






# Konstantinos Zampogiannis

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**Research Interests** I am interested in various aspects of 3D perception.  
Computer Vision — Robotics — Artificial Intelligence — Machine Learning

**Experience** **Magic Leap, Inc.** *September 2019-Present*  
**Senior Computer Vision Researcher/Engineer**

**University of Maryland** *Fall 2014-Spring 2019*  
**Graduate Research Assistant**

- Developed a method for non-rigid, topology-aware raw point cloud registration 
- Created *cilantro*, a general-purpose, feature-rich point cloud processing library  
- Developed model-based 6DoF stochastic object tracking algorithms in RGB-D videos
- Developed a method for grounding pairwise spatial relations between objects observed in 3D and proposed an action representation based on their temporal evolution  

**Robot Training Academy** *June 2016-August 2016*  
**Perception Intern**

- Implemented a small-scale RGB-D SLAM pipeline 
- Developed algorithms for cuboid detection and fitting in incomplete 3D geometries 
- Developed a method for automatic part decomposition and fitting for box-like containers and appliances from partial interior and exterior 3D scans

**University of Maryland** *Fall 2011-Spring 2014*  
**Graduate Teaching Assistant**

- [CMSC425] *Game Programming* (Spring 2013)
- [CMSC122] *Programming via the Web* (Fall 2012, Fall 2013, Spring 2014)
- [CMSC351] *Algorithms* (Spring 2012)
- [CMSC427] *Computer Graphics* (Fall 2011)

**National Technical University of Athens** *Fall 2004-Spring 2011*  
– Designed and implemented Kalman and Particle Filtering 2D tracking algorithms based on color and optical flow cues (diploma thesis)  
– Lab assistant in ECE course *Introduction to Programming* (Stathis Zachos), Fall 2005

**Education** **University of Maryland at College Park**  
PhD in Computer Science  
Dissertation: *Reasoning about Geometric Object Interactions in 3D for Manipulation Action Understanding*  
Advisor: Prof. Yiannis Aloimonos, co-advisor: Dr. Cornelia Fermüller

**University of Maryland at College Park**  
MSc in Computer Science

**National Technical University of Athens**  
5-year diploma (MEng equivalent) in Electrical and Computer Engineering  
Thesis: *Stochastic Object Tracking*  
Advisor: Prof. Petros Maragos








**Service & Memberships** **Reviewer**  
Conferences: ICRA, ICCV, AAAI  
Journals: RA-L, RAS, CVIU, IMAVIS, TVCJ

## Visiting Researcher

Telluride Neuromorphic Cognition Engineering Workshop (June-July 2015)

## Student Member

IEEE, SIAM

- Publications**
- [1] **Topology-Aware Non-Rigid Point Cloud Registration**, [K. Zampogiannis](#), C. Fermüller, Y. Aloimonos, *PAMI 2019* 
  - [2] **cilantro: A Lean, Versatile, and Efficient Library for Point Cloud Data Processing**, [K. Zampogiannis](#), C. Fermüller, Y. Aloimonos, *ACM MM 2018 (OSSC)*  
  - [3] **Prediction of Manipulation Actions**, C. Fermüller, F. Wang, Y. Yang, [K. Zampogiannis](#), Y. Zhang, F. Barranco, M. Pfeiffer, *IJCV 2018* 
  - [4] **Combining Visual Learning with a Generic Cognitive Model for Appliance Representation**, K. Ganguly, [K. Zampogiannis](#), C. Fermüller, Y. Aloimonos, *EUCOG 2016* 
  - [5] **Learning the Spatial Semantics of Manipulation Actions through Preposition Grounding**, [K. Zampogiannis](#), Y. Yang, C. Fermüller, Y. Aloimonos, *ICRA 2015*  

**Selected Course Projects** The following advanced undergraduate and graduate course projects were either individual work or completed by a group of two students:

### Computer Vision

- Development of a dense 3D point cloud reconstruction pipeline from multiple 2D views
- Development of an image mosaicking application using homographies
- Implementation of classical vision algorithms for edge and corner detection, optical flow estimation, nonlinear image diffusion and MRF/CRF inference based segmentation

### Pattern Recognition

- Implementation of an SVM face image classifier
- Development of an unsupervised, realtime speaker indexing application
- Development of a small vocabulary speech recognition system using continuous HMMs
- Implementation of a simple LPC vocoder

### Robotics and AI

- Development of an HTN planner for the solar panel operations on ISS (*ICKEPS 2012* challenge track)
- Development of a robotic manipulator simulator with kinematic redundancies

### Programming Languages

- Development of forward and backward symbolic execution interpreters in OCaml for a TAC language
- Development of a compiler in C for the procedural programming language *Dana*

<b>Relevant Graduate Coursework</b>	Processing of Pictorial Information	Computational Geometry
	Image Segmentation	AI Planning
	Subspaces and Manifolds in CV and ML	Scientific Computing
	Statistical Pattern Recognition	Program Analysis and Understanding

- Honors & Awards**
- University of Maryland **Dean's Fellowship**, 2011-2013
  - Member of the team that represented Greece in the final stage of Microsoft's **Imagine Cup 2009** competition in Cairo, in the category of Software Design: we built a semi-automatic malaria diagnosis system for remote, rural areas of the developing world
  - **Award** by the bank *Eurobank EFG* for ranking 1<sup>st</sup> in class (panhellenic exams performance) in the last year of high school, 2003

**Technical Skills**

**Languages:** C++, C, MATLAB, Python, Java, OCaml, Haskell, Prolog, Pascal  
**APIs:** OpenCV, PCL, Eigen, Ceres, g2o, ROS, OpenGL, OpenMP  
**Tools:** GNU Make, CMake, Visual Studio, L<sup>A</sup>T<sub>E</sub>X  
**Operating Systems:** GNU/Linux, Windows