

CHRISTOS K. VERGINIS, PHD

PERSONAL DATA

PLACE AND DATE OF BIRTH: ATHENS, GREECE | 12 APRIL 1989
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EDUCATION

- NOV. 2015 - MAY 2020 **KTH Royal Institute of Technology**, STOCKHOLM, SWEDEN
Division of Decision and Control, School of Electrical Engineering and Computer Science
PhD (300 ECTS)
- RESEARCH TOPIC: PLANNING AND CONTROL OF MULTI-ROBOT MANIPULATOR-ENDOWED SYSTEMS
- ADVISOR: PROF. [DIMOS V. DIMAROGONAS](#), CO-ADVISOR: PROF. [DANICA KRAGIC](#)
- SEP 2019 - DEC 2019 **Rice University**, HOUSTON, TEXAS, USA
Department of Computer Science
Research Visit at Rice University, [Kavraki Lab](#)
(Worked on integration of sampling-based motion planning algorithms and control design for collision-free planning of robotic manipulators)
- SEP 2013 - OCT 2015 **National Technical University of Athens**, ATHENS, GREECE
MSc (120 ECTS) in Automation Systems | Major: Automatic Control Systems and Robotics
- THESIS: "[DISTRIBUTED CONTROL PROTOCOLS FOR VEHICULAR PLATOONS](#)"
- ADVISOR: PROF. [KOSTAS J. KYRIAKOPOULOS](#)
- GPA: 9.60/10.0
- SEP 2007 - JUL 2013 **National Technical University of Athens**, ATHENS, GREECE
MEng (300 ECTS) in Electrical and Computer Engineering | Major: Electronics and Systems
- THESIS: "[3D PLANE REGISTRATION USING UNCERTAINTIES](#)"
(conducted in the Institute of Automatic Control Engineering [LSR](#) of the Technical University of Munich)
- ADVISOR: PROF. [COSTAS S. TZAFESTAS](#)
- GPA: 8.04/10.0 (47TH OUT OF 343)
- SEP 2012 - MAR 2013 **Technical University of Munich**, MUNICH, GERMANY
Exchange Semester at the Institute of Automatic Control Engineering ([LSR](#)), [TUM](#)

PROFESSIONAL EXPERIENCE

- OCT 2020 - **University of Texas at Austin**, AUSTIN, TEXAS, USA
Oden Institute for Computational Engineering and Sciences
Postdoctoral Research Associate
RESEARCH SUPERVISOR: PROF. [UFUK TOPCU](#)
- MAY 2020 - OCT 2020 **KTH Royal Institute of Technology**, STOCKHOLM, SWEDEN
Division of Decision and Control, School of Electrical Engineering and Computer Science
Postdoctoral Research Associate
RESEARCH SUPERVISOR: PROF. [DIMOS V. DIMAROGONAS](#)
- AUG 2011 - JUN 2012 **Publishing Company "G. Fountas"**, ATHENS, GREECE
PARTICIPATION IN THE TRANSLATION FROM ENGLISH TO GREEK OF THE SCIENTIFIC BOOKS:

- *"Robotics: Modeling, Planning and Control"* BY BRUNO CILICIANO, LORENZO SCIAVICCO, LUIGI VILLANI AND GIUSEPPE ORIOLO
- *"Discrete-Time Signal Processing"* BY ALAN V. OPPENHEIM AND RONALD W. SCHAFER

RESEARCH INTERESTS

- NONLINEAR DYNAMICAL SYSTEMS (MODELING, ANALYSIS, DESIGN AND CONTROL)
- UNCERTAIN SYSTEMS
- DATA-DRIVE CONTROL
- ROBUST AND ADAPTIVE CONTROL
- MULTI-AGENT DYNAMIC CONTROL SYSTEMS/MULTI-ROBOT COOPERATION/COORDINATION
- AUTONOMOUS ROBOTS, NAVIGATION, REAL TIME CONTROL SYSTEMS AND ROBOTICS

PUBLICATIONS

Journal Publications

9. C. K. Verginis, D. Zelazo, and D. V. Dimarogonas, *"Cooperative Manipulation via Internal Force Regulation: A Rigidity Theory Perspective"*, under Review.
8. C. K. Verginis and D. V. Dimarogonas, *"Adaptive Robot Navigation with Collision Avoidance Subject to 2nd-order Uncertain Dynamics"*, *Automatica* 123, 2021.
7. C. K. Verginis and D. V. Dimarogonas, *"Asymptotic Tracking of Nonsmooth Feedback Stabilizable Unknown Systems with Prescribed Transient Response"*, *IEEE Transactions on Automatic Control*, 2020.
6. C. K. Verginis and D. V. Dimarogonas, *"Closed-Form Barrier Functions for Multi-Agent Ellipsoidal Systems With Uncertain Lagrangian Dynamics"*, *IEEE Control Systems Letters*, vol. 3, no. 3, pp. 727-732, July 2019. [Simulation Results](#)
5. C. K. Verginis, M. Mastellaro, and D. V. Dimarogonas, *"Robust Cooperative Manipulation Without Force/Torque Measurements: Control Design and Experiments"*, *IEEE Transactions on Control Systems Technology* 28(3), pp.713-729, 2019. [Simulation/Experimental Results](#)
4. C. K. Verginis, A. Nikou, and D. V. Dimarogonas, *"Robust Formation Control in SE(3) for Tree-Graph Structures with Prescribed Transient and Steady State Performance"*, *Automatica* 103 (2019): 538-548, 2019. [Simulation/Experimental Results](#)
3. C. K. Verginis and D. V. Dimarogonas, *"Timed abstractions for distributed cooperative manipulation"*, *Autonomous Robots*, 42(4): 781-799, 2018. [Simulation Results](#)
2. C. K. Verginis, Ch. P. Bechlioulis, D. V. Dimarogonas, and K. J. Kyriakopoulos, *"Robust Distributed Control Protocols for Large Vehicular Platoons with Prescribed Transient and Steady State Performance"*, *IEEE Transactions on Control Systems Technology*, 26(1): 299-304, 2018. [Experimental Results](#)

1. S. Khan, A. Dometios, C. Verginis, C. Tzafestas, D. Wohlerr, M. Buss, "RMAP: A Rectangular Cuboid Approximation Framework for 3D Environment Mapping", *Journal of Autonomous Robots*, no. 10514, pp. 1-17, February 2014.

Conference Publications

22. N. Lissandrini, C. K. Verginis, P. Roque, A. Cenedese, and D. V. Dimarogonas, "Decentralized Nonlinear MPC for Robust Cooperative Manipulation by Heterogeneous Aerial-Ground Robots", to appear in the *International Conference on Intelligent Robots and Systems (IROS)*, Las Vegas, Nevada, USA, 2020.
21. T. Pan, C. K. Verginis, A. M. Wells, L. E. Kavraki, and D. V. Dimarogonas, "Augmenting Control Policies with Motion Planning for Robust and Safe Multi-robot Navigation", to appear in the *International Conference on Intelligent Robots and Systems (IROS)*, Las Vegas, Nevada, USA, 2020.
20. C. K. Verginis, D. V. Dimarogonas, and L. E. Kavraki, "Sampling-based Motion Planning for Uncertain High-dimensional Systems via Adaptive Control", to appear in the *Workshop on the Algorithmic Foundations of Robotics (WAFR)*, Oulu, Finland, 2021.
19. C. K. Verginis, W. S. Cortez, and D. V. Dimarogonas, "Adaptive Cooperative Manipulation with Rolling Contacts", to appear in the *American Control Conference (ACC)*, Denver, Colorado, Usa, 2020.
18. C. K. Verginis and D. V. Dimarogonas, "Energy-Optimal Cooperative Manipulation via Provable Internal-Force Regulation", to appear in the *International Conference on Robotics and Automation (ICRA)*, Paris, France, 2020.
17. C. K. Verginis and D. V. Dimarogonas, "Asymptotic Stability of Uncertain Lagrangian Systems with Prescribed Transient Response", *Proceedings of the IEEE Conference on Decision and Control (CDC)*, Nice, France, 2019.
16. C. K. Verginis and D. V. Dimarogonas, "Adaptive Leader-Follower Coordination of Lagrangian Multi-Agent Systems under Transient Constraints", *Proceedings of the IEEE Conference on Decision and Control (CDC)*, Nice, France, 2019.
15. C. K. Verginis, C. Vrohidis, C. P. Bechlioulis, K. J. Kyriakopoulos, and D. V. Dimarogonas, "Reconfigurable Motion Planning and Control in Obstacle Cluttered Environments under Timed Temporal Tasks", *Proceedings of the IEEE Conference on Robotics and Automation (ICRA)*, Montreal, Canada, 2019.
14. C. K. Verginis, A. Nikou and D. V. Dimarogonas, "Communication-based Decentralized Cooperative Object Transportation Using Nonlinear Model Predictive Control", *Proceedings of the 2018 European Control Conference (ECC)*, Limassol, 2018, pp. 733-738.
Experimental Results
13. J. Wei, C. K. Verginis, J. Wu, D. V. Dimarogonas, H. Sandberg, and K. H. Johansson, "Asymptotic and finite-time almost global attitude tracking-representations free approach", *Proceedings of the European Control Conference (ECC)*, Limassol, 2018, pp. 3126-3131.
12. L. Lindemann, C. K. Verginis, and D. V. Dimarogonas, "Prescribed Performance Control for Signal Temporal Logic Specifications", *Proceedings of the IEEE Annual Conference on Decision and Control (CDC)*, Melbourne, VIC, 2017, pp. 2997-3002.
11. A. Nikou, S. Heshmati-Alamdari, C. K. Verginis, and D. V. Dimarogonas, "Decentralized Abstractions and Timed Constrained Planning of a General Class of Coupled Multi-Agent Systems", *Proceedings of the IEEE Annual Conference on Decision and Control (CDC)*, Melbourne, VIC, 2017, pp. 990-995.
10. C. K. Verginis, A. Nikou, and D. V. Dimarogonas, "Position and Orientation Based Formation Control of Multiple Rigid Bodies with Collision Avoidance and Connectivity Maintenance", *Proceedings of the IEEE Annual Conference on Decision and Control (CDC)*, Melbourne, VIC, 2017, pp. 411-416.
9. C. K. Verginis and D. V. Dimarogonas, "Robust Decentralized Abstractions for Multiple Mobile Manipulators", *Proceedings of the IEEE Annual Conference on Decision and Control (CDC)*, Melbourne, VIC, 2017, pp. 2222-2227.

8. A. Nikou, C. K. Verginis, S. Heshmati-Alamdari, and D. V. Dimarogonas, "[A Nonlinear Model Predictive Control Scheme for Cooperative Manipulation with Singularity and Collision Avoidance](#)", *Proceedings of the Mediterranean Conference on Control and Automation (MED)*, pp. 707-712, Malta, 2017.
7. C. K. Verginis, and D. V. Dimarogonas, "[Robust Quaternion-based Cooperative Manipulation without Force/Torque Information](#)", *IFAC-PapersOnline*, 50(1):1754-1759, 2017.
6. C. K. Verginis, and D. V. Dimarogonas, "[Multi-Agent Motion Planning and Object Transportation under High Level Goals](#)", *IFAC-PapersOnline*, 50(1):15816-15821, 2017.
5. Alexandros Nikou, C. K. Verginis, and D. V. Dimarogonas, "[Robust Distance-Based Formation Control of Multiple Rigid Bodies with Orientation Alignment](#)", *IFAC-PapersOnline*, 50(1):15458-15463, 2017.
4. C. K. Verginis, Ziwei Xu, and D. V. Dimarogonas, "[Decentralized Motion Planning with Collision Avoidance for a Team of UAVs under High Level Goals](#)", *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, pp. 781-787, Singapore, 2017.
Simulation/Experimental Results
3. C. K. Verginis, and D. V. Dimarogonas, "[Distributed Cooperative Manipulation under Timed Temporal Specifications](#)", *Proceedings of the American Control Conference (ACC)*, pp. 1358-1363, Seattle, WA, USA, 2017.
2. C. K. Verginis, Ch. P. Bechlioulis, D. V. Dimarogonas, K. J. Kyriakopoulos, "[Decentralized 2-D Control of Vehicular Platoons under Limited Visual Feedback](#)", *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 3566-3571, Hamburg, Germany, 2015.
1. A. Tsiamis, C. K. Verginis, Ch. P. Bechlioulis, K. J. Kyriakopoulos, "[Cooperative Manipulation Exploiting only Implicit Communication](#)", *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 864-869, Hamburg, Germany, 2015.

PROJECTS

- **Co4ROBOTS:** ACHIEVING COMPLEX COLLABORATIVE MISSIONS VIA DECENTRALIZED CONTROL AND CO-ORDINATION OF INTERACTING ROBOTS
- **AEROWORKS:** COLLABORATIVE AERIAL WORKERS

TEACHING

NOV 2015-PRESENT	KTH <i>School of Electrical Engineering and Computer Science</i> - TEACHING ASSISTANT FOR THE UNDERGRADUATE COURSE "BASIC CONTROL".
NOV 2015-PRESENT	KTH <i>School of Electrical Engineering and Computer Science</i> - TEACHING ASSISTANT FOR THE POSTGRADUATE COURSE "HYBRID AND EMBEDDED CONTROL SYSTEMS".
NOV 2015-PRESENT	KTH <i>School of Electrical Engineering and Computer Science</i> - SUPERVISION OF BACHELOR AND MASTER THESES.
SEP 2008-JUL 2015	Private Tutor, ATHENS, GREECE - I HAVE BEEN TUTORING HIGH SCHOOL AND SENIOR HIGH SCHOOL STUDENTS IN THE COURSES OF MATHEMATICS, GEOMETRY, PHYSICS, CHEMISTRY AND COMPUTER PROGRAMMING. I HAVE ALSO TUTORED UNDERGRADUATE STUDENTS IN THE COURSE OF AUTOMATIC CONTROL SYSTEMS.
SEP 2013-JUN 2014	Secondary Education Institute "C. Sofiadis", ATHENS, GREECE - I TUTORED HIGH SCHOOL STUDENTS IN THE COURSES OF PHYSICS AND CHEMISTRY AND SENIOR HIGH SCHOOL STUDENTS IN THE COURSE OF CHEMISTRY.

OTHER RESEARCH EXPERIENCE

- SEP 2014-JUL 2015 **Control Systems Lab, NTUA**
School of Mechanical Engineering
- I PARTICIPATED IN A PART OF THE EUROPEAN RESEARCH PROJECT "RECONFIG: COGNITIVE, DECENTRALIZED COORDINATION OF HETEROGENEOUS MULTI-ROBOT SYSTEMS VIA RECONFIGURABLE TASK PLANNING". MORE SPECIFICALLY, MY WORK INVOLVED REAL-TIME EXPERIMENTS OF MULTI-AGENT VEHICLE PLATOONS. FURTHERMORE, I ASSISTED THE VERIFICATION OF A COOPERATIVE MANIPULATION CONTROLLER THROUGH EXTENSIVE REALISTIC SIMULATIONS. THE POSITION WAS IN THE FRAMEWORK OF MY MASTER THESIS.
- SEP 2014-JUL 2015 **Control Systems Lab, NTUA**
School of Electrical Engineering
- I CONDUCTED SCIENTIFIC RESEARCH BY EXPERIMENTING DIFFERENT NONLINEAR CONTROL SCHEMES ON THE 3-DOF HELICOPTER PLATFORM BY QUANSER CONSULTING.
- SEP 2012-APR 2013 **Institute of Automatic Control Engineering, TUM**
School of Electrical Engineering
- MY RESEARCH INVOLVED DEVELOPING TOOLS FOR ROBOT NAVIGATION AND LOCALIZATION, SUCH AS FINDING APPROPRIATE DATA STRUCTURES OR PERFORMING POINT CLOUD SEGMENTATION. THIS POSITION WAS IN THE FRAMEWORK OF MY MENG THESIS.

ONLINE COURSE CERTIFICATES

- APRIL 2015 *Advanced Engineering Systems in Motion: Dynamics of Three Dimensional (3D) Motion*
BY GEORGIA TECH VIA [COURSERA.ORG](https://www.coursera.org) (GRADE: 95%)
- MARCH 2015 *Introduction to Astronomy*
BY DUKE UNIVERSITY VIA [COURSERA.ORG](https://www.coursera.org) (GRADE: 99%)
- DECEMBER 2014 *Underactuated Robotics*
BY MIT VIA [EDX.ORG](https://edx.org) (GRADE: 99%)
- JULY 2014 *Robot Mechanics and Control, Part II*
BY SNU VIA [EDX.ORG](https://edx.org) (GRADE: 91%)
- JULY 2014 *Autonomous Navigation for Flying Robots*
BY TUM VIA [EDX.ORG](https://edx.org) (GRADE: 99%)
- MAY 2014 *Robot Mechanics and Control, Part I*
BY SNU VIA [EDX.ORG](https://edx.org) (GRADE: 96%)
- MARCH 2014 *Control of Mobile Robots*
BY GEORGIA TECH VIA [COURSERA.ORG](https://www.coursera.org) (GRADE: 91.5%)
- NOVEMBER 2013 *Foundations of Computer Graphics*
BY BERKELEY VIA [EDX.ORG](https://edx.org) (GRADE: 100%)
- AUGUST 2013 *Discrete Optimization*
BY UNIVERSITY OF MELBOURNE VIA [COURSERA.ORG](https://www.coursera.org) (GRADE: 73%)

SEMINARS-FURTHER EDUCATION

- 2014 PARTICIPATION IN THE EVENT "RESEARCHER'S NIGHT 2014" WHICH TOOK PLACE IN THE NATIONAL CENTER FOR SCIENTIFIC RESEARCH "DEMOKRITOS" AS A VOLUNTEER
- 2013 10-HOUR SEMINARS IN 2D AUTOCAD
- 2013 "PLUG INTO THE CLOUD WITH ORACLE DATABASE 12C: BUILT FOR THE CLOUD", ORACLE TECHNOLOGY DAY AT HELLENIC MOTOR MUSEUM
- 2009 3RD NATIONAL CONGRESS OF STUDENTS OF ELECTRICAL ENGINEERING AND COMPUTER "YOUNG ENGINEERS IN THE KNOWLEDGE SOCIETY" UNDER THE AUSPICES OF THE ARISTOTLE UNIVERSITY OF THESSALONIKI

OCCUPATIONAL SKILLS

- *Analytical and Critical Thinking*
- *Adaptive in Multicultural Environment*

- *Organizational skills*
- *Excellent time management*
- *Open to travel and/or relocation*
- *Pro-active and positive attitude*
- *Dedication and commitment to goals*

LANGUAGES

ENGLISH: FLUENT (PROFICIENCY)
GREEK: MOTHER TONGUE
GERMAN: BASIC KNOWLEDGE (B2)
SPANISH: BASIC KNOWLEDGE (B2)
SWEDISH: BASIC KNOWLEDGE (B1)

COMPUTER SKILLS

BASIC KNOWLEDGE: JAVA, MYLUA, MATHEMATICA
ADVANCED KNOWLEDGE: PYTHON, MATLAB, C, C++, V-REP, WEBOTS, ROS, LINUX,

INTERESTS AND ACTIVITIES

TECHNOLOGY, CINEMA, TRAVELLING, READING BOOKS, PLAYING MUSIC, PUZZLES, SKETCHING, SPORTS, BASKETBALL, MARTIAL ARTS, SNOWBOARDING, VOLUNTEERISM