Prof. Emmanouil E. Kriezis

1. GENERAL INFORMATION

1.1 Contact details

Work Address	Aristotle University of Thessaloniki, School of Electrical & Computer Engineering, Department of Telecommunications
Position	Professor
Telephone	+30 2310 995920
E-mail	mkriezis@auth.gr
Web	http://photonics.ee.auth.gr

1.2 Academic Qualifications

- PhD Degree, Department of Electrical and Computer Engineering (DECE), Aristotle University of Thessaloniki (AUTH), Greece, with highest honours (May 1992 – May 1996).
- Diploma in Electrical Engineering (5-year degree), DECE, AUTH, Greece, with highest honours: **9.31/10**, **1st** out of approximately 200 graduates (September 1986 – July 1991).
- Completion of Secondary Education, 14th Lyceum of Thessaloniki, "Excellent" **19$^{7/10}$** out of **20**. Admitted by the Department of Electrical and Computer Engineering, AUTH, through the General Panhellenic Completion (ranked 8th out of 150 selected electrical engineering students).

1.3 Awards

2001	Royal Society University Research Fellowship (http://royalsociety.org/).
1993	Young Scientist Award during the URSI'93 XXIVth General Assembly of the International Union of Radio Science (Kyoto, Japan).
1991	Award from the Technical Chamber of Greece (TEE) for graduating with the highest marks (first out of 200 electrical engineering graduates).
1987, 1988, 1989, 1990, 1991	Annual scholarship from the State Scholarships Foundation (IKY), during undergraduate studies.

1.4 Posts previously held

- Royal Society University Research Fellow, University of Oxford (October 2001 – September 2002).
- Stipendiary Lecturer in Electrical Engineering, Pembroke College, University of Oxford (October 1999 – September 2000).
- Postdoctoral Researcher, University of Oxford (October 1998 – September 2001).

1.5 Executive Summary

- Published **121** referred journal articles and **106** conference papers.
- Published **4** book chapters, co-authored the textbook *Microwaves: Theory and Applications* and authored the textbook *Optical Communications*.
- Included in Top 2% Scientists Worldwide in "Optoelectronics & Photonics" and "Optics" (2019, 2020, 2021, 2022, 2023).
- Received over **3800** citations (h-index **34**).
- Is heading the Photonics Group (http://www.photonics.ee.auth.gr/), established in 2002.

2. TEACHING

2.1 Teaching of undergraduate courses

October 2002 – today
Teaching of four (4) courses in the Electrical & Computer Engineering Undergraduate Program:

- Optical Communications 8th Semester, compulsory
- Microwave Engineering 9th Semester, compulsory
- Photonics 9th Semester, elective
- Computational Electromagnetics 8th Semester, elective

September 1999 – September 2000
During the above period, I was a stipendiary Lecturer at Pembroke College, University of Oxford (http://www.pmb.ox.ac.uk/). Teaching load was six (6) hours per week and covered basic engineering mathematics (linear algebra, complex-number algebra, differential equations and numerical analysis) and basic electrical engineering topics (electrical and electronic circuits, electromagnetism, electrical machines and telecommunications) for college students up to third year. Additional duties included the selection of future undergraduate students, academic assessments and general contribution to the Engineering Curriculum offered by Pembroke College.

September 1993 – February 1994
Teaching assistant for the undergraduate course Optics I at DECE, AUTH. Course content covered a review of Maxwell's Equations, geometrical optics, ray theory, Fourier optics, scalar diffraction theory and optical holography.

February 1992 – June 1996
Teaching assistant for the undergraduate courses Electromagnetic Field Theory I, II, III, IV at DECE, AUTH. Course content covered electrostatic fields, systems of conductors and capacitors, fields due to steady currents, magnetostatic fields, electromagnetic induction, magnetic circuits, forces on particles, Maxwell's equations, boundary value problems, plane electromagnetic waves, guided waves and metallic waveguides, transmission lines, antennas and radiation and plane-wave reflection and refraction.

2.2 Teaching of postgraduate courses

September 2002 – today
Teaching one postgraduate courses in the Doctoral (PhD) Program offered by the Department of Electrical & Computer Engineering, AUTH:

- Advanced Topics in Photonics

2.3 Textbooks

- Traianos V. Yioultsis and Emmanouil E. Kriezis, **Microwaves: Theory and Applications**, ISBN 978-960-418-612-9 (in Greek), Tziola Publications, pages 892, 2017.

Elements of electromagnetic field theory, basic transmission line theory, waveguides, planar transmission lines and circuits, matching, microwave circuits' excitation, microwave resonators and cavities. Multi-port microwave circuits, power dividers and directional couplers, microwave filters,

ferrites and ferrite devices, active microwave components, detectors, mixers, PIN diode circuits, microwave sources, microwave transistors and amplifier design, microwave systems and applications.

- Emmanouil E. Kriezis, **Optical Communications**, ISBN 978-618-221-041-3 (in Greek), Tziola Publications, pages 446, 2024.

Optical waveguides and modes: ray theory, electromagnetic theory, planar (slab) dielectric waveguide, circular optical fiber, graded index fibers. Transmission in optical fibers: attenuation mechanisms, intermodal and intramodal dispersion, fibers with modified dispersion properties. Transmission equation in single-mode optical fibers, transmission of pulses with arbitrary shape, bounds in maximum bit-rate due to dispersion, dispersion compensation. Laser and Laser diodes: general principles, light emission in semiconductors, laser diode structures (Fabry-Perot, DFB, DBR, VCSEL), mathematical description of a semiconductor injection laser, coupling to fibers. Optical detectors: principles of optical detection, PIN photodiodes, avalanche photodiodes. Direct detection optical receiver: noise sources, quantum limit, typical receiver implementations, receiver sensitivity, bit-error rate (BER), minimum power at receiver, factors that degrade sensitivity. Coherent optical systems: basic principles, external modulators, optical transmitters and receivers for coherent communications, DSP in coherent optical systems. Multiplexing techniques: Optical Time-Division Multiplexing (OTDM), Wavelength-Division Multiplexing (WDM), Polarization-Division Multiplexing (PDM), Space-Division Multiplexing (SDM). Optical amplifiers: basic principles, gain and noise, the Erbium Doped Fiber Amplifier, mathematical description with rate equations, steady-state and transient response, the EDFA as preamplifier, cascaded optical amplifiers.

2.4 Educational Laboratories

- Microwave Educational Laboratory: Organization and supervision of the compulsory Lab for the undergraduate course "Microwave Technology / Microwaves II". It includes four (4) laboratory exercises:

  (a) Klystron tube measurements
  (b) Gunn diode measurements, microwave power measurement, measurements of reflection coefficient and standing wave ratio (SWR) using directional couplers
  (c) Measurement of frequency, wavelength, SWR and complex impedance - Smith chart
  (d) Mixer measurements (CE, intermodulation products, IP3, SFDR)
  (e) Measurements with vector network analyzer (filters, dividers, amplifiers)

- Optical Communications Educational Laboratory: Organization and supervision of laboratory exercises for the undergraduate course "Optical Communications":

  (a) Optical fibers, coupling between optical sources and optical fibers
  (b) Optical Time Domain Reflectometer (OTDR) measurements
  (c) Emission, modulation, and reception of optical signals: DFB laser diode, Electro-absorption Modulator (EAM), PIN photodiode

2.5 Diploma Thesis (5th year project) Supervision

58 Diploma theses have been completed under my supervision. A full listing, including title and examination period, is provided below.

	Name	Title	Examined
1	Ntogari G. Tsipouridou D.	Light propagation in ferroelectric-liquid-crystal optical switches and modulators	03/2004

2	Zoumboulakis G.	Characterization of optical sources and optical detectors	07/2004
3	Ziogos G.	Scalar finite-element Beam Propagation Method for integrated optical circuits	10/2004
4	Bavelis K.	Study of photonic crystal devices using the finite-difference time-domain method	03/2005
5	Stoltidou C.	Measurements of spectral losses in optical fibers	03/2005
6	Pitilakis A.	Vector Beam Propagation Method for integrated photonics devices	07/2005
7	Kostoulakis L.	Erbium doped fiber laser	02/2006
8	Kouinelis A.	Study of electromagnetic bandgap devices at microwave measurements	02/2006
9	Micholitsis A.	Study of diffraction gratings at optical frequencies	02/2006
10	Tasolamprou A.	Study of tropospheric wave propagation using parabolic equation techniques	07/2006
11	Athanasiadis P.	Study of diffraction gratings and tunable photonic crystals at optical frequencies	10/2006
12	Kapula S.	Study in 3-D of photonic crystal devices infiltrated with liquid crystals	10/2006
13	Plakias C. Tasikas A.	Optical free-space links[1]	06/2007
14	Zoidis V.	Study of Erbium-doped fiber amplifiers using numerical models	07/2007
15	Zerva M. Stefanidou I.	Electromagnetic wave attenuation measurements in concrete slabs[2]	07/2007
16	Athanasiou A.	Analysis of liquid-crystal optical diffraction gratings	07/2007
17	Tsilipakos O.	Dispersion diagram calculation in purely dielectric and metalo-dielectric photonic crystals in 2- and 3-dimensions using expansions in plane waves	02/2008
18	Kourikos E.	Study of tunable photonic crystal devices with single periodicity on the silicon on insulator (SOI) platform	02/2008
19	Psara E.	Analysis of index-guided photonic crystal fibers with the multi-pole expansion method	06/2008
20	Sarri D.	Analysis of index guided photonic crystal fibers with the finite element method	06/2008
21	Aggrafiotis S.	Erbium Doped Fiber Amplifiers	09/2008
22	Echarchou A.	Analysis and design of optical micro-ring resonators	03/2009
23	Tsiatmas A.	Analysis of surface plasmon polariton devices with the Beam Propagation Method	03/2009
24	Papadodopoulos I.	Plane wave interaction with perforated perfect-metal surfaces in the context of the mode-matching method	03/2009
25	Koutroulou C.	Analysis and design of photonic crystal resonant cavities and filters	07/2009
26	Petousi D.	Calculations in optical communication systems in the framework of the nonlinear Schrödinger equation	07/2009
27	Skolianos G.	All-optical wavelength conversion in dispersion-shifted fibres using four-wave mixing	06/2010
28	Skouras D.	Dispersion diagram calculation of one- and two-dimensional plasmonic waveguides	06/2010
29	Frida A.	Pulse propagation in silicon waveguides in the framework of the nonlinear Schrödinger equation	09/2010
30	Pantelis E.	Study of self-pulsating semiconductor lasers: description of a computational model based on carrier rate-equations	09/2010
31	Alanis D.	Erbium doped fiber amplifiers: experimental characterization and analysis with the spectral model	06/2011
32	Lazaridis E.	Pulse propagation in optical fibers in the context of the nonlinear Schrödinger equation	07/2012
33	Liaska E.	Nonlinear pulse propagation in silicon waveguides: free-carrier effects	07/2012
34	Zdrali E.	Stimulated Raman scattering in optical fibers and integrated silicon waveguides	03/2013
35	Papadopoulos S.	Coherent detection for distributed optical fiber sensing[3]	05/2013
36	Chatzidimitriou D.	Nonlinear effects in nanophotonic waveguides in the context of the vectorial nonlinear Schrodinger Equation	07/2013
37	Simeonidis M.	Theoretical and experimental study of four wave mixing and stimulated Raman scattering in optical fibers	11/2013

[1] In collaboration with Prof. G. Karagiannidis

[2] In collaboration with Prof. G. Sergiadis

[3] This work was conducted in the framework of the bilateral scientific agreement AUTH-EPFL, under the supervision of Prof. L. Thevenaz.

38	Sinatkas G.	Interfacing silicon photonic waveguides with Metal-Insulator-Metal plasmonic waveguides	11/2013
39	Christopoulos T.	Optical bistability in photonic devices with third order nonlinearity	04/2014
40	Grivas N.	Nonlinear effects in graphene resonators: bistability in the THz frequency band	07/2016
41	Skandalos I.	Silicon electro-optic modulators based on free carrier effects in transparent conducting oxides	03/2017
42	Katsikas G.	Plasmonic slot waveguides and electro-optic slot modulators exploiting transparent conducting oxides	07/2017
43	Ataloglou V.	Third order nonlinear effects, carrier effects and saturable absorption in silicon photonic resonators with graphene	11/2017
44	Georgakis E.	Bistability at THz frequencies from a uniform graphene sheet illuminated by a linearly polarized plane wave	07/2018
45	Xenidis N.	Wave phenomena at periodic graphene surfaces using Floquet series expansions: scattering and eigenvalue problems	11/2018
46	Kadoglou M.	Perfect free space absorber based on the metamaterial technology and study of parity-time symmetry effects in Erbium doped fibers	07/2019
47	Dakis F.	Mathematical analysis, simulation, development, and experimental measurements in actively and passively mode-locked fiber lasers	11/2019
48	Dympeta I.	Radar cross section calculations using the Puma-EM public domain software and experimental measurements	11/2019
49	Nousios G.	Nonreciprocal photonic devices based on nonlinear resonators	11/2020
50	Gionis M.	Mathematical analysis and simulation of a figure-eight optical fiber laser	07/2021
51	Eleftheriadi M.	Contemporary thin-film lithium niobate photonic modulators	11/2021
52	Pavlidis T.	Four-wave mixing in waveguides comprising graphene or graphene oxide	03/2022
53	Metallidis I.	Study of passive mode-locking in laser diodes using the finite-difference time-domain method	07/2022
54	Stefopoulos C.	Frequency combs in the near and mid infrared regions	11/2022
55	Palaiochorinos A.	Metasurfaces for electromagnetic absorption in the visible and near infrared regions	11/2022
56	Politikou K.	Analysis and Design of an Optical Source for Emission at 740 nm Using 2D Transition-Metal-Dichalcogenides	11/2023
57	Melissaris C.	Study of third harmonic generation in photonic resonators using temporal coupled mode theory	7/2024
58	Papafilippou K.	Techniques for the computation of quality factor in photonic and plasmonic resonators that support quasi normal modes	7/2024

3. RESEARCH ACTIVITY

3.1 Research Experience and Research Agenda

AUTH, Department of Electrical & Computer Engineering: October 2002 – today

- Optical/photonic integrated circuits of plasmonic technology: switching elements based on plasmonic waveguides, resonators, and filters. Optical routers based on plasmonic technology. Nonlinear effects in plasmonic waveguides.
- Nonlinear effects in nano-photonic waveguides with emphasis on silicon-on-insulator (SOI) waveguides. Soliton waves for optical time-domain multiplexing applications.
- Photonic and THz components for linear and nonlinear operation based on graphene and other 2-D materials. Light emission from 2-D materials.
- Photonic crystals with emphasis on externally controllable devices that allow for tunable operation. Photonic crystals infiltrated with liquid crystals. Optical integrated components/circuits based on photonic crystals.
- Optical Microstructured Fibers: endlessly single-mode fibers, fibers with high-birefringence and tunable properties.
- Silicon-based photonic devices: research in SOI-based devices for optical communications and sensor applications.
- Computational techniques for photonics: development of advance computational techniques for the analysis and design of photonic integrated components and circuits and thin-film devices.
- Liquid Crystal Photonics: guided and free-space component that are based on liquid crystals. Bistable liquid crystal devices.
- Optical nanomaterials: study of novel optical nanomaterials with spatially dependent structure that combine liquid crystals and polymers.
- Spatial Light Modulators: study of spatial light modulators with very high resolution for optical switches and other diffractive elements, with emphasis on polarization insensitive operation. Diffraction gratings.
- Microwave propagation over urban conditions: Development of computational techniques based on the parabolic equation for wave-propagation at microwave frequencies.
- Microwave elements that exploit electromagnetic bandgap structures.

University of Oxford, Department of Engineering Science, ROYAL SOCIETY University Research Fellow: October 2001 – September 2002

Research in the area of light propagation/scattering in complex anisotropic media and devices. I studied light scattering from micrometer-sized Liquid Crystal droplets dispersed in polymer (Polymer Dispersed Liquid Crystals). In addition, I conducted research related to light scattering of tightly focused vector beams in optical data storage systems (optical disks) and I examined ways of increasing the storage density of such systems.

University of Oxford, Department of Engineering Science, EPSRC funded research: January 2001 – September 2001

I conducted research in the area of multi-dimensional optics for Liquid Crystal devices. Emphasis was given on reconfigurable LC phase gratings with high diffraction efficiency for optical switching and beam-steering applications. In addition, I analyzed bistable nematic devices (for low-power applications) based on surface relief gratings with double periodicity, employing realistic 3-D models.

University of Oxford, Department of Engineering Science, Hewlett-Packard funded research: July 2000 – December 2000

Researcher funded by Hewlett Packard (HP Laboratories Bristol, http://www.hpl.hp.com/bristol/) at the University of Oxford, Department of Engineering Science, Liquid Crystal Technology Group.

Research was conducted in the area of Bistable Nematic (BN, ZBN, ABN) displays for low-power consumption small-sized flat panels. The theoretical investigations have been complemented by optical measurements (transmitted and diffracted waves), as well.

University of Oxford, Department of Engineering Science, EPSRC funded Post-Doctoral Research: October 1998 – July 2000
Post-Doctoral Researcher supported by EPSRC (Engineering & Physical Sciences Research Council, http://www.epsrc.ac.uk/) and in collaboration with SHARP Laboratories of Europe (SLE Ltd., http://www.sle.sharp.co.uk/). My research focused on the development of multi-dimensional models for the optics of liquid crystal devices by advanced numerical methods (Vector Beam Propagation Methods – VBPM, Finite-Difference Time-Domain Methods – FDTD). Areas of application included effects at twisted nematic (TN) pixel edges containing disclination lines, small-sized pixels for micro-displays, Zenithal Bistable Nematic (ZBN) devices, and multi-domain twisted nematic pixels. Further studies focused on Ferroelectric Liquid Crystal (FLC) with multiple domains and domain walls, helical structures and Anti-Ferroelectric (AFLC) structures.

3.2 Doctoral thesis (PhD) supervision

I have supervised eight (8) doctoral theses, as outlined in the table below.

	Name	Thesis title	Examined
1	Ziogos I.	Development of advanced beam-propagation-method techniques for the analysis of anisotropic photonic devices, explicit schemes and time-domain schemes	07/2012
2	Tasolamprou A.	Analysis and design of electrically tunable planar photonic and plasmonic devices using nematic liquid crystals	11/2012
3	Tsilipakos O.	Surface-plasmon devices with sub-wavelength dimension	11/2013
4	Pitilakis A.	Analysis, design and characterization of integrated photonic devices based on the hybrid conductor-dielectric-silicon technology	12/2013
5	Chatzidimitriou D.	Exploiting linear and nonlinear graphene properties in nanophotonic waveguides	12/2018
6	Christopoulos T.	Plasmonic and graphene nonlinear resonant nanophotonic devices: optical bistability and four-wave mixing	11/2019
7	Sinatkas G.	Silicon nanophotonic modulators with field-effect control of free carriers: The epsilon-near-zero effect in transparent conducting oxides	01/2022
8	Nousios G.	Integrated Nanophotonic Elements Utilizing Two-Dimensional Materials for Switching Applications and Light Sources	10/2024

In addition, I have actively contributed to the supervision of the PhD thesis of E. Kosmidou (examined 6/2006) and the PhD thesis of D. Zografopoulos (examined 12/2008).

I am currently serving as Advisory Committee Member for the following two (2) doctoral theses:

	Name	Institution	Name	Institution
1	Raptis S.	AUTH		
2	Ntokos C.	AUTH		

AUTH: Aristotle University of Thessaloniki

Finally, I served as Examination Committee Member for thirty-nine (39) doctoral theses:

	Name	Examined		Name	Examined
1	Ntouanoglou E.	11/2004	**21**	Dimitriadou E. * [DUT]	03/2014
2	Katsibas T.	02/2005	**22**	Ntaikos D.	04/2014
3	Zigiridis T.	10/2005	**23**	Kollatou T.	10/2014
4	Prokopidis K.	02/2006	**24**	Pappi K.	03/2015
5	Kosmidou E.	06/2006	**25**	Papaioannou S.	06/2015
6	Vasiliadis T.	07/2006	**26**	Ketzaki D. *	06/2015
7	Dimitriou A.	07/2006	**27**	Alexoudi T.	10/2015
8	Karapantazis S.	05/2007	**28**	Fitsios D. *	10/2015
9	Polimeridis T.	09/2008	**29**	Bourgis N. *	01/2016
10	Zografopoulos D. *	12/2008	**30**	Karamanos T.	10/2016
11	Moneda A.	05/2008	**31**	Amanatiadis S.	11/2016
12	Sounas D.	05/2009	**32**	Pyrgialakos G.	04/2019
13	Karatzidis D.	06/2009	**33**	Nitas M. *	04/2019
14	Theofilogiannakos G.	06/2009	**34**	Rizou Z. * [DUT]	02/2020
15	Asimonis S.	07/2011	**35**	Passia T. *	07/2020
16	Lalas A.	11/2011	**36**	Kastritsis D. [DUT-ENIB]	01/2022
17	Papadopoulos T.	03/2012	**37**	Doukas S. [UoI]	12/2022
18	Chatzidiamantis N. *	05/2012	**38**	Tzitzis A.	10/2023
19	Bouzianas G.	01/2013	**39**	Salonikios V. *	04/2024
20	Dimitriadis A.	11/2013			

(*) Also, Advisory Committee Member, DUT: Democritus University of Thrace

3.3 Research Projects

- **Graphene-enhanced on-chip nanophotonics for switching and lasing applications (GRAINS)**, Hellenic Foundation for Research & Innovation (HFRI), "First Call for HFRI Research Projects to support Faculty Members and Researchers and the procurement of high-cost research equipment grant" (Project Number: HFRI-FM17-2086), 2019-2023, 187,927 €, PI Prof. E. Kriezis. Research on tightly confining Si waveguides enhanced by graphene, cavities subjected to graphene's saturable absorption, demonstration of proof-of-concept devices for on-chip optically self-controlled or optically addressed switching elements and lasing modules.
- **Innovative composite materials for the drag and electromagnetic signature reduction for applications in aviation (RADAERO)**, Operational Programme "Competitiveness, Entrepreneurship and Innovation" (EPAnEK), 2020-2023, 246,775 €, PI Prof. K. Yakinthos. The project aims at the development of a novel, multifunctional, hybrid composite material with thin layer films for Unmanned Aerial Vehicle (UAV) applications.
- **Design of nonlinear silicon devices incorporating graphene and using the Parity-Time symmetry concept**, Operational Program "Human Resources Development, Education and Lifelong Learning" EDULL103, 2020-2021, 50,050 €, PI Prof. E. Kriezis. Research on novel integrated photonic devices that combine the SOI platform with the inclusion of 2D materials and exploit the Parity-Time (PT) symmetry concept and the broader class of Non-Hermitian devices. Key emphasis is on the study of nonreciprocal devices with nonlinearity (loss saturation) and structural asymmetry.
- **Nonlinear phenomena in graphene-comprising resonators**, Operational Program "Human Resources Development, Education and Lifelong Learning" EDULL34, 2018-2019, 56,350 €, PI Prof. E. Kriezis. Research on third-order nonlinear processes in resonators comprising graphene, such as optical bistability, cross-phase modulation, four-wave mixing, and third-harmonic generation.

- **Polymeric Nanocomposites for Electromagnetic Shielding applications (POLYSHIELD)**, Operational Programme "Competitiveness, Entrepreneurship and Innovation" (EPAnEK), 2018-2021, 150,000 €, PI Prof. T. Yioultsis. Development of primary nanocomposite materials for electromagnetic shielding in constructions, new electronic devices, and personal protection.
- **Nanophotonic components controlled by carrier effects in transparent conducting oxides,** Research Projects for Excellence IKY/Siemens, 2015-2017, 50,000 €, PI Prof. E. Kriezis. Study of novel nanophotonic components that exploit the Epsilon-Near-Zero (ENZ) effect in Transparent Conducting Oxides (TCO), in a silicon photonics platform.
- **Nanophotonic devices for waveguiding based on graphene**, IKY-Siemens Program 2014/15 (SR 22948), 2014-2016, 26,000 €. Grant supporting the postdoctoral research of Dr. Alexandros Pitilakis, under my supervision.
- **Analytical and numerical electromagnetism with applications in photonics and nanodevices (ANEMOS)**, 2012-2015, 600,000 €, THALES Project, co-financed by the European Union (European Social Fund, ESF) and Greek national funds through the Operational Program "Education and Lifelong Learning" of the National Strategic Reference Framework (NSRF), coordinated by Prof. K. Hizanidis (NTUA). I had led the AUTH team with a budget allocation of 80,000 €. Research on optical nanocomponents, with emphasis on tunable nanophotonic components exploiting optical fluids and Liquid Crystals, optical integrated circuits based on silicon technology and metamaterials.
- **Merging Plasmonic and Silicon Photonics Technology towards Tb/s routing in optical interconnects (PLATON)**, FP7 Project, Contract No. 249135, 2010-2012, consortium budget 3,403,174 €, coordinator Dr. N. Pleros. My group participated through the Center for Research & Technology Hellas (CERTH), Informatics & Telematics Institute (ITI), 498,354 € and the amount of funding for our activities was 100,000 €. Our main role was the design and numerical modeling of 2x2 and 4x4 thermo-optic plasmonic switching elements, meeting the specifications of practical optical interconnects. Designs were based on the Dielectric-Loaded Surface Plasmon Polariton (DLSPP) waveguide and were hosted on a Silicon-on-Insulator (SOI) platform. Both travelling wave resonators and longitudinal arrangements were successfully demonstrated. Another key activity was the design of a low-loss interface between the plasmonic DLSPP circuitry and the coupling-in and coupling-out Silicon (SOI) waveguides. Our designs were fabricated by other consortium partners and were subsequently evaluated in system level experiments.
- **Analysis, design, and characterization of integrated photonic devices based on the hybrid conductor-dielectric-silicon technology**, 2010-2013, 45,000 €, HERACLITUS II Program, co-financed by the European Union (European Social Fund, ESF) and Greek national funds through the Operational Program "Education and Lifelong Learning" of the National Strategic Reference Framework (NSRF). This program supported the PhD Thesis of Alexandros Pitilakis, under my supervision.
- **Surface-plasmon devices with sub-wavelength dimension**, 2010-2013, 45,000 €, HERACLITUS II Program, co-financed by the European Union (European Social Fund, ESF) and Greek national funds through the Operational Program "Education and Lifelong Learning" of the National Strategic Reference Framework (NSRF). This program supported the PhD Thesis of Odysseas Tsilipakos, under my supervision.
- **Towards Functional Sub-Wavelength Photonic Structures**, European Cooperation in the field of Scientific and Technical Research, COST MP0702, coordinator Prof. M. Marciniak, 2008-2011.

- **Optical Fibres for New Challenges Facing the Information Society**, European Cooperation in the field of Scientific and Technical Research, COST 299, coordinator Prof. L. Thevenaz, 2006-2010.
- **Physics of Linear, Non-Linear and Active Photonic Crystals**, European Cooperation in the field of Scientific and Technical Research, COST P11, coordinator Prof. C. Sibilia, 2003-2007.
- **Nouveaux Nanomatériaux Cristaux Liquides Cholestériques à gradient de fonction: études expérimentales et théoriques**, Bilateral Collaboration between Greece and France, General Secretariat for Research & Technology, 2006-2008, 11,600 €, PI Prof. E. Kriezis. Joint biennial research project with the Centre d'Elaboration de Matériaux et d'Etudes Structurales (http://www.cemes.fr/), Centre National de la Recherche Scientifique (CNRS), Toulouse, France. We provided the theoretical studies of novel Cholesteric Liquid Crystals (CLCs) with engineered nanostructure and analyzed CLCs with a pitch gradient for expanding the bandgap and also polymer stabilized CLCs with helicity inversion. These latter structures can be hyper-reflective (i.e., reflectance goes beyond the 50% limit for unpolarized light.
- **Photonic Crystals for optical communications based on silicon and liquid crystals**, 8th Session for Scientific and Technological Cooperation, Italian Ministry of Foreign Affairs, 2006-2009, 220,000 €, led by Dr. R. Beccherelli and Prof. E. Kriezis. Joint triennial research project with the Istituto per la Microelettronica e Microsistemi (http://www.imm.cnr.it/), Consiglio Nazionale delle Ricerche (CNR), Rome, Italy. Our main objective was the study of planar photonic crystal structures that are infiltrated with nematic liquid crystals. Emphasis was given on slab geometries which are derived by the preferential (anisotropic) etching of SOI wafers.
- **Design and development of novel devices for microwave and optical communications**, PENED'2003[4], General Secretariat for Research & Technology, 2005-2008, 132,790 €, led by Prof. T. D. Tsiboukis. Theoretical analysis and design of a novel class of Photonic Crystal Fibers (PCF) that was intended for in-line polarization control. The key idea was the infiltration of some or all the PCF capillaries with isotropic fluids or liquid crystals that can be switched, to induce high levels of controllable birefringence.
- **Measurements of Electromagnetic and Acoustic Power Density**, AUTH Research Committee project, 2004-2013, 60,000 €, led by Prof. C. S. Antonopoulos. Field (on-site) and lab measurements at RF/Microwave frequencies, such as power density, antenna gain, electromagnetic shielding, scattering parameters, etc. The above range of services is offered to industry, telecom operators, local authorities, governmental agencies and to the public.
- **Implementation of a Finite-Difference Time-Domain method to model complex DVD systems**, subcontract from Imperial College London, (prime contract SLAM – Super Laser Array Memory – IST-2000-26479), 2004, 4,000 €, PI Prof. E. Kriezis. Development of a custom Finite-Difference Time-Domain (FDTD) code for modeling light scattering/diffraction by micrometer-sized features in optical data storage systems, when illuminated by high-NA vector beams.
- **Strengthening informatics at the Department of Electrical & Computer Engineering AUTH**, EPEAEK II, led by Prof. P. Mitkas.
- **Numerical Modelling of Light Wave Propagation in Complex Anisotropic Devices**, ROYAL SOCIETY University Research Fellowship, 516002.KAW/kk, PI Dr. E. Kriezis, 2001-2002, £ 39,650 (pa after overhead deduction). Independent theoretical research on optical wave propagation in complex anisotropic media, such as polymer dispersed liquid crystals and infiltrated photonic crystal lattices.

[4] PENED: Research Personnel Support Programme

- **Three-dimensional optical modelling for microstructures in liquid crystal devices**, HEWLETT PACKARD Laboratories, Bristol, 2000, £ 50,000, Principal Investigator Prof. S. Elston.
- **Light Propagation in Liquid Crystal Materials**, UK Engineering and Physical Research Council (EPSRC), Grant GR/M04051/01, 1998-2001, £ 110,205, Principal Investigator Prof. S. Elston.
- **Development of software tools for the analysis and design of integrated optical components**, PENED'1994, General Secretariat for Research & Technology, 1996-1998, 23,500 €, led by Prof. A. Papagiannakis.

3.4 Current Research Interests

- Nanophotonics with emphasis on integrated circuits of guided plasmonic waves for optical interconnects and optical processing.
- Integrated photonic devices on silicon (SOI) platform.
- Components for the NIR and THz that exploit graphene and other 2-D materials, including nanolasers.
- Nonlinear phenomena in optical resonators, optical bistability, wave-mixing and free carrier effects.
- Modulators based on transparent conducting oxides (TCO).
- Optical micro-structured fibers with tunable properties for polarization and dispersion control.
- Advanced computational techniques for the analysis and design of integrated photonic components and circuits (BPM, FEM, FDTD, NLSE).
- Liquid crystals with emphasis on guided-wave control in photonic or plasmonic waveguides and on spatial light modulators for optical switches. Bistable LC devices.
- Free-space devices: diffraction gratings and metasurfaces.

4. SCIENTIFIC ACTIVITY

4.1 Reviewer for International Journals

I am serving as Reviewer for many international scientific journals:

- ACS Photonics
- Advanced Physics Research
- Applied Optics
- Applied Physics Letters
- Journal of Applied Physics
- Journal of the European Optical Society (JEOS) – Rapid Publications
- Journal of Optical Society of America A
- IEEE Journal of Lightwave Technology
- IEEE Photonics Journal
- IEEE Photonics Technology Letters
- IEEE Journal of Selected Topics in Quantum Electronics
- Laser & Photonics Reviews
- Optical and Quantum Electronics
- Optics Communications
- Optics Express
- Optics Letters
- Optik
- Nanophotonics
- Nature Scientific Reports
- Photonics and Nanostructures – Fundamentals and Applications

I have reviewed more than **150 papers** since 2002.

4.2 Journal Editorial Boards

- Optical and Quantum Electronics, published by Springer: 2010-2024.

4.3 Consulting

- SHARP Laboratories of Europe (SLE Ltd): 2000-2001

4.4 Project Evaluation Panels

- Evaluator for proposals submitted to the Hellenic Foundation for Research & Innovation (HFRI) (2019-2023).
- Evaluator for the Cyprus Agency of Quality Assurance and Accreditation (CYQAA) in Higher Education (2021).
- Project certifier for EYDE-ETAK, Operational Programme "Competitiveness, Entrepreneurship and Innovation" (2019-2021).
- Evaluator for many European National Agencies (Cyprus Research Promotion Foundation, Slovak Republic Research Agency, Poland National Science Centre, Latvian Council of Science, State Secretariat for Education and Research of Federal Department of Home Affairs Switzerland) (2016-2024).

- Evaluator for proposals submitted to the Competitive Research Grants program, Round 2 Competition of King Abdullah University of Science and Technology (KAUST) (2013).
- Evaluator for the Basic Research Grants program funded by the National Technical University Athens (2006, 2021).
- Evaluator for many national research calls funded by the General Secretariat of Research & Technology, the Operational Program "Human Resources Development, Education and Lifelong Learning", the Research Grants program HERACLITUS II, and other national funding bodies, including the State Scholarships Foundation (IKY).

4.5 Faculty-Member Evaluation Panels

- Participation in Evaluation Committees (each comprised of three members) for the promotion or for granting tenure to faculty members.
- Participation as Elector in numerous (above 100) Faculty-Member Evaluation Panels in the Department of Electrical & Computer Engineering, AUTH, in other AUTH Faculties and Departments, as well as in other Greek universities (National Technical University Athens, National and Kapodistrian University of Athens, University of Patras, Democritus University of Thrace, University of Thessaly, University of Ioannina, Harokopio University of Athens).
- External expert and panel member for the evaluation of academics at the Department of Electrical and Electronics Engineering, School of Electrical Electronic and Communication Engineering, Holon Institute of Technology, Israel, and the Frederick University of Cyprus.

4.6 Conference Organizing Committees

- IEEE Conference on Electromagnetic Field Computation CEFC 2008: Editorial Board Member.
- 12th European Conference on Liquid Crystals, ECLC-2013 (Rhodes): Organizing Committee Member.
- IEEE International Conference on Modern Circuits and Systems Technologies, MOCAST 2016, 2017, 2018: Program Committee.
- IEEE International Workshop on Antenna Technology 2017: Technical Program Committee.
- 20th International Symposium on Applied Electromagnetics and Mechanics, ISEM 2022 (Thessaloniki): Local Organizing Committee.

4.7 Measurements and Services

Active contribution to the project "Measurements of Electromagnetic and Acoustic Power Density" (Research Committee AUTH), that provides on-site measurements of RF power density due to mobile operators, radio & TV broadcasting, and microwave links. Other services offered include dedicated measurements of electromagnetic compatibility and shielding. The above range of services is offered to industry, telecom operators, local authorities, governmental agencies, and the public.

4.8 Professional Bodies and Organizations

- Senior Member of the Institute of Electrical and Electronics Engineers (IEEE).
- Member of the Optical Society of America (OPTICA).
- Member of the Technical Chamber of Greece (TEE).

5. ADMINISTRATIVE POSITIONS AND DELEGATIONS

5.1 Department of Electrical & Computer Engineering, AUTH

- Director of the Telecommunications Laboratory (10/2024-today).
- Director of the Telecommunications Department (9/2013–8/2016).
- Head of the Optical Communication Unit of the Telecommunications Laboratory (2011–today).
- Committee for Undergraduate-Student Matters (2003–2007).
- Library Committee (2005–2007).
- Curriculum Committee (2012–2016, 2021-today).
- Committee of European Educational Programs (2011–2013).
- Deputy Representative to the University Research Committee Council (2011–2014).
- Participation in various other departmental committees.

5.2 Aristotle University of Thessaloniki

- Coordinator of the university action ΕΔΒΜ20 "Acquisition of Academic Teaching Experience for New Scientists holding a PhD Diploma at Aristotle University of Thessaloniki" (2016-2017), which financially supports the teaching by young PhD holders of 217 elective courses at AUTH during the academic year 2016-2017 (total budget 832,215 €).
- Coordinator of the university action ΕΔΒΜ45 "Acquisition of Academic Teaching Experience for New Scientists holding a PhD Diploma at Aristotle University of Thessaloniki" (2017-2018), which financially supports the teaching by young PhD holders of 217 elective courses at AUTH during the academic year 2017-2018 (total budget 993,600 €).
- Coordinator of the university action ΕΔΒΜ82 "Acquisition of Academic Teaching Experience for New Scientists holding a PhD Diploma at Aristotle University of Thessaloniki" (2018-2019), which financially supports 158 teaching posts for young PhD holders at AUTH during the academic year 2018-2019 (total budget 2,102.980 €).
- Committee member for re-evaluating tenders for informatics infrastructure at AUTH (2003).

5.3 National Academic Recognition and Information Center

Member of the Electrical and Computer Engineering panel of the National Academic Recognition and Information Center (ΔΟΑΤΑΠ, http://www.doatap.gr/), 2004-2010. This National Center serves as the single point in Greece that decides whether university degrees earned in overseas are equivalent to those offered by the domestic higher education institutions.

5.4 General Secretariat of Research and Technology, Ministry of Development

- National Delegate to the Joint Board on Satellite Communication Programs (JCB) of the European Space Agency (ESA, http://www.esa.int/) from Nov 2004 to Feb 2008.
- National Delegate (Member of the Management Committee) for the following three COST actions:

  COST P11"Physics of Linear, Non-Linear and Active Photonic Crystals"
  COST 299 "Optical Fibres for New Challenges Facing the Information Society"
  COST MP0702 "Towards Functional Sub-Wavelength Photonic Structures"

5.5 Technical Chamber of Greece

Examination Committee Member for evaluating the Diploma Thesis of Electrical and Computer Engineering graduates, to acquire professional rights (2004–2005).

6. PUBLICATIONS

6.1 Doctoral Thesis

"Development of fully vectorial Beam Propagation Method schemes for the analysis of light guidance in optical devices," Department of Electrical & Computer Engineering, AUTH, 1996. Supervisor: Assoc. Prof. A. Papagiannakis

6.2 Books and Book Chapters

[β.1] Yioultsis T. V. and Kriezis Em. E., *Microwaves: Theory and Applications*, ISBN 978-960-418-612-9 (in Greek), Tziola Publications, pages 892, 2017.

[β.2] Kriezis Em. E., *Optical Communications*, ISBN 978-618-221-041-3 (in Greek), Tziola Publications, pages 446, 2024.

[b.1] Kriezis Em. E., Parry-Jones, L. A., and Elston S. J., "Optical properties and applications of ferroelectric and antiferroelectric liquid crystals", pp. 1-61, chapter 1 of *Optical Applications of Liquid Crystals* (edited by L. Vicari), Institute of Physics (IoP) Publishing, Bristol, 2003.

[b.2] Kriezis Em. E. and Brown C. V., "Liquid Crystal Diffractive Optical Elements," pp. 65, book chapter in *Handbook of Organic Electronics and Photonics* (edited by H. W. Nalwa), American Scientific Publishers (ASP), 2007.

[b.3] Papaioannou S., Vyrsokinos K., Kalavrouziotis D., Giannoulis G., Apostolopoulos D., Avramopoulos H., Zacharatos F., Hassan K., Weeber J.-C., Markey L., Dereux A., Kumar A., Bozhevolnyi S. I., Suna A, Gili de Villasante O., Tekin T., Waldow M., Tsilipakos O., Pitilakis A., Kriezis Em. E., and Pleros N., "Merging Plasmonics and Silicon Photonics towards Greener and Faster "Network-on-Chip" Solutions for Data Centers and High-Performance Computing Systems," pp. 26, book chapter in *Plasmonics – Principles and Applications* (edited by Ki Young Kim), InTech, 2012.

[b.4] Zografopoulos D. C., Pitilakis A., and Kriezis Em. E., "Liquid crystal-infiltrated photonic crystal fibres for switching applications," pp. 30, book chapter in *Optofluidics, Sensors and Actuators in Microstructured Optical Fibers* (edited by S. Pissadakis and S. Selleri), Woodhead Publishing, 2015.

6.3 Book Reviews

[r.1] Kriezis Em. E., "Propagating Beam Analysis of Optical Waveguides by J. Yamauchi," *Contemporary Physics*, **Vol. 45**, No. 6, pp. 533-534, (2004). [**invited**]

6.4 Publications in International Peer-Reviewed Journals

[a.1] Kriezis Em. E. and Chrissoulidis D. P., "EM-Wave Scattering by an Inclined Strip Grating," *IEEE Transactions on Antennas Propagation*, **Vol. 41**, No. 11, pp. 1473-1480, (1993).

[a.2] Kriezis Em. E., Pantelakis P., and Papagiannakis A. G., "Gaussian Beam Diffraction from periodic planar screens," *Journal of the Optical Society of America A*, **Vol. 11**, No. 2, pp. 630-636, (1994).

[a.3] Golias N. A., Kriezis Em. E., and Tsiboukis T. D., "An Hybrid Finite Element - Analytical Method for the Analysis of Diffraction from Metallic Gratings of Arbitrary Profile," *Journal of the Optical Society of America A*, **Vol. 12**, No. 5, pp. 1147-1151, (1995).

[a.4] Kriezis Em. E. and Papagiannakis A. G., "A Joint Finite-Difference and FFT Full Vectorial Beam Propagation Scheme," *IEEE Journal of Lightwave Technology*, **Vol. 13**, No. 4, pp. 692-700, (1995).

[a.5] Kantartzis N. V, Kriezis Em. E., and Tsiboukis T. D., "Transient Analysis of Electromagnetic Field Propagation in the Vicinity of Millimetre Waveguide Structures with an Efficient Finite-Difference Time-Domain Technique," *COMPEL*, **Vol. 14**, No. 4, pp. 191-195, (1995).

[a.6] Pantelakis P. K., Kriezis Em. E., and Kriezis E. E. "FFT Based Beam Propagation Method for Media with Random Refractive Index Variation," *International Journal of Theoretical Electrotechnics*, **Vol. 6**, pp. 157-164, (1996).

[a.7] Kriezis Em. E., Pantelakis P., Antonopoulos C. S., and Papagiannakis A. G., "Full Vector Beam Propagation Method for Axially Dependent 3-D Structures," *IEEE Transactions on Magnetics,* **Vol. 33**, No. 2, pp. 1540-1543, (1997).

[a.8] Kriezis Em. E. and Papagiannakis A. G., "A 3-Dimensional Full Vectorial Beam Propagation Method for z-dependent structures," *IEEE Journal of Quantum Electronics*, **Vol. 33**, No. 5, pp. 883-890, (1997).

[a.9] Kriezis Em. E. and Elston S. J., "A Wide Angle Beam Propagation Method for the Analysis of Tilted Nematic Liquid Crystal Structures," *Journal of Modern Optics*, **Vol. 46**, No. 8, pp. 1201-1212, (1999).

[a.10] Kriezis Em. E. and Elston S. J., "Finite-Difference Time Domain Method for Light Wave Propagation within Liquid Crystal Devices," *Optics Communications*, **Vol. 165**, No. 1-3, pp. 99-105, (1999).

[a.11] Kriezis Em. E. and Elston S. J., "Light Wave Propagation in Periodic Tilted Liquid Crystal Structures: A Periodic Beam Propagation Method," *Liquid Crystals*, **Vol. 26**, No. 11, pp. 1663-1669, (1999).

[a.12] Kriezis Em. E., Filippov S., and Elston S. J., "Light Propagation in Domain Walls in Ferroelectric Liquid Crystal Devices by the Finite-Difference Time-Domain Method," *Journal of Optics A: Pure and Applied Optics*, **Vol. 2**, No. 1, pp. 27-33, (2000).

[a.13] Kriezis Em. E. and Elston S. J., "Light Wave Propagation in Liquid Crystal Displays by the 2-D Finite-Difference Time-Domain Method," *Optics Communications*, **Vol. 177**, No. 1-6, pp. 69-77, (2000).

[a.14] Antonopoulos C. S, Kriezis Em. E, and Kriezis E. E., "Path Integral Analysis for Gaussian Beam Propagation over Non-Penetrable Obstacles," *COMPEL*, **Vol. 19**, No. 4, pp. 987-996, (2000).

[a.15] Kriezis Em. E. and Elston S. J., "A Wide Angle Beam Propagation Method for Liquid Crystal Device Calculations," *Applied Optics*, **Vol. 39**, No. 31, pp. 5707-5714, (2000).

[a.16] Kriezis Em. E. and Elston S. J., "Beam Propagation Method Modelling of Zenithal Bistable Nematic Devices: Analysis and Assessment," *Molecular Crystals and Liquid Crystals*, **Vol. 359**, pp. 597-608, (2001).

[a.17] Kriezis Em. E. and Elston S. J., "Numerical Modelling of Multi-Dimensional Liquid Crystal Optics: Finite-Difference Time-Domain Method," *Molecular Crystals and Liquid Crystals*, **Vol. 359**, pp. 609-619, (2001).

[a.18] Kriezis Em. E. and Elston S. J., "Optical Behaviour of Display Performance Enhancement Films," *Journal of Modern Optics*, **Vol. 48**, No. 8, pp. 1319-1328, (2001).

[a.19] Judge L. A., Kriezis Em. E, and Elston S. J., "Field Driven Helix Unwinding in Thick AFLC Cells," *Molecular Crystals and Liquid Crystals*, **Vol. 366**, pp. 2513-2523, (2001).

[a.20] Said S. M., Kriezis Em. E, and Elston S. J., "Modelling Switching and Optics in Ferroelectric Liquid Crystal Microdisplays," *Molecular Crystals and Liquid Crystals*, **Vol. 368**, pp. 3925-3933, (2001).

[a.21] Kriezis Em. E., "Numerical Modelling of Light Wave Propagation in Reflective Liquid Crystal Microdisplay Devices," *Journal of Modern Optics*, **Vol. 49**, No. 13, pp. 2065-2081, (2002).

[a.22] Brown C. V., Kriezis Em. E., and Elston S. J., "Optical Diffraction from a Liquid Crystal Phase Grating," *Journal of Applied Physics*, **Vol. 91**, No. 6, pp. 3495-3500, (2002).

[a.23] Kriezis Em. E. and Elston S. J., "Modelling Multi-Dimensional Optics in Complex Liquid Crystal Structures and Displays," *Molecular Crystals and Liquid Crystals*, **Vol. 401**, pp. 75-85, (2003).

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At the Assistant Professor level

[a.24] Kriezis Em. E., Newton C. J., Spiller T. P, and Elston S. J., "3-D Simulations of Light Propagation in periodic Liquid Crystal Microstructures," *Applied Optics*, **Vol. 41**, No. 25, pp. 5346-5356, (2002).

[a.25] Kriezis Em. E., "A Comparative Study of Light Scattering from Liquid Crystal Droplets," *Microwave and Optical Technology Letters*, **Vol. 35**, No. 6, pp. 437-441, (2002).

[a.26] Parry-Jones L., Kriezis Em. E., and Elston S. J., "Conoscopic Observations of a Homeotropically Aligned Antiferroelectric Liquid Crystal Device: A Comparison of Theory and Experiment," *Japanese Journal of Applied Physics*, **Vol. 41**, Part 2, No. 12B, pp. 1485-1487, (2002).

[a.27] Brown C. V. and Kriezis Em. E., "Calculation of the Efficiency of Polarisation-Insensitive SSFLC Diffraction Gratings," *Applied Optics*, **Vol. 42**, No. 13, pp. 2257-2263, (2003).

[a.28] Edwards E. G., Brown C. V., Kriezis Em. E., and Elston S. J., "Behaviour of a Nematic Liquid Crystal Cell containing a Diffraction Grating," *Molecular Crystals and Liquid Crystals*, **Vol. 400**, pp. 13-19, (2003).

[a.29] Parry-Jones L. A., Kriezis Em. E., and Elston S. J., "Determination of material constants of antiferroelectric liquid crystal mixture CS4001," *Molecular Crystals and Liquid Crystals*, **Vol. 410**, pp. 657-668, (2004).

[a.30] Edwards E. G., Brown C. V., Kriezis Em. E., Elston S. J., Kitson S. C., and Newton C. J., "Diffraction from the two stable states in a nematic liquid crystal cell containing a mono-grating with homeotropic director alignment," *Molecular Crystals and Liquid Crystals*, **Vol. 410**, pp. 929-936, (2004).

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[a.32] Brown C. V. and Kriezis Em. E., "Surface-stabilized ferroelectric liquid-crystals diffraction gratings with micrometer-scale pitches," *Applied Optics*, **Vol. 43**, No. 28, pp. 5287-5294, (2004).

[a.33] Said S. M., Kriezis Em. E., Parry-Jones L. A., and Elston S. J., "Optical Determination of Twist Elastic Constant of the Chiral Smectic Liquid Crystal SCE8," *Ferroelectrics*, **Vol. 311**, pp. 3-9, (2004).

[a.34] Ntogari G., Tsipouridou D., and Kriezis Em. E., "A numerical study of optical switches and modulators based on ferroelectric liquid crystals," *Journal of Optics A: Pure and Applied Optics*, **Vol. 7**, pp. 82-87, (2005).

[a.35] Kosmidou E. P., Kriezis Em. E., and Tsiboukis T. D., "FDTD Analysis of Photonic Crystal Defect Layers Filled with Liquid Crystals," *Optical and Quantum Electronics*, **Vol. 37**, pp. 149-160, (2005).

[a.36] Kosmidou E. P., Kriezis Em. E., and Tsiboukis T. D., "Analysis of Tunable Photonic Crystal Devices Comprising Liquid Crystal Materials as Defects," *IEEE Journal of Quantum Electronics*, **Vol. 41**, No. 5, pp. 657-665, (2005).

[a.37] Török P, Munro P. R. T., and Kriezis Em. E., "A rigorous near– to far–field transformation for vectorial diffraction calculations and its numerical implementation," *Journal of the Optical Society of America A*, **Vol. 23**, No. 3, pp. 713-722, (2006).

[a.38] Zografopoulos D. C., Kriezis Em. E., and Tsiboukis T. D., "Photonic crystal-liquid crystal fibers for single-polarization or high-birefringence guidance," *Optics Express*, **Vol. 14**, No. 2, pp. 914-925 (2006).

[a.39] Zografopoulos D. C., Kriezis Em. E., Mitov M., and Binet C., "Theoretical and experimental optical studies of cholesteric liquid crystal films with thermally induced pitch gradients," *Physical Review E*, **Vol. 73**, 061701, (2006).

[a.40] Kosmidou E. P., Kriezis Em. E., and Tsiboukis T. D., "Analysis of tunable photonic crystal directional couplers," *Journal of Applied Physics*, **Vol. 100**, 043118, (2006).

[a.41] Zografopoulos D. C., Kriezis Em. E., and Tsiboukis T. D., "Tunable Highly Birefringent Bandgap-Guiding Liquid-Crystal Microstructured Fibers," *IEEE Journal of Lightwave Technology*, **Vol. 24**, No. 9, pp. 3427-3432 (2006).

[a.42] Zografopoulos D. C., Kriezis Em. E., Bellini B., and Beccherelli R., "Tunable one-dimensional photonic crystal slabs based on preferential etching of silicon-on-insulator," *Optics Express*, **Vol. 15**, pp. 1832-1844 (2007).

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At the Associate Professor level

[a.43] Zografopoulos D. C. and Kriezis Em. E., "Tunable optical fiber polarization elements based on long-period gratings inscribed in birefringent microstructured fibers," *Journal of the Optical Society of America B*, **Vol. 25**, No. 1, pp. 111-118, (2008).

[a.44] Török P., Munro P. R. T., and Kriezis Em. E., "High numerical aperture vectorial imaging in coherent optical microscopes," *Optics Express*, **Vol. 16**, No. 2, pp. 507-523, (2008).

[a.45] Karatzidis D. I., Yioultsis T. V., and Kriezis Em. E., "Fast analysis of photonic crystal structures with mixed-order prism macroelements," *IEEE/OSA Journal of Lightwave Technology*, **Vol. 26**, No. 13, pp. 2002-2009, (2008).

[a.46] Zografopoulos D. C. and Kriezis Em. E., "Tunable polarization properties of hybrid-guiding liquid-crystal photonic crystal fibers," *IEEE/OSA Journal of Lightwave Technology*, **Vol. 27**, No. 6, pp. 773-779, (2009).

[a.47] Tasolamprou A. C., Mitov M., Zografopoulos D. C., and Kriezis Em. E., "Theoretical and experimental studies of hyperreflective polymer-network cholesteric liquid crystal structures with helicity inversion," *Optics Communications*, **Vol. 282**, pp. 903-907, (2009).

[a.48] Ziogos G. D. and Kriezis Em. E., "Modeling light propagation in liquid crystal devices with a 3-D full-vector finite-element beam propagation method," *Optical and Quantum Electronics*, **Vol. 40**, No. 10, pp. 733-748, (2008).

[a.49] Lalas A. X., Kriezis Em. E., and Tsiboukis T. D., "Accelerating FDTD Simulations for Eigenfrequency Detection in EBG Devices by Means of the GPOF Method," *IEEE Transactions on Magnetics*, **Vol. 45**, No. 3, pp. 1316-1319, (2009).

[a.50] Tasolamprou A. C., Bellini B., Zografopoulos D. C., Kriezis Em. E., and Beccherelli R., "Tunable optical properties of silicon-on-insulator photonic crystal slab structures," *Journal of the European Optical Society - Rapid publications*, **Vol. 4**, 09017, (2009).

[a.51] Yioultsis T. V., Ziogos G. D., and Kriezis Em. E., "Explicit finite-difference vector beam propagation method based on the iterated Crank–Nicolson scheme," *Journal of the Optical Society of America A*, **Vol. 26**, No. 10, pp. 2183-2191, (2009).

[a.52] Tsilipakos O., Yioultsis T. V., and Kriezis Em. E., "Theoretical analysis of thermally tunable microring resonator filters made of dielectric-loaded plasmonic waveguides," *Journal of Applied Physics,* **Vol. 106**, 093109, (2009).

[a.53] Tsilipakos O. and Kriezis Em. E., "Microdisk resonator filters made of dielectric-loaded plasmonic waveguides," *Optics Communications,* **Vol. 283**, pp. 3095–3098, (2010)

[a.54] Tsilipakos O., Pitilakis A., Tasolamprou A. C., Yioultsis T. V., and Kriezis Em. E., "Computational Techniques for the Analysis and Design of Dielectric-Loaded Plasmonic Circuitry," *Optical and Quantum Electronics*, **Vol. 42**, pp. 541-555, (2011).

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[a.56] Tsilipakos O., Kriezis Em. E., and Yioultsis T. V., "Boundary condition for the efficient excitation and absorption of hybrid waveguide modes in finite element formulations," *Microwave and Optical Technology Letters*, **Vol. 53**, No. 11, pp. 2626-2631, (2011).

[a.57] Pitilakis A., Zografopoulos D. C, and Kriezis Em. E., "In-line Polarization Controller Based on Liquid-Crystal Photonic Crystal Fibers," *IEEE/OSA Journal of Lightwave Technology*, **Vol. 29**, No. 17, pp. 2560-2569, (2011).

[a.58] Pleros N., Kriezis Em. E., and Vyrsokinos K., "Optical Interconnects using plasmonics and Si-photonics," *IEEE Photonics Journal,* **Vol. 3**, No. 2, pp. 296-301, (2011). [**invited**]

[a.59] Papaioannou S., Vyrsokinos K., Tsilipakos O., Pitilakis A., Hassan K., Weeber J.-C., Markey L., Dereux A., Bozhevolnyi S. I., Miliou A., Kriezis Em. E., and Pleros N., "A 320Gb/s-throughput capable 2x2 Silicon-Plasmonic Router Architecture for Optical Interconnects," *IEEE/OSA Journal of Lightwave Technology*, **Vol. 29**, No. 21, pp. 3185-3195, (2011).

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At the Professor level

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[c.66] Tsilipakos O., Christopoulos T., Sinatkas G., and Kriezis Em. E., "Modelling Optical Bistability with Hybrid Silicon-Plasmonic Resonators," *Optical Wave & Waveguide Theory and Numerical Modelling Workshop OWTNM 2015* (London, United Kingdom), (2015).

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[c.86] Christopoulos T., Tsilipakos O., Ataloglou V. G., and Kriezis Em. E., "A Theoretical Study of Nonlinear Multi-Channel Graphene Components for the Near and Far-Infrared," *OSA Frontiers in Optics + Laser Science APS/DLS FiO+LS 2020* (all-virtual event), (2020).

[c.87] Chatzidimitriou D., Pitilakis A., Yioultsis T., and Kriezis Em. E., "Nonreciprocal propagation in a non-Hermitian silicon photonic coupler employing graphene saturable absorption," *European Optical Society Annual Meeting EOSAM 2020* (all-virtual event), (2020).

[c.88] Chatzidimitriou D., Pitilakis A., Yioultsis T., and Kriezis Em. E., "Nonreciprocal Silicon Photonic Coupler Exploiting Graphene Saturable Absorption," *OSA Advanced Photonics Congress APC 2020* (all-virtual event), (2020).

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[c.91] Christopoulos T., Tsilipakos O., and Kriezis Em. E., "Coupled-Mode Theory Approach for Consolidating Nonlinearities with Quasinormal Modes," *OSA Frontiers in Optics + Laser Science APS/DLS FiO+LS 2021* (all-virtual event), (2021).

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[c.95] Zografopoulos D. C., Algorri J. F., Fuscaldo W., López-Higuera J. M., Vergaz R., Sánchez-Pena J. M., Karolos I.-A., Beccherelli R., Tsioukas V. E., Yioultsis T. V., Kriezis Em. E., "Toroidal dipole dielectric metasurfaces for mechanically tunable polarization beam splitting," *17th European Conference on Antennas and Propagation EuCAP 2023* (Florence, Italy), (2023).

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[c.99] Nousios G., Christopoulos T., Tsilipakos O., and Kriezis Em. E., "Integrated Q-switched lasing element in the NIR with transition metal dichalcogenide gain and graphene saturable absorption," *13th International Conference on Metamaterials, Photonic Crystals and Plasmonics META 2023* (Paris, France), (2023).

[c.100] Christopoulos T., Kriezis Em. E., and Tsilipakos O., "A multimode quasi-normal mode framework for nonlinear harmonic generation with 2D materials," *13th International Conference on Metamaterials, Photonic Crystals and Plasmonics META 2023* (Paris, France), (2023). [**invited**]

[c.101] Christopoulos T., Kriezis Em. E., and Tsilipakos O., "Analysis and Design of Reflective Nonlinear Metasurfaces Incorporating 2D Materials Utilizing a Multimode Quasi-Normal Mode Framework for Non-Hermitian Systems," *17th International Congress on Artificial Materials for Novel Wave Phenomena – Metamaterials 2023* (Crete, Greece), (2023).

[c.102] Nousios G., Chatzidimitriou D., Christopoulos T., Tsilipakos O., and Kriezis Em. E., "Integrated passive Q-switched and mode-locked lasers utilizing TMD gain and graphene saturable absorption," *Micro Nano 2023* (Athens, Greece), (2023).

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[c.104] Tsilipakos O., Theodosi A., Kafesaki M., Christopoulos T., and Kriezis Em. E., "Graphene-based Nonlinear Metasurfaces for Efficient Third Harmonic Generation at THz Frequencies," *Photonics & Electromagnetics Research Symposium PIERS 2024* (Chengdu, China), (2024).

[c.105] Christopoulos T., Nousios G., Kriezis Em. E., and Tsilipakos O., "Metasurfaces enhanced with 2D photonic materials: Analysis based on quasinormal modes," *International Conference on Antennas and Electromagnetic Systems AES 2024* (Rome, Italy), (2024).

[c.106] Ntokos K., Passia M-T, Raptis S., Tourlouki K., Kehagias N., Kriezis Em. E., and Yioultsis T. V., "Ultra-thin and flexible metasurface absorbers mounted on a highly conductive CFRP substrate," *IEEE International Symposium on Antennas and Propagation and INC/USNC-URSI Radio Science Meeting AP-S/INC-USNC-URSI 2024* (Firenze, Italy), (2024).

6.6 Classification of Publications in Research Areas

- **Scattering, diffraction, and propagation at microwave frequencies**
  [a.1], [a.2], [a.3], [a.5], [a.14], [c.1], [c.3], [c.5], [c.8], [c.12]
- **Microwave elements**
  [a.49], [a.70], [c.34], [c.38], [c.59]

- **Scattering and diffraction at optical frequencies**
  [a.25], [a.37], [a.44], [c.23], [c.26], [c.30]
- **Waveguiding at optical frequencies (fibers and integrated optical components)**
  [a.4], [a.6], [a.7], [a.8], [a.34], [a.48], [a.51], [a.56], [c.2], [c.4], [c.6], [c.7], [c.9], [c.10], [c.11]
- **Liquid Crystal optoelectronic technology**
  [a.9], [a.10], [a.11], [a.12], [a.13], [a.15], [a.16], [a.17], [a.18], [a.19], [a.20], [a.21], [a.23], [a.24], [a.26], [a.28], [a.29], [a.30], [a.31], [a.33], [a.39], [a.47], [a.69], [a.76], [a.84], [c.13], [c.14], [c.15], [c.16], [c.17], [c.18], [c.19], [c.20], [c.21], [c.29], [c.39], [c.56], [c.65]
- **Spatial light modulators and switchable diffraction gratings**
  [a.22], [a.27], [a.32], [a.63], [a.81], [a.82], [a.88], [a.91], [c.22], [c.53], [c.64], [c.76]
- **Microstructured Optical Fibers / Photonic Crystal Fibers**
  [a.38], [a.41], [a.43], [a.46], [a.57], [a.61], [a.75], [c.28], [c.31], [c.33], [c.35]
- **Photonic crystal integrated components**
  [a.35], [a.36], [a.40], [a.45], [c.24], [c.25], [c.27]
- **Silicon based photonic devices**
  [a.42], [a.50], [a.90], [a.96], [c.32], [c.36], [c.75], [c.77]
- **Plasmonic integrated components and circuits for optical interconnects**
  [a.52], [a.53], [a.54], [a.55], [a.58], [a.59], [a.60], [a.62], [a.64], [a.65], [a.66], [a.67], [a.71], [a.77], [a.79], [c.37], [c.40], [c.41], [c.42], [c.43], [c.46], [c.47], [c.48], [c.49], [c.50], [c.51], [c.52], [c.57], [c.60], [c.71]
- **Nonlinear effects in nanophotonic waveguides**
  [a.68], [a.73], [a.74], [a.78], [a.80], [a.85], [a.86], [c.54], [c.55], [c.58], [c.61], [c.62], [c.66], [c.70]
- **Free-space optical links**
  [a.72], [c.44], [c.45]
- **Graphene-based devices**
  [a.83], [a.87], [a.89], [a.92], [a.94], [a.95], [a.97], [a.100], [a.102], [a.103], [a.104], [a.107], [a.108], [a.111], [a.112], [a.113], [a.114], [a.117], [a.118], [c.67], [c.68], [c.69], [c.72], [c.74], [c.79], [c.80], [c.81], [c.83], [c.85], [c.86], [c.87], [c.88], [c.89], [c.90], [c.92], [c.94], [c.97], [c.98], [c.99], [c.102], [c.104]
- **Metamaterials and Metasurfaces**
  [a.93], [a.98], [a.101], [a.106], [a.110], [a.115], [a.120], [a.121], [a.116], [c.73], [c.78], [c.84], [c.93], [c.95], [c.96], [c.100], [c.101], [c.103], [c.105], [c.106]
- **Photonics (broader context)**
  [a.99], [a.105], [a.109], [a.119], [c.82], [c.91]

6.7 Patents

[p.1] Török P., Salt M., Munro P. R. T., Herzig H.-P., Kriezis Em. E., Rockstuhl C. "Optical Disk and Reader Therefor," British Patent Application No: 0416649.2; International Patent Application; Taiwanese Patent Application. PCT International Publication Number WO 2006/010882 Al.

6.8 Other Publications

[o.1] Kriezis Em. E., "Scattering and diffraction of plane electromagnetic waves from periodic surfaces," Department of Electrical & Computer Engineering, AUTH, Telecommunications Division Colloquium Proceedings (edited by S. Panas), (1992).

[o.2] Kriezis Em. E., Pombortsis A., and Bleris G. L., "Project ARISTOTELES: Development of a Unified/Distributed Computing Environment in the Aristotle University of Thessaloniki," Technical Chamber of Greece - *Technika Chronika*, **Vol. 15**, No. 1-2, pp. 27-37, (1995).

[o.3] Mitov M., Dessaud N., Tasolamprou A. C., Zografopoulos D. C., and Kriezis Em. E., "Going beyond the reflectance limit of cholesteric liquid crystals: experimental and theoretical investigations," *European Science Foundation Exploratory Workshop on Frontiers in European Research on Liquid Crystalline Soft Matter* (LC Lab Bandol, France), (2009). [**invited**]

[o.4] Pitilakis A., Tsilipakos O., Tasolamprou A. C., Kriezis Em. E., "Guided Wave Plasmonics: An emerging technology for nanophotonic integrated circuits with high levels of functionality," *Panhellenic Conference on Electronics and Communications PACET 2012* (Thessaloniki), (2012).

6.9 Journal Impact Factors

	Journal	ISSN	IF	count
1	Advanced Optical Materials	2195-1071	**8,0**	**1**
2	Advanced Photonics Research	2699-9293	**3,7**	**1**
3	Applied Optics	1559-128X	**1,7**	**5**
3	Applied Physics A - Materials Science & Processing	0947-8396	**2,5**	**2**
4	Applied Physics Letters	0003-6951	**3,5**	**3**
5	COMPEL	0332-1649	**1,0**	**2**
6	Ferroelectrics	0015-0193	**0,6**	**1**
7	IEEE Journal of Lightwave Technology	0733-8724	**4,1**	**8**
8	IEEE Journal of Quantum Electronics	0018-9197	**2,2**	**5**
9	IEEE Journal of Selected Topics in Quantum Electronics	1077-260X	**4,3**	**1**
10	IEEE Transactions on Antennas and Propagation	0018-926X	**4,6**	**1**
11	IEEE Transactions on Magnetics	0018-9464	**2,1**	**2**
12	IEEE Photonics Journal	1943-0655	**2,1**	**2**
13	IEEE Photonics Technology Letters	1041-1135	**2,3**	**3**
14	International Journal of Applied Electromagnetics & Mechanics	1383-5416	**1,1**	**1**
15	International Journal of Microwave and Wireless Technologies	1759-0787	**1,4**	**1**
16	Japanese Journal of Applied Physics	0021-4922	**1,5**	**1**
17	Journal of Applied Physics	0021-8979	**2,7**	**14**
18	Journal of Modern Optics	0950-0340	**1,2**	**3**
19	Journal of Optical Communications and Networking	1943-0620	**4,0**	**1**
20	Journal of Physics D: Applied Physics	0022-3727	**3,1**	**1**
21	Journal of the European Optical Society-Rapid Publications	1990-2573	**1,9**	**1**
22	Journal of the Optical Society of America A	1084-7529	**1,4**	**4**
23	Journal of the Optical Society of America B	0740-3224	**1,8**	**7**
24	Journal of Optics (*)	2040-8978	**2,0**	**2**
25	Lab on a Chip	1473-0197	**6,1**	**1**
26	Liquid Crystals	0267-8292	**2,4**	**1**
27	Microwave and Optical Technology Letters	0895-2477	**1,0**	**2**
28	Molecular Crystals and Liquid Crystals	1542-1406	**0,7**	**10**
29	Optics Express	1094-4087	**3,2**	**6**
30	Optics Letters	0146-9592	**3,1**	**4**
31	Optics Communications	0030-4018	**2,2**	**5**
32	Optical and Quantum Electronics	0306-8919	**3,3**	**5**
33	Photonics and Nanostructures-Fundamentals and Applications	1569-4410	**2,5**	**1**
34	Physical Review Applied	2331-7019	**3,8**	**2**
35	Physical Review A	1050-2947	**2,6**	**4**
36	Physical Review B	2469-9950	**3,2**	**3**
37	Physical Review E	1539-3755	**2,2**	**3**
	(*) former Journal of Optics A: Pure and Applied Optics			**120**

Source: 2023 Journal Citation Reports Science Edition, ISI Web of Knowledge, Thomson Reuters.

6.10 Citations

- Total number of Scholar Google citations (inc. self-citation): **3818**
  http://scholar.google.com/citations?user=CUb8oGIAAAAJ&hl=en&oi=ao
- SCOPUS (third-author citations/total number): **2148/2964**
  https://www.scopus.com/authid/detail.uri?authorId=16550332700
- Web of Science (third-author citations/total number): **2228/2644**
  http://www.researcherid.com/rid/F-4872-2010
- H-index: 34 [Scholar Google], 30 [SCOPUS], 29 [Web of Science]

7. OTHER PROFESSIONAL ACTIVITIES

March 1998 – September 1998
Electromagnetic field measurements for telecommunication and industrial applications, in collaboration with C3T s.a. (Control Command Communications Technologies s.a., Kilkis, Greece), funded by the General Secretariat of Research & Technology. My duties included the development of various software and hardware subsystems for a vehicular electromagnetic-radiation measurement system, integration, and initial test measurements.

September 1997 – September 1998
Preliminary design and tender documents for the public project "Improvement and modernization of the electromechanical equipment of the sewage-treatment installation (capacity 350m^3/h) at Kremasti, Rhodes".

January 1996 – March 1998
Development of a vehicular system for radio-wave coverage measurements for the Greek Telecommunications Authority (OTE). My duties included the development of various software modules for interconnecting the measurement equipment, data logging, user interface, and system integration.

April 1996 – September 1996
Design of a new medium-voltage network for the AUTH campus, funded by the AUTH Research Committee. My duties included the design of a modern, remotely controlled medium-voltage network at 20 KV comprising of 24 sub-stations, meeting the AUTH campus requirements.

May 1993 – September 1994
Project ARISTOTELES: Development of a unified and distributed computing environment with open architecture at AUTH, with funding from the Ministry of Education and the General Secretariat of Research & Technology. The project was based on the highly successful project MIT ATHENA. At completion stage project ARISTOTELES comprised of 200 UNIX workstations, the necessary servers that provided the ATHENA environment functionality, and diverse application software. My duties included design of local area networks, management of a large-scale distributed UNIX environment, server and application software installation and technical report preparation.

Military Service
I served my military service in the Technical Corps, from September 27th, 1996, to March 27th, 1998. In parallel to my military service, I undertook some professional activity, as summarized in Section 7.