

# Konstantinos Chatzilygeroudis

## Curriculum Vitae

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### At a glance

Current Position	<b>Post-Doctoral Fellow</b> at <b>LASA - EPFL</b> , Switzerland
Education	<b>PhD in Robotics/Machine Learning</b>
Honors	Ranked in <b>top 5%</b> at <b>Computer Science and Engineering 2014 Graduation</b>
Experience	<b>Google Summer of Code Intern</b> for <b>Open Source Robotics Foundation</b>
Research Keywords	Robot Learning, Reinforcement Learning, Evolutionary Robotics, Machine Learning

### Education

Oct 2015–Dec 2018	<b>PhD in Robotics and Machine Learning</b> , <i>University of Lorraine - Inria Nancy (LARSEN Team)</i> , France.
September 2016	<b>Gaussian Process and Uncertainty Quantification Summer School</b> , <i>University of Sheffield</i> , UK. <i>Organizers:</i> Javier Gonzalez, Richard Wilkinson, Jeremy Oakley, Neil Lawrence, Sheffield ML Group
2009–2014	<b>Diploma of Computer Science and Engineering</b> , <i>University of Patras</i> , Greece, <i>GPA – 8.25/10</i> . Specialized in Artificial Intelligence, Robotics, Software Engineering and Computer Graphics - Top 5%
<b>Other</b>	
2010–2015	<b>Online Courses</b> , <i>Coursera, edX, Udacity</i> . I have attended and completed over 15 online courses covering a very broad range of topics, including Software Engineering, Artificial Intelligence, Robotics, Control Theory, Machine Learning, Game Theory, Digital Signal Processing, e.t.c.
2006–2009	<b>High School</b> , <i>G.E.L. Kato Kastritsiou</i> , Patras, Greece, <i>GPA – 19.3/20</i> . Specialized in Mathematics/Physics

### Experience

#### Vocational

October 2018–present	<b>Post-Doctoral Fellow</b> , <i>EPFL (LASA Team)</i> , Lausanne, Switzerland. <b>Research Topic:</b> Robot Learning and Adaptation <b>Funding:</b> ERC "SAHR" Project, CHIST-ERA "CORSMAL" Project <b>Supervisor:</b> Aude Billard
Oct 2015–Sept 2018	<b>Doctoral Researcher</b> , <i>Inria (LARSEN Team)</i> , Nancy, France. <b>Research Topic:</b> Micro-Data Reinforcement Learning for Adaptive Robots <b>Funding:</b> ERC "ResiBots" Project <b>Supervisor:</b> Jean-Baptiste Mouret

- September–December 2017 **Teaching Assistant in Post-Graduate Real-Time Programming Course**, UPMC - University Pierre and Marie Curie, SPI Master, Paris, France.  
The lab exercises involved the Orocos Real-Time Toolkit and Linux kernel modules.  
**Professor:** Ludovic Saint-Bauzel
- January–September 2015 **Computer/Software Engineer**, *Institute of Language and Speech Processing*, Athens, Greece, Scholarship.  
Computer/Software Engineer at Institute for Language and Speech Processing, Athens. I was market researching and setting up a laboratory for multi-modal human-computer interaction based on expressive speech synthesis (robots, avatars, motion capture systems, microphone arrays, e.t.c.). My main duties involved searching for available hardware and selecting the most appropriate given specific user/scientific cases. I was, also, involved in integrating *Innoetics'* software into modules of the humanoid robot NAO and creating the infrastructure for easy code re-use.
- May–August 2015 **Google Summer of Code 2015**, *Open Source Robotics Foundation*.  
As a GSoC 2015 intern, I focused on adding more features to the core library of the *Ignition Robotics Transport Library*. The main tasks involved code restructuring using C++11 features and enabling easy code re-use and enhancing modularity. I was also involved in creating some command line tools for the library.
- March–June 2015 **Intern**, *Bit My Job*, Patras, Greece.  
During my internship at Bit My Job I developed a framework for Tablet (Android) to Server (Java) communication for live-scoring purposes in shooter tournaments. Also, I created several websites using PHP, Joomla or Wordpress. My internship had a duration of 3 months.
- Miscellaneous
- Nov–Dec 2013 **Programmer**, *Laboratory for Manufacturing Systems & Automation*, University of Patras, Greece.  
Worked on CAPP 4 SMEs European Project. I was developing 3D/2D simulation (using Java and OpenGL) and a Web Application (using Ruby on Rails).
- July 2010–June 2015 **Coach**, *Table Tennis Academy "Anagennisi Patron"*, Rion, Greece.  
I was the head coach of the Table Tennis Academy "Anagennisi Patron".

## Publications

### Peer-Reviewed Journal Papers

- 2019 **Benchmark for Bimanual Robotic Manipulation of Semi-deformable Objects**, *Konstantinos Chatzilygeroudis, Bernardo Fichera, Ilaria Lauzana, Fanjun Bu, Kunpeng Yao, Farshad Khadivar, Aude Billard*, IEEE Robotics and Automation Letters: Special Issue on Benchmarking Protocols for Robotic Manipulation, *To appear*.

**Benchmark for Human-to-Robot Handovers of Unseen Containers with Unknown Filling**, *Ricardo Sanchez-Matilla\*, Konstantinos Chatzilygeroudis\*, Apostolos Modas, Nuno Ferreira Duarte, Alessio Xompero, Pascal Frossard, Aude Billard, Andrea Cavallaro*, IEEE Robotics and Automation Letters: Special Issue on Benchmarking Protocols for Robotic Manipulation, *To appear*.

\* Equal contribution

**A survey on policy search algorithms for learning robot controllers in a handful of trials**, *Konstantinos Chatzilygeroudis, Vassilis Vassiliades, Freek Stulp, Sylvain Calinon, Jean-Baptiste Mouret*, IEEE Transactions on Robotics, *To appear*.

- 2018 **Reset-free Trial-and-Error Learning for Robot Damage Recovery**, *Konstantinos Chatzilygeroudis, Vassilis Vassiliades, Jean-Baptiste Mouret*, Robotics and Autonomous Systems.

**Limbo: A Flexible High-performance Library for Gaussian Processes modeling and Data-Efficient Optimization**, Antoine Cully, Konstantinos Chatzilygeroudis, Federico Allocati, Jean-Baptiste Mouret, The Journal of Open Source Software.

- 2017 **Using Centroidal Voronoi Tessellations to Scale Up the Multi-dimensional Archive of Phenotypic Elites Algorithm**, Vassilis Vassiliades, Konstantinos Chatzilygeroudis, Jean-Baptiste Mouret, IEEE Transactions on Evolutionary Computation.

#### Peer-Reviewed Conference Papers

- Oct 2019 **On Force Synergies in Human Grasping Behavior**, Julia Starke, Konstantinos Chatzilygeroudis, Aude Billard and Tamim Asfour, Proceedings of the International Conference on Humanoid Robots, Toronto, Canada.
- Oct 2018 **Multi-objective Model-based Policy Search for Data-efficient Learning with Sparse Rewards**, Rituraj Kaushik, Konstantinos Chatzilygeroudis and Jean-Baptiste Mouret, Proceedings of the Conference on Robot Learning (CoRL 2018), Zurich, Switzerland.
- May 2018 **Using Parameterized Black-Box Priors to Scale Up Model-Based Policy Search for Robotics**, Konstantinos Chatzilygeroudis and Jean-Baptiste Mouret, Proceedings of the International Conference on Robotics and Automation (ICRA 2018), Brisbane, Australia.
- May 2018 **Bayesian Optimization with Automatic Prior Selection for Data-Efficient Direct Policy Search**, Rémi Pautrat, Konstantinos Chatzilygeroudis and Jean-Baptiste Mouret, Proceedings of the International Conference on Robotics and Automation (ICRA 2018), Brisbane, Australia.  
*A short version of the paper was accepted at the non-archival track of the 1st Conference on Robot Learning (CoRL) 2017.*
- Feb 2018 **Alternating Optimisation and Quadrature for Robust Control**, Paul Supratik, Konstantinos Chatzilygeroudis, Kamil Ciosek, Jean-Baptiste Mouret, Michael A. Osborne and Shimon Whiteson, Proceedings of the Thirty-Second AAAI Conference on Artificial Intelligence (AAAI 2018), New Orleans, Louisiana, USA.
- Sept 2017 **Black-Box Data-efficient Policy Search for Robotics**, Konstantinos Chatzilygeroudis, Roberto Rama, Rituraj Kaushik, Dorian Goepp, Vassilis Vassiliades, Jean-Baptiste Mouret, Proceedings of the International Conference on Intelligent Robots and Systems (IROS), Vancouver, BC, Canada.
- May 2015 **Human robot collaboration for folding fabrics based on force/RGB-D feedback**, Panagiotis Koustoumpardis, Konstantinos Chatzilygeroudis, Aris Synodinos, Nikos Aspragathos, Proceedings of the 24th International Conference on Robotics in Alpe-Adria-Danube Region, Bucharest, Romania, Pages: 235-243.

#### Peer-Reviewed Workshop Papers

- July 2017 **20 Years of Reality Gap: a few Thoughts about Simulators in Evolutionary Robotics**, Jean-Baptiste Mouret, Konstantinos Chatzilygeroudis, Proceedings of the International Workshop "Simulation in Evolutionary Robotics" at the Genetic and Evolutionary Computation Conference (GECCO).
- July 2017 **Comparing multimodal optimization and illumination**, Vassilis Vassiliades, Konstantinos Chatzilygeroudis, Jean-Baptiste Mouret, Proceedings of the Genetic and Evolutionary Computation Conference (GECCO) (Poster-only papers), Berlin, Germany.

- July 2017 **A comparison of illumination algorithms in unbounded spaces**, *Vassilis Vassiliades, Konstantinos Chatzilygeroudis, Jean-Baptiste Mouret*, Proceedings of the International Workshop "Measuring and Promoting Diversity in Evolutionary Algorithms" at the Genetic and Evolutionary Computation Conference (GECCO).
- Dec 2016 **Safety-Aware Robot Damage Recovery Using Constrained Bayesian Optimization and Simulated Priors**, *Vaios Papaspyros, Konstantinos Chatzilygeroudis, Vassilis Vassiliades, Jean-Baptiste Mouret*, BayesOpt 2016: Proceedings of the International Workshop on "Bayesian Optimization" at NIPS 2016.
- May 2016 **Towards semi-episodic learning for robot damage recovery**, *Konstantinos Chatzilygeroudis, Antoine Cully, Jean-Baptiste Mouret*, AILTA '16: Proceedings of the International Workshop "AI for Long-term Autonomy" at ICRA 2016.

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## Reviewer & Program Committee Member

- **T-RO** - *ieee transactions on robotics (journal)* (2019)
- **ICRA** - *one of the top conferences in robotics* (2016, 2017, 2019, 2020)
- **RSS** - *one of the top conferences in robotics (PC member)* (2020)
- **IROS** - *one of the top conferences in robotics* (2019, 2020); serving as **Associate Editor** from 2020
- **GECCO** - *one of the top conferences in evolutionary computation (PC member)* (2020)
- **CoRL** - *robot learning conference* (2018, 2019)
- **RA-L** - *robotics and automation letters (journal)* (2017-2020)
- **IJAIT** - *journal on artificial intelligence tools* (2017)
- **JOSS** - *the journal of open source software* (2018)
- **IISA** - *conference on information, intelligence, systems and applications (reviewer and PC member)* (2019)
- **BayesOpt** - *international workshop on bayesian optimization (at NIPS)* (2018)
- **HFR** - *international workshop on human-friendly robotics* (2017)
- **IFAC** - *world congress on automatic control* (2017)
- **ReMAR** - *conference on reconfigurable mechanisms and robots* (2016)

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## Open Source Activities

I have contributed in several open-source projects including:

- limbo** *Main developer and maintainer.* Limbo is an open-source C++11 library for Gaussian Processes and data-efficient optimization (e.g., Bayesian optimization) that is designed to be both highly flexible and very fast.
- robot\_dart** *Main developer and maintainer.* robot\_dart is an open-source C++11 generic wrapper around the DART robotics simulator for easier and faster usage.
- iiwa\_ros** *Main developer and maintainer.* iiwa\_ros contains ROS packages to integrate KUKA's IIWA robots in ROS. This is achieved through the KUKA's Fast Research Interface (FRI) and makes it possible for up to 1KHz control (in torque or position control mode).
- roboticsgroup\_gazebo\_plugins** *Main developer and maintainer.* roboticsgroup\_gazebo\_plugins is a collection of Gazebo plugins; most notably the *MimicJointPlugin*.

<b>DART</b>	<i>Bug reports and fixes.</i> DART (Dynamic Animation and Robotics Toolkit) is a collaborative, cross-platform, open source library that provides data structures and algorithms for kinematic and dynamic applications in robotics and computer animation.
<b>dynamixel_control_hw</b>	<i>Developer.</i> dynamixel_control_hw provides a hardware interface for ROS control. Its aim is to allow generic software controllers to control a set of Dynamixel actuators.
<b>Magnum</b>	<i>Added DART Integration and bug fixes.</i> Magnum is a lightweight and modular C++11/C++14 graphics middleware for games and data visualization.
<b>Ignition Transport</b>	<i>GSoC 2015.</i> Ignition transport is a component in the ignition framework, a set of libraries designed to rapidly develop robot applications.

A full list of the projects that I am involved in can be found in my GitHub and bitbucket accounts (*costashatz* username).

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## PhD Thesis

Title	<i>Micro-Data Reinforcement Learning for Adaptive Robots</i>
Supervisor	Dr. Jean-Baptiste Mouret
Description	<i>Robots have to face the real world, in which trying something might take seconds, hours, or even days. Unfortunately, the current state-of-the-art reinforcement learning algorithms (e.g., deep reinforcement learning) require big interaction times to find effective policies. In this thesis, we explored approaches that tackle the challenge of learning by trial-and-error in a few minutes on physical robots. We call this challenge "micro-data reinforcement learning". Throughout this thesis, our goal was to design algorithms that work on physical robots, and not only in simulation. Consequently, all the proposed approaches have been evaluated on at least one physical robot. Overall, this thesis aimed at providing methods and algorithms that will allow physical robots to be more autonomous and be able to learn in a handful of trials.</i>
Videos	<a href="http://costashatz.github.io/videos.html">http://costashatz.github.io/videos.html</a>
Codes	<a href="https://github.com/resibots">https://github.com/resibots</a>

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## Diploma Thesis

Title	<i>Navigation of Humanoid Robot Nao In Unknown Space With Dynamic Obstacles</i>
Supervisors	Professor Nikos Aspragathos & Professor Emmanouil Psarakis & PhDc Aris Synodinos
Description	This thesis dealt with all the fields that give the ability to humanoid robots to move autonomously in a previously unknown space. It was, mainly, a software development project with a brief bibliographic overview of the major algorithms and techniques in each individual field. The "small" humanoid NAO (from Aldebaran Robotics) was used for the experiments and ROS (Robot Operating System) as the programming framework.
Grade	10/10
Video	<b>NAO Walking in Gazebo:</b> <a href="https://www.youtube.com/watch?v=xPg7cal26Z4">https://www.youtube.com/watch?v=xPg7cal26Z4</a>
Code	<a href="https://github.com/costashatz/nao_dcm">https://github.com/costashatz/nao_dcm</a> <a href="https://github.com/costashatz/nao_gazebo">https://github.com/costashatz/nao_gazebo</a>

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## Honors & Awards

- December 2014 **Computer Engineering and Informatics Department Graduation.**  
Ranked **9th with GPA 8.25/10** amongst 250 students that graduated from the Computer Engineering and Informatics Department of University of Patras in 2014.
- August 2009 **Greek National Exams - Admission Exams.**  
Ranked **1st in admission exams** for the Computer Engineering and Informatics Department of University of Patras among 250 students who succeeded.
- May 2010 **Microsoft Imagine Cup Competition.**  
Ranked among the **150 best teams** with team TTD (as a game designer/developer) at the Game Development part of the International "Imagine Cup 2010" competition (organized by Microsoft) with the project/game *Spring*.

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## Skills

- Intermediate Ruby, Screw Theory, XNA, DirectX10, OpenGL, MATLAB/Octave, MVC Web Development with Ruby on Rails or PHP,  $\text{\LaTeX}$ , Javascript/jQuery, Android, HTML5/CSS
- Advanced C/C++, Robotics Operating System (ROS), Java, C#, Python, Object Oriented Design & Programming, Game-Graphics Programming, Math for 2D/3D Graphics

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## Personal Data

- Place/Date of Birth Nottingham, UK | 5 February 1991
- Citizenship Greek
- Marital Status Married
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- Website <http://costashatz.github.io/>
- E-mail [konstantinos.chatzilygeroudis@epfl.ch](mailto:konstantinos.chatzilygeroudis@epfl.ch),  
[costashatz@gmail.com](mailto:costashatz@gmail.com)
- Google Scholar Konstantinos Chatzilygeroudis (*user=tnf6B-EAAAAJ*)
- Linked-In konstantinoschatzilygeroudis

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## Languages

- Greek **Native**
- English **Full professional proficiency** *Fluent both in oral and written (C2)*
- French **Limited working proficiency** *Basic oral and written skills (B2)*

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## Interests

- Artificial Intelligence
- Machine Learning
- Table Tennis
- Robotics
- Programming
- Drawing