

Charalampos Pitsalidis

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Current Position

Assistant Professor

Department of Physics, Khalifa University
Abu Dhabi, UAE

Education

2014	PhD in Physics, AUTH, Greece
2008	MSc in Nanosciences and Nanotechnologies, AUTH, Greece
2004	BSc in Physics, Fundamental physics, University of Crete, Greece

Research Experience

2017 – 2021	Postdoctoral Research Associate, Department of Chemical Engineering and <i>Biotechnology</i>, University of Cambridge, UK “Innovative technology solutions to explore effects of the microbiome on intestine and brain pathophysiology” - Fabrication of biomimetic electronic devices based on conducting polymers. - Developed scaffold-based electronics for monitoring living tissue. - Developed organic electronic devices (multi-electrode arrays, electrochemical transistors, flexible electrodes) for sensing and monitoring biological signals.
2016 – 2017	Postdoctoral Researcher, Centre Microelectronique Provence- EMSE, France “In-line blood brain barrier (BBB) toxicology platform” - Designed and fabricated the first ever 3D electrochemical transistor based on conducting polymer scaffolds for use in cell based biosensing and 3D cell culture applications. - Developed and optimized polymeric and hybrid scaffolds for monitoring 3D cell cultures. - Designed electronic devices for interfacing with biological membranes for studying ion channel formation and drug/membrane interactions.
2015 – 2016	Postdoctoral Researcher, Institut Fresnel, University Aix-Marseille, France “Development of the laser procedures and synthesis of the materials towards flexible electronics applications.” - Performed laser experiments (i.e., ablation, LIFT) for the fabrication of flexible electronics. - Successfully demonstrated the use of laser patterning to control adhesion and growth of electroactive & non-electroactive cells on conducting polymer devices.
2014 – 2015	Postdoctoral Researcher, Laboratory of Thin Films and Nanotechnology, Greece “Development of a roll-to-roll (R2R) pilot printing system for the fabrication of OLEDs” - Developed flexible organic light emitting diodes based on newly synthesized inks via printing techniques (i.e., blade-coating, gravure printing, inkjet printing)

- *Performed electrical and surface characterization of thin films and devices.*

2010 – 2013	Doctoral Researcher , Aristotle University of Thessaloniki, Greece “Deposition and characterization of organic materials for organic electronics applications”
2008 – 2010	Research assistant , Laboratory of Thin Films and Nanotechnology, Greece

Research/Lab Skills

- *Materials processing - thin films*: PVD and wet processes (i.e., spray-coating, spraying, inkjet printing)
- *Structured materials processing*: Freeze-drying, electrospinning
- *Microfabrication*: UV photolithography, basic PDMS- μ fluidic devices, microelectronic devices (electrochemical transistors, multi-electrode arrays), 3D electronic materials.
- *Characterization techniques*: EIS, DC-IV/pulsed measurements, AFM, XRD, XRR, Optical/confocal microscopy
- *Cell Cultures*: Cell lines (Caco2, MDCKII, Caco2/HT29-MTX, Fibroblasts)
- *Biochemical assays*: ELISA, XTT, MTT

Funding - Grants - Awards

2024	ESIG 2024 Grant , 1 year, 367,415 AED
2024	SWARD – Sustainability Grant , external grant 1 year, AED 499,742
2023	Al Jalila Foundation Grant , external grant 2 year, AED 299,163
2023	Environmental Sustainability Awards , Khalifa University, 1year, AED 38,000
2023	Research Investigator Grant (RIG2023) , Khalifa University, 2 years, AED 2,814,685
2023	NFFA Grant 2023 , EU, FORTH, AED 19,600
2022	NFFA Grant 2022 , EU, FORTH, AED 19,600
2021	FSU-2022-007 - Khalifa University, UAE, 2 years, €212,000
2019-2020	Contribution Reward Scheme for Researchers, University of Cambridge, UK Salary increments (2) for outstanding research within the department and the University
2018	Cambridge NanoDTC project , University of Cambridge, UK 4 months to contact research with a postgraduate student covering tutoring, research costs.
2010 – 2013	Scholarship of Excellence , Research Funding Project Heracleitus II 2009, Greece € 45,000 to conduct doctoral research, covering salary and travel expenses. (<10% success)
2006 – 2007	Best standing award in the interdisciplinary Master program “Nanosciences & Nanotechnologies, 2006-2007, € 2,000 prize, Aristotle University of Thessaloniki, Greece.

Publications

1. Jena, K. K., Fatma, B., Arya, S. S., Alhassan, S. M., Chan, V., Pappa, A. M., and Pitsalidis, C.: High performance flexible triboelectric nanogenerators using bio-derived films made of siloxane-modified castor oil, *J. Mater. Chem. A* (2024)
2. R. A. Nasser, S. S. Arya , K. H. Alshehhi, J. C.M. Teo, C. Pitsalidis, Conducting polymer scaffolds: a new frontier in bioelectronics and bioengineering, *Trends in Biotechnology* (2024)
3. N.B. Alsaafeen, S. S. Bawazir, K. K. Jena, A. Seitak, B. Fatma, C. Pitsalidis*, A. Khandoker*, and A.M Pappa*, One-Pot Synthesis of a Robust Crosslinker-Free Thermo-Reversible Conducting Hydrogel Electrode for Epidermal Electronics, *ACS Applied Materials and Interfaces* (2024)
4. B. Fatma, S.M. Andrabi, S. Gupta, V. Verma, A. Kumar, C. Pitsalidis, A. Garg, Biocompatible, breathable and degradable microbial cellulose based triboelectric nanogenerator for wearable transient electronics, *NanoEnergy*. 114 (2023) 108628.
5. A. Savva, J. Saez-Castaño, A. Withers, C. Barberio, V. Stoeger, S. Elias-Kirma, Z. Lu, C.M. Moysidou, K. Kallitsis, C. Pitsalidis, R. Owens, 3D Organic Bioelectronics for Electrical Monitoring of Human Adult Stem Cells, *Mater. Horizons*. (2023).

6. S. S. Arya, N. K. Morsy, D. K. Islayem, S. A. Alkhatib, C. Pitsalidis, A.-M. Pappa, Bacterial Membrane Mimetics: From Biosensing to Disease Prevention and Treatment. *Biosensors*. 13, 189 (2023).
7. J. Peng, Q. Lin, T. Földes, H.-H. Jeong, Y. Xiong, C. Pitsalidis, G.G. Malliaras, E. Rosta, J.J. Baumberg, In-Situ Spectro-Electrochemistry of Conductive Polymers Using Plasmonics to Reveal Doping Mechanisms, *ACS Nano* (2022) 16 21120–21128.
8. E. Tan, J. Kim, K. Stewart, C. Pitsalidis, S. Kwon, N. Siemons, J. Kim, Y. Jiang, J.M. Frost, D. Pearce, J.E. Tyrrell, J. Nelson, R.M. Owens, Y. Kim, J. Kim, The Role of Long-Alkyl-Group Spacers in Glycolated Copolymers for High-Performance Organic Electrochemical Transistors, *Advanced Materials* (2022) 34 2202574.
9. Pitsalidis, C., Niekerk, D. van, Moysidou, C.-M., Boys, A. J., Withers, A., Vallet, R., & Owens, R. M.. Organic electronic transmembrane device for hosting and monitoring 3D cell cultures. *Science Advances*, (2022) 8(37), eabo4761.
10. Pitsalidis, C., Pappa, A.-M., Boys, A. J., Fu, Y., Moysidou, C.-M., Niekerk, D. van, Saez, J., Savva, A., Iandolo, D., & Owens, R. M.. Organic Bioelectronics for In Vitro Systems. *Chemical Reviews*, (2022) 122(4), 4700–4790.
11. Moysidou,* C., Pitsalidis,* C., Al-Sharabi, M., Withers, A. M., Zeitler, J. A., & Owens, R. M. (2021). 3D Bioelectronic Model of the Human Intestine. *Advanced Biology*, (2021) 5(2), 2000306.
12. J. Nightingale, C. Pitsalidis, A.M, Pappa, E. Tan, K. Stewart, R. M. Owens and J-S. Kim “Small Molecule Additive for Low-power Accumulation Mode Organic Electrochemical Transistors”, *Journal of Materials Chemistry C*, (2020) 8, 8846-8855
13. H-Y. Liu, A-M. Pappa, A. Pavia, C. Pitsalidis, A. Salleo, R.M. Owens, S. Daniel “Reconstituting the cell plasma membrane on an organic bioelectronic device”, *Langmuir*, (2020) 36, 26, 7325–7331
14. D. Iandolo, J. Sheard, G. K. Levy, C. Pitsalidis, E. Tan, A. Dennis, J-S. Kim, A. E. Markaki, D. Wider, R.M. Owens “Collagen-enriched 3D PEDOT scaffolds for expansion and osteogenic differentiation of human neural crest-derived stem cells”, *MRS communication*, (2020) 1-9
15. F. Decataldo, V. Druet, A.-M. Pappa, E. Tan, A. Savva, C. Pitsalidis, J-S. Kim, B. Fraboni, R. M. Owens, D. Iandolo, “BMP-2 functionalized PEDOT:PSS-based OECTs for stem cell osteogenic differentiation monitoring”, *Flexible and Printed Electronics*, (2019) 4 (4), 044006
16. E. Tan, A. Pappa, C. Pitsalidis, J. Nightingale, S. Wood, F. A. Castro, R. M. Owens and J. Kim, “A highly sensitive molecular structural probe applied to in-situ biosensing of metabolites using PEDOT:PSS”, *Biotechnology and Bioengineering*, (2019) bit.27187.
17. P. Cavassin, A. Pappa, C. Pitsalidis, H. F. P. Barbosa, R. Colucci, J. Saez, Y. Tuchman, A. Salleo, G. C. Faria, R. M. Owens, “Organic Transistors Incorporating Lipid Monolayers for Drug Interaction Studies”, *Advanced Materials Technologies*, (2019) 1900680.
18. C. Pitsalidis*‡, A. K. Jayaram‡, E. Tan, C.-M. Moysidou, M. F. L. De Volder, J.-S. Kim, R. M. Owens, “3D Hybrid Scaffolds Based on PEDOT:PSS/MWCNT Composites”, *Frontier of Chemistry*, 7 (2019) 363.
19. C. Pitsalidis*, M. P. Ferro, D. Iandolo, L. Tzounis, S. Inal, R. M. Owens*, “Transistor in a tube: A route to three-dimensional bioelectronics”, *Science Advances*, 4 (2018) eaat4253.
20. C. Pitsalidis, A. Pappa, M. Porel, C.M. Artim, G.C. Faria, D.D. Duong, C.A. Alabi, S. Daniel, A. Salleo, R.M. Owens, Biomimetic Electronic Devices for Measuring Bacterial Membrane Disruption, *Adv. Mater.* 30 (2018) 1803130.
21. Del Agua, S. Marina, C. Pitsalidis, D. Mantione, M. Ferro, D. Iandolo, A. Sanchez-Sanchez, G. G. Malliaras, R. M. Owens and D. Mecerreyes, Conducting Polymer Scaffolds Based on Poly(3,4-ethylenedioxythiophene) and Xanthan Gum for Live-Cell Monitoring, *ACS Omega*, 3 (2018) 7424–7431.

22. J. Pas, C. Pitsalidis, D. A. Koutsouras, P. P. Quilichini, F. Santoro, B. Cui, L. Gallais, R. P. O'Connor, G. G. Malliaras, R. M. Owens, "Neurospheres on Patterned PEDOT:PSS Microelectrode Arrays Enhance Electrophysiology Recordings", *Advanced Biosystems*, 2 (2017) 1700164.
23. C. Pitsalidis*, D. Ohayon†, A. M. Pappa, A. Hama, Y. Zhang, L. Gallais, R. M. Owens*, Laser Patterning of Self-Assembled Monolayers on PEDOT:PSS Films for Controlled Cell Adhesion", *Advanced Mat. Interfaces*, 4 (2017) 1–8.
24. S. Inal, A. Hama, M. Ferro, C. Pitsalidis, J. Oziat, D. Iandolo, A.-M. Pappa, M. Hadida, M. Huerta, D. Marchat, P. Mailley, R. M. Owens, "Conducting Polymer Scaffolds for Hosting and Monitoring 3D Cell Culture", *Advanced Biosystems*, 1 (2017) 1700052.
25. A.M. Pappa, S. Inal, K. Roy, Y. Zhang, C. Pitsalidis, A. Hama, J. Pas, G. G. Malliaras, R. M. Owens, "Polyelectrolyte Layer by Layer Assembly on Organic Electrochemical Transistors" *ACS Applied Materials & Interfaces*, 9, 10427 (2017).
26. C. Pitsalidis*, T. Kaimakamis†, A. Papamichail, A. Laskarakis, S. Logothetidis, "Organic transistors based on airbrushed small molecule-insulating polymer blends with mobilities exceeding $1 \text{ cm}^2 \text{ V}^{-1} \text{ s}^{-1}$ " *RSC Advances* 6 (2016) 97077–97083.
27. C. Pitsalidis*, A. M. Pappa, S. Hunter, A. Laskarakis, T. Kaimakamis, M. M. Payne, J. E. Anthony, T. D. Anthopoulos, S. Logothetidis, "High mobility transistors based on electrospray-printed small-molecule/polymer semiconducting blends" *Journal of Materials Chemistry C*, 4 (2016) 3499–3507
28. C. Pitsalidis*, A. M. Pappa, S. Hunter, M. M. Payne, J. E. Anthony, T. D. Anthopoulos, S. Logothetidis, "Electrospray-processed soluble acenes toward the realization of high-performance field-effect transistors" *ACS Applied Materials Interfaces*, 7 (2015) 6496–6504
29. M. Gioti, C. Pitsalidis, A.K. Andreopoulou, E. Mparmpoutsis, L. Tzounis, J.K. Kallitsis, S. Logothetidis "Synthesis, Characterization and Properties of Yellow-light-emitting Polyethers containing Bis(styryl)anthracene Units" *American Institute of Physics, Conf. Proceedings*. (2015) 1646, 129
30. A. M. Pappa, V. Karagkiozaki, S. Krol, S. Kassavetis, D. Konstantinou, C. Pitsalidis, L. Tzounis, N. Pliatsikas, S. Logothetidis, "Oxygen-plasma-modified biomimetic nanofibrous scaffolds for enhanced compatibility of cardiovascular implants", *Beilstein Journal Nanotechnology* 6 (2015) 254–262.
31. C. Pitsalidis*, N. Kalfagiannis, N.A. Hastas, P. G. Karagiannidis, C. Kapnopoulos, S. Logothetidis "High Performance Transistors based on the Controlled Growth of TIPS-Pentacene Crystals via non-Isotropic Solvent Evaporation" *RSC Advances* 4, 20804 (2014)
32. N. Kalfagiannis, P. G. Karagiannidis, C. Pitsalidis, N. A. Hastas, P. Patsalas, S. Logothetidis "Performance of hybrid buffer Poly(3,4-ethylenedioxythiophene) poly(styrenesulfonate) layers doped with plasmonic silver nanoparticles" *Thin Solid Films* 560, 27 (2014)
33. I. Tsydel, M. Kucinska, T. Marszalek, Nosal, J. Jung, M. Gazicki-Lipman, C. Pitsalidis, C. Gravalidis, S. Logothetidis, M. Zagorska, J. Ulanski "High-Mobility and Low Turn-On Voltage n-Channel OTFTs Based on a Solution-Processable Derivative of Naphthalene Bisimide" *Advanced Functional Materials* 22, 3840 (2012)
34. N. Kalfagiannis, P. G. Karagiannidis, C. Pitsalidis, N. T. Panagiotopoulos, C. Gravalidis, S. Kassavetis, P. Patsalas, and S. Logothetidis "Plasmonic silver nanoparticles for improved organic solar cells" *Solar Energy Materials & Solar Cells* 104, 165 (2012)
35. P. G. Karagiannidis, N. Kalfagiannis, D. Georgiou, A. Laskarakis, N. A. Hastas, C. Pitsalidis, S. Logothetidis "Effects of buffer layer properties and annealing process on bulk heterojunction morphology and organic solar cell performance" *Journal of Materials Chemistry* 22, 14624 (2012)
36. P. G. Karagiannidis, D. Georgiou, C. Pitsalidis, A. Laskarakis, S. Logothetidis "Evolution of vertical phase separation in P3HT:PCBM thin films induced by thermal annealing" *Materials Chemistry Physics* 129, 1207 (2011)

37. P. G. Karagiannidis, S. Kassavetis, C. Pitsalidis, S. Logothetidis “Thermal annealing effect on the nanomechanical properties and structure of P3HT:PCBM thin films” *Thin Solid Films* 519, 4105 (2011)
38. N. G. Semaltianos, C. Koidis, C. Pitsalidis, P. Karagiannidis, S. Logothetidis, W. Perrie, D. Liu, S. P. Edwardson, E. Fearon, R. J. Potter, G. Dearden, K. G. Watkins “Picosecond laser patterning of PEDOT:PSS thin films” *Synthetic Metals* 161, 431 (2011)
39. M. Garganourakis, S. Logothetidis, C. Pitsalidis, D. Georgiou, S. Kassavetis, A. Laskarakis “Deposition and characterization of PEDOT/ZnO layers onto PET substrates” *Thin Solid Films* 517, 6409 (2009)
40. M. Garganourakis, S. Logothetidis, C. Pitsalidis, N. A. Hastas, K. Breza, A. Laskarakis, N. Frangis “Study of the growth of inorganic and organic electrodes onto polyethylene terephthalate substrates” *Thin Solid Films* 518, 1124 (200)

Book Chapters

1. Handbook of Conducting Polymers, 4th edition, 2019, TAYLOR & FRANCIS, Conducting and Conjugated Polymers for Biosensing Applications C. Pitsalidis, A.M. Pappa, C.M Moysidou, D. Iandolo and R. M. Owens
2. Hydrogels for Functional Bioelectronics, TAYLOR & FRANCIS, B. Fatma, N. Halfords, N. Alsafeen, C. Pitsalidis*, in press (2024)

Patents

1. C. Pitsalidis, S. Inal, R.M. Owens, “Transistor electrochimique organique tubulaire integrant une matrice biocompatible en 3-Dimension”, France, 2017, (FR1758683).
2. C. Pitsalidis, et al., “Organic Bioelectronic Transmembrane Device for Monitoring 3D Cell Cultures”, under evaluation (WO 2023/026047)
3. N.B. Alsaafeen, C. Pitsalidis, A. Khandoker, and A.M Pappa*N. One-Pot Synthesis of a Robust Crosslinker-Free Thermo-Reversible Conducting Hydrogel Electrode for Epidermal Electronics (20230101087)

Selected Presentations

1. MatSUS 2023, Spain, Invited talk
2. IEEE, NMDC 2023, Italy, Invited talk
3. Nanotextology 2023, ISFOE, Greece, Invited talk
4. Nanoseries 2023, Spain, Invited talk
5. SPIE, 2022, San Diego, USA, Invited talk
6. MRS 2022 Spring Meeting, Hawaii, USA, Invited Talk
7. MRS 2019 Spring Meeting, Phoenix, USA, Invited Talk
8. MF-10 Tenth Microfluidics Consortium, Cambridge, UK, Invited Talk
9. ITN-MIMIC School, 2019, London, UK, Invited Talk
10. 3rd health innovation conference, 2019 Greece, Invited Talk
11. MRS 2018 Fall Meeting, 2018, Boston, USA, Talk
12. MRS 2016 Fall Meeting, 2016, Boston, USA, Talk

Seminars

1. Physics Seminars (2022), Khalifa University, Bioelectronics: Bridging the gap between electronics and biology
2. Biomedical Engineering Seminars (2021), Khalifa University

3. Virtual Seminars in Biomedical Science, “A 3D bioelectronics model of the human intestine”, Imperial College London, 23 Sep 2020
4. Bioscience Seminar, “Interfacing Electronics with Biology: a Route toward 3D Bioelectronics”, Biological and Environmental Science and Engineering Division, 2018, KAUST
5. Masterclass in PostDoc society, “Organic Bio-Electronic systems: from tissue engineering to drug discovery”, 2018, University of Cambridge
6. Summer school, “Solution processes for the fabrication of OFETs”, 7th International Summer School on Nanosciences & Nanotechnologies, 2013, Greece

Teaching Creativity

- 5th Professional development week at the Centre of Teaching and Learning, Khalifa University, 2021
- e-teaching, BB interface, Khalifa University, 2021
- ECR teach program (4 months), Course design on “Introduction of Lab-on-a-chip technologies”, teaching, assessment and evaluation in Higher Education Institutes, Institute of Continuing Education, 2018, University of Cambridge, UK
- Participation in “AUTH on Sunday”, University opens its doors to the public, 2013, AUTH, Greece
- Development of virtual laboratories and remote experiments for the investigation of the optical, morphological and nanomechanical properties of thin films, LiLA Project, 2010, AUTH, Greece

Memberships

1. SPIE member since 2022
2. Member of Organ-on-a-Chip Technologies Network since 2018
3. MRS member since 2016

Media Interactions

1. Dailymail, “3D 'organ on a chip' could end laboratory tests on animals while speeding-up cures for killer diseases”, [link](#)
2. Materials Research Society (MRS) bulletin, “3D tubular platform monitors cell cultures”, 2019, [link](#)
3. BBC “Human organs, grown small enough to sit in a microchip to help study disease”
4. Yahoo! News, “14 innovations that helped make the world a better place in 2018”, [link](#)

Entrepreneurial Skills & Organizational Service

Entrepreneur and personal development events

1. Impulse programme, Maxwell Centre, Cambridge, entrepreneurial programme for scientists and academic entrepreneurs, (Sponsored by PDoc & OdPA society) 2019
2. Glasgow Enterprise Fair, Postdocs 2 Innovators, insights into the process of research commercialisation, starting a business, finding funding, and self-employment, 2018

Organization of international conferences

3. Accepted proposal for the organization of a symposium for MRS2024 Fall, Boston, 2023
4. Co-organizer, International Symposium on Flexible Organic Electronics, ~350 participants, 2010-2013
5. Co-organizer, NanoteXnology (NN conferences), ~500-600 participants, 2009-2013

Participation in exhibitions

6. Exhibitor with Laboratory for Thin Films Nanosystems and Nanometrology, HELEXPO, 2011

7. Exhibitor with Planetarium of Thessaloniki, Astronomy and telescope accessories, HELEXPO, 2007

IT & communication skills

- ∞ English: Excellent understanding, speaking and writing (Cambridge FCE English)
- ∞ Design & graphics: Corel Draw 7, Adobe Photoshop, Inkshape, Solid Edge (beginner).
- ∞ Cambridge IT Skills MS Office™
- ∞ Origin, Matlab, Autocad (basic)