithm with compression ratio roughly 2 on English texts.**  
(Fall 2008, Implementation in Python).

**Development of a clustering algorithm for eye movement.**  
(Spring 2008, Implementation in Matlab).

**Neural network implementation of a Full Adder.**  
(Spring 2008, Implementation in Matlab).

**Design and implementation of a parallel algorithm for solving the shortest path problem.**  
(Fall 2007, Implementation in C).

**Design and implementation of a client-server system for time scheduling, with the ability to receive a large number of processes and schedule them in round robin or shortest job first fashion.**  
(Fall 2007, Implementation in C).

**Implementation of a /proc Filesystem and the memory management module of the kernel, for MINIX operating system.**  
(Spring 2007, Implementation in C).

## Computer Skills

Programming languages: MatLab, C, C++, Java, Scheme/Racket, L<sup>A</sup>T<sub>E</sub>X.

Computer Vision and Robotics Programming: OpenCV, PCL, ROS.

## Professional Services

**Reviewer:** IROS 2011, CCC 2010

**External Reviewer:** SODA 2010, GLOBECOM 2009

## Honors & Awards

### *University of Patras (2003 - 2008)*

Ranking in top 5% of the class for all the academic years between 2003-2008.

## Miscellaneous

### *Foreign languages*

Greek (native), English (fluent).

### *University Activities*

#### **Northeastern University**

Organize SCANS and PhD Seminar: Fall 2009, Spring 2010.

Organize Algorithmic Game Theory Reading Group: Fall 2008, Spring 2009.

#### **University of Patras**

Undergraduate Student Representative 2003-2008

## References Available Upon Request

Last updated: May 24, 2012

<http://www.ccs.neu.edu/home/dkanou/cv.pdf>