

SUMMARY

As a program director at NSF, Dr. Plaku co-leads the National AI Research Institutes program, a cornerstone federal investment in AI, managing a \$540 million portfolio that supports 27 institutes nationwide. This flagship initiative, supported by multiple federal agencies and industry partners, drives long-term, high-impact AI research while fostering collaboration between academia, industry, and government to accelerate innovation and real-world applications. In addition, Dr. Plaku is a program director for the CISE/IIS/Robust Intelligence program, which focuses on developing AI systems that are resilient and adaptable to real-world challenges. Dr. Plaku was also instrumental in advancing robotics research at NSF, co-leading the Foundational Research in Robotics (FRR) program, the agency's flagship initiative in robotics. He also co-chaired the Intelligent Robotics and Autonomous Systems (IRAS) Interagency Working Group, coordinating federal R&D efforts across multiple agencies to accelerate progress in robotics and autonomous systems. Additionally, Dr. Plaku played a key role in advancing international collaborations, engaging with organizations such as Japan's Science and Technology Agency and the UK's Engineering and Physical Sciences Research Council.

Through his work at NSF, Dr. Plaku continues to drive high-impact research initiatives, foster collaboration across disciplines, agencies, and international partners, and advance AI innovations with broad scientific, technological, and societal impact.

Research: Dr. Plaku is also a noted expert in AI, specializing in planning, high-level reasoning, autonomous systems, and AI-driven decision-making. With a prolific academic career spanning over a decade, he has pioneered research in AI and robotics, advancing both foundational research and practical applications, effectively bridging the gap between advanced AI and their real-world uses in robotics and autonomous systems. His work integrates advanced techniques in autonomous decision-making, motion planning, and intelligent automation, alongside cutting-edge developments in generative AI, large language models (LLMs), and foundational AI models. As a professor at George Mason University and The Catholic University of America, he conducted impactful research and mentored students in AI and robotics, contributing to significant advancements in AI-powered autonomy. Dr. Plaku has developed and released several open-source software tools that advance AI, robotics, and autonomous systems, fostering collaboration and broadening the impact of advanced technologies among researchers, students, educators, industry professionals, and practitioners.

Dr. Plaku is actively engaged in advancing AI and robotics research, seeking to expand the capabilities of autonomous systems and intelligent decision-making. His deep technical expertise, strategic vision, and experience managing high-impact AI programs allow him to make meaningful contributions to AI innovation and the ongoing development of intelligent systems at scale.

EMPLOYMENT

- ◇ **National Science Foundation, Alexandria, VA** 12/2023–present
Program Director (Federal)
 - Co-Lead: National Artificial Intelligence Research Institutes
 - Robust Intelligence (RI)Division of Information and Intelligent Systems (IIS)
Directorate for Computer and Information Science and Engineering (CISE)
- ◇ **George Mason University, Fairfax, VA** 08/2020–12/2023
Associate Professor, Department of Computer Science
- ◇ **National Science Foundation, Alexandria, VA** 08/2019–08/2022
Program Director (IPA)
Division of Information and Intelligent Systems (IIS)
Directorate for Computer and Information Science and Engineering (CISE)
 - ▷ **Programs**
 - Co-Lead: Foundational Research in Robotics (FRR)

- * *NSF Director's Award for Superior Accomplishment (Group, FRR, 05/2021)*
- Co-Lead: National Robotics Initiative (NRI)
- Robust Intelligence (RI)
- National Artificial Intelligence Research Institutes
- ▷ *Inter-Agency Engagements*
 - Co-Chair: Intelligent Robotics and Autonomous Systems (IRAS) Interagency Working Group, Networking & Information Technology Research & Development Program (NITRD)
- ◇ **Catholic University of America, Washington, DC** 08/2016–08/2020
Associate Professor, Department of Electrical Engineering and Computer Science
- ◇ **Catholic University of America, Washington, DC** 08/2010–08/2016
Assistant Professor, Department of Electrical Engineering and Computer Science
- ◇ **Johns Hopkins University, Baltimore, MD** 08/2010–07/2012
Adjunct Assistant Professor, Department of Computer Science

EDUCATION

- ◇ **Johns Hopkins University, Baltimore, MD** 08/2008–08/2010
Postdoctoral Fellow
Laboratory for Computational Sensing and Robotics, Department of Computer Science
- ◇ **Rice University, Houston, TX** 08/2002–07/2008
Ph.D. in Computer Science
- ◇ **Clarkson University, Potsdam, NY** 08/2000–05/2002
M.S. in Computer Science
- ◇ **State University of New York, Fredonia, NY** 08/1996–05/2000
B.S. in Computer Science (majors: (1) Computer Science (2) Mathematics)

PROGRAM MANAGEMENT AND LEADERSHIP

- ◇ **National Artificial Intelligence Research Institutes Program (Co-Lead)** 12/2023–present
 - ▷ Co-leads the **National AI Research Institutes** program, a multi-sector effort led by NSF in partnership with several federal agencies and industry, consisting of 27 AI Institutes and representing a \$540 million investment and a cornerstone Federal Government commitment to fostering long-term, foundational and use-inspired research in AI while advancing the key objectives of the **National Artificial Intelligence Research and Development Strategic Plan**.
- ◇ **Robust Intelligence (Program Director)** 08/2019–08/2022, 12/2023–present
 - ▷ Program director in NSF/CISE/IIS **Robust Intelligence**, which supports computational research in AI, machine learning, computer vision, human-language technologies, computational neuroscience, generative AI, large language models, foundational models, and other cutting-edge areas of AI research.
- ◇ **Artificial Intelligence R&D Interagency Working Group (member)**
Networking & Information Technology Research & Development Program 12/2023–present
 - ▷ Active representative of NSF in the Artificial Intelligence R&D Interagency Working Group, coordinating federal AI R&D efforts and supporting initiatives set by the NSTC Select Committee on AI and the Subcommittee on Machine Learning and Artificial Intelligence to enhance U.S. leadership and competitiveness in AI R&D and its transformative applications.
- ◇ **Intelligent Robotics and Autonomous Systems Interagency Working Group (Co-Chair)**
Networking & Information Technology Research & Development Program 07/2021–08/2022
 - ▷ Co-chaired the Intelligent Robotics and Autonomous Systems Interagency Working Group, coordinating R&D efforts across 28 federal agencies to accelerate the development and deployment of resilient, ethical, and efficient robots and autonomous systems to enhance human productivity, safety, and quality of life across diverse environments such as workplaces, hospitals, communities, and homes.
- ◇ **Foundational Research in Robotics (Co-Lead)** 07/2021–08/2022

- ▷ Co-led the **Foundational Research in Robotics** program, NSF's flagship robotics initiative, a collaborative effort between the CISE and ENG Directorates, supporting groundbreaking research on robotic systems that integrate advanced computational capabilities with complex physical functions to drive the future of robotics and autonomous systems.
- ◇ **National Robotics Initiative (Co-Lead)** 08/2019–05/2022
 - ▷ Co-led the **National Robotics Initiative**, a partnership between NSF and several federal agencies, resulting in an investment of over \$250 million to support more than 300 groundbreaking research projects aimed at driving innovation in robotics to enhance human safety, productivity, and independence.
- ◇ **International Engagements**
 - ▷ Led NSF/CISE efforts in fostering collaborations with the
 - Japan Science and Technology (JST) Agency and
 - UK Engineering and Physical Sciences Research Council (EPSRC)
 - ▷ Coordinated NSF/CISE/IIS and NSF/FRR efforts for the NSF-India Collaboration

AWARDS

- ◇ **NSF Director's Award for Superior Accomplishments 2021**
Foundational Research in Robotics (FRR) Group (in my role as an NSF IPA PD)
- ◇ **Finalist Best Application Paper**
McMahon J and Plaku E (2021): *"Dynamic Multi-Goal Motion Planning with Range Constraints for Autonomous Underwater Vehicles Following Surface Vehicles."* Proceedings of the IEEE International Conference on Automation Science and Engineering, pp. 704–711
- ◇ **Best Robotics Paper**
Le D and Plaku E (2017): *"Cooperative Multi-Robot Sampling-Based Motion Planning with Dynamics."* Proceedings of the International Conference on Planning and Scheduling, pp. 513–521
- ◇ **Best Student Paper**
Wells A and Plaku E (2015): *"Adaptive Sampling-Based Motion Planning for Mobile Robots with Differential Constraints."* Springer LNCS Towards Autonomous Robotic Systems, vol. 9287, pp. 283–295
- ◇ **Kaman Excellence in Research Award**
School of Engineering, Catholic University of America, 2015
- ◇ **Faculty Research Fellowship**
Office of Naval Research, Summer 2014
- ◇ **Burns Fellowship**
School of Engineering, Catholic University of America, 2011

GRANTS

- ◇ (2019) NSF CCF1900085 (Division of Computing and Communication Foundations): *"FET: Medium: Collaborative Research: Automated Analysis and Exploration of High-dimensional and Multimodal Molecular Energy Landscapes"*
PIs: Shehu A, Plaku E, Wanli Q
Funding awarded to Plaku E: **\$219,992.00**, overall: \$799,348 (08/01/2019–07/31/2023)
- ◇ (2015) NSF IIS1548406 (Division of Information & Intelligent Systems): *"A Synergistic Framework for Motion and Task Planning in Mixed Continuous and Discrete Spaces"*
PI: Plaku E, Funding awarded: **\$99,924.00** (09/01/2015–08/31/2018)
- ◇ (2014) NSF IIS1449505 (Division of Information & Intelligent Systems): *"Toward Supervised Autonomy for Robotic Systems"*
PI: Plaku E, Funding awarded: **\$149,995.00** (09/01/2014–08/31/2017)
- ◇ (2014) NSF ACI1440581 (Division of Advanced Cyberinfrastructure): *"A plug-and-play software platform of robotics-inspired algorithms for modeling biomolecular structures and motions"*
PIs: Shehu A, Plaku E, Roitberg A
Funding awarded to Plaku E: **\$215,476.00**, overall: \$499,999 (02/01/2015–01/31/2019)

- ◇ (2015) U.S. Naval Research Laboratory: “Adaptive Mission and Motion Planning to Enhance the Autonomy of Underwater Vehicles”

PI: **Plaku E**, Funding awarded: **\$55,298.00** (05/30/2015–05/29/2016)

PUBLICATIONS

	total nr. citations	h-index	i10-index
overall	3024	27	53
since 2020	1129	18	34

PUBLICATIONS 2025

- 97 Lu Y, Das D, **Plaku E**, and Xiao X (2025): “Multi-Goal Motion Memory.” IEEE International Conference on Robotics and Automation, in press

PUBLICATIONS 2024

- 96 Bui H, **Plaku E**, and Stein G (2024): “Multi-Robot Guided Sampling-Based Motion Planning With Dynamics in Partially Mapped Environments.” IEEE Access, vol. 12, pp. 56448–56460
- 95 Khanal A, Bui H, **Plaku E**, and Stein G (2024): “Learning-informed Long-Horizon Navigation under Uncertainty for Vehicles with Dynamics.” IEEE/RSJ International Conference on Intelligent Robots and Systems, pp. 3069–3075
- 94 Aghzal M, **Plaku E**, and Yao Z (2024): “Look Further Ahead: Testing the Limits of GPT-4 in Path Planning.” IEEE International Conference on Science and Engineering, pp. 1020–1027
- 93 Das D, Le Y, **Plaku E**, and Xiao X (2024): “Motion Memory: Leveraging Past Experiences to Accelerate Future Motion Planning.” IEEE International Conference on Robotics and Automation, pp. 16467–16474
- 92 Aghzal M, **Plaku E**, and Yao Z (2024): “Can Large Language Models be Good Path Planners? A Benchmark and Investigation on Spatial-temporal Reasoning.” International Conference on Learning Representation, Workshop on Large Language Models for Agents

PUBLICATIONS 2023

- 91 McMahon J and **Plaku E** (2023): “Autonomous Data Collection with Dynamic Goals and Communication Constraints for Marine Vehicles.” IEEE Transactions on Automated Science and Engineering, vol. 20, no. 3, pp. 1607–1620
- 90 McMahon J, Parker R, Baldoni P, Anstee S, and **Plaku E** (2023): “Simultaneous Survey and Inspection with Autonomous Underwater Vehicles.” IEEE/RSJ International Conference on Intelligent Robots and Systems, pp. 1–7
- 89 Le Y and **Plaku E** (2023): “Leveraging Single-Goal Predictions to Improve the Efficiency of Multi-Goal Motion Planning with Dynamics.” IEEE/RSJ International Conference on Intelligent Robots and Systems, pp. 850–857
- 88 Khanal A, Bui H, Stein G, and **Plaku E** (2023): “Guided Sampling-Based Motion Planning with Dynamics in Unknown Environments.” IEEE International Conference on Automation Science and Engineering, pp. 1–8
- 87 Plaku E, Cela A, and **Plaku E** (2023): “Motion Planning with Safety Zones.” International Conference of Informatics in Control, Automation and Robotics, vol. 1, pp. 405–412

PUBLICATIONS 2022

- 86 Baldoni P, McMahon J and **Plaku E** (2022): “Leveraging Neural Networks to Guide Path Planning: Improving Dataset Generation and Planning Efficiency.” IEEE International Conference on Automation Science and Engineering, pp. 667–674

- 85 Bui H, Le Y, and **Plaku E** (2022): “Improving the Efficiency of Sampling-based Motion Planners via Run-time Predictions for Motion-Planning Problems with Dynamics.” IEEE/RSJ International Conference on Intelligent Robots and Systems, pp. 4486–4491

PUBLICATIONS 2021

- 84 Zhang Y, Huang H, **Plaku E** and Lap-Fai Y (2021): “Joint Computational Design of Workspaces and Workplans.” ACM Transactions on Graphics, vol. 48, no. 6, pp. 1–16
- 83 Can Secim, B, Kvelashvili T, Kilic O, and **Plaku E** (2021): “Antenna-Based Aerial Inspection of Nonflat Terrains using Microwave Remote Sensing.” IEEE International Conference on Automation Science and Engineering, pp. 934–941
- 82 McMahon J and **Plaku E** (2021): “Dynamic Multi-Goal Motion Planning with Range Constraints for Autonomous Underwater Vehicles Following Surface Vehicles.” IEEE International Conference on Automation Science and Engineering, pp. 704–7011
(Finalist Best Application Paper)
- 81 McMahon J and **Plaku E** (2021): “Autonomous Data Collection With Timed Communication Constraints for Unmanned Underwater Vehicles.” IEEE Robotics and Automation Letters, vol. 6, no. 2, pp. 1832–1839 (also in IEEE International Conference on Robotics and Automation)
- 80 Le D and **Plaku E** (2021): “Multi-Robot Motion Planning with Unlabeled Goals for Mobile Robots with Differential Constraints.” IEEE International Conference on Robotics and Automation, pp. 7950–7956

PUBLICATIONS 2020

- 79 Warsame Y, Edelkamp S, and **Plaku E** (2020): “Energy-Aware Multi-Goal Motion Planning Guided by Monte Carlo Search.” IEEE International Conference on Automated Science and Engineering, pp. 335–342, doi: 10.1109/CASE48305.2020.9217008

PUBLICATIONS 2019

- 78 Molloy K, **Plaku E**, and Shehu A (2019): “ROMEO: A Plug-and-play Software Platform of Robotics-inspired Algorithms for Modeling Biomolecular Structures and Motions.” arXiv 1905.08331
- 77 Edelkamp S, Warsame Y, and **Plaku E** (2019): “Monte-Carlo Search for Prize-Collecting Robot Motion Planning with Time Windows, Capacities, Pickups, and Deliveries.” Springer LNCS Advances in Artificial Intelligence, vol. 11793, pp. 154–167
- 76 Le D and **Plaku E** (2019): “Multi-Robot Motion Planning with Dynamics via Coordinated Sampling-Based Expansion Guided by Multi-Agent Search.” IEEE Robotics and Automation Letters, vol. 4, pp. 1868–1875

PUBLICATIONS 2018

- 75 Le D and **Plaku E** (2018): “Cooperative, Dynamics-Based, and Abstraction-Guided Multi-Robot Motion Planning.” Journal of Artificial Intelligence Research, vol. 63, pp. 361–390
- 74 Morris D, Maximova T, **Plaku E**, and Shehu A (2018): “Attenuating Dependence on Structural Data in Computing Protein Energy Landscapes.” BMC Bioinformatics, vol. 20 (Suppl11):280
- 73 Plaku E, **Plaku E**, and Simari P (2018): “Clearance-driven Motion Planning for Mobile Robots with Differential Constraints.” Robotica, vol. 36, pp. 971–993
- 72 Edelkamp S, Lahijanian M, Magazzeni D, and **Plaku E** (2018): “Integrating Temporal Reasoning and Sampling-Based Motion Planning for Multi-Goal Problems With Dynamics and Time Windows.” IEEE Robotics and Automation Letters, vol. 3, pp. 3473–3480
- 71 Qiao W, Akhterg N, Fangu X, Maximova T, **Plaku E**, and Shehu A (2018): “From Mutations to Mechanisms and Dysfunction via Computation and Mining of Protein Energy Landscapes.” BMC Genomics, vol. 19, pp. 671–683
- 70 Le D and **Plaku E** (2018): “Multi-Robot Motion Planning with Dynamics Guided by Multi-Agent Search.” International Joint Conferences on Artificial Intelligence, pp. 5314–5318

PUBLICATIONS 2017

- 69 Maximova T, Zhang Z, Carr D, **Plaku E**, and Shehu A (2017): “Sample-based Models of Protein Energy Landscapes and Slow Structural Rearrangements.” *Journal of Computational Biology*, vol. 25, pp. 33–50
- 68 Edelkamp S, Pomarlan M, and **Plaku E** (2017): “Multi-Region Inspection by Combining Clustered Traveling Salesman Tours with Sampling-Based Motion Planning.” *IEEE Robotics and Automation Letters*, vol. 2, pp. 428–435
- 67 Plaku E, **Plaku E**, and Simari P (2017): “Direct Path Superfacets: An Intermediate Representation for Motion Planning.” *IEEE Robotics and Automation Letters*, vol. 2, pp. 350–357
- 66 McMahon J and **Plaku E** (2017): “Robot Motion Planning with Task Specifications via Regular Languages.” *Robotica*, vol. 35, pp. 26–49
- 65 Edelkamp S, Can Secim, B, and **Plaku E** (2017): “Surface Inspection via Hitting Sets and Multi-Goal Motion Planning.” *Springer LNCS Towards Autonomous Robotic Systems*, vol. 10454, pp. 134–149
- 64 Qiao W, Maximova T, Fang X, **Plaku E**, and Shehu A (2017): “Reconstructing and Mining Protein Energy Landscapes to Understand Disease.” *IEEE International Conference on Bioinformatics and Biomedicine*, pp. 22–27
- 63 Le D and **Plaku E** (2017): “Cooperative Multi-Robot Sampling-Based Motion Planning with Dynamics.” *International Conference on Planning and Scheduling*, pp. 513–521 (**Best Robotics Paper**)
- 62 Morris D, Maximova T, **Plaku E**, and Shehu A (2017): “Out of One, Many: Exploiting Intrinsic Motions to Explore Protein Structure Spaces.” *IEEE International Conference on Computational Advances in Bio and Medical Sciences*, pp. 1–1
- 61 Qiao W, Maximova T, **Plaku E**, and Shehu A (2017): “Statistical Analysis of Computed Energy Landscapes to Understand Dysfunction in Pathogenic Protein Variants.” *ACM International Conference on Bioinformatics, Computational Biology, and Health Informatics*, pp. 679–684
- 60 Kvelashvili T, Kilic O, Can Secim B, and **Plaku E** (2017): “UAV Swarm-Based Antenna System.” *USNC-URSI National Radio Science*, in press

PUBLICATIONS 2016

- 59 Shehu A and **Plaku E** (2016): “A Survey of Computational Treatments of Biomolecules by Robotics-inspired Methods Modeling Equilibrium Structure and Dynamics” *Journal of Artificial Intelligence Research*, vol. 57, pp. 509–572
- 58 McMahon J and **Plaku E** (2016): “Autonomous Data Collection with Limited Time for Underwater Vehicles.” *IEEE Robotics and Automation Letters*, vol. 2, pp. 112–119
- 57 Maximova T, **Plaku E**, and Shehu A (2016): “Structure-guided Protein Transition Modeling with a Probabilistic Roadmap Algorithm.” *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, vol. 13, pp. 1–14
- 56 **Plaku E**, Rashidian S, and Edelkamp S (2016): “Multi-Group Motion Planning in Virtual Environments.” *Computer Animation and Virtual Worlds*, vol. 29(6), e1688,, doi: 10.1002/cav.1688
- 55 **Plaku E** and Le D (2016): “Interactive Search for Action and Motion Planning with Dynamics.” *Journal of Experimental and Theoretical Artificial Intelligence*, vol. 28, pp. 849–869
- 54 McMahon J and **Plaku E** (2016): “Mission and Motion Planning for Autonomous Underwater Vehicles Operating in Spatially and Temporally Complex Environments.” *IEEE Journal of Oceanic Engineering*, vol. 41, pp. 893–912
- 53 Maximova T, Carr D, **Plaku E**, and Shehu A (2016): “Sample-based Models of Protein Structural Transitions.” *ACM Conference on Bioinformatics and Computational Biology*, pp. 128–137

- 52 Maximova T, **Plaku E**, and Shehu A (2016): “The Sampling-based Algorithm for Modeling Protein Conformational Switching Method for Extended Sampling and Transition Paths Prediction with Probabilistic Roadmap Algorithm.” Structural Bioinformatics and Computational Biophysics, Intelligent Systems for Molecular Biology, pp. 66 (**Outstanding Research Presentation**)

PUBLICATIONS 2015

- 51 **Plaku E** and Karaman S (2015): “Motion Planning with Temporal-Logic Specifications: Progress and Challenges.” AI Communications, vol. 29, pp. 151–162
- 50 McMahon J, Dzikowicz B, Houston B, and **Plaku E** (2015): “A Hybrid Planning Framework For Autonomous Underwater Vehicles.” NRL Review, pp. 114–116
- 49 Wallar A, **Plaku E**, and Sofge D (2015): “Reactive Motion Planning for Unmanned Aerial Surveillance of Risk-Sensitive Areas.” IEEE Transactions on Automated Science and Engineering, vol. 12, pp. 969–980
- 48 **Plaku E** (2015): “Region-Guided and Sampling-Based Tree Search for Motion Planning with Dynamics.” IEEE Transactions on Robotics, vol. 31, pp. 723–735
- 47 Wells A and **Plaku E** (2015): “Adaptive Sampling-Based Motion Planning for Mobile Robots with Differential Constraints.” Springer LNCS Towards Autonomous Robotic Systems, vol. 9287, pp. 283–295 (**Best Student Paper**)
- 46 Maximova T, **Plaku E**, and Shehu A (2015): “Computing Transition Paths in Multiple-Basin Proteins with a Probabilistic Roadmap Algorithm.” IEEE International Conference on Bioinformatics and Biomedicine, pp. 35–42
- 45 McMahon J and **Plaku E** (2015): “Autonomous Underwater Vehicle Mine Countermeasures via the Physical Traveling Salesman Problem.” MTS/IEEE Oceans, isbn 978-0-9339-5743-5
- 44 Edelkamp S, **Plaku E**, Greulich C, and Pomarlan M (2015): “Solving the Inspection Problem via Colored Traveling Salesman Tours.” Workshop on Task Planning for Intelligent Robots in Service and Manufacturing, IEEE International Conference on Robotics and Automation, pp. 26–31

PUBLICATIONS 2014

- 43 **Plaku E** and McMahon J (2014): “Motion Planning and Decision Making for Underwater Vehicles Operating in Constrained Environments in the Littoral.” Springer LNCS Towards Autonomous Robotic Systems, vol. 8069, pp. 328–339
- 42 Wallar A and **Plaku E** (2014): “Path Planning for Swarms by Combining Probabilistic Roadmaps and Potential Fields.” Springer LNCS Towards Autonomous Robotic Systems, vol. 8069, pp. 417–428
- 41 McMahon J and **Plaku E** (2014): “Sampling-Based Tree Search with Discrete Abstractions for Motion Planning with Dynamics and Temporal Logic.” IEEE/RSJ International Conference on Intelligent Robots and Systems, pp. 3726–3733
- 40 Le D and **Plaku E** (2014): “Guiding Sampling-Based Tree Search for Motion Planning with Dynamics via Probabilistic Roadmap Abstractions.” IEEE/RSJ International Conference on Intelligent Robots and Systems, pp. 212–217
- 39 Rashidian S, **Plaku E**, and Edelkamp S (2014): “Motion Planning with Rigid-Body Dynamics for Generalized Traveling Salesman Tours.” ACM SIGGRAPH Motion in Games, pp. 87–96
- 38 Edelkamp S and **Plaku E** (2014): “Multi-Goal Motion Planning with Physics-Based Game Engines.” IEEE Conference on Computational Intelligence and Games, pp. 115–122
- 37 Wallar A and **Plaku E** (2014): “Path Planning for Swarms in Dynamic Environments by Combining Probabilistic Roadmaps and Potential Fields.” IEEE Symposium on Swarm Intelligence, pp. 290–297
- 36 Wallar A, **Plaku E**, and Sofge D (2014): “A Planner for Autonomous Risk-Sensitive Coverage (PARCov) by a Team of Unmanned Aerial Vehicles.” IEEE Symposium on Swarm Intelligence, pp. 283–289
- 35 McMahon J and **Plaku E** (2014): “Combined Task and Motion Planning for AUVs.” Workshop on AI and Robotics, IEEE/RSJ International Conference on Intelligent Robots and Systems, pp. 17–18

PUBLICATIONS 2013

- 34 **Plaku E**, Kavraki LE, and Vardi MY (2013): “*Falsification of LTL Safety Properties in Hybrid Systems.*” Springer International Journal on Software Tools for Technology Transfer, vol. 15, pp. 305–320
- 33 **Plaku E** (2013): “*Robot Motion Planning with Dynamics as Hybrid Search.*” AAAI Conference on Artificial Intelligence, pp. 1415–1421
- 32 McMahon J and **Plaku E** (2013): “*Combined Mission and Motion Planning to Enhance Autonomy of Underwater Vehicles Operating in the Littoral Zone.*” Workshop on Combining Task and Motion Planning, IEEE International Conference on Robotics and Automation, pp. 17–22
- 31 McMahon J and **Plaku E** (2013): “*Motion Planning with Linear Temporal Logic for Underwater Vehicles Operating in Constrained Environments.*” Workshop on Planning in Continuous Domains, International Conference on Automated Planning and Scheduling, pp. 3
- 30 **Plaku E** (2013): “*From Navigation to Robotic-Assisted Surgery: Combined Planning in Discrete and Continuous Spaces.*” Workshop on Combining Robot Motion Planning and AI Planning for Practical Applications, Robotics: Science and Systems, pp. 5–6

PUBLICATIONS 2012

- 29 **Plaku E** (2012): “*Planning in Discrete and Continuous Spaces: From LTL Tasks to Robot Motions.*” Springer LNCS Towards Autonomous Robotic Systems, vol. 7429, pp. 331–342.
- 28 **Plaku E** (2012): “*Guiding Sampling-Based Motion Planning by Forward and Backward Discrete Search.*” Springer LNCS Intelligent Robots and Applications, vol. 7508, pp. 289–300
- 27 **Plaku E** (2012): “*Motion Planning with Discrete Abstractions and Physics-Based Game Engines.*” Springer LNCS Motion in Games, vol. 7660, pp. 290–301
- 26 **Plaku E** (2012): “*Path Planning with Probabilistic Roadmaps and Linear Temporal Logic.*” IEEE/RSJ International Conference on Intelligent Robots and Systems, pp. 2269–2275
- 25 **Plaku E** (2012): “*Motion Planning with Differential Constraints as Guided Search over Continuous and Discrete Spaces.*” International Symposium on Combinatorial Search, pp. 171–172
- 24 **Plaku E** (2012): “*Planning Robot Motions to Satisfy Linear Temporal Logic, Geometric, and Differential Constraints.*” Workshop on Combining Task and Motion Planning for Real-World Applications, International Conference on Automated Planning and Scheduling, pp. 21–28

PUBLICATIONS 2011

- 23 Pezzementi Z, **Plaku E**, Reyda C, and Hager GD (2011): “*Tactile Object Recognition From Appearance Information.*” IEEE Transactions on Robotics, vol. 27, pp. 473–487
- 22 Liu WP, Lucas BC, Guerin K, and **Plaku E** (2011): “*Sensor and Sampling-Based Motion Planning for Minimally Invasive Robotic Exploration of Osteolytic Lesions.*” IEEE/RSJ International Conference on Intelligent Robots and Systems, pp. 1346–1352
- 21 **Plaku E** (2011): “*Sampling-Based Motion Planning with High-Level Discrete Specifications.*” Workshop on Progress and Open Problems in Motion Planning, IEEE/RSJ International Conference on Intelligent Robots and Systems, pp. 29–30

PUBLICATIONS 2010

- 20 **Plaku E**, Kavraki LE, and Vardi MY (2010): “*Motion Planning with Dynamics by a Synergistic Combination of Layers of Planning.*” IEEE Transactions on Robotics, vol. 26, pp. 469–482
- 19 Reiley C, **Plaku E**, and Hager GD (2010): “*Motion Generation of Robotic Surgical Tasks: Learning from Expert Demonstrations.*” International Conference of the IEEE Engineering in Medicine and Biology Society, pp. 967–970
- 18 **Plaku E** and Hager GD (2010): “*Sampling-Based Motion and Symbolic Action Planning with Geometric and Differential Constraints.*” IEEE International Conference on Robotics and Automation, pp. 5002–5008

PUBLICATIONS 2009

- 17 **Plaku E**, Kavraki LE, and Vardi MY (2009): *"Hybrid Systems: From Verification to Falsification by Combining Motion Planning and Discrete Search."* Springer Formal Methods in System Design, vol. 34, pp. 157–182
- 16 **Plaku E**, Kavraki LE, and Vardi MY (2009): *"Falsification of LTL Safety Properties in Hybrid Systems."* International Conference on Tools and Algorithms for the Construction and Analysis of Systems, pp. 368–382

PUBLICATIONS 2008

- 15 **Plaku E** and Kavraki LE (2008): *"Quantitative Analysis of Nearest-Neighbors Search in High-Dimensional Sampling-Based Motion Planning."* Springer Tracts in Advanced Robotics, vol. 47, pp. 3–18
- 14 **Plaku E**, Kavraki LE, and Vardi MY (2008): *"Impact of Workspace Decompositions on Discrete Search Leading Continuous Exploration (DSLX) Motion Planning."* IEEE International Conference on Robotics and Automation, pp. 3751–3756

PUBLICATIONS 2007

- 13 **Plaku E**, Stamati H, Clementi C, and Kavraki LE (2007): *"Fast and Reliable Analysis of Molecular Motion Using Proximity Relations and Dimensionality Reduction."* Proteins: Structure, Function, and Bioinformatics, vol. 67, pp. 897–907
- 12 **Plaku E** and Kavraki LE (2006): *"Distributed Computation of the knn Graph for Large High-Dimensional Point Sets."* Journal of Parallel and Distributed Computing, vol. 67, pp. 346–359
- 11 **Plaku E**, Kavraki LE, and Vardi MY (2007): *"Hybrid Systems: From Verification to Falsification."* International Conference on Computer Aided Verification, pp. 468–481
- 10 **Plaku E**, Kavraki LE, and Vardi MY (2007): *"Discrete Search Leading Continuous Exploration for Kinodynamic Motion Planning."* Robotics: Science and Systems, pp. 326–333
- 9 **Plaku E** and Kavraki LE (2007): *"Nonlinear Dimensionality Reduction Using Approximate Nearest Neighbors."* SIAM International Conference on Data Mining, pp. 180–191
- 8 **Plaku E**, Kavraki LE, and Vardi MY (2007): *"A Motion Planner for a Hybrid Robotic System with Kinodynamic Constraints."* IEEE International Conference on Robotics and Automation, pp. 692–697
- 7 **Plaku E**, Bekris KE, and Kavraki LE (2007): *"OOPS for Motion Planning: An Online Open-source Programming System."* IEEE International Conference on Robotics and Automation, pp. 3711–3716

PUBLICATIONS 2005

- 6 **Plaku E**, Bekris KE, Chen BY, Ladd AM, and Kavraki LE (2005): *"Sampling-Based Roadmap of Trees for Parallel Motion Planning."* IEEE Transactions on Robotics, vol. 21, pp. 587–608
- 5 Akinc M, Bekris KE, Chen BY, Ladd AM, **Plaku E**, and Kavraki LE (2005): *"Probabilistic Roadmaps of Trees for Parallel Computation of Multiple Query Roadmaps."* Springer Tracts in Advanced Robotics, vol. 15, pp. 80–89
- 4 **Plaku E** and Kavraki LE (2005): *"Distributed Sampling-Based Roadmap of Trees for Large-Scale Motion Planning."* IEEE International Conference on Robotics and Automation, pp. 3879–3884

PUBLICATIONS 2003

- 3 Bekris KE, Chen BY, Ladd AM, **Plaku E**, and Kavraki LE (2003): *"Multiple Query Motion Planning using Single Query Primitives."* IEEE/RSJ International Conference on Intelligent Robots and Systems, pp. 656–661

PUBLICATIONS 2001

- 2 **Plaku E** and Shparlinski IE (2001): *"On Polynomial Representations of Boolean Functions Related to some Number Theoretic Problems."* International Conference on the Foundations of Software Technology and Theoretical Computer Science, pp. 305–316

PUBLICATIONS 1999

- 1 Arnavut Z and **Plaku E** (1999): “Lossless Compression of ECG Signals.” IEEE International Conference of the Engineering in Medicine and Biology Society, pp. 274

INVITED TALKS

- ◇ Autonomy Summit, University of Maryland, 11/2024
- ◇ Summit for AI Institutes Leadership (SAIL), Pittsburgh, PA, 10/2024
- ◇ HBCU Making and Innovation Showcase, Washington, D.C., 09/2024
- ◇ Robotics and Controls Systems (RCS) Seminar, UNC Charlotte, 08/2023
- ◇ NITRD Intelligent Robotics and Autonomous Systems (IRAS) Interagency Working Group, 04/2023
- ◇ NSF Panel, National Workshop on Human-like Robots, 07/2022
- ◇ NSF Panel, Workshop on Algorithmic Foundation of Robotics, 06/2022
- ◇ 16th Japan-U.S. Joint Working Level Committee Meeting on Science and Technology, 06/2021
- ◇ Workshop on No-Touch Care for Worker Safety During Pandemic Response, IEEE International Conference on Robotics and Automation, 06/2021
- ◇ U.S. - Israel Innovation Forum, 04/2021
- ◇ Computer Science Department, George Mason University, 02/2020
- ◇ Robust Intelligence and National Robotics Initiative, NSF 02/2019
- ◇ Panel on AI Perspectives, Smith Group, Washington, DC, 11/2018
- ◇ School of Informatics, Tirana University, Albania 6/2018
- ◇ Computer Science Department, George Mason University, 10/2017
- ◇ National Robotics Engineering Center, CMU, 07/2017
- ◇ Robotics Seminar, MIT, 12/2016
- ◇ Workshop on Planning for Hybrid Systems (keynote talk), AAAI Conference on Artificial Intelligence, 02/2016
- ◇ Virginia Tech – Northern Virginia Center, Department of Computer Science, 12/2014
- ◇ Naval Research Laboratory, Washington, DC, 07/2014
- ◇ Workshop on Model Checking and Automated Planning, International Conference on Automated Planning and Scheduling, Portsmouth, NH, 06/2013
- ◇ University of Florida, Department of Mechanical Engineering, 01/2013
- ◇ Workshop on Planning in Continuous Domains, International Conference on Automated Planning and Scheduling, Rome, Italy, 06/2013
- ◇ Naval Research Laboratory, Washington, DC, 06/2012
- ◇ Virginia Tech – Northern Virginia Center, Department of Computer Science, 03/2012
- ◇ Johns Hopkins University, Laboratory for Computational Sensing and Robotics, 11/2011
- ◇ Stanford University, Department of Computer Science, 03/2010
- ◇ George Mason University, Department of Computer Science, 11/2009
- ◇ Robotics: Science and Systems, Workshop on Bridging the gap between high-level discrete representations and low-level continuous behaviors, Seattle, WA, 06/2009.

- ◇ Johns Hopkins University, Department of Computer Science, 10/2008
- ◇ Carnegie Mellon University, Department of Computer Science, 03/2008
- ◇ Willow Garage, Mountain View, CA, 05/2008
- ◇ Worcester Polytechnic Institute, Department of Computer Science, 02/2008
- ◇ Intel Research, Hillsboro, OR, 01/2007
- ◇ State University of New York at Fredonia, 11/2006
- ◇ Rutgers State University of New Jersey, 07/2005
- ◇ Texas A&M University, Department of Computer Science, 05/2005

TEACHING AND EDUCATIONAL ACTIVITIES

- ◇ **Catholic University of America (CUA)**
 - ▷ Design of Data Science program (M.S. and minor) 2018–2019
 - ▷ Key player in developing CS/EE Robotics concentration 2014
 - ▷ CS curriculum revisions 2012, 2017
 - ▷ CUA Committee on Core Curriculum Revisions 2018–2019
 - Convergence education driven by compelling themes
 - Covered in a number of courses from different disciplines
- ◇ **Curriculum Development**
 - ▷ CSC530/DA501: Data Analytics (CUA)
 - ▷ CSC/EE 576: Introduction to Robotics (CUA)
 - ▷ CS 336: Algorithms for Sensor-Based Robotics (JHU)
- ◇ **Courses Redesigned**
 - ▷ CS 580: Artificial Intelligence (GMU)
 - ▷ CSC 542: Artificial Intelligence (CUA)
 - ▷ CSC 212: Theory of Computing (CUA)
 - ▷ CSC 223: Object-Oriented Programming (CUA)
 - ▷ CSC 113: Introduction to Programming (CUA)
- ◇ **Courses Taught**
 - ▷ GMU CS 583: Algorithms Fall 2023
 - ▷ GMU CS 484: Data Mining Spring 2023
 - ▷ GMU CS 580: Artificial Intelligence Fall 2022
 - ▷ CUA CSC/EE 576: Introduction to Robotics Fall 2011, Spring 2014, Spring 2016
 - ▷ CUA CSC 542: Artificial Intelligence Spring 2011, 2013, 2015, 2017, 2018, 2019
 - ▷ CUA CSC484/584/DA515: Introduction to Machine Learning Summer 2019
 - ▷ CUA CSC530/DA501: Data Analytics Fall 2018
 - ▷ CUA CSC 223: Object-Oriented Programming Fall 2014–2016
 - ▷ CUA CSC 212: Theory of Computing Spring 2011–2019
 - ▷ CUA CSC 113: Introduction to Computer Programming Fall 2010–2016, 2018
 - ▷ JHU CS 336: Algorithms for Sensor-Based Robotics Spring 2010
- ◇ **Committees**

- ▷ GMU CS Graduate Studies Committee (Fall 2023)
- ▷ GMU MS Admissions Committee (Spring 2023)
- ▷ GMU Robotics Strategies and Development (2022–2023)
- ▷ CUA AI & Ethics Group, Chair (2017–2019)
- ▷ CUA University Undergraduate Board (2015–2019)
- ▷ CUA School of Engineering Committee on University Strategic Planning (2016–2019)
- ▷ CUA School of Engineering Committee on Appointment and Promotion (2018–2019)
- ▷ CUA Chair of Computer Science Undergraduate Curriculum Committee (2013)
- ▷ CUA EECS Computer Science Curriculum Revision Committee (Fall 2010, Spring 2011)
- ▷ CUA EECS Computer Science Odyssey Day and Open House (2011–2017)

◇ Educational Activities

- ▷ **Robotics for Elementary School Students** Fall 2018
Providing robotics presentations and demonstrations for K-6 students and helping elementary school teachers launch robotics project-based learning modules, where the kids learn about designing and creating their own model robots
- ▷ **Math for Elementary School Students** Spring 2019
Ran MathClub at Canterbury Woods Elementary School, where I taught about 70 students in grades K-6 every week during Spring 2019, emphasizing logical reasoning and problem solving
- ▷ **DC FIRST Robotics** 2012–2019
Trained high-school students and conducted robotics exhibits at the main competition events.
- ▷ **Engineering New Frontiers** Summer 2011–2012
Organized the robotics events, presentations, and competitions as part of the summer camp for high-school students
- ▷ **Robotics Competitions** 2011–2019
Organizing robotics events such as robot soccer, robot wars, and drone competitions.

STUDENT MENTORING

◇ Ph.D. Advisor

- ▷ Hoang Dung Bui (Ph.D. Student, GMU) Spring 2020 – Fall 2023
- ▷ Yuanjie Lu (Ph.D. Student, GMU) Spring 2021 – Fall 2023
- ▷ Philip Baldoni (Ph.D. Student, GMU) Spring 2021 – Fall 2023
- ▷ James McMahon (Ph.D., CUA) Spring 2012–Spring 2016
- ▷ Duong Le (Ph.D., CUA) Fall 2013–Fall 2018
- ▷ Baris Secim (Ph.D. Student, CUA) Fall 2015 – 2018

◇ M.S. Advisor

- ▷ Sara Rashidian (M.S. Student, CUA) Fall 2013–Summer 2014

◇ Undergraduate Research Advisor

- ▷ Andrew Wells (Undergraduate, CUA) 2014–2016
- ▷ Alex Wallar (Undergraduate, St. Andrews University, UK) 2012–2015
- ▷ Tien Pham (Undergraduate, CUA) 2018–2019

◇ Senior-Design Research Advisor

- ▷ Michael Morgan, Joseph Santschi, James Conroy, James Lucas, Khrysitian-Alexander Tran (2018–2019):
“Exploration of Unknown Environments using a Team of Aerial and Ground Robots”
- ▷ Taner Tuncer and Abdulaziz Alhuthali (2018–2019): “Making Music with AI”

- ▷ Tsothe Kvelashvili, John Paul McPherson, Dulanjana Jayawardane (2016–2017): “UAV Swarm-based Antenna System” (**1st place**)
- ▷ Andrew Wells, Timothy Danchik, Peter Kuebler, Phillip Samra (2015–2016): “Target Tracking by a Team of Unmanned Aerial Vehicles”
- ▷ Matthew Dillon and Jorge Coronado (2014–2015): “Self-Balancing Skateboard”
- ▷ Matthew Melly and Lance Van Arsdale (2014–2015): “Mixed Real and Virtual Environments”
- ▷ Iyeol Beniam, Hilary Bruynell, and Elena Fafaul (2013–2014): “Robot Wars” (**1st place**)
- ▷ Patrick Gilfoil and Po Ming Chen (2013–2014): “3D Gaming with Physics Engines”
- ▷ Duong Le, Tuan Nguyen, Thanh Nguyen (2012–2013): “Kuka YouBot – At Your Service” (**1st place**)
- ▷ Hung Tran (2012–2013): “Using Kinect to Recognize Body-Language Gestures”
- ▷ Joseph Lattisaw (2011–2012): “Exploration of Unknown Environments by a Team of Robots”
- ▷ Minh Le (2011–2012): “Multi-Goal Motion Planning”
- ▷ Phuong Pham (2011–2012): “Motion Planning with Moving Obstacles”
- ▷ Kevin Lynn and Mohammed Abotaleb (2010–2011): “Axes Robotic Arm Designed to Pick Up Items Based on a Specific Color”
- ◇ **High-School Students Research Advisor**
 - ▷ Shrey Gupta (Thomas Jefferson High School for Science and Technology, McLean, VA) Summer 2021
 - ▷ Anwitha Kollipara (Thomas Jefferson High School for Science and Technology, McLean, VA) Summer 2021
 - ▷ Taj Abdin (Thomas Jefferson High School for Science and Technology, McLean, VA) Summer 2021
 - ▷ Ronit Reddy (South County High School, Lorton, VA) Summer 2021
 - ▷ David Garner (Eleanor Roosevelt High School, Greenbelt, MD) Fall 2015–2016
 - ▷ Sophia Barbieri (John F. Kennedy High School, Silver Spring, MD) Spring 2015
 - ▷ Alex Wallar (George Mason High School, Falls Church, VA) Summer 2012
 - ▷ Vladimir Utchin (George Mason High School, Falls Church, VA) Summer 2012
 - ▷ Devin Luce (Montgomery Blair High School, Silver Spring, MD) Summer 2012
 - ▷ Tong Hyun (Chantilly High School, Chantilly, VA) Summer 2011