Dr. Evangelos Vlachos

Assistant Researcher (Researcher Grade C)

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Summary

Dr. Evangelos Vlachos is an Assistant Researcher at the Industrial Systems Institute (ISI) of the ATHENA Research Center, where he has formed and leads an independent research group focusing on Joint Communication, Control, and Sensing (JC&S). He supervises and scientifically guides postdoctoral researchers and Ph.D. candidates, while his research work is internationally recognized with 47 publications, awards (Platinum Best Paper Award), and institutional collaborations with foreign universities (Univ. of Sussex, Edinburgh). Concurrently, as a Principal Investigator at the ATHENA Research Center, he has secured over €850,000 in funding, both through competitive programs (EUSOME) and private industry contracts (SPLASH).

Areas of Expertise

Non-linear & Intelligent Control for CPS; Distributed Model Predictive Control (MPC) for UAV Networks; Scientific Machine Learning (Deep Unfolding) & Physics-Aware AI; Joint Sensing, Communication and Control Co-design; Graph Signal Processing; Convex Optimization & Beamforming.

Education (Qualifications)

2009-2015	**Ph.D.** in Wireless Communications and Signal Processing, University of Patras. Thesis: *Efficient tranceiver techniques for interference and fading mitigation in wireless communication systems*, Supervisor: Prof. K. Berberidis, Grade: 10/10.
2006-2009	**M.Sc.** in Information Processing and Machine Learning, University of Patras. Thesis: *Adaptive techniques for V-BLAST like receivers for MIMO systems*, Supervisor: Prof. K. Berberidis, Grade: 10/10.
1999-2005	**Diploma** of Computer Engineering and Informatics, University of Patras. *Analysis and Implementation of Equalization Methods for MIMO systems in Frequency Domain*, Supervisor: Prof. K. Berberidis, Grade: 8/10.

Professional Experience

2019-present	**Assistant Researcher (Researcher Grade C)** *Industrial Systems Institute, ATHENA R.C.*
2024-2025	**Research Fellow** *School of Engineering and Informatics, University of Sussex, UK.*
2017-2019	**Postdoctoral Researcher**, Institute for Digital Communications *School of Engineering, University of Edinburgh, UK.*

2016-2017	**Postdoctoral Researcher**, Visualization and Virtual Reality Group *Department of Electrical and Computer Engineering, University of Patras.*
2015-2016	**Postdoctoral Researcher**, Signal Processing and Communications Lab *Department of Computer Engineering and Informatics, University of Patras.*

Awards

2017	"World's FIRST 10K Best Paper Award - Platinum Award" on efficient graph-based matrix completion of incomplete animated 3D point-clouds.
2009	Postgraduate studies scholarship.

Industry Collaboration

2023-present	Collaboration with **Hellenic U-Space Industry (HUSI)** on joint sensing, communication and control of aerial vehicles in the project SPLASH.
2022-present	Collaboration with **Quantum Neural Technologies** on quantum search algorithms for the optimization of telecommunication networks.
2020-present	Collaboration with **Hellenic Drones** on multi-modal localization and path planning for drones, and in the joint project HERMES.
2017-2018	Research collaboration with Mathematical and Algorithmic Sciences Lab, **Huawei Technologies France**.

Participation in Research Projects

2025-2029	**EUSOME** Horizon Europe Excellence Hub (Role: **PI** for ATHENA R.C.) *Enabling Autonomous Aerial Systems through Operational Methods and Technological Enhancements*
2023-2026	**SPLASH** Industrial funding (Role: **PI**) *Signal processing for physical layer design of joint sensing, communication and control of aerial vehicles*
2023-2026	**TERRAMETA** 6G-SNS funding (Role: Researcher) *TERahertz ReconfigurAble METAsurfaces for Ultra-high Rate Wireless Communications*
2023	**FIRA-DAV** Athena Internal PoC (Role: **PI**) *Development of a standard radar/camera database for autonomous systems.*
2022	**HERMES** H2020 Smart4all funding (Role: **PI**) *Enhanced Fire Management System via drones*
2019-2020	**CPSoSaWare** (European Horizon H2020) *Cross-layer cognitive optimization tools & methods for the lifecycle support of dependable Cyber-Physical-Systems of Systems*
2016–2017	**myAirCoach** (European Horizon H2020) *Analysis, modelling and sensing of both physiological and environmental factors for the customized and predictive self-management of Asthma*
2015–2016	**HANDiCAMS** (European FP7 FET) *Heterogeneous Ad-Hoc Networks for Distributed, Cooperative, and Adaptive Multimedia Signal Processing*
2012–2015	**ENDECON** (Greek THALIS program) *Energy efficient Design of Communications Networks*

Teaching and Research Supervision

2023-2025	**Lecturer**, Department of Physics, University of Patras. Independent teaching of the courses "Digital Communications" and "Mobile Communications" in the "Applied Physics" M.Sc. program.
2021-present	**Primary Supervisor** of Ph.D. Candidate (Nikolaos Ntavanelos) and member of advisory committees.
2021-2022	**Co-supervisor** of M.Sc. students at the University of Patras in collaboration with ATHENA R.C.
2019	**Lecturer**, School of Engineering, University of Edinburgh, UK. Teaching the undergraduate course Advanced Coding Techniques.
2011-2013	**Laboratory Associate**, TEI of Patras (now University of Peloponnese). Teaching Digital Signal Processing courses.

Other Professional Activities

- **Workshop Chair:** Workshop on Emerging Technologies in Autonomous Aerial Systems and Environmental Monitoring (SkySense 2025), in the framework of IEEE ISC2 2025.

- **Special Session Chair:** "Key enabling technologies for the physical-layer of 6G communications", 30th IFIP/IEEE VLSI-SoC 2022.

- **Reviewer:** In prestigious international journals (IEEE Trans. on Wireless Communications, IEEE Trans. on Vehicular Technology, IEEE Signal Processing Letters, etc.).

- **Committee Member:** EURASIP Technical Area Committee on Signal Processing for Communications and Networking (TAC SPCN).

Technical Skills

Programming Languages & Software
MATLAB/Simulink, Python (PyTorch for Scientific ML), C/C++, Julia Lang, LabView, LaTeX, Linux/Unix Shell Scripting.

Signal Processing & Telecommunications
Software Defined Radios (USRP), mmWave/THz Communications, Massive MIMO Beamforming, Reconfigurable Intelligent Surfaces (RIS), Integrated Sensing and Communications (ISAC), Radar Signal Processing (FMCW, OTFS), Graph Signal Processing.

Control & Robotics
Model Predictive Control (MPC) & Distributed MPC, UAV Flight Control Systems, Hardware-in-the-Loop (HIL) Simulation, Swarm Intelligence, ADMM-based Cooperative Control.

Machine Learning & Mathematics
Model-based AI (Deep Unfolding), Convex Optimization (CVX), Matrix Completion, Quantum Computing Algorithms (Search/Optimization), Time Series Analysis.

Embedded Systems & Hardware
Embedded AI Units, mmWave Radar Sensors (e.g., TI IWR6843), Drone Platforms Integration.

Other Information

- **Military Service (2007-2008):** Fulfilled military obligations at the **Research and Informatics Directorate (DEPLI)** of the Hellenic Army General Staff (HAGS), specializing in Technology and Informatics Research.

List of Publications

Submitted / Under Review Papers

2026

[S7] E. Vlachos, G. Alexiou, G. Papastefanatos, and A. Sakellaropoulou. Enabling Safe and Scalable UAV Swarms: ISAC Technology, GNSS Resilience, and Risk Modeling in U-space. *Under revision for resubmission to SESAR Innovation Days*, 2026

[S6] D. E. Venetis, E. Vlachos, and K. Berberidis. A New Consensus-Driven Cooperative Localization Technique for UAV Swarms under Intermittent GPS. In *Submitted to IEEE International Conference on Communications (ICC)*, 2026

[S3] N. Ntavanelos and E. Vlachos. Regularized Deep Unfolding Conjugate Gradient Detector for MIMO-OTFS Channels. In *Submitted to IEEE ICASSP*, 2026

[S2] C. Vitale, E. Vlachos, P. Kolios, and G. Ellinas. Intelligent UAV Path Planning for Ergodic Rate Maximization of MIMO Multipath Channels. In *Submitted to IEEE International Conference on Communications (ICC)*, 2025

[S1] E. Vlachos. Regularized Distributed MPC for UAV Networks: Stabilizing Coupled Motion and Hybrid Beam Alignment. *Submitted to IEEE Control Systems Letters (L-CSS)*, 2026

2025

[S5] G. C. Alexandropoulos, K. D. Katsanos, and E. Vlachos. Receiving RISs: Enabling Channel Estimation and Autonomous Configuration. In *Submitted to Book Chapter*. Under Review, 2025. Preprint available at arXiv:2506.10662

[S4] E. Vlachos and A. Kaushik. Turning Interference into Diversity: Covariance-based Spatial Partitioning for Massive MIMO ISAC. *Submitted to IEEE Transactions on Wireless Communications*, 2025

Book Chapters

2025

[BC1] Evangelos Vlachos, Aryan Kaushik, and George Alexandropoulos. Integrated Sensing and Communications for Future Wireless Networks: Principles, Advances and Key Enabling Technologies. *Elsevier Book Chapter*, 2024

Journals

2025

[J15] Evangelos Vlachos, Christos Mavrokefalidis, Kostas Berberidis, and George C. Alexandropoulos. Improving Wideband Massive MIMO Channel Estimation With UAV State-Space Information. *IEEE Transactions on Vehicular Technology*, 2025. doi: 10.1109/tvt.2025.3569350

2022

[J14] A. Kaushik, E. Vlachos, M. Nekovee, J. Thompson, and F. Courts. Towards 6G: Spectrally efficient joint radar and communication with radio frequency selection, interference and hardware impairments. *IET Signal Processing*, 2022a. doi: 10.1049/sil2.12131

2021

[J12] E. Vlachos and J. Thompson. Energy-Efficiency Maximization of Hybrid Massive MIMO Precoding With Random-Resolution DACs via RF Selection. *IEEE Transactions on Wireless Communications*, 2021. doi: 10.1109/twc.2020.3030772

[J11] A. Kaushik, E. Vlachos, C. Tsinos, J. Thompson, and S. Chatzinotas. Joint Bit Allocation and Hybrid Beamforming Optimization for Energy Efficient Millimeter Wave MIMO Systems. *IEEE Transactions on Green Communications and Networking*, 2021. doi: 10.1109/tgcn.2020.3026725

2020

[J13] E. Vlachos, J. Thompson, A. Kaushik, and C. Masouros. Radio-frequency chain selection for energy and spectral efficiency maximization in hybrid beamforming under hardware imperfections. *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 2020. doi: 10.1098/rspa.2020.0451

[J10] A. S. Lalos, E. Vlachos, K. Berberidis, A. Fournaris, and C. Koulamas. Robust and Efficient Privacy Preservation in Industrial IoT via correlation completion and tracking. In *2019 IEEE 17th International Conference on Industrial Informatics (INDIN)*, pages 1225–1228, 2019c. doi: 10.1109/indin41052.2019.8972154

2019

[J9] E. Vlachos, G. Alexandropoulos, and J. S. Thompson. Wideband MIMO Channel Estimation for Hybrid Beamforming Millimeter Wave Systems via Random Spatial Sampling. *IEEE Journal of Selected Topics in Signal Processing*, 2019a. doi: 10.1109/jstsp.2019.2937633

[J8] A. Kaushik, J. Thompson, E. Vlachos, C. Tsinos, and S. Chatzinotas. Dynamic RF Chain Selection for Energy Efficient and Low Complexity Hybrid Beamforming in Millimeter Wave MIMO Systems. *IEEE Transactions on Green Communications and Networking*, 2019a. doi: 10.1109/tgcn.2019.2931613

[J7] A. S. Lalos, E. Vlachos, G. Arvanitis, K. Moustakas, and K. Berberidis. Signal Processing on Static and Dynamic 3D Meshes: Sparse Representations and Applications. *IEEE Access*, 7:15779–15803, 2019b. doi: 10.1109/access.2019.2894533

2018

[J6] E. Vlachos, George C. Alexandropoulos, and J. Thompson. Massive MIMO Channel Estimation for Millimeter Wave Systems via Matrix Completion. *IEEE Signal Processing Letters*, 2018a. doi: 10.1109/lsp.2018.2870533

[J5] E. Vlachos, A. S. Lalos, A. Spathis-Papadiotis, and K. Moustakas. Distributed consolidation of highly-incomplete dynamic point clouds based on rank minimization. *IEEE Transactions on Multimedia*, 2018d. doi: 10.1109/TMM.2018.2839911

[J4] E. Vlachos, A. S. Lalos, K. Berberidis, and J. Thompson. Adaptive Windowing for ICI Mitigation in Vehicular Communications. *IEEE Wireless Communications Letters*, 2018c. doi: 10.1109/lwc.2018.2842226

2016

[J3] A. Lalos, I. Nikolas, E. Vlachos, and K. Moustakas. Compressed Sensing for Efficient Encoding of Dense 3D Meshes Using Model-Based Bayesian Learning. *IEEE Transactions on Multimedia*, 2017. doi: 10.1109/TMM.2016.2605927

[J2] E. Vlachos, A. S. Lalos, and K. Berberidis. Low-complexity OSIC equalization for OFDM-based Vehicular Communications. *IEEE Transactions on Vehicular Technology*, 2016. doi: 10.1109/TVT.2016.2598185

2012   **[J1]** E. Vlachos, A.S. Lalos, and K. Berberidis. Stochastic Gradient Pursuit for Adaptive Equalization of Sparse Multipath Channels. *IEEE Journal on Emerging and Selected Topics in Circuits and Systems*, 2(3):413–423, 2012b. doi: 10.1109/JETCAS.2012.2214631

Conferences

2025   **[C31]** E. Vlachos and G. Alexandropoulos. Biconvex Optimization for Time-Domain Channel Estimation Under Dual-Wideband Fading Conditions. In *33rd European Signal Processing Conference (EUSIPCO)*, 2025. doi: 10.23919/eusipco63237.2025.11226656

2023   **[C30]** E. Vlachos, C. Mavrokefalidis, and K. Berberidis. Velocity-aided Channel Estimation for Spatially Selective mmWave Massive MIMO Communications. In *31st European Signal Processing Conference (EUSIPCO)*, 2023. doi: 10.23919/eusipco58844.2023.10289899

   [C29] Evangelos Vlachos and Aryan Kaushik. Subset Selection Based RIS-Aided Beamforming for Joint Radar-Communications. In *2023 IEEE Wireless Communications and Networking Conference (WCNC)*, pages 1–6, 2023b. doi: 10.1109/wcnc55385.2023.10119089

   [C28] Evangelos Vlachos and Aryan Kaushik. Covariance-Based Hybrid Beamforming for Spectrally Efficient Joint Radar-Communications. In *IEEE International Conference on Communications (ICC)*, 2023a. doi: 10.1109/icc45041.2023.10279571

2022   **[C27]** Evangelos Vlachos and Kostas Blekos. Quantum Computing-Assisted Channel Estimation for Massive MIMO mmWave Systems. In *2022 IFIP/IEEE 30th International Conference on Very Large Scale Integration (VLSI-SoC)*, 2022. doi: 10.1109/vlsi-soc54400.2022.9939656

   [C26] Evangelos Vlachos, Evangelos D. Spyrou, Chrysostomos Stylios, and Kostas Berberidis. Optimal MmWave Sensor Selection for Bearing-Only Localization in Smart Environments. In *2022 30th Mediterranean Conference on Control and Automation (MED)*, pages 152–157, 2022. doi: 10.1109/med54222.2022.9837261

   [C25] Aryan Kaushik, Evangelos Vlachos, Christos Masouros, Christos Tsinos, and John Thompson. Green Joint Radar-Communications: RF Selection with Low Resolution DACs and Hybrid Precoding. In *IEEE International Conference on Communications (ICC) 2022*, pages 3160–3165, 2022b. doi: 10.1109/icc45855.2022.9838485

   [C24] Evangelos Vlachos and Aris S. Lalos. ADMM-based Cooperative Control for Platooning of Connected and Autonomous Vehicles. In *ICC 2022 - IEEE International Conference on Communications*, pages 4242–4247, 2022. doi: 10.1109/icc45855.2022.9839099

2020   **[C23]** G. Alexandropoulos, E. Vlachos, and B. Smida. Joint Localization and Channel Estimation for UAV-Assisted Millimeter Wave Communications. In *2020 54th Asilomar Conference on Signals, Systems, and Computers*, 2020a. doi: 10.1109/ieeeconf51394.2020.9443514

   [C22] G. C. Alexandropoulos and E. Vlachos. A Hardware Architecture For Reconfigurable Intelligent Surfaces with Minimal Active Elements for Explicit Channel Estimation. In *ICASSP 2020 - 2020 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pages 9175–9179, 2020. doi: 10.1109/icassp40776.2020.9053976

[C21] G. C. Alexandropoulos, E. Vlachos, and J. Thompson. Wideband Channel Tracking for Millimeter Wave Massive Mimo Systems with Hybrid Beamforming Reception. In *ICASSP 2020 - 2020 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pages 8698–8702, 2020b. doi: 10.1109/icassp40776.2020.9053440

2019   **[C20]** A. Kaushik, C. Tsinos, E. Vlachos, and J. Thompson. Energy Efficient ADC Bit Allocation and Hybrid Combining for Millimeter Wave MIMO Systems. In *2019 IEEE Global Communications Conference (GLOBECOM)*, pages 1–6, 2019b. doi: 10.1109/globecom38437.2019.9014072

[C19] A. Lalos, G. Arvanitis, E. Vlachos, and K. Moustakas. Energy Efficient Transmission of 3D Meshes Over MMWave-Based Massive MIMO Systems. In *2019 IEEE International Conference on Multimedia and Expo (ICME)*, pages 1714–1719, 2019a. doi: 10.1109/icme.2019.00295

[C18] E. Vlachos, G. C. Alexandropoulos, and J. Thompson. Hybrid Beamforming with Random Analog Sampling for Wideband Channel Estimation in Millimeter Wave Massive MIMO Systems. In *2019 IEEE 20th International Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, pages 1–5, 2019b. doi: 10.1109/spawc.2019.8815512

[C17] E. Vlachos, J. Thompson, M. A. Babar Abbasi, V. F. Fusco, and M. Matthaiou. Robust Estimator for Lens-based Hybrid MIMO with Low-Resolution Sampling. In *2019 IEEE 20th International Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, pages 1–5, 2019c. doi: 10.1109/spawc.2019.8815573

[C16] A. Kaushik, E. Vlachos, and J. Thompson. Energy Efficiency Maximization of Millimeter Wave Hybrid MIMO Systems with Low Resolution DACs. In *IEEE International Conference on Communications (ICC) 2019*, pages 1–6, 2019c. doi: 10.1109/icc.2019.8761357

2018   **[C15]** A. Kaushik, E. Vlachos, J. Thompson, and A. Perelli. Efficient Channel Estimation in Millimeter Wave Hybrid MIMO Systems with Low Resolution ADCs. In *2018 26th European Signal Processing Conference (EUSIPCO)*, pages 1825–1829, 2018. doi: 10.23919/eusipco.2018.8553303

[C14] E. Vlachos, A. Kaushik, and J. Thompson. Energy Efficient Transmitter with Low Resolution DACs for Massive MIMO with Partially Connected Hybrid Architecture. In *2018 IEEE 87th Vehicular Technology Conference (VTC Spring)*, pages 1–5, 2018b. doi: 10.1109/vtcspring.2018.8417650

[C13] E. Vlachos and J. Thompson. Dithered Beamforming for Channel Estimation in Mmwave-Based Massive Mimo. In *2018 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pages 3604–3608, 2018. doi: 10.1109/icassp.2018.8461911

2017   **[C12]** E. Vlachos, A. S. Lalos, K. Moustakas, and K. Berberidis. Efficient graph-based matrix completion on incomplete animated models. In *2017 IEEE International Conference on Multimedia and Expo (ICME)*, pages 1548–1553, 2017b. doi: 10.1109/icme.2017.8019502

[C11] E. Vlachos, A. S. Lalos, K. Berberidis, and C. Tselios. Autonomous driving in 5G: Mitigating interference in OFDM-based vehicular communications. In *2017 IEEE 22nd International Workshop on Computer Aided Modeling and Design of Communication Links and Networks (CAMAD)*, pages 1–6, 2017a. doi: 10.1109/camad.2017.8031619

2016   **[C10]** E. Vlachos and K. Berberidis. Adaptive completion of the correlation matrix in wireless sensor networks. In *24th European Signal Processing Conference (EUSIPCO)*, pages 1403–1407, 2016. doi: 10.1109/eusipco.2016.7760479

[C9] C. G. Tsinos, E. Vlachos, and K. Berberidis. Blind distributed beamforming via matrix completion. In *2016 IEEE 17th International Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, pages 1–6, 2016. doi: 10.1109/spawc.2016.7536750

[C8] C. Mavrokefalidis, D. Ampeliotis, E. Vlachos, K. Berberidis, and E. Varvarigos. Supervised energy disaggregation using dictionary-based modelling of appliance states. In *2016 IEEE PES Innovative Smart Grid Technologies Conference Europe (ISGT-Europe)*, pages 1–6, 2016. doi: 10.1109/isgteurope.2016.7856277

2013   **[C7]** E. Vlachos, A.S. Lalos, and K. Berberidis. Galerkin projections-based ICI cancellation in OFDM systems with doubly selective channels. In *18th International Conference on Digital Signal Processing (DSP)*, pages 1–6, 2013a. doi: 10.1109/icdsp.2013.6622686

[C6] E. Vlachos, A.S. Lalos, and K. Berberidis. Regularized MMSE ICI equalization for OFDM systems over doubly selective channels. In *IEEE International Symposium on Signal Processing and Information Technology*, pages 458–463, 2013b. doi: 10.1109/isspit.2013. 6781924

[C5] C. G. Tsinos, E. Vlachos, and K. Berberidis. Distributed blind adaptive computation of beamforming weights for relay networks. In *2013 IEEE 24th International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC)*, pages 570–574, 2013. doi: 10.1109/PIMRC.2013.6666200

[C4] V. Kekatos, E. Vlachos, D. Ampeliotis, G. Giannakis, and K. Berberidis. A decentralized approach to generalized power system state estimation. In *IEEE 5th International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP)*, 2013. doi: 10.1109/camsap.2013.6714011

[C3] E. Adamidi, E. Vlachos, A. Dermitzakis, K. Berberidis, and N. Pallikarakis. A scheme for X-ray medical image denoising using sparse representations. In *IEEE 13th International Conference on Bioinformatics and Bioengineering (BIBE)*, 2013. doi: 10.1109/bibe.2013. 6701544

2012   **[C2]** E. Vlachos, A. Lalos, G. Lionas, and K. Berberidis. Compressed Sensing Techniques for Decision Feedback Equalization of Sparse Wireless Channels. In *IEEE 75th Vehicular Technology Conference (VTC Spring)*, 2012a. doi: 10.1109/vetecs.2012.6240285

2011   **[C1]** A. Lalos, E. Vlachos, K. Berberidis, and A. Rontogiannis. Greedy algorithms for sparse adaptive decision feedback equalization. In *IEEE International Symposium on Signal Processing and Information Technology (ISSPIT)*, 2011. doi: 10.1109/isspit.2011.6151567

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