Dr. Maria Manousidaki

Personal Information

Date of Birth: 21 May 1990
Place of Birth: Heraklion, Crete, Greece
Citizenship: Greek

Contact Information

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Research Gate: https://www.researchgate.net/profile/Maria-Manousidaki
Google Scholar: https://scholar.google.com/citations?user=aP0vOwQAAAAJ
LinkedIn: www.linkedin.com/in/maria-manousidaki-21a12559

Current Position

Postdoctoral Researcher at the Institute of Plasma Physics & Lasers (IPPL), Crete, Greece.

Education

2014–2019: **Ph.D. Department of Materials Science & Technology**, *University of Crete*.
Ph.D. Thesis: Tailored Laser Wavepackets for Advanced Micro Structuring of Materials.
Supervision Committee: Prof. Stelios Tzortzakis, Prof. Dimitrios G. Papazoglou, Prof. Maria Kafesaki

2012–2014 : **Master of Physics, Microelectronics & Optoelectronics Graduate Program, Department of Physics**, *University of Crete*.
Research topic: Fabrication of 3D structures using modified laser beams. Supervisors: Prof. Costas Fotakis, Prof. Stelios Tzortzakis, Prof. Dimitrios Papazoglou Advisor: Dr. Maria Farsari

2008–2012 : **Bachelor of Physics, Department of Physics**, *University of Crete*.
Diploma Thesis: 3D phase-sensitive photonic crystal biosensors.Supervisors: Prof. Costas Fotakis, Dr. Maria Farsari

Professional Experience

Oct.2020-Feb.2025 **Postdoctoral Researcher at the Institute of Electronic Structure and Laser at the Foundation for Research and Technology Hellas, Crete, Greece**.
Member of two research groups at FORTH: the NonLinear Lithography group (NLL). Head of the Group: Dr. Maria Farsari NLL - Webpage
The Ultrashort Nonlinear Laser Interactions and Sources Research group (UNIS). Head of the Group: Prof.Stelios Tzortzakis UNIS - Webpage

2020 **Postdoctoral Research Associate in the Science Program at Texas A&M University**.
Projects: (i) ZnO-coated 3D porous structures fabricated by Advanced Holographic laser lithography for photo-catalytic applications. (ii) Advanced laser-engineered membranes of tailored nano-pores sizes & distribution for ultrafiltartion applications. (iii) Development of stochastically reconstructed 3D porous media micromodels using Additive Manufacturing, for realistic micro-fluidics studies.

Oct.–Dec. 2019 **Senior Research Associate in the Science Program at Texas A&M University**.
I developed and implemented an innovative all-in-one optical platform for laser micromachining and additive manufacturing of 3D micro/nano structures, employing cutting-edge equipment. Yb:KGW femtosecond Pharos laser (Light Conversion), Two Spatial light Modulators (@ 1030nm & 515nm), High accuracy linear XYZ Nanopositioning Stages (Aerotech)). Workshop Of Photonics, FemtoLab.

2014 – 2019 **Ph.D. Research**.
Ph.D. Candidate at the Department of Material Science & Technology, University of Crete.
Project – Research Study: Tailored Laser Wavepackets for Advanced Micro Structuring of Materials.

Supervisors : Dr. Maria Farsari, *Research Director at IESL-FORTH*

Prof. Stelios Tzortzakis, *Full Professor, Department of Materials Science & Technology, University of Crete*

Prof. Dimitrios G. Papazoglou, *Full Professor, Department of Materials Science & Technology, University of Crete*

Jun – Sep 2011 **Internship**.
At the IESL-FORTH, Nonlinear Lithography Lab
Research Study: Hybrid photosensitive Material Synthesis, Direct Laser Writing by Multiphoton Polymerization (Ti:Sapphire femtosecond oscillator 800nm), 3D Structure Fabrication. Supervisor Prof. Costas Fotakis & Advisor Dr. Maria Farsari

Scientific Expertise

- Femtosecond Laser Non-Linear Lithography by Multi-Photon polymerization.
- Direct Laser processing of dielectrics, glasses, and metals.
- Light-based Additive Manufacturing at the micro and nanoscale.
- Laser beam Shaping and Tailoring using Spatial Light Modulators (SLM) for advanced processing of materials.
- Advanced Laser Materials Processing using modified on demand laser beams i.e. Bessel, Multi-Foci, Airy beams, Laguerre-Gaussian beams.
- Advanced Holographic 3D micro-engineering of materials.
- Selective metallization of 3D printed micro-structures for functional devices applications.
- Photonic crystal (Bio)sensors, Electromagnetic and Mechanical Metamaterials, Micro-engineered Photo-catalysts.
- Synthesis of photosensitive hybrid materials.
- Strong Knowledge in Linear/Non-Linear Optics, Optical Set Up, Ultrafast lasers.
- Expertise in characterization methods: SEM, FE-SEM, Optical microscope, UV-VIS, FTIR.

Personal skills

Mother tongue: Greek

Other Language(s): English Language Certificate – Proficient Knowledge: Certificate of Proficiency in English (2005), Edexcel International, University of Westminster

German Language - Basic Knowledge

IT Skills: Certification of high-level Computer knowledge - University of Crete
Windows, Microsoft Office
Software packages: OriginPro, ImageJ, Sketch Up, Adobe Illustrator
Programming language: Matlab
Typesetting System: *LaTex*

Micro-machining Software: 3DPOLI by FEMTIKA
SCA Professor - Laser Automation Software, by WOP
Photon Workshop - 3D printing Software
Ultimaker CURA - 3D printing Software
FUSION 360 Autodesk - 3D models design

Teaching Experience

2014 - 2019 : **Course: Physics Laboratory I**, Department of Material Science & Technology, University of Crete.

2012 - 2014 : **Course: Advanced Physics Laboratory I** , Department of Physics, University of Crete.

Students Mentorship -Supervision

2024 - Present : **Supervision of PhD student, Department of Material Science & Technology, UoC**.
Research Topic: Smart laser beam shaping for materials engineering and applications.

2022-24 : **Supervision of Graduate student, Department of Material Science & Technology, UoC**.
Research Topic: Ultrashort laser wave packet sculpting for optimized materials engineering.

Feb 2021 - Feb 2022 : **Supervision of Undergraduate student, Department of Material Science & Technology, UoC**. Research Topic: Rapid Fabrication of 3D Porous Structures via Multiple Beam Interference Lithography for Photocatalysis applications.

Oct 2020 - Oct 2021 : **Supervision of Undergraduate student, Department of Material Science & Technology, UoC**. Research Topic: Accelerating laser photopolymerization through laser beam shaping.

Fellowships & Awards

2017 - 2019 Recipient of the **State Scholarship Foundation (IKY),** ESPA 2014-2020, (program: 5003404, grant No. 2017-050-0504-10113).

2017 Recipient of the **ELIDEK** Hellenic Foundation For Research and Innovation, Government of Greece, PhD Scholarship Graduate Studies Scholarship, (grant No.4697-)

Participation in Funded Programs

2023 NAIAD - Project Nature Inspired Augmented Design of Hierarchical Materials (09578), Work on Holographic 3D printing of mechanical Metamaterials **"ELIDEK"**, Hellenic Foundation For Research and Innovation, Government of Greece,

2023 «FABulous - FABrication of 3D metasurfaces to enable the next generation of high-efficiency optical products» GA 101091644 - **HORIZON EUROPE** Research work on Development of holographic 3D printing

2023 «RIS3Crete: Food safety traceability using advanced non-invasive spectroscopic techniques (FOODTrast) (2020-2023)- **Funded by Region of Crete and European Union**, Research work on fabrication of electromagnetic metamaterials for chemical substances identification by developing enhanced field time-domain THz spectroscopy

2022 «IN2SIGHT - An in Vivo Bioengineered Chip as a Smart Intravital Multiphoton Imaging Window for New Validation Protocols of Biomaterials» GA 964481 **HORIZON EUROPE** Research work on Advanced 3D sculptured materials for catalysis using Holographic 3D printing

2020-22 SUBAWARD AGREEMENT Texas A&M University at Qatar & FORTH «ADVANCED 3D-SCULPTURED MATERIALS FOR CATALYSIS» No M1903360 **Qatar National Research Fund**

2019-20 (NPRP9-383-1-083), "Engineered light for biomedical and energy harvesting applications", **Qatar National Research Fund**

2019 **«HELLAS-CH ELI LASERLAB EUROPE SYNERGY»** (OPS5002735), Research on developing method for photopolymer processing using Holography.

2019-20 (NPRP9-383-1-083), "Engineered light for biomedical and energy harvesting applications", **Qatar National Research Fund**

2014-15 «THALIS» Project – IESL/FORTH – **EPEAK- Operational Programme for Education and Initial Vocational Training, European Social Fund**, Research on Fabrication of 3D scaffolds for tissue -engineering (OPS5002735), Research on developing method for photopolymer processing using Holography.

2012-14 «ERC-02 EXEL - EXTENDING ELECTROMAGNETISM THROUGH NOVEL ARTIFICIAL MATERIALS», **European Research Council, General Secretariat of Research and Innovation (GSRI)**

Position of Responsibility

Certified Reviewer, Springer Nature's Light: Science & Applications.

Certified Reviewer, OSA Optical Society of America - Optica Publishing Group.

Outreach

Dec 2022 **IESL Science Days**, Presentation and dissemination of my recent research achievements to IESL members for new collaboration opportunities between the research groups. *https://www.iesl.forth.gr/en/iesl-science-days-2022.*

2021 **Honored for my research work as a Woman Researcher in Science at FORTH, at the *International Day of Women & Girls in Science*.**

By sharing my success story, I inspired more women to participate in Science, and promoted gender equality in the research and academic community

Seminars & Training Courses for DEI

2022 **Special Education Seminar**, *University of the Aegean, Greece*, 9-months seminar focused on diverse learning needs of students with disabilities.
Successful Evaluation through Exams

2022 **Sexual Education Seminar**, *University of the Aegean, Greece*, 9-months seminar related to gender identity, sexual orientation, and the role of educators on diversity in the classroom.
Successful Evaluation through Exams

2019 **Course: Creating a Discrimination-free Workplace/EEO**, Texas A&M University at Qatar.
Successful Evaluation through Exams

List of Publications

2025 Savvas Papamakarios, Odysseas Tsilipakos, Ioannis Katsantonis, Anastasios D. Koulouklidis, **Maria Manousidaki**, Gordon Zyla, Christina Daskalaki, Stelios Tzortzakis, Maria Kafesaki, and Maria Farsari. Cactus-like metamaterial structures for electromagnetically induced transparency at thz frequencies. *ACS Photonics*, volume 12, pages 87–97, 2025.

2025 Panagiotis Konstantakis, **Maria Manousidaki**, and Stelios Tzortzakis. Encrypted optical information in nonlinear chaotic systems uncovered using neural networks. *Optica*, volume 12, pages 131–139. Optica Publishing Group, Feb 2025.

2024 Savvas Papamakarios, Odysseas Tsilipakos, Anastasios Koulouklidis, **Maria Manousidaki**, Gordon Zyla, Ioannis Katsantonis, Stylianos Tzortzakis, Maria Farsari, and Maria Kafesaki. Electromagnetically induced transparency in 3D THz metallodielectric metamaterial fabricated via multiphoton lithography. In *Nanoscale and Quantum Materials: From Synthesis and Laser Processing to Applications 2024*, volume PC12874. International Society for Optics and Photonics, SPIE, 2024.

2024 Savvas Papamakarios, Odysseas Tsilipakos, Ioannis Katsantonis, Anastasios D. Koulouklidis, **Maria Manousidaki**, Gordon Zyla, Christina Daskalaki, Stelios Tzortzakis, Maria Kafesaki, and Maria Farsari arXiv 2406.04862. Cactus-like metamaterial structures for electromagnetically induced transparency at thz frequencies, 2024.

2024 Dongwon Lee, Matthias Ruf, Nikolaos Karadimitriou, Holger Steeb, **Maria Manousidaki**, Emmanouil A Varouchakis, Stelios Tzortzakis, and Andreas Yiotis. Development of stochastically reconstructed 3D porous media micromodels using additive manufacturing: numerical and experimental validation. *Scientific Reports*, volume 14, page 9375, 2024.

2024 Panagiotis Konstantakis, **Maria Manousidaki**, and Stelios Tzortzakis. Encrypted Optical Information in Nonlinear Chaotic Systems Uncovered Using Neural Networks. *Optica*, volume Submitted. Optica Publishing Group, 2024.

2023 Angelos Xomalis, Odysseas Tsilipakos, **Maria Manousidaki**, Oriol Pérez De Gregorio Busquets, George Kenanakis, Stelios Tzortzakis, Maria Farsari, Costas M Soukoulis, Elefterios N Economou, and Maria Kafesaki. Enhanced Refractive Index Sensing with Direction-Selective Three-Dimensional Infrared Metamaterials. *ACS Applied Optical Materials*, volume 1, pages 10–16. American Chemical Society, 2023.

2023 **Manousidaki, Maria**, Apostolos Kyriakakis, Konstantinos Misdanitis, Dimitrios G. Papazoglou, Maria Farsari, and Stelios Tzortzakis. Taming laser wavefronts for advanced multiphoton polymerization, *Conference on Lasers and Electro-Optics Europe & European Quantum Electronics Conference (CLEO/Europe-EQEC*. pages 1–1, 2023.

2023 Ioannis Syngelakis, **Manousidaki, Maria**, Elmina Kabouraki, Apostolos Kyriakakis, George Kenanakis, Argyro Klini, Stelios Tzortzakis, and Maria Farsari. Laser Direct Writing of Efficient 3D TiO2 Nano-photocatalysts, *Journal of Applied Physics AIP Publishing, Accepted*. 2023.

2023 Ioannis Katsantonis, **Maria Manousidaki**, Anastasios D Koulouklidis, Christina Daskalaki, Anna C Tasolamprou, | Costas, M Soukoulis, Eleftherios N Economou, Stelios Tzortzakis, Maria Farsari, Maria Kafesaki, Correspondence I Katsantonis, M Farsari, and M Kafesaki. Strong and Broadband Pure Optical Activity in 3D Printed THz Chiral Metamaterials, *Advanced Optical Materials*. 2023.

2022 Panagiotis Konstantakis, Paul E Dufour, **Maria Manousidaki**, Anastasios D Koulouklidis, and Stelios Tzortzakis. Taming femtosecond laser filamentation and supercontinuum generation in liquids using neural networks. *Opt. Lett.*, volume 47, pages 5445–5448. Optica Publishing Group, nov 2022.

2022 Panagiotis Konstantakis, Paul E Dufour, **Maria Manousidaki**, Anastasios D Koulouklidis, and Stelios Tzortzakis. Control of Femtosecond Laser Filamentation and Supercontinuum Generation in Liquids Using Neural Networks. In *Conference on Lasers and Electro-Optics*, Technical Digest Series, page JTu3B.23, San Jose, California, 2022. Optica Publishing Group.

2020 **Maria Manousidaki**, D.G. Papazoglou, M. Farsari, and S. Tzortzakis. 3D holographic light shaping for advanced multiphoton polymerization. *Optics Letters*, volume 45, 2020.

2019 **Maria Manousidaki**, DG Papazoglou, S Tzortzakis, M Farsari, and VY Fedorov. Advanced manufacturing technologies for micro-and nanosystems in security and defence ii. 11168. 2019.

2019 **Maria Manousidaki**, D.G. Papazoglou, M. Farsari, and S. Tzortzakis. Long-scale multiphoton polymerization voxel growth investigation using engineered Bessel beams. *Optical Materials Express*, volume 9, 2019.

2019 **Maria Manousidaki**, V.Y. Fedorov, D.G. Papazoglou, M. Farsari, and S. Tzortzakis. Ultrashort ring-Airy laser beams for advanced materials engineering. In *Proceedings of SPIE - The International Society for Optical Engineering*, volume 11168, 2019.

2018 **Maria Manousidaki**, V.Y.U. Fedorov, D.G. Papazoglou, M. Farsari, and S. Tzortzakis. Ring-Airy beams at the wavelength limit. *Optics Letters*, volume 43, 2018.

2018 **Maria Manousidaki**, Vladimir Yu. Fedorov, Dimitrios G Papazoglou, Maria Farsari, and Stelios Tzortzakis. Advanced Multiphoton Polymerization using Tunable Shaped Laser Wavepackets. In *Frontiers in Optics / Laser Science*, OSA Technical Digest, page FM4B.4, Washington, DC, 2018. Optica Publishing Group.

2017 A. Danilov, A.I. Aristov, **Maria Manousidaki**, K. Terzaki, C. Fotakis, M. Farsari, and A.V. Kabashin. Phase singularities in 3D plasmonic crystal metamaterials for ultra-sensitive biosensing. In *Proceedings of SPIE - The International Society for Optical Engineering*, volume 10093, 2017.

2017 A. Danilov, A.I. Aristov, **Maria Manousidaki**, K. Terzaki, C. Fotakis, M. Farsari, and A.V. Kabashin. 3D plasmonic metamaterials for enhanced spectral sensitivity of optical nanosensors. In *Progress in Biomedical Optics and Imaging - Proceedings of SPIE*, volume 10080, 2017.

2017 A Danilov, AI Aristov, AV Kabashin, **Maria Manousidaki**, K Terzaki, C Fotakis, M Farsari, H Song, H Ahn, K Kim, et al. Progress in biomedical optics and imaging-proceedings of spie. 2017.

2016 **Maria Manousidaki**, D.G. Papazoglou, M. Farsari, and S. Tzortzakis. Abruptly autofocusing beams enable advanced multiscale photo-polymerization. *Optica*, volume 3, 2016.

2016 A.I. Aristov, **M. Manousidaki**, A. Danilov, K. Terzaki, C. Fotakis, M. Farsari, and A.V. Kabashin. 3D plasmonic crystal metamaterials for ultra-sensitive biosensing. *Scientific Reports*, volume 6, 2016.

2015 Elmina Kabouraki, Konstantina Terzaki, Vasileia Melissinaki, **Maria Manousidaki**, Maria Vamvakaki, and Maria Farsari. Direct fs Laser Writing of 3D Nanostructures BT - Progress in Nonlinear Nano-Optics. pages 137–154. Springer International Publishing, Cham, 2015.

2012 G. Bickauskaite, **Maria Manousidaki**, K. Terzaki, E. Kambouraki, I. Sakellari, N. Vasilantonakis, D. Gray, C.M. Soukoulis, C. Fotakis, M. Vamvakaki, M. Kafesaki, M. Farsari, A. Pikulin, and N. Bityurin. 3D photonic nanostructures via diffusion-assisted direct fs laser writing. *Advances in OptoElectronics*, volume 2012, 2012.

Conferences / Summer Schools

2023 26-30 June, **CLEO EUROPE, EQEC 2023**, Munich,Germany. *Oral Presentation*

2022 11-15 July, **COFIL Conference**, Chania, Crete, Greece. *Organization Committee*

2018 16-20 Sep, **Frontiers in Optics**, Washington, District of Columbia United States. *Oral Presentation*

2016 21-22June 2016 MINOS Lab Meeting, Marseille, France. *Oral Presentation*

2015 3rd **FASTDOT Summer School**, 'Photonics meets Biology' Heraklion Crete. *Oral Presentation*

2015 10-12 Feb **SPIE Photonics West Conference**, San Francisco *Oral Presentation*

2014 21-24 Sep 30th **Panhellenic Conference on Solid-State Physics and Materials Science**, Heraklion Crete. *Poster Presentation*

2013 17-21 June 22nd **European Doctoral School on Metamaterials**, "Fabrication of metamaterials - METAMORPHOSE VI", Univesity of Scotland, UK. *Poster Presentation*

2013 2nd **FASTDOT Summer School**, 'Photonics meets Biology' Heraklion Crete. *Poster Presentation*

2011 1st **FASTDOT Summer School**, 'Photonics meets Biology' Heraklion Crete. *Poster Presentation*