

# Georgia Chalvatzaki, Ph.D.

INTELLIGENT AUTONOMOUS SYSTEMS GROUP,  
COMPUTER SCIENCE DEPARTMENT,  
TECHNICAL UNIVERSITÄT DARMSTADT, GERMANY

Havelstrasse 9, 64295, Darmstadt, Germany  
Born 6 May 1988, Birth Place: Athens, Nationality: Greek  
Google scholar h-index: 7  
georgia@robot-learning.de |  
Webpage : <http://users.ntua.gr/gchal/>  
Github : [github.com/gchal](https://github.com/gchal)  
cell: +49-1766-0916-821

---

EDUCATION      **PhD in Robotics, NTUA Greece,** 12/2012 - 12/2019  
*Intelligent Robotics & Automation Lab*  
School of Electrical and Computer Engineering  
Doctoral courses GPA: 9.5/10

**MEng Electrical and Computer Engineer,** 11/2006 - 07/2012  
*National Technical University of Athens, Greece*  
School of Electrical and Computer Engineering  
**GPA: 8.1/10**

---

RESEARCH INTERESTS      Stochastic Estimation, Detection and Tracking, Robotic Perception,  
Machine Learning, Deep Learning (DL), Pattern Recognition  
Reinforcement Learning (RL), Adaptive Control  
Grasping and Manipulation, Assistive Robotics, Mobile Robotics, Human-Robot Interaction

---

RESEARCH EXPERIENCE      **IAS Group, TU Darmstadt** 10/2019 - Present  
*PostDoctoral Researcher*

Current projects:

- **Skills4Robots, ERC project No. #640554**
- **KoBo project, BMBF**
- **RoboTrust project, Hessian state funding**

Research Topics:

- Deep learning of object representations for mobile grasping
- Multi-task learning of robot skills for manipulation tasks
- Human motion tracking and activity prediction for human-robot interaction
- Attentive meta-learning in reinforcement learning

**iWalk: Intelligent Robotic Walker for Mobility and Cognitive Assistance**  
**Contract No. 5030856 National Funding**

*Research Assistant, Institute of Communications & Computer Systems* 09/2018 - 09/2019

- Implementation of human pose estimation and gait analysis module using DL methods
- Development of 3D semantic SLAM from RGB-D sensor
- Implementation a shared-autonomy human-robot control module using MPC and RL
- Analyzed human body stability towards a fall-prevention control module
- Technical design and support of the sensorial equipment of the robotic platform
- Technical reports and project deliverables writing

**Vertliner Start-up company**

*Robotic & Automation Engineer (consulting)*

10/2018- 12/2018

- Assisting and advising towards the development of a 3D SLAM module using data from laser range sensors in ROS
- Assisting and advising for the development of the UAV control module

**BabyRobot: NextGen Social Robotics**  
**HORIZON 2020 Contract No: 687831**

*Research Assistant, Institute of Communications & Computer Systems* 09/2017 - 12/2018

- Analysis of children body poses while interacting with social robots
- Introduced a DL method for classifying children engagement during child-robot interaction
- Participated in a large-scale research for applying RL in child-robot games using the estimated engagement as a reward
- Technical support and integration of systems for large-scale data collection experiments
- Technical reports and project deliverables writing

#### **I-Support - Supported Bath Robots**

**HORIZON 2020 Contract No: 643666.**

*Research Assistant, Institute of Communications & Computer Systems* 07/2017- 08/2017

- Technical Support and Integration of systems for data-collection experiments

#### **MOBOT: Intelligent Active MObility Assistance RoBOT integrating Multimodal Sensory Processing, Proactive Autonomy and Adaptive Interaction, FP7 Contract No: 600796**

*Research Assistant, Institute of Communications & Computer Systems* 02/2013 - 06/2017

- Implementation of tracking algorithms for human detection and tracking from laser data
- Development of an online non-wearable gait analysis system and the classification of patients to various pathological classes
- Analysis of human walking using MoCap data - Technical support and integration of systems for large-scale data collection and validation experiments - Technical reports and project deliverables writing

---

AWARDS & ACHIEVEMENTS	-RSS Pioneers grant	2020
	-RAS Travel Award for participating in IROS 2019	2019
	-RAS Travel Award for participating in ICRA 2019	2019
	-Best Paper Award in the 27th IEEE International Symposium on Robot and Human Interactive Communication (RoMan)	2018
	-RAS Travel Award for participating in ICRA 2018	2018
	-ECE NTUA Travel Award for participating in ICRA 2017	2017
	-Thomaidion Award for Scientific Publications, NTUA	2017
	-Thomaidion Award for Scientific Publications, NTUA	2016
	-Best Paper Award in the 8th International Conference on Integrated Modeling and Analysis in Applied Control and Automation	2015
	-Thomaidion Award for Scientific Publications, NTUA	2015
	-Thomaidion Award for Scientific Publications, NTUA	2014
	-Best Student Paper Finalist in the 4th IEEE International Conference on Wireless Mobile Communication and Health	2014
	- Scholarship from the Egyptian-Greek Association for undergrad studies in NTUA	2006

---

REVIEWING ACTIVITIES	IEEE International Conference on Robotics and Automation
	IEEE Robotics & Automation Letters
	IEEE/RSJ International Conference on Intelligent Robots and Systems
	IEEE European Control Conference
	IEEE Mediterranean Conference on Control and Automation
	IEEE RAS/EMBS International Conference on Biomedical Robotics and Biomechanics
	IEEE International Conference on Robot & Human Interactive Communication
Robotics and Autonomous Systems Journal	

---

TEACHING EXPERIENCE	<p><b>Teaching Assistant</b>  <i>Electrical &amp; Computer Engineering Department, NTUA</i></p> <p>-Course Robotics I: Analysis and Control</p>	<i>Fall Semesters 2012-2018</i>
	<p><b>Teaching Assistant</b>  <i>Electrical &amp; Computer Engineering Department, NTUA</i></p> <p>-Course Robotics II: Intelligent Robotics Systems</p>	<i>Spring Semesters 2012-2018</i>
	<p><b>Teaching Assistant</b>  <i>Electrical &amp; Computer Engineering Department, NTUA</i></p> <p>-Masters Course Robotics Control Systems</p>	<i>Spring Semesters 2012-2018</i>
MASTER'S THESIS ADVISOR	<p>-Master's thesis topic: <i>Learning Object Representations for Robot Manipulation</i>, Student: Daljeet Nandha, Supervisor: Georgia Chalvatzaki, Computer Science Department, TU Darmstadt (in progress)</p> <p>-Master's thesis topic: <i>Long-horizon ball trajectory estimation for agile robot baseball batting</i>, Student: Axel Patzwal, Supervisor: Georgia Chalvatzaki, Computer Science Department, TU Darmstadt (in progress)</p> <p>-Master's thesis topic: <i>Investigating Memory Models for Deep Reinforcement Learning in POMDPs</i>, Student: Cedric Derstoff, Co-Supervisor: Georgia Chalvatzaki, Computer Science Department, TU Darmstadt (in progress)</p> <p>-Master's thesis topic: <i>Learning cooperative grasping of objects and adaptive robot dexterity in child-robot interaction environments</i>. Student: Theodore Tsitsimis, Supervisor: Costas S. Tzafestas, School of Electrical &amp; Computer Engineering Department, NTUA</p> <p>-Master's thesis topic: <i>Virtual agent for object assembly assistance using object pose estimation</i>. Student: Jack Hadfield, Supervisor: Petros Maragos</p> <p>-Master's thesis topic: <i>3D Visual Semantic SLAM for indoor navigation of a mobile robot</i>. Student: Ioannis Asmanis, Supervisor: Petros Maragos</p>	
COMPUTER SKILLS	<p><b>Programming Languages:</b> Python, C, C++, L<sup>A</sup>T<sub>E</sub>X, Javascript</p> <p><b>DL Frameworks:</b> PyTorch, Keras, Tensorflow</p> <p><b>Software/Environments:</b> Windows, Linux (Ubuntu), MATLAB, ROS, Gazebo, PyBullet, MuJoCo</p>	
LANGUAGES	<p><b>Greek:</b> Native language, <b>English:</b> Proficient knowledge (C2),  <b>German:</b> Very good knowledge (B1), <b>French:</b> Advanced knowledge (B2)</p>	
TOP PUBLICATIONS	<ol style="list-style-type: none"> <li><b>Georgia Chalvatzaki</b>, Xanthi S. Papageorgiou, Costas S. Tzafestas, Petros Maragos, "Learn to adapt to human walking: A Model-based Reinforcement Learning Approach for a Robotic Assistant Rollator", IEEE Robotics &amp; Automation Letters (RAL), vol. 4, no. 4, pp. 3774-3781, Oct. 2019, DOI: 10.1109/LRA.2019.2929996.</li> <li><b>Georgia Chalvatzaki</b>, Xanthi S. Papageorgiou, Costas S. Tzafestas, Petros Maragos, "Augmented Human State Estimation using Interacting Multiple Model Particle Filters with Probabilistic Data Association", IEEE Robotics &amp; Automation Letters (RAL), Volume: 3, Issue: 3, p.p. 1872 - 1879, July 2018, DOI: 10.1109/LRA.2018.2800084.</li> </ol>	

3. **Georgia Chalvatzaki**, Petros Koutras, Jack Hadfield, Xanthi S. Papageorgiou, Costas S. Tzafestas, Petros Maragos, “*LSTM-based Network for Human Gait Stability Prediction in an Intelligent Robotic Rollator*”, IEEE International Conference on Robotics and Automation (ICRA), Montreal, Canada, May 20-24, 2019, DOI:10.1109/ICRA.2019.8793899.
4. Mehdi Khamassi, **Georgia Chalvatzaki**, Theodore Tsitsimis, Georgios Velentzas, Costas S. Tzafestas, “*A framework for robot learning during child-robot interaction with human engagement as reward signal*”, the 27th International Conference on Robot and Human Interactive Communication (RO-MAN), August 27-31, 2018 Nanjing and Tai’an, China, DOI: 10.1109/ROMAN.2018.8525598 (**Best paper award**).
5. **Georgia Chalvatzaki**, Xanthi S. Papageorgiou, Petros Maragos, Costas S. Tzafestas, “*User-Adaptive Human-Robot Formation Control for an Intelligent Robotic Walker using Augmented Human State Estimation and Pathological Gait Characterization*”, IEEE International Conference on Intelligent Robotics (IROS) 2018, 1-10 October 2018, Madrid, Spain, DOI : 10.1109/IROS.2018.8594360.
6. **Georgia Chalvatzaki**, Xanthi S. Papageorgiou, Costas S. Tzafestas, “*Towards a User-Adaptive Context-Aware Robotic Walker with a Pathological Gait Assessment System: First Experimental Study*”, IEEE International Conference on Intelligent Robotics (IROS), September 24 - 28, 2017, Vancouver, Canada, DOI: 10.1109/IROS.2017.8206388.
7. **Georgia Chalvatzaki**, Xanthi S. Papageorgiou, Costas S. Tzafestas, Petros Maragos, “*Comparative Experimental Validation of Human Gait Tracking Algorithms for an Intelligent Robotic Rollator*”, IEEE International Conference on Robotics and Automation (ICRA), May 29 - June 3, 2017, Singapore, p.p. 6026-6031, DOI: 10.1109/ICRA.2017.7989713.
8. Xanthi S. Papageorgiou, **Georgia Chalvatzaki**, Costas S. Tzafestas, Petros Maragos, “*Hidden Markov Modeling of Human Pathological Gait using Laser Range Finder for an Assisted Living Intelligent Robotic Walker*”, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Hamburg, Germany, September 28 - October 02, 2015, DOI: 10.1109/IROS.2015.7354283.
9. **Georgia Chalvatzaki**, Georgios Pavlakos, Kevis Maninis, Xanthi S. Papageorgiou, Vasilis Pitsikalis, Costas S. Tzafestas and Petros Maragos, “*Towards an Intelligent Robotic Walker for Assisted Living using Multimodal Sensorial Data*”, MOBIHEALTH 2014, 4th International Conference on Wireless Mobile Communication and Healthcare - Transforming healthcare through innovations in mobile and wireless technologies, November 3-5, 2014 Athens, Greece, DOI: 10.1109/MOBIHEALTH.2014.7015934 (**Best Student Paper Finalist**).
10. Xanthi S. Papageorgiou, **Georgia Chalvatzaki**, Costas S. Tzafestas, Petros Maragos, “*Hidden Markov Modeling of Human Normal Gait using Laser Range Finder for a Mobility Assistance Robot*”, IEEE International Conference on Robotics and Automation (ICRA), May 31 - June 7, 2014, Hong Kong, China, p.p. 482-487, DOI: 10.1109/ICRA.2014.6938999.

## THESIS

1. Doctoral Thesis: “*Human-Centered Modeling for Assistive Robotics: Stochastic Estimation and Robot Learning in Decision Making*”, Advisor: Costas S. Tzafestas, National Technical University of Athens, Greece, 2019. <https://tinyurl.com/gchall>
2. Master Thesis: “*System for recognizing and segmenting simple radiographic images of hands for detecting their geometric characteristics and functional parts*”, Advisor: Elias Koukoutsis, National Technical University of Athens, Greece, 2012.

## REFERENCES

**Jan Peters**, Full Professor, Computer Science Department, TU Darmstadt  
 Contact e-mail: mail@jan-peters.de  
<https://www.ias.informatik.tu-darmstadt.de/Member/JanPeters>

**Costas S. Tzafestas**, Associate Professor, Division of Signals, Control and Robotics, Electrical and Computer Engineering Department, NTUA

Contact e-mail: [ktzaf@cs.ntua.gr](mailto:ktzaf@cs.ntua.gr)  
<https://robotics.ntua.gr/members/ktzaf/>

**Petros Maragos**, Professor, Division of Signals, Control and Robotics, Director of Intelligent Robotics and Automation Lab, Electrical and Computer Engineering Department, NTUA  
Contact e-mail: [maragos@cs.ntua.gr](mailto:maragos@cs.ntua.gr)  
<https://robotics.ntua.gr/members/maragos/>

**Mehdi Khamassi**, Permanent research scientist (CRCN CNRS) at the Centre National de la Recherche Scientifique, Institute of Intelligent Systems and Robotics Sorbonne Universit, Paris, France  
Contact email: [mehdi.khamassi@upmc.fr](mailto:mehdi.khamassi@upmc.fr)  
<http://people.isir.upmc.fr/khamassi>