Kostas Sozos

Laboratory of Parallel and Distributed Systems
Department of Computer Engineering and Informatics
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Education

Ph.D. in Computer Engineering and Informatics,
University of Western Attica
Thesis: "Photonic Neuromorphic Techniques in Optical Communication and Image Processing Applications"
Supervisor: Antonis Bogris, 2020-2024
EKT Link: http://hdl.handle.net/10442/hedi/58111

MSc in Microsystems and Nanodevices,
National Technical University of Athens
Thesis: "Self-organization properties of amphiphilic copolymers with strong crystalline components"
Supervisor: Apostolos Kyritsis, 2019-2020

BSc in Physics,
University of Patras
Thesis: "Adsorption of copolymers on nanoporous membranes"
Supervisor: Dimitris Anastasopoulos, 2012-2018

Participation in Research Projects

Horizon Europe QPIC1550 project (No 101135785)	**2024-2025**
Horizon Europe PROMETHEUS project (No 101070195).	**2022-2025**
H.F.R.I. Research Projects to support Faculty Members & Researchers: NOOK project (No 2901)	**2022-2025**
EU H2020 NEoteRIC project (No 871330)	**2020-2023**
H.F.R.I. Research Projects to support Post-Doctoral Researchers: NEBULA project	**2020-2021**

Publications in International Scientific Journals

1. K. Sozos, C. Mesaritakis, and A. Bogris, "Reservoir Computing Based on Mutually Injected Phase Modulated Semiconductor Lasers as a Monolithic Integrated Hardware Accelerator," *IEEE Journal of Quantum Electronics*, vol. 57, no. 5, 2021, https://doi.org/10.1109/JQE.2021.3104855.
2. K. Sozos, A. Bogris, P. Bienstman, G. Sarantoglou, S. Deligiannidis, and C. Mesaritakis, "High-speed photonic neuromorphic computing using recurrent optical spectrum slicing neural networks," *Nature Communications Engineering*, vol. 1, no. 1, p. 24, Oct. 2022, https://doi.org/10.1038/s44172-022-00024-5.
3. K. Sozos, S. Deligiannidis, C. Mesaritakis, and A. Bogris, "Self-Coherent Receiver Based on a Recurrent Optical Spectrum Slicing Neuromorphic Accelerator," (Invited) *IEEE Journal of Lightwave Technology*, pp. 1–9, 2023, https://doi.org/10.1109/JLT.2023.3235278.
4. K. Sozos, S. Deligiannidis, G. Sarantoglou, C. Mesaritakis, and A. Bogris, "Recurrent Neural Networks and Recurrent Optical Spectrum Slicers as Equalizers in High Symbol Rate Optical Transmission Systems," *IEEE Journal of Lightwave Technology*, pp. 1–14, 2023, https://doi.org/10.1109/JLT.2023.3282999.
5. K. Sozos et al., "Experimental Investigation of a Recurrent Optical Spectrum Slicing Receiver for Intensity Modulation/Direct Detection Systems Using Programmable Photonics," *Journal of Lightwave Technology*, pp. 1–9, 2024, https://doi.org/10.1109/JLT.2024.3430489.
6. K. Sozos, S. Deligiannidis, C. Mesaritakis, and A. Bogris, "Unconventional Computing Based on Four Wave Mixing in Highly Nonlinear Waveguides," *IEEE Journal of Quantum Electronics*, vol. 60, no. 4, pp. 1–6, Aug. 2024, https://doi.org/10.1109/JQE.2024.3405826.
7. S. Deligiannidis, K. Bottrill, K. Sozos, C. Mesaritakis, P. Petropoulos, and A. Bogris, "Multichannel Nonlinear Equalization in Coherent WDM Systems Based on Bi-directional Recurrent Neural Networks," *IEEE Journal of Lightwave Technology*, pp. 1–9, 2023, https://doi.org/10.1109/JLT.2023.3318559.
8. Aris Tsirigotis, George Sarantoglou, Menelaos Skontranis, Stavros Deligiannidis, Kostas Sozos, Giannis Tsilikas, Dimitris Dermanis, Adonis Bogris, Charis Mesaritakis, "Unconventional Integrated Photonic Accelerators for High-Throughput Convolutional Neural Networks," *SPJ Intelligent Computing*, vol. 2, p. 0032, Jan. 2023, https://doi.org/10.34133/icomputing.0032.
9. Menelaos Skontranis, George Sarantoglou, Kostas Sozos et al., "Multimode Fabry-Perot Laser as a Reservoir Computing and Extreme Learning Machine Photonic Accelerator," *Neuromorphic Computing and Engineering*, vol. 3, 2023, https://doi.org/10.1088/2634-4386/ad025b.

Publications in International Scientific Conferences

1. C. Mesaritakis, K. Sozos, D. Dermanis, and A. Bogris, "Spatial Photonic Reservoir Computing Based on Non-Linear Phase-to-Amplitude Conversion in Micro-Ring Resonators," in *Optical Fiber Communication Conference (OFC) 2021*, Washington, D.C.: OSA, 2021, p. Tu1H.2. https://doi.org/10.1364/OFC.2021.Tu1H.2.
2. K. Sozos, C. Mesaritakis, and A. Bogris, "Reservoir Computing Based on Mutually Injected Phase Modulated Lasers: A Monolithic Integration Approach Suitable for Short-Reach Communication Systems," in *2021 Optical Fiber Communications Conference and Exhibition (OFC)*, San Francisco, USA, 2021, pp. 1-3. https://doi.org/10.1364/OFC.2021.W6A.4.

3. K. Sozos, A. Bogris, P. Bienstman, and C. Mesaritakis, "Photonic Reservoir Computing Based on Optical Filters in a Loop as a High Performance and Low-Power Consumption Equalizer for 100 Gbaud Direct Detection Systems," in *2021 European Conference on Optical Communication (ECOC)*, IEEE, Sep. 2021, pp. 1–4, https://doi.org/10.1109/ECOC52684.2021.9606123.

4. G. Sarantoglou, K. Sozos, T. Kamalakis, C. Mesaritakis, and A. Bogris, "Experimental Demonstration of an Extreme Learning Machine Based on Fabry Perot Lasers for Parallel Neuromorphic Processing," in *2022 Optical Fiber Communications Conference and Exhibition*, OFC 2022 - Proceedings, 2022. https://opg.optica.org/abstract.cfm?uri=OFC-2022-M1G.3.

5. A. Bogris, K. Sozos, S. Deligiannidis, G. Sarantoglou, and C. Mesaritakis, "Machine Learning and Neuromorphic Computing Approaches for the Mitigation of Transmission Impairments in High Baud Rate Transmission Systems," *2022 European Conference on Optical Communication (ECOC)*, Basel, Switzerland, 2022, pp. 1-4. https://opg.optica.org/abstract.cfm?uri=ECEOC-2022-Th2C.5.

6. Tsirigotis, I. Tsilikas, K. Sozos, A. Bogris, and C. Mesaritakis, "Filter-Based Photonic Reservoir Computing as a Key-Enabling Platform for All-Optical, High-Speed Processing of Time-Stretched Images and Telecom Data," in *AI and Optical Data Sciences III*, K. Kitayama and B. Jalali, Eds., SPIE, Mar. 2022, p. 50, https://doi.org/10.1117/12.2607438.

7. Bogris, K. Sozos, G. Sarantoglou, S. Deligiannidis, and C. Mesaritakis, "Neuromorphic Computing by Means of Recurrent Spectrum Slicing for Next Generation High Baud Rate Transmission Systems," in *2023 IEEE Photonics Society Summer Topicals Meeting Series (SUM)*, Sicily, Italy: IEEE, Jul. 2023, pp. 1–2, https://doi.org/10.1109/SUM57928.2023.10224454.

8. K. Sozos, S. Deligiannidis, C. Mesaritakis, and A. Bogris, "Unconventional Computing Based on Four Wave Mixing in Highly Nonlinear Media," in *Conference on Lasers and Electro-Optics/Europe (CLEO/Europe 2023)* and *European Quantum Electronics Conference (EQEC 2023)*, paper jsiii_1_1. https://opg.optica.org/abstract.cfm?uri=EQEC-2023-jsiii_1_1.

9. A. Tsirigotis, I. Tsilikas, K. Sozos, A. Bogris, and C. Mesaritakis, "Photonic Neuromorphic Accelerator Combined with an Event-Based Neuromorphic Camera for High-Speed Object Classification," in *Conference on Lasers and Electro-Optics/Europe (CLEO/Europe 2023)* and *European Quantum Electronics Conference (EQEC 2023)*, https://opg.optica.org/abstract.cfm?uri=eqec-2023-jsiii_3_4.

10. K. Sozos, A. Francesco Da Ros, Metodi Yankov, Stavros Deligiannidis, George Sarantoglou, Charis Mesaritakis, Adonis Bogris, "Experimental Investigation of a M-QAM Receiver Based on Recurrent Optical Spectrum Slicing and Direct Detection," in *2024 European Conference on Optical Communication (ECOC)*, IEEE, Sep. 2024.

11. K. Sozos, A. Francesco Da Ros, Metodi Yankov, Stavros Deligiannidis, George Sarantoglou, Charis Mesaritakis, Adonis Bogris, "Recurrent Optical Spectrum Slicing Receiver for Power Fading Mitigation in Highly Dispersive Links Using Programmable Photonics," *2024 IEEE Photonics Conference (IPC)*, Rome, Italy, 2024, pp. 1-2, https://doi.org/10.1109/IPC60965.2024.10799740.

Research Interests

- Photonic Neuromorphic Computing
- Photonic Sensors
- Quantum Metrology
- Optical Communications
- Signal Processing