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Cristian-Ioan Vasile

Research Interests

My research goal is enabling *autonomy* in robotic systems. I focus on automated synthesis and decision making, explainability, scalability, and learning, with emphasis on deployment on physical robots. I leverage methods from motion planning, formal methods, automata-theory, machine learning, and control engineering. I am interested in:

- automated synthesis and decision making under uncertainty
- planning with robust and relaxed specifications
- large-scale planning based on composition and contracts
- planning for large fleets of robots
- reinforcement learning with temporal logic goals for continuous domains
- temporal logic inference from time-series data

Education

2012–2016 **PhD**, *Hybrid and Networked Systems (HyNeSs) Group, BU Robotics Lab, Division of Systems Engineering, College of Engineering, Boston University*, Advisor: Calin Belta
Systems Engineering, *GPA: 4.0/4.0*
Thesis: *Motion Planning and Control: a Formal Methods Approach*

2011–2015 **PhD**, *Department of Automatic Control and Systems Engineering, Politehnica University of Bucharest*, Advisor: Ioan Dumitrache
Control Engineering, *GPA: 10.00*
Thesis: *Distributed Control for Multi-Robot Systems*

2009–2011 **Master**, *Department of Automatic Control and Systems Engineering, Politehnica University of Bucharest*
Intelligent Control Systems, *GPA: 10.00*
Thesis: *Chidori Architecture – Distributed Control for Multi-robot Systems*, Thesis advisor: Cătălin Buiu

2005–2009 **Bachelor**, *Faculty of Automatic Control and Computers, Politehnica University of Bucharest*
Computer Science, focus on Embedded Systems, *GPA: 9.49*
Thesis: *Software system for collaborative robotics applications*, Thesis advisor: Cătălin Buiu

Academic Appointments

Aug 2019– **Assistant Professor**, *Department of Mechanical Engineering and Mechanics, Lehigh University*

2019– **Courtesy Appointment**, *Department of Computer Science and Engineering, Lehigh University*

Research Experience

2016–2019 **Postdoctoral Associate**, *Massachusetts Institute of Technology (MIT)*
Advisor: Sertac Karaman, Laboratory for Information and Decision Systems (LIDS)
Advisor: Daniela Rus, Distributed Robotics Laboratory, Computer Science and Artificial Intelligence Laboratory (CSAIL)

2016 **Visiting PhD Student**, *Laboratory for Information and Decision Systems (LIDS), Massachusetts Institute of Technology (MIT)*, Advisor: Sertac Karaman

2013–2016 **Research Assistant**, *Hybrid and Networked Systems (HyNeSs) Group, BU Robotics Lab, Boston University*, Advisor: Calin Belta

2007–2012 **Volunteer Researcher**, *Laboratory of Natural Computing and Robotics, Politehnica University of Bucharest*, Advisors: Ioan Dumitrache and Cătălin Buiu

Research Fellowships and Summer Schools

Mar 2012 *Research Fellowship*, Faculty of Philosophy and Science in Opava, Silesian University in Opava, Czech Republic – reference: Prof Jozef Kelemen, PhD

Sep 2011 *First International School on Biomolecular and Biocellular Computing*, Osuna, Spain – awarded tuition, travel and accommodation grant – reference: Prof Miguel A. Gutiérrez, PhD, ISBBC2011

Sep 2010 *Neural Dynamics Approaches to Cognitive Robotics*, Ruhr-Universität, Bochum, Germany – awarded tuition, travel and accommodation grant – reference: Prof Gregor Schöner, PhD, Neural Dynamics 2010

Jul 2010 1^{st} *Cooperative Cognitive Control for Autonomous Underwater Vehicles*, Jacobs University, Bremen, Germany – awarded tuition and accommodation grant – reference: Prof Kaustubh Pathak, PhD, and Prof Andreas Birk, PhD, Co3-AUVs 2010

Grant Awards

2023– Tactical Edge Reprogramming for Rapid Autonomy Adaptation (TERRAA), 2023-, MIT Lincoln Lab Line Project (Prime: US DoD-Air Force), Role: PI (LU, share: $100k), Collaborators: Ho Chit Siu (MIT LL)

2021– Multi-Application Explainable and Safe Temporal Logic for Reward-based Objectives (MAESTRO), 2021-, MIT Lincoln Lab Line Project (Prime: US DoD-Air Force), Role: PI (LU, share: $165k), Collaborators: Calin Belta (PI, BU), Roberto Tron (PI, BU), Kevin Leahy (MIT LL), Zachary Serlin (MIT LL)

2019–2021 Inter-and Intra-Team Coordination from High-Level Specification (IITCHS), 2019-2021, MIT Lincoln Lab Line Project (Prime: US DoD-Air Force), Role: PI (LU, share: $160k), Collaborators: Calin Belta (PI, BU), Roberto Tron (PI, BU), Kevin Leahy (MIT LL)

2021 Autonomous Planning and Control for Versatile Aerial Robots in Difficult Environments, 2021-2022, LU CORE, Role: PI (share: $20k), Collaborators: Nader Motee (PI, LU), David Saldana (PI, LU)

2024 Self-driving cars in urban environments with traffic, 2024, LU MTSE + RARE, Role: PI (share: $13k)

2023 Self-driving cars in urban environments with traffic, 2023, LU MTSE + STEM SI, Role: PI (share: $13k)

2022 Self-driving cars in urban environments with traffic, 2022, LU MTSE + RARE, Role: PI (share: $13k)

2021 Self-driving cars in urban environments with traffic, 2021, LU MTSE + RARE, Role: PI (share: $13k)

2020 Testbed for self-driving cars in urban environments with traffic, 2020, LU MTSE, Role: PI (share: $11k)

Awards

- **BU Dean's Fellow**, 2012–2013, Division of Systems Engineering, College of Engineering, Boston University.
- **Roberto Rocca Scholarship**, 2010-2011, Roberto Rocca Educational Program, TenarisSilcotub. It is a merit-based award for academic excellence and leadership awarded via a national selection process.

- **NSF Student Travel Award**, IEEE International Conference on Robotics and Automation (ICRA) 2014 in Hong Kong, China.
- **SE PhD Student Travel Award**, Systems Engineering Division, Boston University: [54] IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2013 in Tokyo, Japan; [50] European Control Conference (ECC) 2015 in Linz, Austria.
- **Academic Scholarship**, 2005-2011, from the Polihenica University of Bucharest. I received a merit-based scholarship during my undergraduate and graduate studies (5.5 years), where performance was evaluated each semester.
- **Awards for Publication**, Romanian National Council of Scientific Research for [21] and [20].

Publications

Books &Chapters

[B1] Kevin Leahy, Dingjiang Zhou, **Cristian Ioan Vasile**, Konstantinos Oikonomopoulos, Mac Schwager, and Calin Belta. Provably correct persistent surveillance for unmanned aerial vehicles subject to charging constraints. In M. Ani Hsieh, Oussama Khatib, and Vijay Kumar, editors, *Experimental Robotics*, volume 109 of *Springer Tracts in Advanced Robotics*, pages 605–619. Springer International Publishing, 2016. isbn: 978-3-319-23777-0, link.

[B2] Ana Brânduşa Pavel, **Cristian Ioan Vasile**, and Ioan Dumitrache. Membrane computing in robotics. In Jozef Kelemen, Jan Romportl, and Eva Zackova, editors, *Beyond Artificial Intelligence: Contemplations, Expectations, Applications*, volume 4 of *Topics in Intelligent Engineering and Informatics (special issue: Beyond Artificial Intelligence)*, pages 125–136. Springer, Berlin, Heidelberg, 2013. isbn: 978-3-642-34422-0, doi:10.1007/978-3-642-34422-0_9.

[B3] Ana Brânduşa Pavel, **Cristian Ioan Vasile**, and Cătălin Buiu. *Biomathematics and Bioinformatics – Concepts and Applications*. Editura Universitară, Bucharest, Romania, 2011. isbn: 978-606-591-178-9, in Romanian.

[B4] Cătălin Buiu, Ana Brânduşa Pavel, and **Cristian Ioan Vasile**. *Cognitive Robots – Bio-inspired Applications*. Editura Universitară, Bucharest, Romania, 2010. isbn: 978-973-749-835-9, in Romanian.

[B5] Ana Brânduşa Pavel and **Cristian Ioan Vasile**. *Cognitive Robots – Concepts, Architecures, Applications*, chapter II: Robots with cognitive vision. Case study – ReMaster One robot, pages 35–97. Editura Universitară, Bucharest, Romania, 2008. isbn: 978-973-749-443-6, in Romanian.

Journal Articles

[J1] **Cristian Ioan Vasile**, Jana Tumova, Sertac Karaman, Calin Belta, and Daniela Rus. Optimal route planning with multiple temporal logic transportation requests. *IEEE Transactions on Robotics*. (submitted).

[J2] Gustavo A. Cardona and **Cristian Ioan Vasile**. Planning for Heterogeneous Teams of Robots with Temporal Logic, Capability, and Resource Constraints. *International Journal of Robotics Research*, 2024. doi:10.1177/02783649241247285.

[J3] Mingyu Cai, Erfan Aasi, **Cristian Ioan Vasile**, and Calin Belta. Overcoming Exploration: Deep Reinforcement Learning for Continuous Control in Cluttered Environments from Temporal Logic Specifications. *IEEE Robotics and Automation Letters*, 8(4):2158–2165, April 2023. doi:10.1109/LRA.2023.3246844.

[J4] Kevin Leahy, Zachary Serlin, **Cristian Ioan Vasile**, Andrew Schoer, Austin M. Jones, Roberto Tron, and Calin Belta. Scalable and Robust Algorithms for Task-Based Coordination From High-Level Specifications (ScRATCHeS). *IEEE Transactions on Robotics*, 38(4):2516–2535, August 2022. doi:10.1109/TRO.2021.3130794.

[J5] Mingyu Cai, Kevin Leahy, Zachary Serlin, and **Cristian Ioan Vasile**. Probabilistic Coordination of Heterogeneous Teams From Capability Temporal Logic Specifications. *IEEE Robotics and Automation Letters*, 7(2):1190–1197, April 2022. doi:10.1109/LRA.2021.3138766.

[J6] Kevin Leahy, Austin Jones, and **Cristian Ioan Vasile**. Fast Decomposition of Temporal Logic Specifications for Heterogeneous Teams. *IEEE Robotics and Automation Letters*, 7(2):2297–2304, April 2022. doi:10.1109/LRA.2022.3143304.

[J7] Xiao Li, Guy Rosman, Igor Gilitschenski, Brandon Araki, **Cristian Ioan Vasile**, Sertac Karaman, and Daniela Rus. Learning An Explainable Trajectory Generator Using The Automaton Generative Network (AGN). *IEEE Robotics and Automation Letters*, 7(2):984–991, April 2022. doi:10.1109/LRA.2021.3135940.

[J8] Noushin Mehdipour, **Cristian Ioan Vasile**, and Calin Belta. Specifying User Preferences using Weighted Signal Temporal Logic. *IEEE Control Systems Letters*, 5(6):2006–2011, December 2021. doi:10.1109/LCSYS.2020.3047362.

[J9] Brandon Araki, Kiran Vodrahalli, Thomas Leech, **Cristian Ioan Vasile**, Mark Donahue, and Daniela Rus. Learning and Planning with Logical Automata. *Autonomous Robots*, 45(7):1013–1028, October 2021. doi:10.1007/s10514-021-09993-6.

[J10] Xiao Li, Guy Rosman, Igor Gilitschenski, **Cristian Ioan Vasile**, Jonathan A. DeCastro, Sertac Karaman, and Daniela Rus. Vehicle Trajectory Prediction Using Generative Adversarial Network With Temporal Logic Syntax Tree Features. *IEEE Robotics and Automation Letters*, 6(2):3459–3466, April 2021. doi:10.1109/LRA.2021.3062807.

[J11] **Cristian Ioan Vasile**, Xiao Li, and Calin Belta. Reactive Sampling-Based Path Planning with Temporal Logic Specifications. *International Journal of Robotics Research*, 39(8):1002–1028, June 2020. doi:10.1177/0278364920918919.

[J12] Kevin Leahy, Eric Cristofalo, **Cristian Ioan Vasile**, Austin Jones, Eduardo Montijano, Mac Schwager, and Calin Belta. Control in Belief Space with Temporal Logic Specifications using Vision-based Localization. *International Journal of Robotics Research*, 38(6):702–722, May 2019. doi:10.1177/0278364919846340.

[J13] **Cristian Ioan Vasile**, Mac Schwager, and Calin Belta. Translational and Rotational Invariance in Networked Dynamical Systems. *IEEE Transactions on Control of Network Systems*, 5(3):822–832, September 2018. doi:10.1109/TCNS.2017.2648499.

[J14] **Cristian Ioan Vasile**, Derya Aksaray, and Calin Belta. Time Window Temporal Logic. *Theoretical Computer Science*, 691(Supplement C):27–54, August 2017. doi:10.1016/j.tcs.2017.07.012.

[J15] Kevin Leahy, Dingjiang Zhou, **Cristian Ioan Vasile**, Konstantinos Oikonomopoulos, Mac Schwager, and Calin Belta. Persistent Surveillance for Unmanned Aerial Vehicles Subject to Charging and Temporal Logic Constraints. *Autonomous Robots*, 40(8):1363–1378, December 2016. doi:10.1007/s10514-015-9519-z.

[J16] Ana Brânduşa Pavel and **Cristian Ioan Vasile**. Identifying cancer type specific oncogenes and tumor suppressors using limited size data. *Journal of Bioinformatics and Computational Biology*, 14(6):1–16, December 2016. doi:10.1142/S0219720016500311.

[J17] **Cristian Ioan Vasile**, Ana Brânduşa Pavel, and Ioan Dumitrache. Universality of Enzymatic Numerical P Systems. *International Journal of Computer Mathematics (special issue: Membrane Computing)*, 90(4):869–879, February 2013. doi: 10.1080/00207160.2012.748897.

[J18] **Cristian Ioan Vasile**, Ana Brânduşa Pavel, Ioan Dumitrache, and Gheorghe Păun. On the Power of Enzymatic Numerical P Systems. *Acta Informatica*, 49(6):395–412, September 2012. if=0.809, doi:10.1007/s00236-012-0166-y.

[J19] Cătălin Buiu, **Cristian Ioan Vasile**, and Octavian Arsene. Development of membrane controllers for mobile robots. *Information Sciences*, 187:33–51, March 2012. if=2.833, doi:10.1016/j.ins.2011.10.007.

[J20] Ana Brânduşa Pavel and **Cristian Ioan Vasile**. PyElph – a Software Tool for Gel Images Analysis and Phylogenetics. *BMC Bioinformatics*, 13(9), January 2012. if=3.03, doi:10.1186/1471-2105-13-9 (Open Access).

[J21] **Cristian Ioan Vasile** and Cătălin Buiu. A software system for collaborative robotics applications and its application in particle swarm optimization implementations. *Applied Soft Computing*, 11(8):5498–5507, December 2011. if=2.084, doi:10.1016/j.asoc.2011.05.009.

[J22] **Cristian Ioan Vasile** and Alexandru Constantinescu. On the quotient criterion. *Gazeta Matematică*, CX(9):420–422, 2005. in Romanian.

Conference Articles

[C1] Kaier Liang, Mingyu Cai, and **Cristian Ioan Vasile**. Control Barrier Function for Linearizable Systems with High Relative Degrees from Signal Temporal Logics: A Reference Governor Approach. In *American Control Conference (ACC)*, Toronto, Canada, July 2024.

[C2] Disha Kamale and **Cristian Ioan Vasile**. Optimal Control Synthesis with Relaxed Global Temporal Logic Specifications for Homogeneous Multi-robot Teams. In *IEEE International Conference on Robotics and Automation (ICRA)*, Yokohama, Japan, May 2024.

[C3] Kaier Liang, Gustavo A. Cardona, and **Cristian Ioan Vasile**. An Iterative Approach for Heterogeneous Multi-Agent Route Planning with Temporal Logic Goals and Travel Duration Uncertainty. In *IEEE International Conference on Robotics and Automation (ICRA)*, Yokohama, Japan, May 2024.

[C4] Ahmad Ahmad, **Cristian Ioan Vasile**, Roberto Tron, and Calin Belta. Robustness Measures and Monitors for Time Window Temporal Logic. In *IEEE Conference on Decision and Control (CDC)*, pages 6841–6846, Singapore, December 2023. doi:10.1109/CDC49753.2023.10383712.

[C5] Disha Kamale, Sofie Haesaert, and **Cristian Ioan Vasile**. Energy-Constrained Active Exploration Under Incremental-Resolution Symbolic Perception. In *IEEE Conference on Decision and Control (CDC)*, pages 6863–6868, Singapore, December 2023. doi:10.1109/CDC49753.2023.10383606.

[C6] Kaier Liang and **Cristian Ioan Vasile**. Distributed Fair Assignment and Rebalancing for Mobility-on-Demand Systems via an Auction-based Method. In *International Symposium on Multi-Robot and Multi-Agent Systems (MRS)*, pages 128–134, Boston, MA, USA, December 2023. doi:10.1109/MRS60187.2023.10416781.

[C7] Gustavo A. Cardona and **Cristian Ioan Vasile**. Preferences on Partial Satisfaction using Weighted Signal Temporal Logic Specifications. In *European Control Conference (ECC)*, pages 1–6, Bucharest, Romania, July 2023. doi:10.23919/ECC57647.2023.10178201.

[C8] Erfan Aasi, Mingyu Cai, **Cristian Ioan Vasile**, and Calin Belta. Time-Incremental Learning of Temporal Logic Classifiers Using Decision Trees. In *Learning for Dynamics and Control Conference (L4DC)*, pages 547–559, Philadelphia, PA, USA, June 2023. link.

[C9] Mingyu Cai, Makai Mann, Zachary Serlin, Kevin Leahy, and **Cristian Ioan Vasile**. Learning Minimally-Violating Continuous Control for Infeasible Linear Temporal Logic Specifications. In

American Control Conference (ACC), pages 1446–1452, San Diego, California, USA, May 2023. doi:10.23919/ACC55779.2023.10156544.

[C10] Gustavo A. Cardona, Disha Kamale, and **Cristian Ioan Vasile**. Mixed Integer Linear Programming Approach for Control Synthesis with Weighted Signal Temporal Logic. In *ACM Hybrid Systems: Computation and Control (HSCC)*, pages 1–12, San Antonio, TX, USA, May 2023. doi:10.1145/3575870.3587120.

[C11] Gustavo A. Cardona, Kevin Leahy, and **Cristian Ioan Vasile**. Temporal Logic Swarm Control with Splitting and Merging. In *IEEE International Conference on Robotics and Automation (ICRA)*, pages 12423–12429, London, UK, May 2023. doi:10.1109/ICRA48891.2023.10160335.

[C12] Disha Kamale, Sofie Haesaert, and **Cristian Ioan Vasile**. Cautious Planning with Incremental Symbolic Perception: Designing Verified Reactive Driving Maneuvers. In *IEEE International Conference on Robotics and Automation (ICRA)*, pages 1652–1658, London, UK, May 2023. doi:10.1109/ICRA48891.2023.10160960.

[C13] Kevin Leahy, Makai Mann, and **Cristian Ioan Vasile**. Rewrite-Based Decomposition of Signal Temporal Logic Specifications. In *NASA Formal Methods*, pages 224–240, Houston, TX, USA, May 2023. doi:10.1007/978-3-031-33170-1_14.

[C14] Danyang Li, Mingyu Cai, **Cristian Ioan Vasile**, and Roberto Tron. Learning Signal Temporal Logic through Neural Network for Interpretable Classification. In *American Control Conference (ACC)*, pages 1907–1914, San Diego, California, USA, May 2023. doi:10.23919/ACC55779.2023.10156357.

[C15] Guangyi Liu, Disha Kamale, **Cristian Ioan Vasile**, and Nader Motee. Symbolic Perception Risk in Autonomous Driving. In *American Control Conference (ACC)*, pages 4077–4082, San Diego, California, USA, May 2023. doi:10.23919/ACC55779.2023.10155904.

[C16] Gustavo A. Cardona, David Saldana, and **Cristian Ioan Vasile**. Planning for Modular Aerial Robotic Tools With Temporal Logic Constraints. In *IEEE Conference on Decision and Control (CDC)*, pages 2878–2883, Cancun, Mexico, December 2022. doi:10.1109/CDC51059.2022.9993288.

[C17] Erfan Aasi, **Cristian Ioan Vasile**, Mahroo Bahreinian, and Calin Belta. Classification of Time-Series Data Using Boosted Decision Trees. In *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 1263–1268, Kyoto, Japan, October 2022. 10.1109/IROS47612.2022.9982105.

[C18] Kaier Liang and **Cristian Ioan Vasile**. Fair Planning for Mobility-on-Demand with Temporal Logic Requests. In *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 1283–1289, Kyoto, Japan, October 2022. 10.1109/IROS47612.2022.9981291.

[C19] Gustavo A. Cardona and **Cristian Ioan Vasile**. Partial Satisfaction of Signal Temporal Logic Specifications for Coordination of Multi-Robot Systems. In *Workshop on the Algorithmic Foundations of Robotics (WAFR)*, pages 1–16, College Park, Maryland, June 2022.

[C20] Jesper Karlsson, Anastasiia Varava, **Cristian Ioan Vasile**, Sertac Karaman, Danica Kragic, Daniela Rus, and Jana Tumova. When to Terminate: Path-non Existence Verification Improves Sampling-based Motion Planning. In *International Conference on Advanced Robotics (ICAR)*, pages 594–600, Ljubljana, Slovenia, December 2021. doi:10.1109/ICAR53236.2021.965945.

[C21] Xiao Li, Jonathan DeCastro, **Cristian Ioan Vasile**, Sertac Karaman, and Daniela Rus. Learning A Risk-Aware Trajectory Planner From Demonstrations Using Logic Monitor. In *Conference on Robot Learning (CoRL)*, London, UK, November 2021. link.

[C22] Gustavo A. Cardona, Diego S. D'Antonio, **Cristian Ioan Vasile**, and David Saldaña. Non-Prehensile Manipulation of Cuboid Objects Using a Catenary Robot. In *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 5270–5275, Virtual, October 2021. doi:10.1109/IROS51168.2021.9636820.

[C23] Disha Kamale, Eleni Karyofylli, and **Cristian Ioan Vasile**. Automata-based Optimal Planning with Relaxed Specifications. In *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 6525–6530, Virtual, October 2021. doi:10.1109/IROS51168.2021.9635906.

[C24] Erfan Aasi, **Cristian Ioan Vasile**, and Calin Belta. A Control Architecture for Provably-Correct Autonomous Driving. In *American Control Conference (ACC)*, pages 2913–2918, New Orleans, LA, USA, May 2021. doi:10.23919/ACC50511.2021.9482810.

[C25] Xiao Li, Guy Rosman, Igor Gilitschenski, Jonathan DeCastro, **Cristian Ioan Vasile**, Sertac Karaman, and Daniela Rus. Differentiable Logic Layer for Rule Guided Trajectory Prediction. In *Conference on Robot Learning (CoRL)*, Virtual Conference, November 2020. link.

[C26] Brandon Araki, Kiran Vodrahalli, Thomas Leech, **Cristian Ioan Vasile**, Mark Donahue, and Daniela Rus. Deep Bayesian Nonparametric Learning of Rules and Plans from Demonstrations with a Learned Automaton Prior. *Procedings of the AAAI Conference on Artificial Intellifence*, 34(06):10026–10034, February 2020. doi:10.1609/aaai.v34i06.6559.

[C27] Francisco Penedo, **Cristian Ioan Vasile**, and Calin Belta. Language-Guided Sampling-based Planning using Temporal Relaxation. In Ken Goldberg, Pieter Abbeel, Kostas Bekris, and Lauren Miller, editors, *Algorithmic Foundations of Robotics XII: Proceedings of the Twelfth Workshop on the Algorithmic Foundations of Robotics*, pages 128–143, Cham, 2020. Springer International Publishing.

[C28] Noushin Mehdipour, **Cristian Ioan Vasile**, and Calin Belta. Average-based Robustness for Continuous-Time Signal Temporal Logic. In *IEEE Conference on Decision and Control (CDC)*, pages 5312–5317, Nice, France, December 2019. doi:10.1109/CDC40024.2019.9029989.

[C29] Alessio Mosca, **Cristian Ioan Vasile**, Calin Belta, and Davide M. Raimondo. Multi-robot routing and scheduling with temporal logic and synchronization constraints. In *IEEE International Conference on Control and Robot Technology (ICCRT)*, pages 40–45, Jeju Island, South Korea, December 2019. doi:10.1145/3387304.3387322.

[C30] Austin M Jones, Kevin Leahy, **Cristian Ioan Vasile**, Sadra Sadradinni, Zachary Serlin, Roberto Tron, and Calin Belta. Scalable and Robust Deployment of Heterogenenous Teams from Temporal Logic Specifications. In *International Symposium on Robotics Research (ISRR)*, pages 224–241, Hanoi, Vietnam, October 2019. doi:10.1007/978-3-030-95459-8_14.

[C31] Noushin Mehdipour, **Cristian Ioan Vasile**, and Calin Belta. Arithmetic-Geometric Mean Robustness for Control from Signal Temporal Logic Specifications. In *American Control Conference (ACC)*, pages 1690–1695, Philadelphia, PA, USA, July 2019. doi:10.23919/ACC.2019.8814487.

[C32] Brandon Araki, Kiran Vodrahalli, Thomas Leech, **Cristian Ioan Vasile**, Mark Donahue, and Daniela Rus. Learning to Plan with Logical Automata. In *Robotics: Science and Systems Conference (RSS)*, pages 1–9, Messe Freiburg, Germany, June 2019. link.

[C33] Alyssa Pierson, **Cristian Ioan Vasile**, Anshula Gandhi, Wilko Schwarting, Sertac Karaman, and Daniela Rus. Dynamic Risk Density for Autonomous Navigation in Cluttered Environments without Object Detection. In *IEEE International Conference on Robotics and Automation (ICRA)*, pages 5807–5814, Montreal, Canada, May 2019. doi:10.1109/ICRA.2019.8793813.

[C34] Jonathan A. DeCastro, Lucas Liebenwein, **Cristian Ioan Vasile**, Russ Tedrake, Sertac Karaman, and Daniela Rus. Counterexample-Guided Safety Contracts for Autonomous Driving. In *Workshop*

on the Algorithmic Foundations of Robotics (WAFR), pages 1–16, Merida, Mexico, December 2018. link.

[C35] Curtis Madsen, Prashant Vaidyanathan, Sadra Sadraddini, **Cristian Ioan Vasile**, Nicholas A. DeLateur, Ron Weiss, Douglas Densmore, and Calin Belta. Metrics for Signal Temporal Logic Formulae. In *IEEE Conference on Decision and Control (CDC)*, pages 1542–1547, Miami Beach, FL, USA, December 2018. doi:10.1109/CDC.2018.8619541.

[C36] Alessandro Abate, Henk Blom, Nathalie Cauchi, Sofie Haesaert, Arnd Hartmanns, Kendra Lesser, Meeko Oishi, Vignesh Sivaramakrishnan, Sadegh Soudjani, **Cristian Ioan Vasile**, and Abraham P. Vinod. ARCH-COMP18 Category Report: Stochastic Modelling. In *ADHS Applied Verification for Continuous and Hybrid Systems (ARCH) Workshop*, pages 71–103, Oxford, UK, July 2018. doi:10.29007/7ks7.

[C37] Sofie Haesaert, Petter Nilsson, **Cristian Ioan Vasile**, Rohan Thakker, Ali-akbar Agha-mohammadi, Aaron D. Ames, and Richard M. Murray. Temporal Logic Control of POMDPs via Label-based Stochastic Simulation Relations. In *IFAC Conference on Analysis and Design of Hybrid Systems (ADHS)*, pages 271–276, Oxford, UK, July 2018. doi:10.1016/j.ifacol.2018.08.046.

[C38] Petter Nilsson, Sofie Haesaert, Rohan Thakker, Kyohei Otsu, **Cristian Ioan Vasile**, Ali-akbar Agha-mohammadi, Richard M. Murray, and Aaron D. Ames. Toward Specification-Guided Active Mars Exploration for Cooperative Robot Teams. In *Robotics: Science and Systems Conference (RSS)*, pages 1–9, Pittsburgh, Pennsylvania, USA, June 2018. link.

[C39] Jesper Karlsson, **Cristian Ioan Vasile**, Jana Tumova, Sertac Karaman, and Daniela Rus. Multi-vehicle motion planning for social optimal mobility-on-demand. In *IEEE International Conference on Robotics and Automation (ICRA)*, pages 7298–7305, Brisbane, Australia, May 2018. doi:10.1109/ICRA.2018.8462968.

[C40] Lucas Liebenwein, Wilko Schwarting, **Cristian Ioan Vasile**, Jonathan DeCastro, Javier Alonso-Mora, Sertac Karaman, and Daniela Rus. Compositional and Contract-based Verification for Autonomous Driving on Road Networks. In *International Symposium on Robotics Research (ISRR)*, pages 163–181, Puerto Varas, Chile, December 2017. doi:10.1007/978-3-030-28619-4_18.

[C41] Xiao Li, **Cristian Ioan Vasile**, and Calin Belta. Reinforcement Learning With Temporal Logic Rewards. In *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 3834–3839, Vancouver, BC, Canada, September 2017. doi:10.1109/IROS.2017.8206234.

[C42] **Cristian Ioan Vasile**, Vasumathi Raman, and Sertac Karaman. Sampling-based Synthesis of Maximally-Satisfying Controllers for Temporal Logic Specifications. In *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 3840–3847, Vancouver, BC, Canada, September 2017. doi:10.1109/IROS.2017.8206235.

[C43] **Cristian Ioan Vasile**, Jana Tumova, Sertac Karaman, Calin Belta, and Daniela Rus. Minimum-violation scLTL motion planning for mobility-on-demand. In *IEEE International Conference on Robotics and Automation (ICRA)*, pages 1481–1488, Singapore, May 2017. doi:10.1109/ICRA.2017.7989177.

[C44] **Cristian Ioan Vasile**, Kevin Leahy, Eric Cristofalo, Austin Jones, Mac Schwager, and Calin Belta. Control in Belief Space with Temporal Logic Specifications. In *IEEE Conference on Decision and Control (CDC)*, pages 7419–7424, Las Vegas, NV, USA, December 2016. doi:10.1109/CDC.2016.7799415.

[C45] Eric Cristofalo, Kevin Leahy, **Cristian Ioan Vasile**, Eduardo Montijano, Mac Schwager, and Calin Belta. Localization of a Ground Robot by Aerial Robots for GPS-deprived Control with

Temporal Logic Constraints. In *International Symposium on Experimental Robotics (ISER)*, pages 525–537, Tokyo, Japan, October 2016. doi:10.1007/978-3-319-50115-4_46.

[C46] Curtis Madsen, Prashant Vaidyanathan, **Cristian Ioan Vasile**, Rachael Ivison, Junmin Wang, Calin Belta, and Douglas Densmore. Utilizing Signal Temporal Logic to Characterize and Compose Modules in Synthetic Biology. In *International Workshop on Biodesign Automation (IWBDA)*, pages 71–73, Newcastle University, Newcastle upon Tyne, UK, August 2016. link.

[C47] Prashant Vaidyanathan, Evan Appleton, Curtis Madsen, **Cristian Ioan Vasile**, Alan Pacheco, Iman Haghighi, Nicholas Roehner, Rachael Ivison, Junmin Wang, Yash Agarwal, Zachary Chapasko, Calin Belta, and Douglas Densmore. Genetic Systems Engineering. In *International Workshop on Biodesign Automation (IWBDA)*, pages 25–26, Newcastle University, Newcastle upon Tyne, UK, August 2016. link.

[C48] Derya Aksaray, **Cristian Ioan Vasile**, and Calin Belta. Dynamic Routing of Energy-Aware Vehicles with Temporal Logic Constraints. In *IEEE International Conference on Robotics and Automation (ICRA)*, pages 3141–3146, Stockholm, Sweden, May 2016. doi:10.1109/ICRA.2016.7487481.

[C49] Giuseppe Bombara, **Cristian Ioan Vasile**, Francisco Penedo Alvarez, Hirotoshi Yasuoka, and Calin Belta. A Decision Tree Approach to Data Classification using Signal Temporal Logic. In *Hybrid Systems: Computation and Control (HSCC)*, pages 1–10, Vienna, Austria, April 2016. doi:10.1145/2883817.2883843.

[C50] **Cristian Ioan Vasile**, Mac Schwager, and Calin Belta. SE(N) Invariance in Networked Systems. In *European Control Conference (ECC)*, pages 186–191, Linz, Austria, July 2015. doi:10.1109/ECC.2015.7330544.

[C51] **Cristian Ioan Vasile** and Calin Belta. An Automata-Theoretic Approach to the Vehicle Routing Problem. In *Robotics: Science and Systems Conference (RSS)*, pages 1–9, Berkeley, California, USA, July 2014. link.

[C52] Kevin Leahy, Dingjiang Zhou, **Cristian Ioan Vasile**, Konstantinos Oikonomopoulos, Mac Schwager, and Calin Belta. Provably Correct Persistent Surveillance for Unmanned Aerial Vehicles Subject to Charging Constraints. In *International Symposium on Experimental Robotics (ISER)*, pages 605–619, Marrakech/Essaouira, Morocco, June 2014. doi:10.1007/978-3-319-23778-7_40.

[C53] **Cristian Ioan Vasile** and Calin Belta. Reactive Sampling-Based Temporal Logic Path Planning. In *IEEE International Conference on Robotics and Automation (ICRA)*, pages 4310–4315, Hong Kong, China, June 2014. doi:10.1109/ICRA.2014.6907486.

[C54] **Cristian Ioan Vasile** and Calin Belta. Sampling-Based Temporal Logic Path Planning. In *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 4817–4822, Tokyo, Japan, November 2013. doi:10.1109/IROS.2013.6697051.

[C55] Ana Brânduşa Pavel, **Cristian Ioan Vasile**, and Ioan Dumitrache. Robot localization implemented with enzymatic numerical P systems. In *Proc. of the Living Machines 2012: The International Conference on Biomimetic and Biohybrid Systems*, volume 7375 of *Lecture Notes in Computer Science*, pages 204–215, Barcelona, Spain, July 2012. Springer Berlin Heidelberg. doi:10.1007/978-3-642-31525-1_18.

[C56] **Cristian Ioan Vasile**, Ana Brânduşa Pavel, Ioan Dumitrache, and Gheorghe Paun. On the Power of Enzymatic Numerical P Systems. In *Proc. of the 10th Brainstorming Week on Membrane Computing*, pages 215–228, Seville, Spain, February 2012. link.

[C57] **Cristian Ioan Vasile**, Ana Brânduşa Pavel, Ioan Dumitrache, and Gheorghe Păun. Numerical P Systems. In *Proc. of the 10th Brainstorming Week on Membrane Computing*, pages 26–29,

Seville, Spain, February 2012. collective paper: Research Topics in Membrane Computing: After CMC 12, Before BWMC 10, Eds. Gheorghe M., Paun Gh., Perez-Jimenez M.J.

[C58] **Cristian Ioan Vasile**, Pavel Pavel, Ana Brânduşa, Ioan Dumitrache, and Jozef Kelemen. Implementing obstacle avoidance and follower behaviors on Koala robots using Numerical P Systems. In *Proc. of the 10th Brainstorming Week on Membrane Computing*, pages 207–214, Seville, Spain, February 2012. link.

[C59] Cătălin Buiu, Ana Brânduşa Pavel, **Cristian Ioan Vasile**, and Ioan Dumitrache. Perspectives of using membrane computing in the control of mobile robots. In *Proc. of the Beyond AI - Interdisciplinary Aspect of Artificial Inteligence Conference*, pages 21–26, Pilsen, Czech Republic, December 2011. link.

[C60] **Cristian Ioan Vasile**, Ana Brânduşa Pavel, and Cătălin Buiu. Integrating human swarm interaction in a distributed robotic control system. In *Proc. of the IEEE 7th Annual IEEE Conference on Automation Science and Engineering (CASE)*, pages 743–748, Trieste, Italy, August 2011. doi:10.1109/CASE.2011.6042493.

[C61] **Cristian Ioan Vasile**, Ana Brânduşa Pavel, and Cătălin Buiu. Chidori - a bio-inspired cognitive architecture for collective robotics applications. In *Proc. of the IFAC Workshop on Intelligent Control Systems*, pages 52–57, Sinaia, Romania, September 2010. link.

[C62] Ana Brânduşa Pavel, **Cristian Ioan Vasile**, and Cătălin Buiu. Cognitive vision system for an ecological mobile robot. In *Proc. of the 13th International Symposium on System Theory, Automation, Robotics, Computers, Informatics, Electronics and Instrumentation (SINTES)*, volume 1, pages 267–272, Craiova, Romania, October 2007. link.

Posters

[P1] Brandon Araki, Kiran Vodrahalli, **Cristian Ioan Vasile**, and Daniela Rus. Learning to Plan with Logical Automata. In *Infer to Control, Workshop on Probabilistic Reinforcement Learning and Structured Control (Infer2Control), NIPS*, page Poster, Montreal, Canada, December 2018. link.

[P2] **Cristian Ioan Vasile**, Jana Tumova, Sertac Karaman, Calin Belta, and Daniela Rus. Minimum-violation scLTL motion planning for mobility-on-demand. In *2nd Symposium on the COntrol of NEtwork Systems (SCONES)*, page Poster, Boston, MA, USA, October 2017.

[P3] Prashant Vaidyanathan, Evan Appleton, Curtis Madsen, **Cristian Ioan Vasile**, Alan Pacheco, Iman Haghighi, Nicholas Roehner, Rachael Ivison, Junmin Wang, Yash Agarwal, Zachary Chapasko, Calin Belta, and Douglas Densmore. Genetic Systems Engineering. In *8th International Workshop on Bio-Design Automation*, page Poster, Newcastle upon Tyne, UK, August 2016. link.

[P4] **Cristian Ioan Vasile** and Calin Belta. Reactive Sampling-Based Temporal Logic Path Planning. In *5th Workshop on Formal Methods for Robotics and Automation*, page Poster, Berkeley, CA, USA, July 2014. link.

[P5] **Cristian Ioan Vasile**, Ana Brânduşa Pavel, Octavian Arsene, Nirvana Popescu, and Cătălin Buiu. Human-swarm interface design and new control techniques for swarms autonomous mobile robots. In *Proc of the 4th International Conference on Cognitive Systems (CogSys)*, page Poster, ETH Zurich, Switzerland, January 2010. link.

Patents

- System and method of validation of operational regulations to autonomously operate a vehicle during travel, Jonathan DeCastro, Lucas Liebenwein, Cristian-Ioan Vasile, Russell Louis Tedrake, Sertac Karaman, Daniela Rus, US Patent App. 16/539,772, 2020

- Autonomous navigation in a cluttered environment, Daniela Rus, Sertac Karaman, Wilko Schwarting, Anshula Gandhi, Cristian-loan Vasile, Alyssa Pierson, US Patent App. US16/741,039, 2020
- Method for learning an explainable trajectory generator using an automaton generative network, Xiao Li, Brandon Araki, Sertac Karaman, Daniela Rus, Guy Rosman, Igor Gilitschenski, Cristian-Ioan Vasile, US Patent App. 17/372,083, 2023

Invited Talks and Demonstrations

Invited Talks

May 2024 TBD, MAD-Games Workshop, ICRA 2024, Yokohama, Japan.

Mar 2024 Robust and Relaxed Temporal Logic Planning for Robot Systems, Autonomy Talks (ETHZ), Virtual.

Apr 2023 Robust and Relaxed Temporal Logic Planning for Robot Systems, KTH, Stockholm, Sweden.

Oct 2022 Robust and Relaxed Satisfaction of Temporal Logic Specifications, IEEE Robotics and Autonomous Systems Technical Committee on Verification of Autonomous Systems, Webinar.

Apr 2020 Formal Methods in Robotics, CSE Course, Lehigh University, PA, US.

Dec 2019 Correct and Scalable Robot Autonomy, University of Leeds, UK.

Mar 2019 Correct and Scalable Robot Autonomy, Stevens Institute of Technology, US.

Mar 2019 Correct and Scalable Robot Autonomy, Lehigh University, US.

Aug 2018 Scalable Planning with Temporal Logic Specifications, Oxford University, UK.

Apr 2018 Scalable Planning with Temporal Logic Specifications, CU Boulder, US.

Jul 2017 Relaxed Specification. Minimum-Violation Planning, RSS, MIT, US.

Jan 2017 Motion Planning and Control with Temporal Logic Specifications, UC Berkeley, US.

Dec 2016 Control in Belief Space with Temporal Logic Specifications, Zoox.

Nov 2016 Sampling-based Motion Planning and Control with Temporal Logic Specifications, KTH, Sweden.

Dec 2015 Temporal Logic Planning and Inference, Distributed Robotics Laboratory, MIT, US.

Sep 2011 Membrane Controllers for Mobile Robots, First International School on Biomolecular and Biocellular Computing, Osuna, Spain.

Jun 2011 Modeling and simulation of human HIV-1 gp120 envelope glycoprotein, IBM High Performance Scientific Computing Workshop, UPB, Romania.

Nov 2010 Particle Swarm Optimization and its applications in collaborative robotics, Laboratory of Natural Computing and Robotics, UPB, Romania.

Demonstrations

Feb 2011 "Chidori Architecture – Distributed Swarm Control System and User Interface" poster and stand at the Artificial Intelligence – Multi-Agent Systems (AI-MAS) Winter Olympics, Politehnica University of Bucharest, Bucharest, Romania

Membership and Community Service

Membership IEEE Member, IEEE RAS Member, IEEE CSS Member

Service **Grant Reviewer**, NSF 2017, 2019, 2021, 2023

Editor

- Associate Editor, International Journal of Robotics Research (IJRR), 2023–
- Associate Editor, IEEE Robotics and Automation Letters (RA-L), 2021–
- Review Editor, AI and Machine Learning Control, Frontiers in Control Engineering, 2021–

- Associate Editor, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Abu Dhabi, UAE, 2024
- Associate Editor, IEEE International Conference on Robotics and Automation (ICRA), Yokohama, Japan, 2024
- Associate Editor, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Detroit, MI, US, 2023
- Associate Editor, IEEE International Conference on Robotics and Automation (ICRA), London, UK, 2023
- Associate Editor, American Control Conference (ACC), San Diego, USA, 2023

Area Chair

- International Symposium on Multi-Robot and Multi-Agent Systems (MRS), Cambridge, UK, 2021

Session Chair

- IEEE Conference on Decision and Control (CDC), Singapore, 2023
- IEEE Conference on Decision and Control (CDC), Cancun, Mexico, 2022
- IEEE International Conference on Robotics and Automation (ICRA), Philadelphia, PA, US, 2022

Organizing Committee

- **Tutorial Co-chair**, International Conference on Intelligent Robots and Systems (IROS), Prague, Czech Republic, 2021
- **Co-chair Inclusion@RSS**, Robotics: Science and Systems (RSS), Pittsburgh, PA, USA, 2018

Program Committee

- ACM International Conference on Hybrid Systems: Computation and Control (HSCC), Hong Kong, 2024
- Conference on Robot Learning (CoRL), Atlanta, GA USA, 2023
- IEEE Computer Society Signature Conference on Computers, Software, and Applications (COMPSAC), Torino, Italy, 2023
- NASA Formal Methods Symposium (NFM), Houston, TX, USA, 2023
- Conference on Robot Learning (CoRL), Auckland, New Zealand, 2022
- IEEE Computer Society Signature Conference on Computers, Software, and Applications (COMPSAC), Virtual, 2022
- Conference on Robot Learning (CoRL), Virtual, 2021
- AAAI Conference on Artificial Intelligence (AAAI), Virtual, 2021
- Conference on Robot Learning (CoRL), Virtual, 2020
- Robotics Science and Systems (RSS), Corvallis, OR, USA, 2020
- Robotics Science and Systems Pioneers, Corvallis, OR, USA, 2020
- International Joint Conference on Artificial Intelligence (IJCAI) and Pacific Rim International Conference on Artificial Intelligence (PRICAI), Yokohama, Japan, 2020
- Conference on Robot Learning (CoRL), Osaka, Japan, 2019
- Robotics: Science and Systems Pioneers, Freiburg im Breisgau, Germany, 2019
- International Conference on Autonomous Agents and Multiagent Systems (AAMAS), Montreal, Canada, 2019
- International Symposium on Multi-Robot and Multi-Agent Systems (MRS), New Brunswick, NJ, USA, 2019

Invited Session Organizer

- Formal Methods for Time-Critical Decision Making and Control, CDC, Singapore, 2023

Workshop Organizer

- ICRA 2024 Workshop on How to Ensure Correct Robot Behaviors? Software Challenges in Formal Methods for Robotics, Yokohama, Japan, 2024
- CDC 2023 Workshop on Formal Methods and Decision Making in the Age of AI, Singapore, 2023
- IROS 2023 Workshop on "It Works Really Well!": Verification in Theory and Practice, Detroit, MI, USA, 2023
- IROS 2021 Workshop on Transforming Specifications into Robot Programs: A Survey of Formal Methods Tools for Non-Experts, Virtual, 2021
- RSS 2017 Workshop on The What without the How: Specifying Planning Problems in Robotics, Cambridge, MA, USA, 2017
- IFAC Workshop on Intelligent Control Systems, Sinaia, Romania, 2010

Community

LIDS Mentorship Committee, Laboratory for Information and Decision Systems (LIDS), MIT, 2018-2019

Organizer and Moderator, "Faculty Applications, Inside Out" Panel, Laboratory for Information and Decision Systems (LIDS), MIT, 2018

Organizing Committee for Stats&LIDS Tea talk Seminars, Laboratory for Information and Decision Systems (LIDS), MIT, 2016-2019

Mentor for Undergraduates at Mentor Advocate Program (MAP), MIT, 2018-2019

Judge Advisor, CEESA First Tech Challenge robotics competition, American International School of Bucharest, April 2011 and March 2012

Reviewer

145 / 120 Verified on Publons

- International Journal of Robotics Research
- IEEE Robotics and Automation Letters
- Autonomous Robots
- IEEE Transactions on Robotics
- IEEE Transactions on Automation Science and Engineering
- IEEE Transactions on Control of Network Systems
- IEEE Transactions on Automatic Control
- IEEE Control Systems Letters
- Automatica
- Artificial Intelligence (AIJ)
- Theoretical Computer Science Journal
- Discrete Event Dynamic Systems
- AIAA Journal of Guidance, Control, and Dynamics
- ASME Journal of Mechanisms and Robotics
- IEEE Transactions on NanoBioscience
- Applied Soft Computing Journal
- Sensors Journal
- AMS Mathematical Reviews
- Robotics: Science and Systems Conference (RSS 2016)
- IEEE International Conference on Robotics and Automation (ICRA 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022)
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2016, 2017, 2018, 2019, 2022)

- International Workshop on the Algorithmic Foundations of Robotics (WAFR 2016)
- International Symposium on Robotics Research (ISRR 2017)
- IEEE International Symposium on Multi-Robot and Multi-Agent Systems (MRS 2017, 2019)
- ACM International Conference on Hybrid Systems: Computation and Control (HSCC 2016, 2017)
- IEEE Conference on Decision and Control (CDC 2014, 2015, 2016, 2017, 2018, 2022)
- American Control Conference (ACC 2019, 2020, 2021, 2022)
- IEEE International Conference on Intelligent Transportation Systems (ITSC 2020)
- IFAC Workshop on Distributed Estimation and Control in Networked Systems (NecSys 2015)
- IFAC Workshop on Intelligent Control Systems (WICS 2010)

Academic Service

PhD Committee

- Apl Sahin, MEM, Lehigh University; Advisor: Subhrajit Bhattacharya.
- Guangyi Liu, MEM, Lehigh Universty; Advisor: Nader Motee.
- Arash Amini, MEM, Lehigh Universty; Advisor: Nader Motee.
- Jinda Cui, CSE, Lehigh Universty; Advisor: Jeff Trinkle.
- Leiming Zhang, MEM, Lehigh University, 2021; Advisor: Subhrajit Bhattacharya.

Department and College

- Organized and Moderated Diversity, Equity, and Inclusion (DEI) Sessions in AIRLab, Lehigh University, 2022.
- Organized and Moderated Diversity, Equity, and Inclusion (DEI) Sessions in MEM, Lehigh University, 2023.
- CSE Faculty Search Committee, Lehigh University, 2021.
- MEM Faculty Search Committee, Lehigh University, 2022.
- MEM Faculty Search Committee, Lehigh University, 2023.
- MEM representative to the Rossin College DEI Council, 2023–
- MEM Undergraduate Curriculum Committee, 2023–

Teaching Qualifications

2018 **Certificate**, *Teaching+Learning Lab, Massachusetts Institute of Technology*
Kaufman Teaching Certificate Program (KTCP)

2005–2010 **Certificate I & II**, *Department of Teacher Training, Politehnica University of Bucharest*
Pedagogical Studies – Level 1 (annex to bachelor diploma), *GPA: 10.00*
Pedagogical Studies Graduate Program – Level 2 (Advanced), *GPA: 10.00*

Teaching Experience

2019– **Assistant Professor**, *Lehigh University*

- ME450 Formal Methods in Robotics (Fall 2020, Spring 2023);
- ME017 Numerical Methods in Mechanical Engineering (Spring 2020, Fall 2020, Spring 2021, Fall 2021, Spring 2022, Fall 2022, Spring 2023, Fall 2023, Spring 2024)

2011–2012 **Teaching Assistant**, *Politehnica University of Bucharest*
Laboratory Classes:

- Robotics and Virtual Reality (Spring 2012);
- Control Engineering (Spring 2012);
- Programming real-time applications (Spring 2012);
- Diagnosis and Decision Techniques (Spring 2012);
- Artificial Intelligence (Fall 2011).

2010–2011 **Associate Teaching Assistant**, *Politehnica University of Bucharest*

Laboratory Classes:

- Robotics and Virtual Reality (Spring 2010, Spring 2011);
- Control Engineering (Spring 2011);
- Cognitive Robotics (winter 2010);
- Intelligent Multi-agent Systems for Ambient Assistance (winter 2010).

2009–2010 **Volunteer Teaching Assistant**, *Politehnica University of Bucharest*

Laboratory Classes:

- Robotics and Virtual Reality (Spring 2009);
- Microprocessor Based Design (Spring 2009, Spring 2010).

Advising

Postdoc

- Mingyu Cai, Lehigh Universty, Postdoc, 2021–2023, now Assistant Professor at University of California, Riverside

PhD

- Disha Kamale, Lehigh Universty, PhD, 2020–
- Gustavo Andres Cardona Calderon, Lehigh Universty, PhD, 2020–
- Kaier Liang, Lehigh University, PhD, 2021–

Master

- Lingyu Liu, Lehigh University, MS, 2020–2021
- Piotr Paluch, Lehigh Universty, MS, 2019–2021

Mentoring

Graduate

- Ahmad Admad, BU, PhD, 2022–
- Erfan Aasi, BU, PhD, 2019–2023
- Brandon Araki, MIT, PhD, 2018–2019
- Noushin Mehdipour, Boston University, PhD, 2018–2020
- Xiao Li, Boston University PhD, 2017–2019
- Lucas Liebenwein, MIT, PhD, 2017–2018
- Jesper Karlsson, KTH, PhD, 2017–2018

Undergraduate

- Lucas Koranda, 2023–
- Aliyah McNeil, 2023–
- Junan Mei, 2023–
- David Shunk, 2023–
- Jasmin Yu, 2023–
- Michael Zaza, 2023–
- Heidrun Cobb, 2022–
- Ryan Kong, 2022–
- Michelle Li, 2022–
- Quan Le, 2023
- Spencer Loh, 2022
- Alex Spero, 2022
- Abdul-Saboor Syed, 2022
- Zayd Aldahleh, 2022
- Roman Mitchell, 2022-2023
- Daniel Cahill, Lehigh University, 2021–2023
- Alex Ratzman, Lehigh University, 2021–2022
- Diep Luong, Lehigh University, 2021–2022
- Declan Coster, Lehigh University, 2021–2022
- Brian Zhu, Lehigh University, 2021–2022
- Andrei Arion, Lehigh University, 2021
- Hua Chen, Lehigh University, 2021
- Nicholas Altenderfer, Lehigh University, 2021
- Paul Duffy, Lehigh University, 2021
- Max Domaratzky, Lehigh University, 2021
- Sarah de Lange, Lehigh University, 2020–2021
- Yubo Wang, Lehigh University, 2020–2021
- Nathan Bowler, Lehigh University, 2020
- Vaibhav Anand, Lehigh University, 2020
- Zehui Xiao, Lehigh University, 2020
- Cindy Xu, Lehigh University, 2020
- Phoebe Li, Lehigh University, 2020
- Aaron Deditch, Lehigh University, Capstone Project, 2020–2021
- Thanos Kougionis, Lehigh University, 2020–2020
- Eleni Karyofylli, Lehigh University, 2020–2021
- Maria Maragkelli, Lehigh Universty, 2019–2022
- Sreya Vangara, MIT, UROP, 2018–2019
- Nathan Wang, MIT UROP, 2018–2019
- Sara K Nicholas, MIT, UROP, 2018
- Kerry Wu, MIT UROP, 2018
- Tony Ding, MIT UROP, 2017
- Mehmet Akbulut, Boston University, Senior Design Project, 2016
- Benjamin Ha, Boston University, Senior Design Project, 2016
- Zoe E. Dickert, Boston University, Senior Design Project, 2016
- Kamiko Lin Darrow, Boston University, Senior Design Project, 2016
- Samuel August Black, Boston University, Senior Design Project, 2016
- Dana Szapiro, Boston University, 2015
- Abdullah Alhashim, Boston University, 2015

Highschool

- Ethan Bradlow, Boston University, 2013

In the news

Lehigh University News – Mountaintop Project: "Testbed for Self-Driving Cars in Urban Environments with Traffic"

Lehigh University Rossin College Resolve Magazine Volume 1 2021 – The Science of Autonomy in the Autonomous and Intelligent Robotics Laboratory (AIRLab), Lehigh University

Teen Scientist interview – Rayna Malhotra from WDIY 88.1 Lehigh Valley Public Radio
Lehigh University News

Skills

Languages

Romanian	native language	
English	Fluent	*TOEFL Score: 111 – R:30, L:30, S: 23, W: 28*
German	Advanced	*German Certificate "Zertifikat Deutsch", Goethe Institute (98%)*

Other skills

- Driving license – category B
- Artistic – violin and music theory, 9.95/10 in national examination "Capacitate" (2001)

References

- Available upon request.