



Prof. Dr. Kostas Alexis

Autonomous Robots Lab, NTNU

Personal Information

Date of Birth 12 March 1984
Place of Birth Irakleio, Crete, Greece
Nationality Greek
Work Address O. S. Bragstads Plass 2D, Trondheim, 7034, Norway
Job Position Full Professor (tenured) at the Department of Engineering Cybernetics, NTNU, Head of the Autonomous Robots Lab.

Education

2007–2011 **PhD with dissertation title “Control of Cooperative Unmanned Aerial Vehicles” (Defended on 6 July 2011, Awarded on 15 July 2011), University of Patras, Greece.**
2001–2007 **Diploma of Electrical and Computer Engineering (2007), University of Patras, Greece.**

PhD Dissertation

Title *Control of Cooperative Unmanned Aerial Vehicles*
Advisor Prof. Anthony Tzes
Examination Committee Prof. N. Aspragathos, Assoc. Prof. E. Dermatas, Assist. Prof. K. Efstathiou, Prof. S. Koubias, Assoc. Prof. S. Manesis, Prof. A. Tzes, Prof. K. Valavanis

Master's Thesis

Title *Exploration of Unknown Environments by a Team of Autonomous Robotic Systems*
Supervisor Prof. Anthony Tzes

Research Interests

Robotics and Autonomous Systems, Unmanned Aerial Systems, Path and Motion Planning, Localization and Mapping, Sensor Fusion, State Estimation, Navigation Systems, Robot Learning, Field Robotics, Autonomy, Intelligent and Resilient Systems.

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Working Experience

- 2020–Present **Full Professor (Tenured) at the Department of Engineering Cybernetics, NORWEGIAN UNIVERSITY OF SCIENCE AND TECHNOLOGY (NTNU)**, Focusing on the Science of Resilient Robotic Autonomy in the Wild, Head of the Autonomous Robots Lab: <http://www.autonomousrobotslab.com/>.
- 2022–Present **Scientific Advisor, SCOUT DRONE INSPECTION (SCOUTDI AS)**, Focusing on advanced navigation solutions for the scout inspection drones Company site: <https://www.scoutdi.com/>.
- 07/2020–12/2020 **Associate Professor (Tenured) at the Computer Science & Engineering Department, UNIVERSITY OF NEVADA, RENO**, Focusing on advanced Resilient Navigational and Operational autonomy for Robotic Systems, Head of the Autonomous Robots Lab: <http://www.autonomousrobotslab.com/>.
- 2015–2020 **Assistant Professor (Tenure-Track) at the Computer Science & Engineering Department, UNIVERSITY OF NEVADA, RENO**, Focusing on advanced Resilient Navigational and Operational autonomy for Robotic Systems, Head of the Autonomous Robots Lab: <http://www.autonomousrobotslab.com/>.
- 2011–2015 **Senior Postdoc Researcher at the Autonomous Systems Lab, ETH ZURICH**, Leading activities in the fields of Control and Path-Planning for Aerial Robots. Participating in multiple European Commission-funded and national research projects: <http://www.asl.ethz.ch/the-lab/people/alumni.html>
- 2007–2011 **Researcher and Teaching Assistant, Electrical & Computer Engineering Department, UNIVERSITY OF PATRAS, GREECE**, Leading the aerial robot development activities at the Electrical and Computer Engineering Department. Acquiring self-funding via the Herakleitos excellence scholarship of the Greek Secretariat of Research and Technology and participating in private-sector funded projects, <http://anemos.ece.upatras.gr/index.php/people>

Research Projects and Grants as a Professor

- 2023–Present **RCN: ROI: RObotic Inspectors for semantic characterization of industrial facilities**, RESEARCH COUNCIL OF NORWAY, BUDGET: NOK 13,438,000, **Role:** Principal Investigator. The project is in collaboration with two industry partners with NTNU representing 90% of the funding.
- 2022–Present **EU Horizon: HORIZON-CL4-2021-DIGITAL-EMERGING-01-09: DIGIFOREST: Digital Analytics and Robotics for Sustainable Forestry**, EUROPEAN COMMISSION, BUDGET: €2,399,074, **Role:** NTNU Lead and Project Partner. The project is in collaboration with TUM (coordinator), University of Oxford, ETH Zurich, University of Bonn, the Swiss Federal Institute for Forest, Snow and Landscape Research, Silvere, Hexagon and Moog . Further details: <https://digiforest.eu/>

- 2021–Present **RCN: IKTUPLUSS: SENTIENT - Science of resilient autonomy in perceptually-degraded environments**, RESEARCH COUNCIL OF NORWAY, BUDGET: NOK 14,218,000, **Role:** Principal Investigator. The project is in collaboration with Equinor, DNV, Altera Infrastructure, ScoutDI. NTNU represents approximately 85% of the funding.
Further details: <http://www.autonomousrobotslab.com/projects.html>
- 2021–Present **RCN: IKTUPLUSS: RESIFARM - Resilient Robotic Autonomy for Underwater Operations in Fish Farms**, RESEARCH COUNCIL OF NORWAY, BUDGET: NOK 12,968,000, **Role:** NTNU Lead and Project Partner. The project is in collaboration with SINTEF Ocean (coordinator), SKARV Technologies, Eelume. NTNU funding is approximately NOK 4,500,000.
Further details: <http://www.autonomousrobotslab.com/projects.html>
- 2021–Present **AFOSR: RESNAV: Resilient Assured Learning-based Autonomous Navigation**, US AIR FORCE OFFICE OF SCIENTIFIC RESEARCH, BUDGET: \$300,000, **Role:** Principal Investigator..
Further details: <http://www.autonomousrobotslab.com/projects.html>
- 2021–Present **NTNU Digital: Jumping Robots for Mars Lava Tube Exploration**, INTERNAL GRANT AT NTNU WITH APPROXIMATE BUDGET: NOK 5,000,000, **Role:** Principal Investigator.
- 2021–Present **RCN: IPN: REDHUS**, RESEARCH COUNCIL OF NORWAY, BUDGET: NOK 24,141,000, **Role:** NTNU Lead and Project Partner. The project is in collaboration with DNV (coordinator), Klaveness, ScoutDI. NTNU funding is approximately NOK 4,500,000.
Further details: <http://www.autonomousrobotslab.com/projects.html>
- 2020–2020 **NRI: INT: COLLAB: Cooperative Robotic Systems for Precision Agriculture and Plant Health Management**, UNITED STATES DEPARTMENT OF AGRICULTURE, BUDGET: \$1,199,199, **Role:** Principal Investigator for the University of Nevada, Reno. UNR portion is \$266,809. The project is in collaboration with University of Minnesota, Twin Towers. Project awarded in 2019 but starts in 2020..
Further details: <http://www.autonomousrobotslab.com/projects.html>
- 2020–2020 **Construction Robotics - Monitoring and Building Automation**, STATE OF NEVADA KNOWLEDGE FUND AND INDUSTRY COLLABORATION, BUDGET: \$150,000, **Role:** Principal Investigator. The project is expected to start early 2020.
Further details: <http://www.autonomousrobotslab.com/projects.html>

- 2018–2021 **DARPA Subterranean (SubT) Challenge**, DEFENSE ADVANCED RESEARCH PROJECTS AGENCY (DARPA) - AWARD: HR00111820045, BUDGET: TOTAL \$4,275,509, PHASE 1 \$1,419,085, PHASE 2 \$1,419,357, PHASE 3 \$1,437,067, \$2,000,000 WINNING PRIZE, **Role:** Principal Investigator - leader of the “**CERBERUS: CollaborativE walking & flying RoBots for autonomous ExploRation in Underground Settings**” Consortium involving a) the University of Nevada, Reno, b) ETH Zurich, c) University of California, Berkeley, d) Sierra Nevada Corporation, and e) Flyability. Winners of the DARPA Subterranean Challenge.
Further details: <http://www.autonomousrobotslab.com/projects.html>, Official DARPA Website <https://subtchallenge.com/>, and Project Website <https://www.subt-cerberus.org/>
- 2019–2020 **A-PNT Demonstration: Visual Odometry Module for High-Speed Navigation**, SIERRA NEVADA CORPORATION, BUDGET: \$148,150, **Role:** Principal Investigator.
Further details: available upon request.
- 2018–2020 **RET Site: Cross-disciplinary Research Experiences on Smart Cities for Nevada Teachers: Integrating Big Data into Robotics**, NATIONAL SCIENCE FOUNDATION (NSF) - AWARD: 1801727, BUDGET: \$581,073, **Role:** Principal Investigator.
Further details: <https://www.unr.edu/bigdatarobotics>
- 2018–2020 **SpaceBadgers - Robotics for Underground Space Mining Operations**, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA) - AWARD: NNX15AI02H, BUDGET: \$31,698, **Role:** Principal Investigator.
Further details: <http://www.autonomousrobotslab.com/projects.html>
- 2017–2020 **Mine Inspection Robotics**, NEVADA GOVERNOR’S OFFICE OF ECONOMIC DEVELOPMENT, BARRICK GOLD CORPORATION, ABOVEGEO, BUDGET: \$398,174, **Role:** Principal Investigator.
Further details: <http://www.autonomousrobotslab.com/projects.html>
- 2018–2020 **REU Site: Collaborative Human Robot Interaction**, NATIONAL SCIENCE FOUNDATION (NSF) - AWARD: 1757929, BUDGET: \$360,000, **Role:** Senior Personnel, PI: Dave Feil-Seifer, Co-PI: Shamik Senguta, Other Senior Personnel: Monica Nicolescu, Hung La.
Further details: <http://www.autonomousrobotslab.com/projects.html>
- 2016–2019 **NRI: Collaborative Research: Multi-Modal Characterization of DOE-EM Facilities**, DEPARTMENT OF ENERGY - AWARD: DOE-EM0004478, BUDGET: \$1,371,287, **Role:** Principal Investigator for the University of Nevada, Reno. UNR portion is \$349,058. The project is in collaboration with Carnegie Mellon University. The project was further extended to include the additional activities of “PCAMS: Pipe Crawling Assay Measurement System” with an additional budget to UNR of \$163,130.
Further details: <http://www.autonomousrobotslab.com/projects.html>

- 2016–2019 **Intelligent Mobility: Living Labs Project**, NEVADA GOVERNOR’S OFFICE OF ECONOMIC DEVELOPMENT - “KNOWLEDGE FUND” - COLLABORATION WITH PROTERRA INC, BUDGET: \$3,121,830, **Role:** Co-Investigator, PI: Mridul Gautam.
Further details: <https://www.unr.edu/ncar> and <http://www.autonomousrobotslab.com/projects.html>
- 2016–2017 **Improving UAV Vehicle Safety: Algorithms for Computer Vision Based Detect and Avoid and Failure-Resistant Control**, STATE OF NEVADA, KNOWLEDGE FUND, BUDGET: \$140,000, **Role:** Co-Investigator for the University of Nevada, Reno. PI: Dave Feil-Seifer.
Further details: <http://www.autonomousrobotslab.com/projects.html>
- 2016–2017 **Motion Analysis Flight Training Arena**, MOTION ANALYSIS, BUDGET: \$12,000, **Role:** Principal Investigator.
Further details: <http://www.autonomousrobotslab.com/projects.html>
- 2017–2018 **IEEE CEMRA: Drones Demystified!**, IEEE RAS, BUDGET: \$10,000, **Role:** Principal Investigator.
Further details: <http://www.autonomousrobotslab.com/projects.html>
- 2017–2017 **Active Information Seeking for Autonomous Aerial Robotic Search and Rescue**, IEEE RAS-SIGHT, BUDGET: \$2,500, **Role:** Principal Investigator.
Further details: <http://www.autonomousrobotslab.com/projects.html>
- 2017–2017 **NVIDIA Hardware Grant, 2×GPUs**, NVIDIA, **Role:** Principal Investigator.
One-time hardware donation. Further details: <http://www.autonomousrobotslab.com/projects.html>
- 2017–2017 **Ultimate Mobility through Smart Quadruped Locomotion**, UNR INTERNAL DIFFERENTIAL FEES-BASED GRANTS, BUDGET: \$10,000, **Role:** Principal Investigator.
- 2017–2018 **The Human-Robot Games Arena**, UNR INTERNAL DIFFERENTIAL FEES-BASED GRANTS, BUDGET: \$30,000, **Role:** Principal Investigator, Co-I: Christos Papachristos.
- 2016–2017 **Autonomous Robots Arena**, UNR INTERNAL DIFFERENTIAL FEES-BASED GRANTS, BUDGET: \$30,000, **Role:** Principal Investigator, Co-Is: Murat Yuksel, Logan Yliniemi, Rodolfo Garcia.
- 2016–2017 **Aerial Robots for Nuclear Monitoring**, NEVADA ADVANCED AUTONOMOUS SYSTEMS INNOVATION CENTER, BUDGET: \$9,190, **Role:** Principal Investigator.
- 2016–2017 **Autonomous Robotic Systems Arena**, UNR, VPRI, BUDGET: \$100,000, **Role:** Principal Investigator, Co-Is: Sesh Commuri, Logan Yliniemi, Rodolfo, Garcia, Murat Yuksel, Sarah Cowie, Hao Xu, Raul Rojas, Colleen Murray.
Further Details: <https://www.autonomousrobotslab.com/autonomous-robots-arena1.html>

Gifts & Donations as a Professor

- 2019 **Gift**, SICK LiDAR, 2 × TiM781 LiDARs, **Details:** Gift provided in the context of the research activities related to subterranean robotics.

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- 2019 **Gift**, CLOUDMINDS, AMOUNT: \$25,000, **Details:** Gift provided in the context of the research activities related to subterranean robotics.
- 2018 **Donation**, VELODYNE, 3 × VELODYNE PUCKLITE, **Details:** Gift provided in the context of the research activities related to autonomous driving.

Research Projects and Grants as a PostDoc or Student

- 2015–2016 **AEROWORKS: Collaborative Aerial Robotic Workers**, EUROPEAN COMMISSION, HORIZON 2020 - AWARD: 644128, BUDGET: 5,906,642€, **Role:** Grant preparation at ETH Zurich, Technical Director of the project and PostDoc Senior Researcher responsible for the relevant activities of the Autonomous Systems Lab - ETH Zurich leading the work packages on aerial manipulation control and inspection path-planning.
The project involved 10 partners - more information: <http://www.aeroworks2020.eu/>
- 2012–2015 **ICARUS: Integrated Components for Assisted Rescue and Unmanned Search operations**, EUROPEAN COMMISSION, FP7 - AWARD: 285417, BUDGET: 17,306,992€, **Role:** Responsible for ETH Zurich and the ASL team research activities, work package leader for the Unmanned Aerial Vehicle developments of the project.
The project involved 24 partners - more information: <http://www.fp7-icarus.eu>
- 2012–2015 **SHERPA: Smart collaboration between Humans and ground-aerial Robots for imProving rescuing activities in Alpine environments**, EUROPEAN COMMISSION, FP7 - AWARD: 600958, BUDGET: 11,274,026€, **Role:** Participating in the ASL team research activities.
The project involved 10 partners - more information: <https://cordis.europa.eu/project/rcn/106964/factsheet/en>
- 2012–2015 **AtlantikSolar**, PRIVATE INVESTORS AND OTHER COLLABORATORS, BUDGET: > 1 MILLION €, **Role:** Participating in the ASL team and leading the control and autonomous path-planning algorithms of the UAV.
The project aims to demonstrate the capability of crossing the Atlantic Ocean with a hand-launchable fixed-wing solar-powered UAV flying below cloud coverage - more information: <http://www.atlantiksolar.ethz.ch/>
- 2011–2012 **AIRobots: Innovative aerial service robots for remote inspections by contact**, EUROPEAN COMMISSION, FP7 - AWARD: 248669, BUDGET: 3,614,142€, **Role:** Responsible for the ETH Zurich UAV Control research efforts and co-handling project deliverables.
This was a STREP project with 6 partners - more information: <http://airobots.ing.unibo.it/>
- 2013–2014 **AETOS**, GREEK SECRETARIAT OF RESEARCH AND TECHNOLOGY, BUDGET: 250K €, **Role:** Scientific advisor of the project.
- 2011–2012 **Swiss Government Scholarship**, STATE SECRETARIAT FOR EDUCATION, RESEARCH AND INNOVATION, Research (PostDoc) Scholarship.
This grant provided support to start working in the Autonomous Systems Lab of ETH Zurich - more information: <https://www.sbf.admin.ch/sbf/en/home.html>

- 2010–2011 **Herakleitos II**, GREEK SECRETARIAT OF RESEARCH AND TECHNOLOGY, PhD Excellence Fellowship.
This fellowship provided support during my PhD studies - more information: <http://erawatch.jrc.ec.europa.eu/>
- 2011–2012 **SaR–Robots**, LATSIS FOUNDATION PRIVATE FUNDING, Prototype development project.
This project studies the development of robot prototypes for search and rescue applications - more information: <http://www.sar-robots.upatras.gr/>

Awards & Records

- 2022 Outstanding Deployed Systems Paper Award, 2022 IEEE International Conference on Robotics and Automation (ICRA) ([C92])
- 2021 PI of Team CERBERUS winners of the DARPA Subterranean Challenge, 2021, Prize Reward: 2,000,000
- 2021 Certificate of Special Congressional Recognition, US Senate, In recognition for contributions in the DARPA Subterranean Challenge
- 2020 Regents' Rising Researcher Award, Board of Regents, Nevada System of Higher Education
- 2020 Best Paper Award, 2019 IEEE Aerospace Conference - "Air Vehicle Systems and Technologies" Track ([C81])
- 2019 Best Paper Award, 2019 IEEE International Conference on Advanced Robotics (ICAR) Track ([C75])
- 2019 Excellence Award, College of Engineering, University of Nevada, Reno, 2019
- 2019 Best CSE Researcher Award - for outstanding research performance during the academic year 2018–2019
- 2019 Best Paper Award, 2019 IEEE Aerospace Conference - "Air Vehicle Systems and Technologies" Track ([C66])
- 2018 Paper C59 received the Superior Paper Award of the Waste Management Symposia 2018
- 2017 Best CSE Researcher Award - for outstanding research performance during the academic year 2016–2017
- 2015 The AtlantikSolar UAV demonstrated 81.5h of continuous-flight, corresponding to the world record for any aircraft lighter than 50kg - [AtlantikSolar Webpage](#)
- 2014 IET 2014 Premium Award for Best Paper in Control Theory & Applications for Journal [J3]
- 2014 Conference paper [C29] was selected among the 5 finalists for the Best Automation Paper award during the IEEE International Conference on Robotics and Automation, (ICRA), 2014, Hong Kong, China, May 31–June 7 2014
- 2011 Swiss Government Scholarship Award (H2011x0397) for postdoc research in the Autonomous System Lab - Institute of Robotics and Intelligent Systems - ETH Zurich, certificate available at: <http://goo.gl/kg4yPw>

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- 2011 Journal [J2] was almost constantly being ranked among the 25 Hottest Articles in Journal of Control Engineering Practice from December 2012 to May 2014.
- 2010 Graduate Fellow, (Herakleitos II Program), funded by the Greek Ministry of Education, Lifelong Learning and Religious Affairs, "Control of Cooperating Robotic Vehicles", Project Number 12-260-6

Academic Teaching Experience

- 2022 (one time) **TTK33: Resilient Aerial Robotic Autonomy**, Norwegian University of Science and Technology. This course educates master level students in the domain of core autonomy techniques for flying robots with a breadth coverage of control and path planning, and a core focus on estimation and localization. **Evaluation Methods:** Code assignments, class presentations, oral exam. **Number of Students:** 35. **Course Website:** <https://www.autonomousrobotslab.com/aerial-robotic-autonomy.html>
- 2022 (one time) **TK8102: Nonlinear State Estimation (PhD course)**, Norwegian University of Science and Technology. This course educates PhD candidates in the domain of nonlinear state estimation with detailed derivation of the links between batch and recursive estimation, as well as modern techniques such as fixed lag estimation and incremental smoothing and mapping methods. **Evaluation Methods:** Code assignments, class presentations, oral exam. **Number of Students:** 30.
- 2022 (one time) **EiT: Expert in Teams**, Norwegian University of Science and Technology. This course educates undergraduate students by working in teams undertaking a research and development assignment of significant value. **Evaluation Methods:** Reports on both the technical developments and the team collaboration aspects. **Number of Students:** 40.
- 2018–2020 (four times) **CS302: Data Structures using C++**, University of Nevada, Reno. This course educates undergraduates about the fundamental topics of data structures and algorithms while the complete implementation takes place using C++. **Evaluation Methods:** Midterm, final, programming assignments, quizzes. **Number of Students:** 110 (approx). **Course Website:** <https://www.autonomousrobotslab.com/cs302---data-structures.html>
- 2016–2018 (five times) **CS491/691: Introduction to Aerial Robotics**, University of Nevada, Reno. This course educates undergraduate and graduate students on aerial robotics and in particular on the topics of flight dynamics, state estimation, control, and path planning. **Evaluation Methods:** Midterm, final, homework assignments, research-oriented semester project. **Number of Students:** 30 (approx). **Course Website:** <https://www.autonomousrobotslab.com/introduction-to-aerial-robotics.html>
- 2016–2017 (two times) **CS491/691: Autonomous Mobile Robot Design**, University of Nevada, Reno. This course educates undergraduate and graduate students on mobile robotics and in particular on the topics of dynamics, camera model, structure from motion, stereo vision, state estimation, localization and mapping, control, and path planning. **Evaluation Methods:** Midterm, final, semester-long research-oriented semester project. **Number of Students:** 20 (approx). **Course Website:** <https://www.autonomousrobotslab.com/autonomous-mobile-robot-design.html>

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- 2017 (one time) **CS791: Robotics for Dirty, Dull and Dangerous Operations**, University of Nevada, Reno. This seminar educates graduate students on advanced robotics sensing, control and planning for nuclearized robotics, remote access in mines, search and rescue and more. A semester-long project on the seminar topic is provided to students. **Evaluation Methods:** Homework assignments, paper presentations, semester-long project. **Number of Students:** 10. **Course Website:** <https://www.autonomousrobotslab.com/robotics-for-ddd-applications.html>
- 2016–2017 (one time) **ENGR 471: UAS Flight Coordinator Course**, University of Nevada, Reno. This course educates undergraduate students on aerial robotics operation and mission planning. **Evaluation Methods:** Midterm, final, laboratory exercises, quizzes. **Number of Students:** 20 (approx).
- 2016–Present Supervisor for multiple **Bachelor** and **Master Theses**, **Capstone projects**, and **Independent Studies** at the University of Nevada, Reno. These include a collection of topics related to robotics and autonomous systems.
- 2012–2015 Supervision of multiple **Bachelor** and **Master Theses**, **Focus Projects**, **Studies on Mechatronics**, as well as **Semester projects** at the Autonomous Systems Lab of ETH Zurich. These include work in the fields of path planning, UAV control and navigation, robot design, manipulation and more.
- 2013 Lecturing on the topic of advanced rotorcraft modeling, identification and control within the framework of the Unmanned Aerial Systems graduate course at ETH Zurich.
- 2012 Organization and Lectures at the AIRobots Summer School, more information: <http://www.asl.ethz.ch/education/conferences.html>
- 2010 Teaching Assistant, Laboratory of Control Systems II, Electrical and Computer Engineering Department, University of Patras, Greece.
- 2010 Teaching Assistant, Laboratory of Control Systems I, Electrical and Computer Engineering Department, University of Patras, Greece.
- 2009 Teaching Assistant, Laboratory of Control Systems II, Electrical and Computer Engineering Department, University of Patras, Greece.
- 2009 Teaching Assistant, Laboratory of Control Systems I, Electrical and Computer Engineering Department, University of Patras, Greece.
- 2008 Teaching Assistant, Laboratory of Analog and Digital Control I, Electrical and Computer Engineering Department, University of Patras, Greece.
- 2007 Teaching Assistant, Laboratory of Control Systems I, Electrical and Computer Engineering Department, University of Patras, Greece.

PostDoc & Senior Researchers Mentorship

- 1 **Marios Xanthidis**, Field: *Motion Planning for Underwater Robots*, Period: March 2022–Now. Dr. Xanthidis is located at SINTEF Ocean, works in the RESIFARM project, and I am the academic supervisor from NTNU

- 2 **Christos Papachristos**, Field: *Autonomous Navigation for Aerial Robots*, Period: January 2016–June 2019. Dr. Papachristos was recently hired as Assistant Professor at University of Nevada, Reno
- 3 **Sotirios Diamantas**, Field: *Computer Vision for Autonomous Driving*, Period: 2017–June 2018. Currently Dr. Diamantas has moved as Assistant Professor at Tarleton State University

PhD Candidate Supervision (Main Advisor)

- 1 **Dinh Huan Nguyen**, Norwegian University of Science and Technology, **Main Advisor**, Field: *Learning-based Navigation for Aerial Robots*, Period: 2021–Present. The candidate started his PhD research at the University of Nevada, Reno. Expected graduation: September, 2023
- 2 **Paolo De Petris**, Norwegian University of Science and Technology, **Main Advisor**, Field: *Fast and Agile Navigation for Collision-tolerant Flying Robots*, Period: 2020–Present. The candidate started his PhD research at the University of Nevada, Reno. Expected graduation: Spring 2024
- 3 **Nikhil Khedekar**, Norwegian University of Science and Technology, **Main Advisor**, Field: *Multi-Modal Perception for Resilient Navigation in Degraded Environments*, Period: 2021–Present. The candidate started his PhD research at the University of Nevada, Reno
- 4 **Jørgen Anker Olsen**, Norwegian University of Science and Technology, **Main Advisor**, Field: *Resilient Robotic Autonomy for Exploration of Martian Lava Tubes*, Period: 2021–Present
- 5 **Mihir Dharmadhikari**, Norwegian University of Science and Technology, **Main Advisor**, Field: *Risk-aware and Semantics-driven Informative Path Planning*, Period: 2022–Present. The candidate started his PhD research at the University of Nevada, Reno
- 6 **Mihir Kulkarni**, Norwegian University of Science and Technology, **Main Advisor**, Field: *Resilient Learning-based Fast Flight in Cluttered Environments*, Period: 2022–Present. The candidate started his PhD research at the University of Nevada, Reno
- 7 **Morten Nissov**, Norwegian University of Science and Technology, **Main Advisor**, Field: *Resilient Localization in Perceptually Degraded Visual Environments*, Period: 2022–Present
- 8 **Mohit Singh**, Norwegian University of Science and Technology, **Main Advisor**, Field: *Camera-based Underwater Localization*, Period: 2022–Present
- 9 **Marvin Harms**, Norwegian University of Science and Technology, **Main Advisor**, Field: *Data-driven Navigation Policy Learning*, Period: 2022–Present
- 10 **Frank Mascarich**, University of Nevada, Reno, **Main Advisor**, Field: *Lightweight Autonomy for Agile and Miniaturized Aerial Robotics*, Period: 2016–2021, Graduation/Thesis Defense: October 2021. Current position: Robotics Engineer at Anduril Industries

- 11 **Tung A. Dang**, University of Nevada, Reno, **Main Advisor**, Field: *Informative Path Planning in Extreme Environments*, Period: 2016–2020, Graduation/Thesis Defense: August 2020. Current position: Autonomy Engineer at Skydio
- 12 **Shehryar Khattak**, University of Nevada, Reno, **Main Advisor**, Field: *Seeing through Dust and Darkness: Enabling Robust Robot Odometry Estimation in Degraded Visual Environments*, Period: 2016–2019, Graduation/Thesis Defense: December 4 2019. Current position: Robot Technologist at NASA JPL

PhD Candidate Co-supervision or Co-examiner role

- 1 **Kshitij Goel**, Carnegie Mellon University, **Co-advisor** with Prof. Dr. Wennie Tabib, Nathan Michael, Field: *Autonomous Navigation in Cluttered Environments*, Period: 2022–now
- 2 **Emanuele Aucone**, ETH Zurich, **Co-advisor** with Prof. Dr. Stefano Mintchev, Field: *Compliant flying robots in natural environments*, Period: 2022–now
- 3 **Henrik Dobbe Flemmen**, Norwegian University of Science and Technology, **Co-advisor** with Prof. Dr. Edmund Brekke, Field: *Radar-based localization in maritime environments*, Period: 2021–now
- 4 **Martin Jacquet**, LAAS-CNRS, **Co-examiner** with Prof. Dr. Antonio Franchi, Field: *Methods for Online Predictive Control of Multi-rotor Aerial Robots with Perception-driven Tasks subject to Sensing and Actuation Constraints*, Period: 2022
- 5 **Azarakhsh Keipour**, Carnegie Mellon University, **Co-examiner** with Prof. Dr. Sebastian Scherer, Field: *Aerial Manipulation*, Period: 2022
- 6 **Sebastian Verling**, ETH Zurich, **Co-advisor** with Prof. Dr. Roland Siegwart, Field: *VTOL Aerial Robot Autonomous Navigation*, Period: 2015–2020
- 7 **Thomas Stastny**, ETH Zurich, **Co-examiner** with Prof. Dr. Roland Siegwart, Field: *Solar-powered Unmanned Aerial Vehicles Control*, Period: 2015–2020
- 8 **Michael Burri**, ETH Zurich, **Co-examiner** with Prof. Dr. Roland Siegwart, Field: *Vision-Based Navigation and Parameter Identification for Unmanned Aerial Vehicles*, Status: PhD Defense, April 19 2017
- 9 **Sankalp Arora**, Carnegie Mellon University, **Co-examiner** with Dr. Sebastian Scherer, Field: *Safe Data Gathering in Physical Spaces*, PhD Defense: September 25 2018
- 10 **Majed Al Zayer**, University of Nevada, Reno, **Co-examiner** with Prof. Dr. Eelke Folmer, Field: *Universal Usability of Virtual Reality*, PhD Defense: April 19 2019

Selected Outreach

- 1 **Collection of articles with interviews in media such as Washington Post, New Scientist, IEEE Spectrum on our DARPA Subterranean Challenge win, 2021**
- 2 **PI of NSF RET Site on Robotics and Big Data**, University of Nevada, Reno, 2018-2020

- 3 **PI of IEEE Supported “Drones Demystified!” program for K12 students**, University of Nevada, Reno, 2017-2018
- 4 **UAS Summer Camp Instructor**, University of Nevada, Reno, 2017-2018
- 5 **Sidney Taylor**, Davidson Academy (High School), Research in the Lab, Field: *Lightweight Blimp Robot for Search and Rescue Operations*, Period: 2017–2018

Start-up Advising

2022–now **Scientific Advisor at Scout Drone Inspection**, NTNU, Developing robots for confined indoor inspection, <https://www.scoutdi.com/>.

Advising Student Teams that lead or started Start-ups

- 2021–now **Aviant**, NORWEGIAN UNIVEERSITY OF SCIENCE ADN TECHNOLOGY, Developing drone delivery solutions with fixed-wing UAVs and being actively deployed for transfer of blood among Norwegian hospitals.
Company and project started as focus project at NTNU, <https://www.aviant.no/>
- 2015–2016 **Wingtra**, ETH ZURICH, Developing hybrid aerial robots that combine the flight envelope of a multicopter with that of a fixed-wing aircraft.
Company and project started as focus project at ETH Zurich, <http://wingtra.com/>

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- [C60] C. Papachristos, and K. Alexis, ***Thermal-Inertial Localization for Autonomous Navigation of Aerial Robots through Obscurants***, International Conference on Unmanned Aircraft Systems (ICUAS), Dallas, TX, USA, June 12-15, 2018, pp. 394-399 [\[PDF\]](#), [\[Video\]](#)
- [C61] S. Khattak, C. Papachristos, and K. Alexis, ***Marker based Thermal-Inertial Localization for Aerial Robots in Obscurant Filled Environments***, International Symposium on Visual Computing, Las Vegas, November 19-21, 2018, pp. 565-575 [\[PDF\]](#), [\[Video\]](#)

- [C62] S. Khattak, C. Papachristos, and K. Alexis, ***Vision-Depth Landmarks and Inertial Fusion for Navigation in Degraded Visual Environments***, International Symposium on Visual Computing, Las Vegas, November 19-21, 2018, pp. 529-540 [\[PDF\]](#), [\[Video\]](#)
- [C63] R. Fyfe, S. Khattak, and K. Alexis, ***History-Aware Free Space Detection for Efficient Autonomous Exploration Using Aerial Robots***, IEEE Aerospace Conference (AeroConf) 2019, Yellowstone Conference, Big Sky, Montana, Mar 2-9, 2019 [\[PDF\]](#), [\[Video\]](#)
- [C64] C. Papachristos, S. Khattak, K. Alexis, ***Haptic Feedback-based Reactive Navigation for Aerial Robots Subject to Localization Failure***, IEEE Aerospace Conference (AeroConf) 2019, Yellowstone Conference, Big Sky, Montana, Mar 2-9, 2019 [\[PDF\]](#)
- [C65] C. Papachristos, S. Khattak, F. Mascarich, K. Alexis, ***Autonomous Navigation and Mapping in Underground Mines Using Aerial Robots***, IEEE Aerospace Conference (AeroConf) 2019, Yellowstone Conference, Big Sky, Montana, Mar 2-9, 2019 [\[PDF\]](#), [\[Video\]](#)
- [C66] S. Khattak, C. Papachristos, K. Alexis, ***Visual-Thermal Landmarks and Inertial Fusion for Navigation in Degraded Visual Environments***, IEEE Aerospace Conference (AeroConf) 2019, Yellowstone Conference, Big Sky, Montana, Mar 2-9, 2019 (Best Paper Award in the “Air Vehicle Systems and Technologies” Track) [\[PDF\]](#), [\[Video\]](#)
- [C67] S. Khattak, C. Papachristos, K. Alexis, ***Keyframe-based Direct Thermal-Inertial Odometry***, IEEE International Conference on Robotics and Automation (ICRA), 2019, May 20-24, 2019 Montreal, Canada, pp. 3563-3569 [\[PDF\]](#), [\[Video\]](#)
- [C68] F. Mascarich, C. Papachristos, T. Wilson, K. Alexis, ***Distributed Radiation Field Estimation and Informative Path Planning for Nuclear Environment Characterization***, IEEE International Conference on Robotics and Automation (ICRA), 2019, May 20-24, 2019 Montreal, Canada, pp. 2318-2324 [\[PDF\]](#), [\[Video\]](#)
- [C69] N. V. Khedekar, F. Mascarich, C. Papachristos, T. Dang, K. Alexis, ***Contact-based Navigation Path Planning for Aerial Robots***, IEEE International Conference on Robotics and Automation (ICRA), 2019, May 20-24, 2019 Montreal, Canada, pp. 4161-4167 [\[PDF\]](#), [\[Video\]](#)
- [C70] C. Papachristos, S. Khattak, F. Mascarich, T. Dang, K. Alexis, ***Autonomous Aerial Robotic Exploration of Subterranean Environments relying on Morphology-aware Path Planning***, International Conference on Unmanned Aircraft Systems (ICUAS), June 11-14, 2019, Atlanta, GA, USA [\[PDF\]](#)
- [C71] T. Dang, S. Khattak, C. Papachristos, K. Alexis, ***Anomaly Detection and Cognizant Path Planning for Surveillance Operations using Aerial Robots***, International Conference on Unmanned Aircraft Systems (ICUAS), June 11-14, 2019, Atlanta, GA, USA [\[PDF\]](#), [\[Video\]](#)
- [C72] S. Khattak, F. Mascarich, T. Dang, C. Papachristos, K. Alexis, ***Robust Thermal-Inertial Localization for Aerial Robots: A Case for Direct Methods***, International Conference on Unmanned Aircraft Systems (ICUAS), June 11-14, 2019, Atlanta, GA, USA [\[PDF\]](#), [\[Video\]](#)

- [C73] T. Dang, F. Mascarich, S. Khattak, H. Nguyen, N. Khedekar, C. Papachristos, K. Alexis, ***Field-hardened Robotic Autonomy for Subterranean Exploration***, Conference on Field and Service Robotics (FSR), 2019, Aug. 29-31, Tokyo, Japan [\[PDF\]](#), [\[Video\]](#)
- [C74] T. Dang, F. Mascarich, S. Khattak, C. Papachristos, K. Alexis, ***Graph-based Path Planning for Autonomous Robotic Exploration in Subterranean Environments***, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2019, Macau, China [\[PDF\]](#), [\[Video\]](#)
- [C75] T. Dang, S. Khattak, F. Mascarich, K. Alexis, ***Explore Locally, Plan Globally: A Path Planning Framework for Autonomous Robotic Exploration in Subterranean Environments***, 19th International Conference on Advanced Robotics (ICAR), Belo Horizonte - Brazil, December 2-6, 2019 [\[PDF\]](#), [\[Video\]](#)
- [C76] K. Alexis, ***Resilient Autonomous Exploration and Mapping of Underground Mines using Aerial Robot***, 19th International Conference on Advanced Robotics (ICAR), Belo Horizonte - Brazil, December 2-6, 2019 [\[PDF\]](#)
- [C77] M. Dharmadhikari, T. Dang, L. Solanka, J.B. Loje, D. H. Nguyen, N. Khedekar, K. Alexis, ***Motion Primitives-based Path Planning for Fast and Agile Exploration using Aerial Robots***, IEEE International Conference on Robotics and Automation (ICRA), 2020, May 31-June 4, 2020 Paris, France [\[PDF\]](#), [\[Video\]](#)
- [C78] D. H. Nguyen, T. Dang, K. Alexis, ***The Reconfigurable Aerial Robotic Chain: Modeling and Control***, IEEE International Conference on Robotics and Automation (ICRA), 2020, May 31-June 4, 2020 Paris, France [\[PDF\]](#), [\[Video\]](#)
- [C79] R. Reinhart, T. Dang, K. Alexis, ***Learning-based Path Planning for Autonomous Exploration of Subterranean Environments***, IEEE International Conference on Robotics and Automation (ICRA), 2020, May 31-June 4, 2020 Paris, France [\[PDF\]](#), [\[Video\]](#)
- [C80] M. Kulkarni, D. H. Nguyen, K. Alexis, ***The Reconfigurable Aerial Robotic Chain: Shape and Motion Planning***, IFAC World Congress, 2020, July 12-17, 2020, Berlin, Germany [\[PDF\]](#), [\[Video\]](#)
- [C81] K. Alexis, ***Levy Flight Foraging Hypothesis-based Autonomous Large-scale Memoryless Search under Sparse Rewards***, IEEE Aerospace Conference (AeroConf) 2019, Yellowstone Conference, Big Sky, Montana, Mar 7-14, 2020 (Best Paper Award in the "Air Vehicle Systems and Technologies" Track) [\[PDF\]](#)
- [C82] T. Dang, F. Mascarich, S. Khattak, D. H. Nguyen, N. Khedekar, S. Hirsh, R. Reinhart, C. Papachristos, K. Alexis, ***Autonomous Search for Underground Mine Rescue Using Aerial Robots***, IEEE Aerospace Conference (AeroConf) 2020, Yellowstone Conference, Big Sky, Montana, Mar 7-14, 2020 [\[PDF\]](#)
- [C83] F. Mascarich, D. H. Nguyen, T. Dang, S. Khattak, C. Papachristos, K. Alexis, ***A Self-deployed Multi-Channel Wireless Communications System for Subterranean Robots***, IEEE Aerospace Conference (AeroConf) 2019, Yellowstone Conference, Big Sky, Montana, Mar 7-14, 2020 [\[PDF\]](#)

- [C84] S. Khattak, H. Nguyen, F. Mascarich, T. Dang, K. Alexis, **Complementary Multi-Modal Sensor Fusion for Resilient Robot Pose Estimation in Subterranean Environments**, International Conference on Unmanned Aircraft Systems (ICUAS), Athens, Greece, 2020 [\[PDF\]](#), [\[Video\]](#)
- [C85] Huan Nguyen, Mina Kamel, Kostas Alexis, Roland Y. Siegwart, **Model Predictive Control for Micro Aerial Vehicles: A Survey**, European Control Conference, June 29-July 2, 2021 [\[PDF\]](#), [\[Video\]](#)
- [C86] Mihir Rahul Dharmadhikari, Harshal Deshpande, Tung Dang, Kostas Alexis, **Hypergame-based Adaptive Behavior Path Planning for Combined Exploration and Visual Search**, IEEE International Conference on Robotics and Automation (ICRA), May 30-June 5, 2021, Xi'an China [\[PDF\]](#), [\[Video\]](#)
- [C87] Paolo De Petris, Dinh Huan Nguyen, Mihir Kulkarni, Frank Mascarich, Kostas Alexis, **Resilient Collision-tolerant Navigation in Confined Environments**, IEEE International Conference on Robotics and Automation (ICRA), May 30-June 5, 2021, Xi'an China [\[PDF\]](#), [\[Video\]](#)
- [C88] Frank Mascarich, Paolo De Petris, Dinh Huan Nguyen, Nikhil Vijay Khedekar, Kostas Alexis, **Autonomous Distributed 3D Radiation Field Estimation for Nuclear Environment Characterization**, IEEE International Conference on Robotics and Automation (ICRA), May 30-June 5, 2021, Xi'an China [\[PDF\]](#), [\[Video\]](#)
- [C89] Ran Duan, Changhong Fu, Kostas Alexis, Erdal Kayacan, **Online Recommendation-based Convolutional Features for Scale-Aware Visual Tracking**, IEEE International Conference on Robotics and Automation (ICRA), May 30-June 5, 2021, Xi'an China [\[PDF\]](#)
- [C90] Mihir Rahul Dharmadhikari, Huan Nguyen, Frank Mascarich, Nikhil Vijay Khedekar, Kostas Alexis, **Autonomous Cave Exploration using Aerial Robots**, IEEE International Conference on Robotics and Automation (ICRA), May 30-June 5, 2021, Xi'an China [\[PDF\]](#)
- [C91] Huan Nguyen, Sondre Holm Fyhn, Paolo De Petris, Kostas Alexis, **Motion Primitives-based Navigation Planning using Deep Collision Prediction**, IEEE International Conference on Robotics and Automation (ICRA), May 23-27, 2022, Philadelphia (PA), USA [\[PDF\]](#), [\[Video\]](#)
- [C92] Mihir Kulkarni, Mihir Rahul Dharmadhikari, Marco Tranzatto, Samuel Zimmermann, Victor Reijgwart, Paolo De Petris, Huan Nguyen, Nikhil Vijay Khedekar, Christos Papachristos, Lionel Ott, Roland Siegwart, Marco Hutter, Kostas Alexis, **Autonomous Teamed Exploration of Subterranean Environments using Legged and Aerial Robots**, IEEE International Conference on Robotics and Automation (ICRA), May 23-27, 2022, Philadelphia (PA), USA [\[PDF\]](#), [\[Video\]](#)
- [C93] Paolo De Petris, Huan Nguyen, Mihir Dharmadhikari, Mihir Kulkarni, Nikhil Khedekar, Frank Mascarich, Kostas Alexis, **RMF-Owl: A Collision-Tolerant Flying Robot for Autonomous Subterranean Exploration**, International Conference on Unmanned Aircraft Systems 2022 (ICUAS 2022) [\[PDF\]](#)

- [C94] Paolo De Petris, Mihir Rahul Dharmadhikari, Huan Nguyen, Kostas Alexis, ***Risk-Aware Motion Planning for Collision-Tolerant Aerial Robots Subject to Localization Uncertainty***, (Finalist for IROS Best Paper Award on Safety, Security, and Rescue Robotics, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), October 23-27, 2022. Kyoto, Japan [\[PDF\]](#), [\[Video\]](#)
- [C95] Nikhil Khedekar, Mihir Kulkarni, Kostas Alexis, ***MIMOSA: A Multi-Modal SLAM Framework for Resilient Autonomy against Sensor Degradation***, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), October 23-27, 2022. Kyoto, Japan [\[PDF\]](#), [\[Video\]](#)
- [C96] Paolo De Petris, Shehryar Khattak, Mihir Dharmadhikari, Gabriel Waibel, Huan Nguyen, Marco Montenegro, Nikhil Khedekar, Kostas Alexis, Marco Hutter ***Marsupial Walking-and-Flying Robotic Deployment for Collaborative Exploration of Unknown Environments***, IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR), November 8-10, 2022, Seville, Spain [\[Video\]](#)

Book Chapters

- [B1] K. Alexis, G. Nikolakopoulos, A. Tzes, L. Dritsas, ***Coordination of Helicopter UAVs for Aerial Forest-Fire Surveillance***, Applications of Intelligent Control to Engineering Systems, Springer-Verlag, 2009, pp. 169-193, [\[PDF\]](#)
- [B2] S. Leutenegger, C. Huerzeler, A. K. Stowers, K. Alexis, M. Achtelik, D. Lentink, P. Oh and R. Siegwart, ***Flying Robots***, Handbook of Robotics, Springer-Verlag, pp. 623-670, 2016 [\[PDF\]](#)
- [B3] M. Kamel, T. Stastny, K. Alexis, R. Siegwart, ***Model Predictive Control for Trajectory Tracking of Unmanned Aerial Vehicles Using ROS***, Springer Book on Robot Operating System (ROS) - The Complete Reference (Volume 2), pp. 3-39, 2017 [\[PDF\]](#)
- [B4] C. Papachristos, M. Kamel, M. Popovic, S. Khattak, A. Bircher, H. Oleynikova, T. Dang, F. Mascarich, K. Alexis, and R. Siegwart, ***Autonomous Exploration and Inspection Path Planning for Aerial Robots using the Robot Operating System***, Springer Book on Robot Operating System (ROS) - The Complete Reference (Volume 3), pp. 67-111, 2019 [\[PDF\]](#)
- [B5] M. Kulkarni, B. Moon, K. Alexis, S. Scherer, ***Aerial Field Robotics***, Encyclopedia of Robotics, 2022 [\[PDF\]](#)

Indicative Workshop Organization and Workshop Talks

- [W1] A. Tzes, K. Alexis, G. Nikolakopoulos, ***Constrained Finite Time Optimal Controllers for Helicopters subject to Wind-Gust Disturbances***, UAS Civilian Applications: Fire Detection, Forest Protection, Emergency Response Workshop, IEEE 17th Mediterranean Conference on Control and Automation, June 23-26, 2009, Thessaloniki, Greece. Presenter.

- [W2] K. Alexis, C. Papachristos, A. Tzes, **Low-cost designs for Vertical and/or Short Take-Off and Landing Unmanned Aerial Vehicles: Sensors, Actuators, Controllers and Communication**, Micro and Small Unmanned Aerial Vehicles Design, Sensor-based Control and Applications Workshop, IEEE 19th Mediterranean Conference on Control and Automation, June 20-22, 2011, Corfu, Greece. Presenter.
- [W3] K. Alexis, **Autonomous Infrastructure Inspection and Maintenance**, European Robotics Forum, Rovereto, Italy, 2014. Presenter.
- [W4] K. Alexis, G. Nikolakopoulos **AEROWORKS: Collaborative Aerial Robotic Workers**, European Robotics Forum, Vienna, Austria, 2015. Presenter.
- [W5] K. Alexis **Path-Planning and Control for Aerial Robotic Infrastructure Inspection and Maintenance**, Summer School on Mobile Manipulators, Castellon, Spain, July 13-14, 2015. Invited talk.
- [W6] K. Alexis, M. Chli, M. Achtelik, D. Kottas, G. Bebis **Special track on Advancing Autonomy for Aerial Robotics**, International Symposium on Visual Computing (ISVC) 2015, December, 2015. Main organizer and presenter.
- [W7] K. Alexis, M. Chli, A. Ollero **Aerial Robotics Manipulation: from Simulation to Real-life**, IEEE International Conference on Robotics and Automation 2016 (ICRA 2016), Stockholm, Sweden. Co-Organizer and presenter.
- [W8] K. Alexis, M. Chli, P. Oh, C. Papachristos, P. Oettershagen, G. Nikolakopoulos, L.R.G. Carillo, **Special track on Advancing Autonomy for Aerial Robotics**, International Symposium on Visual Computing (ISVC) 2016, December, 2016. Main organizer and presenter.
- [W9] K. Alexis, **AtlantikSolar - flying forever**, ETH Meets California, October, 2016. Invited talk.
- [W10] K. Alexis, **RI Seminar: Kostas Alexis: Autonomous Exploration and Inspection using Aerial Robots**, Carnegie Mellon University - Robotics Seminars, October, 2016. Invited talk. [\[Video\]](#)
- [W11] M. W. Achtelik, K. Alexis, G. Antonelli, M. Chli, A. Ollero, R. Siegwart, K. Valavanis, **Autonomous Structural Monitoring and Maintenance using Aerial Robots**, IEEE International Conference on Robotics and Automation 2017 (ICRA 2017), Singapore. Co-organizer and presenter.
- [W12] K. Alexis, **Robotic Inspection for Infrastructure Facilities and Nuclear Sites**, University of Omaha, NSF Workshop, October, 2017. Invited talk.
- [W13] K. Alexis, **Cognizant Autonomous Exploration and Mapping Using Aerial Robots**, University of Maryland, Lockheed Martin Seminars, October, 2017. Invited talk. [\[Link\]](#)
- [W14] K. Alexis, G. Antonelli, M. Calva, M. Chli, M. Fumagalli, A. Ollero, **Aerial Robotic Inspection and Maintenance: Research Challenges, Field Experience and Industry Needs**, IEEE International Conference on Robotics and Automation 2018 (ICRA 2018), Brisbane, Australia. Main organizer and presenter.

- [W15] K. Alexis, M. Mueller, C. Papachristos, T. Stastny, ***Autonomous Navigation for Aerial Robots in Extreme Environments: From Subterranean Environments to the Arctic***, International Conference on Unmanned Aircraft Systems (ICUAS), Dallas, TX, USA, 2018. Main organizer and presenter.
- [W16] K. Alexis, ***Autonomous Exploration in Degraded and High-Risk Environments***, NASA Jet Propulsion Laboratory, November, 2018. Invited talk.
- [W17] K. Alexis, G. Antonelli, M. Chli, G. Loianno, A. Ollero, ***The Future of Aerial Robotics: Challenges and Opportunities***, IEEE International Conference on Robotics and Automation 2019 (ICRA 2019), Montreal, Canada. Co-organizer and presenter.
- [W18] K. Alexis, , ***Field-hardened Robotic Autonomy***, Stanford University, Seminar Series. October 2018, Invited talk.[\[Video\]](#)
- [W19] T. Dang, K. Alexis, , ***Field-hardened Robotic Autonomy***, Challenges in Vision-based Drones Navigation, Full Day workshop at IROS 2019, November 8, 2019, The Venetian, Macau, Invited talk.
- [W20] AC. Heckman, A. Kramer, L. Carlone, K. Alexis, A. Agha, ***Robust Perception For Autonomous Field Robots in Challenging Environments workshop***, IEEE International Conference on Robotics and Automation 2021 (ICRA 2021), China. Co-organizer.
- [W21] AC. Heckman, A. Kramer, L. Carlone, K. Alexis, A. Agha, ***Integrated Perception, Learning, and Control for Agile Super Vehicles***, International Conference on Intelligent Robots and Systems (IROS 2021) 2021, Czech Republic. Presenter.
- [W22] A. Ollero, I. del Pozo, G. Loianno, V. Jin Xiang, K. Alexis, K. Valavanis, ***Intelligent Aerial Robotics: From Autonomous Micro Aerial Vehicles to Sustainable Urban Air Mobility Operations***, IEEE International Conference on Robotics and Automation 2022 (ICRA 2022), USA. Co-organizer.
- [W23] A. Faragasso, G. Romeo, G. Loianno, H. Asama, K. Alexis, H. Woo, K. Ren, N. Shinsuke, M. Alessandro, K. Kawabata, Y. Li, ***Robotics for nuclear environments exploration and decommissioning: challenges and emerging technologies***, International Conference on Intelligent Robots and Systems (IROS) 2022, Japan. Presenter.
- [W24] Miguel A. Olivares-Mendez, David Rodríguez-Martínez, Raj Thilak Rajan, Kostas Alexis, ***Heterogeneous multi-robot cooperation for exploration and science in extreme environments***, IEEE International Conference on Robotics and Automation 2023 (ICRA 2023), USA. Co-organizer.

Technical Reports

- [TR1] C. Huerzeler and K. Alexis, ***AIRobots Coaxial helicopter prototype linear simulator***, ETH Zurich, Tech. Rep., July 2012
- [TR2] K. Alexis, ***Technical Report: Optimal Surveillance of Dynamic Parades using Teams of Aerial Robots***, University of Nevada, Reno, arXiv preprint arXiv:1701.00019, 2016

Open Source Contributions

- [OS1] **Graph-based Exploration Planner**, https://github.com/ntnu-arl/gbplanner_ros
- [OS2] **Motion Primitives-based Exploration Planner**, https://github.com/ntnu-arl/mbplanner_ros
- [OS3] **Visual Saliency-aware Exploration Planner**, <https://github.com/unr-arl/vseplanner>
- [OS4] **History-Aware Free Space Detection**, <https://github.com/ntnu-arl/hfsd>
- [OS5] **Uncertainty-aware Receding Horizon Exploration and Mapping Planner**, https://github.com/ntnu-arl/rhem_planner
- [OS6] **Robust Visual-Thermal Inertial Odometry**, <https://github.com/ntnu-arl/rovtio>
- [OS7] **Next-Best-View Planner**, <https://github.com/ethz-asl/nbvplanner>
- [OS8] **Structural Inspection Planner**, <https://github.com/ethz-asl/StructuralInspectionPlanner>
- [OS9] **UAV Model Predictive Control Library**, https://github.com/ethz-asl/mav_control_rw
- [OS10] **Lin-Kernighan-Helsgaun TSP Solver Interfaces**, https://github.com/ntnu-arl/LKH_TSP
- [OS11] **Robust Model Predictive Control**, https://github.com/unr-arl/rmpc_mav
- [OS12] **Dubins Aircraft**, <https://github.com/ntnu-arl/DubinsAirplane>

Released Datasets

- [D1] **Aerial Views of the CTC UAV Test Site in Collsuspina, Spain**, <https://sites.google.com/site/kostasalexis1/research/5-datasets/ctc-uav-test-site?overridemobile=true>
- [D2] **ICARUS project field-trials in Marche-en-Famenne: a multi-robot reconstruction of the environment**, <https://projects.asl.ethz.ch/datasets/doku.php?id=jffricarus>
- [D3] **Datasets accompanying the ICRA 2015 Paper: Structural Inspection Path Planning via Iterative Viewpoint Resampling with Application to Aerial Robotics**, <http://projects.asl.ethz.ch/datasets/doku.php?id=koptinspection:koptinspection>
- [D4] **Datasets accompanying the FSR 2015 Paper: Long-Endurance Sensing and Mapping using a Hand-Launchable Solar-Powered UAV**, <http://projects.asl.ethz.ch/datasets/doku.php?id=fsr2015>
- [D5] **Datasets accompanying the ICRA 2017 Paper: Uncertainty-aware Receding Horizon Exploration and Mapping using Aerial Robots**, <https://github.com/unr-arl/icra-2017-datasets>

- [D6] **Radiation Source Localization Dataset**, <https://github.com/unr-arl/radiation-source-localization-dataset>
- [D7] **Vehicles at Nighttime**, <https://github.com/unr-arl/vehicles-nighttime>
- [D8] **Distributed Radiation Field Mapping**, https://github.com/unr-arl/drm_dataset
- [D9] **Keyframe-based Thermal-Inertial Odometry**, <https://www.autonomousrobotslab.com/ktio.html>
- [D10] **CERBERUS DARPA Subterranean Challenge Winning Run**, <https://www.research-collection.ethz.ch/handle/20.500.11850/552248>

Indicative Industry-focused Conferences/Exhibitions

- [CE1] V. Fotinopoulos, K. Alexis, **AETOS: Automated Autopilot & Geopointing Payload**, 14th Remotely Piloted Aircraft Systems (RPAS) 2012, 5-7 June, 2012, Planete Equinoxe, 18-20 rue du Col. Pierre Avia, 75015 Paris, France
- [CE2] Search and Rescue Europe 2015, **Aerial Robotic Assisted–Search and Rescue**, Portsmouth, United Kingdom (21-23 April, 2015)
- [CE3] Nevada Advanced Autonomous Systems Innovation Center, **Annual UAS Search & Rescue Symposium**, Reno, Nevada, USA, April, 2016
- [CE4] TIECON, **Democratization of Drones**, Santa Clara Convention Center, California, USA, May, 2017
- [CE5] Trondheim Tech Port, **CERBERUS: Winning the DARPA Subterranean Challenge**, Trondheim, Norway, 2022
- [CE6] SINTEF Industry Days, **Autonomous Structural Inspection using Aerial Robots**, Trondheim, Norway, 2022

Selected Videos of Research Results

- [V1] Motion Primitives-based Navigation Planning using Deep Collision Prediction (2022) [\[Video Link\]](#)
- [V2] Radar-Inertial ICP-based Pose Graph SLAM (2022) [\[Video Link\]](#)
- [V3] MIMOSA: A Multi-Modal SLAM Framework for Resilient Autonomy against Sensor Degradation (2022) [\[Video Link\]](#)
- [V4] Team CERBERUS Wins the DARPA Subterranean Challenge (2021) [\[Video Link\]](#)
- [V5] Autonomous Teamed Exploration of Subterranean Environments using Legged and Aerial Robots (2021) [\[Video Link\]](#)
- [V6] Autonomous Distributed Radiation Field Characterization and Informative Planning: Experiment 1 (2021) [\[Video Link\]](#)
- [V7] CERBERUS: Deployment at the DARPA Subterranean Challenge Urban Circuit (2021) [\[Video Link\]](#)

- [V8] Autonomous Distributed 3D Radiation Field Estimation for Nuclear Environment Characterization (2022) [\[Video Link\]](#)
- [V9] Forceful Aerial Manipulation based on an Aerial Robotic Chain: Hybrid Modeling and Control (2020) [\[Video Link\]](#)
- [V10] Graph-based Exploration Path Planning - Aerial Robot inside an Underground Mine (2020) [\[Video Link\]](#)
- [V11] Motion Primitives-based Path Planning for Fast and Agile Exploration using Aerial Robots (2019) [\[Video Link\]](#)
- [V12] Learning-based Path Planning for Autonomous Exploration of Subterranean Environments (2019) [\[Video Link\]](#)
- [V13] Keyframe-based Thermal-Inertial Odometry (2019) [\[Video Link\]](#)
- [V14] Distributed Radiation Field Estimation and Informative Path Planning for Nuclear Characterization (2019) [\[Video Link\]](#)
- [V15] Autonomous Exploration and Mapping in Underground Mines using Aerial Robots (2018) [\[Video Link\]](#)
- [V16] Keyframe-based Direct Thermal-Inertial Odometry (2018) [\[Video Link\]](#)
- [V17] Visual-Thermal Landmarks and Inertial Fusion for Navigation in Degraded Visual Environments (2018) [\[Video Link\]](#)
- [V18] Visual Saliency-aware Receding Horizon Autonomous Exploration with Application to Aerial Robotics (2018) [\[Video Link\]](#)
- [V19] Uncertainty-aware Exploration and Mapping using Aerial Robots (2017) [\[Video Link\]](#)
- [V20] Receding Horizon “Next-Best-View” Exploration (2016) [\[Video Link\]](#)
- [V21] Solar-powered 81 hour endurance world record flight (2015) [\[Video Link\]](#)
- [V22] Aerial Contact-based Inspection Path Planning and Control (2015) [\[Video Link\]](#)
- [V23] Full Attitude Control of a VTOL Tailsitter UAV (unlisted) (2016) [\[Video Link\]](#)
- [V24] Fast Nonlinear Model Predictive Control for Multicopter Attitude Tracking on SO(3) (2015) [\[Video Link\]](#)
- [V25] Structural Inspection Path Planning (2014) [\[Video Link\]](#)

Indicative Media Coverage

- [MC1] EuroNews, Futuris, Covering our work on Aerial Robotics for Contact-based Inspection, 2012 [Futuris Video](#)
- [MC2] Discovery Channel, Swiss TV, Multiple Websites, AtlantikSolar Endurance World Record, [Summary of links](#)
- [MC3] MIT Technology Review - German Version, Covering early steps of the development of the Autonomous Robots Link at the University of Nevada, Reno, [\[PDF\]](#)
- [MC4] Nevada Today, Covering the early steps of the development of the Autonomous Robots at the University of Nevada, Reno, [Link](#)

- [MC5] Interview at KTVN2 - Face the State for the Research Activities on Autonomous Robots at the University of Nevada, Reno, [\[Video\]](#)
- [MC6] Forbes, CityLab, SFGate, NewAtlas and other media covered our work on autonomous electric buses - example: [Forbes](#), [SFGate](#), and [NewAtlas](#)
- [MC7] Firmatek - Toxic Site Cleanup: How the Tools We Use Help Emergency Response Teams, Too, [Link](#)
- [MC8] Northern Nevada Business Weekly - UNR tests drones to help clean nuclear waste, [Link](#)
- [MC9] BBC Click - interview for activities of robotics research at the University of Nevada, Reno, [Link](#)
- [MC10] Inside Unmanned Systems honors us with a detailed article on our work on Nuclearized Flying Robots, [Link](#)
- [MC11] Multiple Media Announcements for our Selection as one of the teams participating in the DARPA Subterranean Challenge (including DARPA's news release, MIT Technology Review, Interesting Engineering and more. Examples: [DARPA News Release](#), [UNR News](#), [MIT Technology Review](#), [Interesting Engineering](#), [NextBigFuture](#)
- [MC11] Multiple Media Announcements for our Participation as one of the DARPA-funded teams in the Tunnel and Urban Circuits of the DARPA Subterranean Challenge. Examples: [DARPA News Release DARPA Subterranean Challenge Tunnel Circuit Wrap Up](#), [DARPA Subterranean Challenge Tunnel Circuit Compilation](#), [DARPA Subterranean Challenge Team CERBERUS](#), [Digital Trends Magazine](#), [IEEE Spectrum](#), [IEEE Spectrum](#), [IEEE Spectrum](#)
- [MC12] Multiple Media Announcements for our Winning Run in the DARPA Subterranean Challenge Finals. Examples: [IEEE Spectrum](#), [Washington Post](#), [Eureka Alert](#), [NewAtlas](#), [NTNU University Newspaper](#), [UNR University Newspaper](#), [Teknisk Ukeblad](#), [Hellenic Broadcasting Corporation](#), [SuasNews](#), [New Scientist](#)

Indicative Invited Talks

- [IT1] K. Alexis, ***Summer School on Mobile Manipulators, Castellon, Spain***, Path-Planning and Control for Aerial Robotic Infrastructure Inspection and Maintenance, July 13-14, 2015. Invited talk.
- [IT2] K. Alexis, ***ETH Meets California***, AtlantikSolar - flying forever, October, 2016. Invited talk.
- [IT3] K. Alexis, ***Carnegie Mellon University - Robotics Seminars***, RI Seminar: Kostas Alexis: Autonomous Exploration and Inspection using Aerial Robots, October, 2016. Invited talk. [\[Video\]](#)
- [IT4] K. Alexis, ***University of Maryland, Lockheed Martin Seminars***, Cognizant Autonomous Exploration and Mapping Using Aerial Robots, October, 2017. Invited talk. [\[Link\]](#)
- [IT5] K. Alexis, ***NASA Jet Propulsion Laboratory***, Autonomous Exploration in Degraded and High-Risk Environments, November, 2018. Invited talk.

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- [IT6] K. Alexis, **Colorado School of Mines**, Field-hardened Robotic Autonomy, April, 2019. Invited talk.
- [IT7] K. Alexis, **Moog Inc**, Field-hardened Robotic Autonomy, August, 2019. Invited talk.
- [IT8] K. Alexis, **Stanford University**, Field-hardened Robotic Autonomy, October, 2019. Invited talk.
- [IT9] K. Alexis, **NTNU, Norway**, Field-hardened Robotic Autonomy, October, 2019. Invited talk.
- [IT10] K. Alexis, **University of College London**, Resilient Robotic Autonomy, 2021. Invited talk.
- [IT11] K. Alexis, **AI4 Good, United Nations**, CERBERUS in the DARPA Subterranean Challenge, 2021. Invited talk.
- [IT12] K. Alexis, **Czech Technical University in Prague**, CERBERUS in the DARPA Subterranean Challenge, 2022. Invited talk.
- [IT13] K. Alexis, **AMOS Centre, Norway**, CERBERUS in the DARPA Subterranean Challenge, 2022. Invited talk.
- [IT14] K. Alexis, **Faktry Start-up Space, Norway**, Technologies for Multi-modal Simultaneous Localization And Mapping, 2022. Invited talk.

Academic Service Activities (other than reviewing or hiring)

- 1 Treasurer, IEEE Section Northern Nevada (2017–2020).
- 2 Member of the Graduate Committee of the Computer Science & Engineering Department of the University of Nevada, Reno (2016-2019).
- 3 Colloquia Talks lead and organizer of the Robotics Short Seminars at the University of Nevada, Reno. Indicative list of speakers: Prof. Dr. Marco Hutter (ETH Zurich), Prof. Dr. Randal Beard (Brigham Young University), Prof. Dr. Mark Mueller (University of California, Berkeley), Dr. Sebastian Scherer (Carnegie Mellon University).

Indicative Reviewing Activities

Editorial boards

- 1 Associate Editor, The International Journal of Robotics Research
- 2 Associate Editor, IEEE Transaction on Robotics (T-RO), IEEE
- 3 Guest Editor, Journal of Intelligent and Robotic Systems, Springer.
- 4 Special Issue Editor, Field Robotics, Special Issue on the DARPA Subterranean Challenge Finals (upcoming)
- 5 Associate Editor, IEEE International Conference on Robotics and Automation (ICRA)

- 6 Program Chair, International Conference on Unmanned Aircraft Systems (ICUAS), 2020
- 7 Senior Program Committee, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2020

Grants

- 1 Reviewer for the European Research Council (ERC)
- 2 Reviewer for the National Science Foundation (NSF)
- 3 Reviewer for Natural Sciences and Engineering Research Council (NSERC)
- 4 Reviewer in multiple projects of the National Research Fund in Luxembourg (FNR)
- 5 Reviewer for the National Defense Science & Engineering Graduate Fellowship (NDSEG)
- 6 Reviewer for the Science Foundation Ireland (SFI)

Journals

- 1 IEEE Transactions on Robotics (T-RO)
- 2 Science Robotics
- 3 Journal of Field Robotics (JFR) / Field Robotics
- 4 International Journal of Robotics Research (IJRR)
- 5 Automatica, Elsevier
- 6 Control Engineering Practice Journal, Elsevier
- 7 IEEE Transactions on Control Systems Technology
- 8 IET Control Theory & Applications
- 9 IEEE Transactions on Mechatronics
- 10 Journal of Intelligent and Robotic Systems, Springer

Conferences

- 1 IEEE International Conference on Robotics and Automation (ICRA)
- 2 IEEE/RSJ Conference on Intelligent Robots and Systems (IROS)
- 3 Robotics, Science and Systems (RSS)
- 4 American Control Conference (ACC)
- 5 European Control Conference (ECC)
- 6 IEEE International Symposium on Industrial Electronics (ISIE)
- 7 IFAC World Congress
- 8 IEEE Conference on Control Applications (CCA)
- 9 International Conference on Advanced Robotics (ICAR)
- 10 IEEE Annual Conference on Decision and Control (CDC)

Books

- 1 Reviewer for Springer–Verlag books

Hiring Committee Experience

- 1 Assistant Professor, Advanced Manufacturing Systems (Computer Science and Engineering, Robotics Mobility), Chair, 2019
- 2 Research Assistant Professor on Autonomous Robots, Chair, 2018
- 3 Assistant Professor, Computer Science & Engineering, Member, 2017
- 4 Lecturer, Computer Science & Engineering, Member, 2017

Membership in Scientific and Technical Organizations

- 1 Member of the Institute of Electrical and Electronics Engineers (Member of the Control Systems Society and Robotics and Automation Society)
- 2 Member of the Technical Chamber of Greece (No: 115009)

Programming and other Hands-on Experience

- 1 C++, C, Mixed C++ & C programming especially for robotics, control systems, signal processing, optimization strategies, perception and planning algorithms. Extensive experience with data structures theory and implementation, usage of standard and domain-specific libraries, as well as complexity analysis.
- 2 Embedded Microprocessors programming including ARM, AVR, and PIC.
- 3 Programming and using the Robot Operating System (ROS) middleware alongside the most relevant libraries including OpenCV, Boost, Eigen etc.
- 4 Hardware interfacing and driver writing.
- 5 Project-based development & GUI design (Qt Framework).
- 6 Cross-Platform Development (CMake).
- 7 Design control systems using MATLAB, its Embedded Coder and a variety of optimization-related software (e.g. YALMIP, MPT, FORCES, SeDuMi, CVX).
- 8 Python scripting and mixed Python & C++
- 9 Design control systems using LabVIEW.
- 10 Experience in CAD Design and 3D printing/Milling (mostly using Solidworks).

Languages

English	Excellent
Norwegian	Advanced
Greek	Mother tongue

Reference Contacts

- Prof. Dr. Roland Siegwart, ETH Zurich, rsiegwart@ethz.ch, [Website](#)
- Prof. Dr. Sebastien Scherer, Carnegie Mellon University, basti@andrew.cmu.edu, [Website](#)
- Prof. Dr. Antonio Franchi, University of Twente, a.franchi@utwente.nl, [Website](#)

more references, or references from specific domains, are available upon request.