Alberto Speranzon, Ph.D. – IEEE Senior Member

CURRENT
CONTACT
INFORMATION

Lockheed Martin
Advanced Technology Labs
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SUMMARY

Experienced research scientist with 20 years of expertise spanning autonomous systems, machine learning, applied mathematics, and distributed computation. I have served as a principal investigator and program manager for both internally and externally funded projects, collaborating with multidisciplinary teams and esteemed universities such as the University of Pennsylvania, MIT, Princeton, and CMU. Notably, I have led or co-led government-sponsored initiatives supported by agencies like DARPA and NASA. My teams, comprising PhD and MSc researchers, bring diverse expertise in applied mathematics, optimization, autonomy/robotics, machine learning, and verification and validation (V&V).

I excel at applying innovative, multidisciplinary approaches to tackle complex technical challenges. With a strong focus on customer needs, I have successfully driven the development of cutting-edge technologies that align with business objectives, enabling organizations to explore new business opportunities.

At Lockheed Martin, I have developed technology strategies in multi-agent autonomy and neuro-symbolic AI for autonomous systems. At Honeywell, I created strategic technology roadmaps for urban air mobility and quantum computing, providing the CTO and Engineering VPs with new actionable insights. These efforts included defining future use cases, identifying technology gaps, and ensuring alignment with product roadmaps.

Currently, my research focuses on advancing autonomous systems' decision-making by integrating first-wave (symbolic) and second-wave (statistical) AI. I am also investigating formal languages for expressing mission specifications and developing runtime monitors to support the V&V of multi-agent autonomous systems.

I actively contribute to the academic and professional community as a member of the Industry Advisory Board (IAB) for the School of Computing and Augmented Intelligence at Arizona State University. I have been a visiting industrial fellow at the University of Minnesota and have held leadership roles within the IEEE Control Community. From 2015 to 2020, I served as Associate Editor for the *IEEE Transactions on Control Systems Technology*, joined the IEEE Control Systems Society's Board of Governors in 2021, and currently serve as an Associate Editor for the *IEEE Open Journal of Control Systems*.

CURRENT
POSITION

Lockheed Martin – Advanced Technology Laboratories (ATL)   *Eagan, MN, USA*
Chief Scientist, Autonomy   **March 2022 – Present**

January 2025 – Present: Trusted Intelligence Lab (TIL)

Leading a new technology "pillar" within TIL focusing on *compositional-by-design* methods supporting various applications domains, from autonomy to C2ISR[1] and cognitive security.

Part of the DARPA "Future of AI" technical group support DARPA STO PM, Tristan Tager, who is developing new programs in the area of Agentic AI architecture for advance data processing, Artificial General Intelligence and Swarm.

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[1]Command and Control for Intelligence, Surveillance, and Reconnaissance.

March 2022 – Decemeber 2024: Strategy Office (CSO)

Leading the development of technologies in the areas of neuro-symbolic AI for autonomous systems, scalable reinforcement learning for multi-agent systems and the development of methods for the V&V of multi-agent systems.

Principal investigator of various lower TRL[2] (1-3) IRADs within ATL and of more high TRL (3-6) corporate sponsored IRADs with various Lockheed Martin Business Areas, including LM Aeronautics and Missiles and Fire Control.

Led or co-led the development of strategic technology roadmaps for neuro-symbolic and swarm autonomy.

I am also co-leading the Assured Compositional Autonomy (ACA) portfolio within the Intelligent Systems Works (ISW) group, with specific focus strategy development can interacting with program managers at DARPA, among other DoD agencies.

Since 2023 I am co-leading a project with Missiles & Fire Control (part of Lockheed Martin) and in collaboration with Army Research Lab (ARL) on the use of neuro-symbolic methods to develop next generation world models and decision making for ground autonomous systems.

EDUCATION

Ph.D. in Automatic Control, May 2006

Royal Institute of Technology, Stockholm, Sweden

Dissertation Title:
"Coordination, Consensus and Communication in Multi-Robot Control Systems"
Advisor: Prof. Karl Henrik Johansson
External reviewer:
Prof. George J. Pappas, University of Pennsylvania, Philadelphia, PA, USA.

Review committee:
Prof. Antonio Bicchi, University of Pisa, Italy
Dr. Petter Ögren, Swedish Defense Agency, Sweden
Prof. Erik Aurell, Royal Institute of Technology, Sweden

M.S. Computer Engineering, November 2000

University of Padova, Padova, Italy

Thesis Title: "A Feedback Control System for Reversing a Multi-Body Vehicle"
Advisor: Prof. Ruggero Frezza

PROFESSIONAL
EXPERIENCE

Honeywell Aerospace – Advanced Technology
Safe Autonomous System Group   *Plymouth, MN, USA*
Technical Fellow   **September 2018 – March 2022**

As a technical fellow I led projects in the area of autonomous systems, mostly aerial vehicles, such as Unmanned Aerial Vehicles (UAV) and Urban Aerial Mobility (UAM) vehicles (AirTaxis) and machine learning applied to image processing for such applications. In particular, I led projects in machine perception, assured autonomy and AI based safe planning.

As Fellow, I also developed and maintained roadmaps connecting autonomy/ML related technologies to products, interacting with product owners, business developers and strategic marketing teams. I also participated, as a subject matter expert on autonomy, to technical due diligence activities during acquisitions.

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[2]Technology Readiness Level.

I had an active collaboration with Dr. David Spivak (MIT/Topos Institute) on new methods to model complex hierarchical planning algorithms and in general to model, analyze and verify complex Systems of Systems (SoS).

I held a visiting industrial fellow position at the Robotics Institute at the University of Minnesota (MNRI), Minneapolis, MN. I spent one day each week at MNRI working with various faculties on problems of common interest with focus on the development of concepts for government agencies.

From April 2021 I co-lead a seedling sponsored by DARPA Microsystems Technology Office (MTO) on the use of machine learning to compensate highly nonlinear effects in MEMs sensors.

In 2018 and 2019 I was Co-PI (PI Prof. Robert Ghrist, University of Pennsylvania, Departments of Mathematics) of a project sponsored by DARPA Defense Science Office (DSO), within the LA-GRANGE program, on new methods for optimization using a combination of topological and sheaf theoretic methods.

From 2015 to 2020 I was Associate Editor of IEEE Transactions on Control Systems Technology and in 2021 I was a member of the Board of Governors (2021) for the IEEE Control Systems Society.

Honeywell Aerospace - Advanced Technology
Communication, Navigation and Surveillance   *Plymouth, MN, USA*
Staff Research Scientist   **September 2015 – August 2018**

Staff Research Scientist (equivalent to Principal Research Scientist at United Technologies Research Center) acting as Program Manager and Principal Investigator of an internally sponsored project on autonomous systems with particular focus on Unmanned Aerial Vehicles for infrastructure inspection problems and data analytics/machine learning for such applications.

I led various aspects of the mid/long term research in autonomy and machine learning and I have been involved in the establishment of a new business unit in this area, announced by Honeywell in September 2017.[3] Algorithms developed by my team were transitioned as product offering within the UAV Services business unit. This business unit was then redirected to focus on Urban Air Mobility (UAM).

I was the technical lead for a NASA sponsored project on the development of new mathematical methods for analysis and composition of complex Systems of Systems. This work is performed in collaboration with MIT and led to a Best Poster Award[4] at the "Hybrid Systems: Computation and Control (HSCC)", 2017 (part of the CPSWeek). I also organized two invited sessions at the SIAM Conference on Control and Its Applications, Pittsburgh, 2017, on new mathematical methods for abstraction, composition and verification of systems of systems.

United Technologies Research Center   *East Hartford, CT, USA*
Principal Research Scientist   **April 2015 – September 2015**

Developed new mathematical methods for autonomous systems, privacy in large scale cyber-physical systems and novel algorithms for analysis of transaction data.

Led/co-led of the following projects:

2015

- Artificial Intelligence and Robotics for Distributed Autonomous Systems. Funding from DARPA Defense Science Office (DSO) on algebraic topological methods for distributed multi-agent systems and new world model abstractions. Team: UTRC & University of Pennsylvania (Prof.

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[3]See the public announcement `https://www.honeywell.com/en-us/newsroom/pressreleases/2018/10/honeywell-uav-service-inspects-more-than-100-miles-of-power-lines-in-five-days`

[4]See `http://hscc2017.ece.illinois.edu/Awards.html`

Robert Ghrist and Prof. Vijay Kumar) - Principal Investigator and Project Manager.
- Privacy and security for cyber-physical systems, part of the Cyber-Physical Systems Security project, internally funded - co-Principal Investigator.

Staff Research Scientist   **November 2010 – March 2015**

Working on multi-objective path planning for autonomous vehicles with perception-based constraints; Hierarchical planning for complex missions; GPS denied localization fusing quantitative and qualitative data; Cyber-physical systems privacy and security; Machine learning for big data.

Main internal and external funded projects I led or co-led:

2014

- Ground/air multi-vehicle coordination and planning with human in the loop, part of the Autonomy project, internally funded - co-Principal Investigator and co-Project Manager.
- Trusted service applications, part of the Cyber-Physical Systems Security project, internally funded - Principal Investigator.

2013

- Model-based cyber-physical systems security: Design methods for legacy systems, part of the Cyber-Physical Systems Security project, internally funded - Principal Investigator.
- Path planning under uncertainty and hierarchical planning for complex missions, part of the Autonomy project, internally funded - Principal Investigator and co-Project Manager.

2012

- Robust and adaptive sensor fusion methods for multi-vehicle localization and path planning with intermittent sensing, part of the Autonomy project, internally funded - Principal Investigator.

2011

- Multi-sensor fusion for autonomous vehicles and visual odometry, part of the Autonomy project, internally funded - Principal Investigator - Collaboration with CMU (Dr. Ben Grokholsky).
- DARPA Strategic Technology Office (STO) sponsored project on distributed algorithms for multi-vehicle sensor fusion and localization in GPS denied/degraded environments - $1.4M - Project Manager and Principal Investigator - Collaboration with UPenn (Prof. Robert Ghrist), Princeton (Prof. Amit Singer), CMU (Prof. Bruno Sinopoli) and UIUC (Prof. Matthew West)

Senior Research Scientist   **September 2008 – October 2010**

Working on distributed algorithms for localization and tracking of wireless sensors in indoor environments; Sparse representation of videos using reduced order dynamic models; Distributed networked control systems: fundamental limitations.

Main internal and external funded projects I led or co-led:

2010

- Role of social networks in the comfort of buildings, internally funded - Project Manager and Principal Investigator.
- Sensor placement for occupancy estimation in buildings, internally funded - Principal Investigator.

2008-2009

- Fundamental limitation in control over networks, internally funded - Project Manager and Principal Investigator.
- Indoor localization of sensors networks, internally funded - Project Manager and Principal Investigator.

Unilever R&D- Port Sunlight Laboratory   *Bebington, UK*
Marie Curie Research Fellow   **2006 – 2008**

Worked on advance robotic applications for health and personal care, research in system biology and modeling of biochemical networks. Continued active research on design and analysis of distributed estimation algorithms over wireless sensor networks with colleagues at Royal Institute of Technology, Sweden and University of California at Berkeley, CA, USA.

PROFESSIONAL ACTIVITIES

Funded projects by US Government Agencies: Involved in writing proposals to multiple government agencies both the USA and EU. In particular, projects I have been leading, co-leading, or significantly involved are:

- DARPA MTO seedling. Technical leader for the machine learning methods. (2021)
- NASA " Category-theoretic Approaches for the Analysis of Distributed Systems" - Technical Lead for Honeywell. (2015-2018)
- DARPA DSO project within the "LAGRANGE" program on novel optimization methods using algebraic topology and sheaf theory - Proposal co-author, co-PI with Prof. Robert Ghirst as PI from University of Pennsylvania (2018–2019)
- DARPA DSO seed project on new abstraction methods for pursuit-evasion games - Proposal author, Project Manager and Principal Investigator. (2015)
- DARPA STO project within the "All Sources Positioning and Navigation" program on GPS denied/degraded navigation - Proposal author, Project Manager and Principal Investigator. (2010–2011)
- DARPA I2O project within the "Graph Understanding and Analysis for Rapid Detection – Deployed On the Ground (GUARD-DOG)" program on social network analysis - Proposal co-author, key technical project contributor. (2009–2010)

I have also been involved in business development activities to obtain funding from various agencies, mainly DARPA, DOE and IARPA.

Projects funded/support by EU

Key contributor of the proposal to the Irish Government for opening a new research center for United Technology Research Center (UTRC), now part of Collins Aerospace, in Ireland. The research topic of the proposal was "Next Generation Security Systems". The proposal was very well received by the Irish Government and UTRC awarded me with the Outstanding Achievement Award. The UTRC-Ireland office officially opened in June 2010.

Involved in writing parts of the deliverables, review reports and presentations for the following European research projects and network of excellence:

- BRIDGET (MC TOK) MKTD-CD 2005 029961
- RECSYS (IST Project): `http://recsys.s3.kth.se/`
- RUNES (IST Project): `http://www.ist-runes.org/`

- HYCON (Network of excellence): `http://www.ist-hycon.org/`

Technical point of contact for UTRC for the project CANDO (Scalable Cooperative Ad-hoc Networks for Building Monitoring and Diagnostics) submitted to the EU FP7 Programme.

TECHNICAL
SESSIONS &
WORKSHOPS

- Invited Speaker and Participant to the prestigious Dagsthul Seminar on "User-Aligned Assessment of AI Systems", organized by Y. Choi (Arizona State University), G. Fainekos (Toyota Motor North America), S. Srivastava (Arizona State University), H. Torfah (Chalmers University of Technology), to be held in January 2026.
- Invited Speaker at the IEEE Conference on Decision and Control (CDC), December 2025, at the Workshop "From Data to Decisions: Safety guarantees for Learning-Enabled Control". Organizers, Prof. Lars Lindemann (USC), Nikolai Matni (UPenn), Dario Paccagnan (Imperial College) and Alessandro Abate (Oxford).
- Invited Speaker and Participant to the prestigious Dagsthul Seminar on "A Roadmap Towards Practical Applications of Neurosymbolic Learning and Reasoning", organized by T.R. Besold (Sony AI), L.H. Gilpin (University of California - Santa Cruz), K. Kersting (TU Darmstadt), A. ten Teije (VU Amsterdam), T. Thanapalasingam (University of Amsterdam), November 2025.
- Speaker at the IEEE Conference on Decision and Control (CDC), 2024, at the Workshop on "Control Architecture Theory" organized by Aaron D. Ames (CalTech), Nikolai Matni (UPenn), and Gioele Zardini (MIT).
- Co-organized with Dr. Dragos D. Margineantu (Senior Technical Fellow & AI Chief Technologist at Boeing) an Industry/Government/Academia session at the 17th International Workshop on Neural-Symbolic Learning and Reasoning (NeSy), 2023.
- Speaker at the International Conference on Robotics and Automation (ICRA), 2019, at the Workshop on "Topological Methods in Robot Planning" organized by S. Bhatttacharya (Lehigh University), F.T. Pokorny (KTH), and V. Kumar (Penn).
- Organizer of a two parts session titled "Novel Approaches for Modeling, Abstraction, Composition, and Analysis of Systems of Systems (SoS)", at the SIAM Conference on Control and Its Applications, Pittsburgh, 2017. Participants: Dr. D. Spivak (MIT), Prof. R. Ghrist (UPenn), Dr. E. Adam (MIT), Prof. P. Tabuada (UCLA), Prof. A. Ames (CalTech), Dr. A. Censi (MIT/ETHZ), Dr. B. Fong (Oxford/UPenn).
- Co-chair of Invited Session "Security, Privacy and Trust in Cyber-Physical Systems" at the American Control Conference 2015. Participants: Prof. R. Poovendran (UW), J. Hespanha (UCB), G. Pappas (UPenn), Prof. V. Gupta (Notre Dame) and Prof. S. Amin (MIT).
- Chair of the Special Session "Industry Job Hunting" at the American Control Conference 2015. Participants: A. Mirtabatabaei (BOSCH), C. Buhr (MathWorks), A. Raghunathan (MERL), K. C. Fregene (Lockheed).
- Chair of Invited Session "Scalable Methods for Design, Analysis and Control of Networked Systems" at the IEEE Conference on Decision and Control, 2010. Participants: F. Bullo (UCSB), I. Mezic (UCSB), J. Burns (VTech).

ACADEMIC
EXPERIENCE

Royal Institute of Technology   *Stockholm, Sweden*
Automatic Control Lab, School of Electrical Engineering   **2006 (6 Months)**
Post-Doctoral Fellow. Working on distributed algorithms for complex networked systems, such as multi-robot and multi-sensor systems. Actively involved in the European Projects IST-RUNES and HYCON.
Automatic Control Lab, School of Electrical Engineering   **January 2001 – May 2006**
Ph.D. Student. Thesis work on cooperative control under communication constraints for multi-

robot systems. Actively involved in the European Project IST-RECSYS.

Master thesis   **2000 (5 Months)**

Developed master thesis project on the design and implementation of a control algorithm to automatically reverse a truck with two trailers.

University of Padova   *Padova, Italy*

Visiting Ph.D. Student   **2005 (6 Months)**

Worked with Prof. Sandro Zampieri at Department of Information Engineering, on problems related to the coordination of a swarm of mobile robots. The emphasis was on how the communication network topology affects the performance (convergence rate to the equilibrium) of such systems.

Research Assistant   **1998 – 1999**

Research assistant. Worked on the development of two mobile robots, part of the ART-team (Azzurra Robotics Team, an Italian consortium comprising seven different universities) for the Robocup (Robot Soccer World Cup), Stockholm, Sweden, 1999. Developed motion planning and part of the coordination algorithms for the mobile robots. Programming of a low level memory handler for concurrent processes.

PROFESSIONAL
SERVICES

PhD & Proposal Defense Committee:

- Rushang Karia, Arizona State University. Proposal Defense: "Learning Sequential Decision Making for the Real World: Scalability, Generalizability, and Usability". Main Supervisor: Prof. Siddharth Srivastava, 2024.

- Naman Shah, Arizona State University. Proposal Defense: "Learning and Using Hierarchical Abstractions for Efficient Taskable Robots" and PhD Thesis: "Autonomously Learning World Model Representations for Efficient Robot Planning". Main Supervisor: Prof. Siddharth Srivastava, 2024

- Rattanachai (Tee) Ramaithitima, University of Pennsylvania, GRASP Lab. Proposal Defense & PhD Thesis: "Sensor Coverage Algorithms for Resource-Constrained Robot Swarms". Main Advisor: Prof. Vijay Kumar, 2018.

Editorship:

- Associate Editor of IEEE Open Journal of Control Systems, Jan 2021 - Present.

- Member of the Board of Governors (BoG), IEEE Control Systems Society, 2021.

- Associate Editor of IEEE Transaction on Control Systems Technology, Jan 2015 - Dec 2020.

Member of the Technical Program Committees:

- Vice Chair for Industry and Applications, *American Control Conference 2026*, `https://acc2026.a2c2.org/about/organizing-committee`

- Program Committee: ICCPS'25 (International Conference on Cyber-Physical Systems), part of the Cyber-Phyisical Week 2025 (CPSWeek'25), `https://iccps.acm.org/2025/organizers/index.html`

- Sponsor Co-Chair: IEEE Conference on Decision and Control, 2023, `https://cdc2023.ieeecss.org/committees/index.html`

- Program Committee: ICCPS'18 (International Conference on Cyber-Physical Systems), part of the Cyber-Phyisical Week 2018 (CPSWeek'18), `http://http://iccps.acm.org/2018test/?q=node/10`

- Co-chair of the session *Robust Autonomy Innovations for Robotic Vehicles*, at the ION GNSS+ 2018. `http://www.ion.org/gnss/sessions.cfm?sessionID=692`

- Program Committee: ICCPS'16 (International Conference on Cyber-Physical Systems), part of the Cyber-Physical Week 2016 (CPSWeek'16) `http://iccps.acm.org/2016/?q=Organizers`.
- Program Committee: 5th IFAC Workshop on Estimation and Control of Networked Systems (NecSys'15), `http://necsys2015.seas.upenn.edu/index.html`.
- Program Committee: ICCPS'15 (International Conference on Cyber-Physical Systems), part of the Cyber-Physical Week 2015 (CPSWeek'15) `http://iccps.acm.org/2015/indexcc71.html?q=Organizers`.
- Program Committee: RSS'14 Workshop on Distributed Control and Estimation for Robotic Vehicle Networks, `https://sites.google.com/site/rss2014dceworkshop/`.
- Program Committee: 4th IFAC Workshop on Estimation and Control of Networked Systems (NecSys'13), `http://www.necsys2013.ruhr-uni-bochum.de`.
- Program Committee: IEEE SmartGridComm Symposium on Architectures and Models for the Smart Grid, 2012 `http://www.ieee-smartgridcomm.org/1.html`.
- Program Committee: 3rd IFAC Workshop on Estimation and Control of Networked Systems (NecSys'12), `http://necsys2012.engr.ucsb.edu/`.
- Program Committee: 2nd IFAC Workshop on Estimation and Control of Networked Systems (NecSys'10), `http://necsys2010.inrialpes.fr/`.
- Program Committee: 1st IFAC Workshop on Estimation and Control of Networked Systems (NecSys'09), `http://www.necsys.org`.
- Track Co-Chair on Distributed Control Systems of IEEE Conference on Automation Science and Engineering, 2008, Washington D.C., USA, August. 2008.

Proposals Evaluator:
- Evaluator of academic project submitted to Air Force Office of Scientific Research (AFOSR) on the topic of new mathematical methods to model and analyze Hybrid Systems (PM: Dr. Fred Leve).
- Evaluator of proposals submitted to the Framework Program 7 (FP7) organized by the European Community. I evaluated projects submitted to the fifth call in Information & Communication Technologies in the area of Networked Embedded and Control Systems: Objective ICT-2009.3.5).
  `http://cordis.europa.eu/fp7/ict/necs/esmc-home_en.html`
- Evaluator of proposals submitted to the Framework Program 7 (FP7) organized by the European Community. I evaluated projects submitted to the second call in Information & Communication Technologies (ICT-2) in the area of Networked Embedded and Control Systems: Objective ICT-2007.3.7.
  `http://cordis.europa.eu/fp7/ict/necs/esmc-home_en.html`

Reviewer:
- Journals: IEEE Transactions on Automatic Control, IEEE Transaction on Signal Processing, IEEE Transactions on Robotics, Automatica, International Journal of Control, ACPA Asian Journal of Control
- Conferences: IEEE International Conference on Robotics and Automation, IEEE Conference on Decision and Control, American Control Conference, IFAC World Congress.

Honors and Awards

"Author of the Year" from ATL leadership, for authoring/co-authoring, three or more publications in 2024 with at least one publication in a high-impact journal, 2025.

Special recognition by the UAV GreenHouse (start-up unit within Honeywell Aerospace focused

on comercialization of UAV and data analytics techologies for infrastructure inspections) for the development of the first product on "crack deteciton analytics", 2018.

Multiple Achievement Awards from Honeywell Aerospace for excellence in technical project leadership, 2018-2022.

Elevated to IEEE Senior Member. This requires three recommendation letters by IEEE Senior or Fellow level members, 2018.

Best Poster Award at the renown international conference in formal methods/control theory, "Hybrid Systems and Control Conference (HSCC)", part of the CPS-Week, Pittsburgh, PA, April, 2017.

Outstanding Achievement Award From United Technologies Research Center (UTRC's highest award for recognizing exceptional performance), 2009.

Marie Curie Research Fellowship, Transfer of Knowledge program. The scholarship was granted by the European Community to work at Unilever R&D Port Sunlight, 2007.

Best Session Presentation Award at American Control Conference, Minneapolis, MN, USA, 2006.

Part of the GOLEM Team, ranked second at Robocup'00 (Robot Soccer World Cup), Melbourne, Australia, 2000.

Part of ART–Azzurra Robot Team, ranked second at Robocup'99 (Robot Soccer World Cup), Stockholm, Sweden 1999.

Mentorship & Advising Activities	**Lockheed Martin**
	Mentorship **August 2022 – Present**

- Thomas Lee, Senior Member of Eng. Staff - Neuro-symbolic Decision Making (2023-Present)
- Kevin Bohlin, Member of Eng. Staff - Runtime Assurance (2023-Present)
- Greg Grebe, Senior Member of Eng. Staff - Autonomy (2022-Present)

Honeywell

Mentorship **November 2015 – March 2022**

Formal Mentor (within Honeywell mentroship program) for:

- Shashank Shivkumar, Senior Research Scientist - Reinforcement Learning (2019-2022)
- Benjamin Johnsson, Senior Research Scientist - Formal Methods (2019-2022)
- Artie Dins, Senior Reearch Scientist - Machine Learning (2017-2019)
- Andrew Stewart, Research Scientist - Autonomy (2015-2018)

Postdoc co-advisor of Dr. Kwassi Holali Degue (Ph.D. Polytechnique Montréal), at Massachusetts Institute of Technology (MIT) within the Aero/Astro department (main advisor Prof. Hamsa Balakrishnan), 2021.

Internship Students Supervision **May 2017 – March 2022**

- Homagni Saha Iowa State University, working on reinforcement learning, (co-supervisor with Vijay Venkataraman (Honeywell)); (2018)
- Karthik Gopalakrishnana, MIT, working on geometric deep learning; (2018)
- Sakthivel Sivaraman, University of Pennsylvania, working on deep neural networks for navigation problems; (2017)

United Technologies Research Center

Internship Students Supervision   **July 20 – August 2015**

- Rattanachai (Tee) Ramaithitima, University of Pennsylvania, GRASP Lab, worksing on abstract planning for pursuit-evasion problems. (2015)
- Peter Niedfeldt, Brigham Young University, Electrical Engineering, working on multi-vehicle SLAM; (2015)
- Morgan DeHart, American University, Department of Mathematics, working on cyber-physical system security; (2014)
- Katy Powers, University of Pennsylvania, GRASP Lab, working on visual odometry; (2013)
- Greg Henselman, Ph.D. student from University of Pennsylvania, Department of Mathematics, working on algebraic topological methods for sensor fusion; (2012).
- Sun Yu, Ph.D. student from University of Illinois at Urbana-Champaign, Mechanical Engineering, working on distributed optimization (currently at Siemens Research); (2010)
- Two Ph.D. students, Chenda Liao from UFL, Mechanical Engineering, and Marcin Szczodrak from Columbia University, Computer Science, working on occupancy estimation in buildings for energy efficient control; (2010)

Unilever R&D

Internship Students Supervision   **July 2007 – September 2007**

Supervised two A-level students during an internship at Unilever. The students developed and implemented a leader-follower algorithm using LEGO-Mindstorm.

TEACHNIG
ACTIVITIES

Royal Institute of Technology

Course Assistant   **January 2001 – May 2006**

Course 2E1700 Electro Project (2001, 2002), 2E1242 Automatic Control Project Course (2002, 2003), 2E1200 Automatic Control (2002, 2003), 2E1262 Nonlinear Systems (2004), 2E1245 Hybrid and Embedded Systems (2004, 2005). The teaching included supervising problem solving sessions and examination. In the control courses it also included laboratory exercises and supervision of course projects.

The course 2E1245 Hybrid and Embedded Systems has been developed by Prof. K. H. Johansson and myself and taught for the first time in 2003. In 2004, for the same course, I developed a compendium of exercises with solutions.

Master Student Supervision   **January 2002 – May 2006**

- Niklas Mattsson, Designing Homework Assignments for Embedded-Control Course, 2006.
- Homan Bromand, Hybrid Control System for Reversing a Multibody Vehicle, 2004.
- Francesco Baldelli, Control and Communication in Multi-Robot Coordination, 2003.
- Rolf Dalenius, Coordinated Control of Mobile Robots, 2002.

INVITED SPEAKER

Invited speaker at the "Control and Dynamical Systems (CDS) Invited Lecture" at University of Maryland on "Integrating Neuro-Symbolic Approaches in Autonomous Systems", May 2025.

Speaker at the "Control and Dynamical Systems (CDS)" seminar at CalTech, on "Trusted AI and Autonomy using Neuro-Symbolic Approaches", December 2024.

Invited to a panel on "Large Pre-trained Models: Defense Industry Presepective", workshop organized by Army Research Lab (ARL), November 2023.

Invited speaker at the "Industry-Led Research Roadmap Panel on Control Engineering in the Age of AI", special session at the Modeling, Estimation and Control Conference (MECC), 2021.

"Mathematical Challenges for the Design of Safe Aerial Autonomy" at the Workshop on Computational and Mathematical Challenges in Complex Egnieering Systems, organized by Pacific Northwest National Laboratory (PNNL), organized by Slaven Peles (PNNL), Emi Constantinescu (ANL), Bill Hart (SNL) and Chris Oehmen (PNNL), August 2021.

"Computer Vision and Machine Learning for the Aerial Autonomy", Speaker at 4th Online Computer Vision and Artificial Intelligence Workshop, organized by National Cheng Kung University, Taiwan, August 2021.

"Sensors and Software Enabling Autonomy for Urban Air Mobility", Keynote Speaker at SEMI MEMS and Sensors Technical Congress (MSTC 2021), April 2021. (`https://www.semi.org/en/connect/events/mems-and-sensors-technical-congress-mstc#agenda`)

"Category Theory from the Engineering World", Industry Showcase, Applied Category Theory, Jul 2020.

"Modeling and Analysis of Systems via Interval Sheaves and Temporal Landscapes", Digital Technology Center, University of Minnesota, College of Science & Engineering - Jan 2020.

"Topological Mapping via Uncooperative Sensing", International Conference on Robotics and Automation (ICRA), Workshop on "Topological Methods in Robot Planning" May, 2019.

"Topological Mapping via Uncooperative Sensing", Department of Mathematics, MIT, May, 2019.

"Topological Mapping via Uncooperative Sensing", Georgia Institute of Technology, October, 2018.

IFAC Aerospace Controls Workshop on Networked & Autonomous Air & Space Systems, Invited speaker, "On Abstraction, Composition and Analysis of Complex Systems: Towards V&V of Autonomous Systems" Santa Fe, NM - June 2018.

Applied Category Theory at NIST, Invited Speaker, "Localization and planning for autonomous systems via (co)homology computation", Gaithersburg, MD - March 2018.

"On Navigation, Planning and Verification of Autonomous Systems", School of Computing, Informatics, and Decision Systems Engineering, January, 2018.

"Sheaf Theoretic Abstraction and Composition of Complex Systems of Systems", Department of Mathematics/Institute for Mathematics and its Applications (IMA), Minneapolis, MN - February, 2017.

"Topological Abstraction and Planning for the Pursuit-Evasion Problem", Department of Computer Science, University of Minnesota, MN, December, 2016.

"On various applications of topological methods: From autonomous systems to privacy", ACCESS Alumni Day'16, Royal Institute of Technology (KTH), May, 2016.

"Topological Abstraction and Planning for the Pursuit-Evasion Problem", Institute for Mathematics and its Applications (IMA), Minneapolis, MN, part of the workshop on "Distributed Control and Decision Making Over Networks" - Invited Speaker, October, 2015.

"On Vehicle Localization: From Geometry to Topology", University of Notre Dame, Notre Dame, IN, August, 2014.

"'Hierarchical Multi-Objective Planning for Autonomous Systems", Washington University, Seattle, WA, July 2014.

"From Homology Computation to Localization", Institute for Mathematics and its Applications (IMA), Minneapolis, MN, part of the workshop on "Topological Systems: Communication, Sensing, and Actuation" - Invited Speaker, March 3-7, 2014.

"Hierarchical Multi-Objective Planning for Autonomous Systems", UTC Institute for Advanced Systems Engineering, University of Connecticut, Storrs, CT, April, 2014.

"Path Planning Under Intermittent Sensing", MIT, Boston, MA, June, 2013.

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"Adaptive Filtering and Topological Methods for Positioning in GPS Denied Environments", University of Connecticut, Storrs, CT, November, 2012.

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"Autonomous And Intelligent Systems At United Technologies Research Center", GRASP Lab, University of Pennsylvania, PA, USA, February, 2012.

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