

George Gregory Malliaras

Prince Philip Professor of Technology, University of Cambridge

Mail: Dept. of Engineering, University of Cambridge, 9 JJ Thomson Avenue, Cambridge CB3 0FA, UK

Tel: +44 (0)1223 748312; Email: gm603@cam.ac.uk

Education

University of Groningen (the Netherlands)

Ph.D. awarded with highest honours (cum laude) in Mathematics and Physical Sciences. 1995
Thesis research on photorefractivity in polymers. Thesis advisor: Prof. Georges Hadziioannou

Aristotle University of Thessaloniki (Greece)

B.S. in Physics. 1991

Professional Experience

University of Cambridge (UK)

Prince Philip Professor of Technology, Department of Engineering. 2017 – Present

Ecole Nationale Supérieure des Mines de Saint Etienne (France)

Professor (classe exceptionnelle from 2012), Department of Bioelectronics. 2009 – 2017
Head, Department of Bioelectronics. 2009 – 2016

Cornell University (USA)

Lester B. Knight Director, Cornell NanoScale Science and Technology Facility. 2006 – 2009
Associate Professor, Department of Materials Science and Engineering. 2004 – 2009
Director of Graduate Studies, Materials Science and Engineering. 2004 – 2006
Member of Graduate Field, Applied & Engineering Physics. 2002 – 2009
Member of Graduate Field, Electrical & Computer Engineering. 2002 – 2009
Assistant Professor, Department of Materials Science and Engineering. 1999 – 2004

IBM Almaden Research Center (USA)

Postdoctoral Fellow, Center for Polymer Interfaces and Macromolecular Assemblies. 1997 – 1998
Advisor: Dr J. Campbell Scott.

University of Groningen (the Netherlands)

Postdoctoral Fellow, Materials Science Centre. 1995 – 1997
Advisor: Prof. Georges Hadziioannou.

Honours and Awards

- Fellow of the Royal Society (UK), 2024.
- Member, European Academy of Sciences (Austria), 2023.
- 2023 Blaise Pascal Medal of the European Academy of Sciences (Austria), 2023.
- Member, Academia Europaea (UK), 2023.
- Mid-Career Researcher Award, Materials Research Society (USA), 2023.
- Honorary Doctorate, University of Linköping (Sweden), 2020.
- Fellow, Materials Research Society (USA), 2017.
- Fellow, Royal Society of Chemistry (UK), 2010.
- NY Academy of Sciences Blavatnik Award for Young Scientists (USA), 2007.
- DuPont Young Professor Award (USA), 2005.

- NSF Faculty Early Career Development Award (USA), 2000.
- Fiona Ip Li '78 and Donald Li '75 Excellence in Teaching Award, Cornell University (USA), 2001
- James M. and Marsha D. McCormick Award for Excellence in Advising First Year Students , Cornell University (USA), 2001, 2007.
- Ph.D. awarded with highest honours “cum laude” (the Netherlands), 1995.

Professional Activities

- Editorial
 - Deputy Editor, *Science Advances* (Associate Editor since 2015), 2020 – present.
 - Advisory Council, *Research Directions: Biotechnology Design*, 2024 – present.
 - Editorial Advisory Board Member, *Advanced Materials Technologies*, 2016 – present.
 - Editorial Advisory Board Member, *MRS Communications*, 2012 – present.
 - Advisory Board Member, *Journal of Materials Chemistry B*, 2012 – present.
 - Past: Chairman of the Editorial Board, *Journal of Materials Chemistry*, 2007 – 2010; Member of the Editorial Board, *Sensors*, 2006 – 2013; Associate Editor, *Japanese Journal of Applied Physics*, 2005 – 2014; Guest Editor, *MRS Communications* (2020), *APL Materials* (2014), *Advanced Materials* (2014), *Japanese Journal of Applied Physics* (2005), *Journal of Polymer Science: Polymer Physics* (2003), *Journal of Materials Chemistry B* (2003).
- Boards/Committees
 - Scientific Advisory Board, Grenoble Institute of Neuroscience (France), 2023 – present.
 - Program Development Committee, Materials Research Society (USA), 2021 – present.
 - International Advisory Committee, Biomedical Engineering (BME) programme, Faculty of Engineering, The University of Hong Kong (China), 2021 – present.
 - International Advisory Council, National Centre of Research & Innovation on Nanotechnology, Nanomedicine and Organic Electronics (Greece), 2021 – present.
 - Standing Committee of External Evaluators for the Italian Institute of Technology (Italy), 2013 – present.
 - International Advisory Board, ELORPrintTech, University of Bordeaux (France), 2015 – present.
 - Scientific Advisory Board, Centre for Research on Adaptive Nanostructures and Nanodevices, Trinity College Dublin (Ireland), 2010 – present.
 - Scientific Advisory Board, Opto.bio (UK), 2022 – present.
 - Scientific Advisory Board, Emm (UK), 2022 – present.
 - Scientific Advisory Board, Panaxium (France), 2018 – present.
 - Scientific Advisory Board, Panaxium (France), 2018 – present.
 - Scientific Advisory Board, Orthogonal, Inc. (USA), 2009 – present.
 - Past: Hellenic National Council for Research and Innovation, 2016 – 2018; Scientific Advisory Board, Max Planck Institute for Polymer Research (Germany), 2013 – 2021; MRS Government Policy Committee, 2014 – 2017; Evaluation Committee for Innovators under 35 Europe, 2017; Executive Committee of the European Materials Research Society, 2016 – 2017; Scientific Advisory Board, Nano Terra, Inc., 2009 – 2012; Scientific Advisory Board, KAUST-Cornell Center for Energy and Sustainability, Cornell University, Ithaca, NY, 2010 – 2013; Scientific Advisory Board, Center for Organic Bioelectronics, Karolinska Institute and Linköping University, Sweden, 2007 – 2011; Board of Directors, Infotonics Technology Center, Inc., Canandaigua, NY, 2007 – 2008.
- Conferences
 - 2015 Materials Research Society Fall Meeting Chair (Boston, MA, USA).
 - 2017 E-MRS Fall Meeting Chair (Warsaw, Poland).
 - Lead organizer, 6th Symposium on Functional pi-Electron Systems, 2004 (Ithaca, NY, USA).

- Organizer of symposia for Materials Research Society, Gordon Research Conferences, European Materials Research Society, American Physical Society, American Chemical Society, Faraday Discussions (Royal Society of Chemistry), Minerals, Metals and Materials Society, and Society of Imaging Science and Technology.
- Various
 - 300+ papers in peer-reviewed journals, 10 patents, 500+ invited talks.
 - 52,000+ citations, h-index=124 (google scholar, 10/24).

RESEARCH

My research is on bioelectronics. I lead a group of scientists, engineers and clinicians who study the fundamental processes that take place at the abiotic/biotic interface and develop better tools for healthcare. Among my group's achievements are the development [Adv. Mater. 2011; Nat. Comm. 2013; Nat. Comm. 2013b; Sci. Adv. 2024; Nat. Commun. 2024] and clinical translation [Nat. Neurosci. 2015] of novel high resolution electrophysiology devices for interfacing with the nervous system, the development of devices for localised delivery in the brain [Adv. Mater. 2017; Sci. Adv. 2018] and the demonstration of minimally invasive [Sci. Adv. 2021] and biohybrid [Sci. Adv. 2023] neural implants. This work is underpinned by research that sheds light into the fundamental mechanisms governing the communication of organic electronic materials and devices with different biological signals. On this front, we established a better understanding of ion transport in conducting polymers [Nat. Comm. 2016; Science 2019; Nat. Mater. 2024; Sci. Adv. 2024] and developed the device physics of organic electrochemical transistors [Adv. Funct. Mater. 2007; Sci. Adv. 2015].

EDUCATION & STUDENT SUPERVISION

Courses developed & taught

- Teaching Biosensors and Bioelectronics course to final year undergraduates and graduate students at Cambridge.
- Developed and taught graduate level module on "Bioelectronics" at EMSE.
- Developed and taught graduate level course "Organic and Molecular Electronics" at Cornell.
- Developed and taught undergraduate level courses "Electronic Materials for the Information Age", "Atomic and Molecular Structure of Matter", and "Materials Design in Electronic Packaging" at Cornell University.

Ph.D. and postdoc supervision

Currently: Misaki Inaoka (2024), Asmay Gharia (2024), Filip Wronowski (2024), Amy Jin (2025), Ruben Ruiz-Mateos Serrano (2025), Luke Gatecliff (2025), Christopher Slaughter (2026), Margaux Forner (2026). Graduated:

33. Poppy Oldroyd, "Stability of thin-film PEDOT:PSS electrodes for neuromodulation", Cambridge (2024).
32. Tobias Naegele, "Redox flow iontophoresis for brain cancer therapy", Cambridge (2023).
31. Elise Jenkins, "Glioblastoma: an electric symphony. Understanding the Electrotherapy and Electrophysiology of Glioblastoma", Cambridge (2023).
30. Ben Woodington, "Using thin-film electronics to interface with the spinal cord", Cambridge (2023).
29. Santiago Velasco-Bosom, "Getting under your skin. Development of wearable devices for improved non-invasive diagnostics", Cambridge (2023).

28. Amy Rochford, "Biohybrid peripheral neural interfaces: Combining cell transplantation and flexible electronics for functional neurological restoration", Cambridge (2022).
 27. Anastasios Polyravas, "Engineering low noise organic electrochemical transistors for electrophysiology applications", Cambridge (2021).
 26. Shao-Tuan Chen, "Emerging bioelectronic devices and methods for neuromodulation", Cambridge (2020).
 25. Jolien Pas, "Flexible neural probes with a fast bioresorbable shuttle: From in vitro to in vivo electrophysiological recordings", EMSE (2017).
 24. Mohamed ElMahmoudy, "Micro- and nano-patterning of conducting polymers for biomedical applications", EMSE (2017).
 23. Marcel Braendlein, "Organic electronic devices for in vitro diagnostics", EMSE (2017).
 22. Eloise Bihar, "Inkjet printed organic electronic devices for biomedical diagnostics", EMSE (2016).
 21. Ilke Uguz, "Organic implantable probes for in vivo recordings of electrophysiological activity and drug delivery", EMSE (2016).
 20. Thomas Lonjaret, "Microfabrication of wearable and high-performing cutaneous devices based on organic materials for human electrophysiological recordings", EMSE (2016).
 19. Julie Oziat, "PEDOT:PSS 3D electrodes for detection of pseudomonas aeruginosa electroactive metabolites", EMSE (2016).
 18. Dimitrios Koutsouras, "Conducting polymer devices for in vitro electrophysiology", EMSE (2016).
 17. Gaëtan Scheiblin, "Development of lactate sensors and transfer to printed electronics", EMSE (2016).
 16. Marc Ferro, "Applications of orthogonal lithography in bioelectronics", EMSE (2016).
 15. Thomas Doublet, "Neuroscience applications of organic electronic devices", Aix Marseille University (2013).
 14. Pierre Leleux, "Conducting polymer devices for electrophysiological recordings", Aix Marseille University (2013).
 13. Eleni Stavrinidou, "Understanding and engineering ion transport in conducting polymers", EMSE (2013).
 12. Dion Khodagholy, "Conducting polymer devices for interfacing with biology", EMSE (2012).
 11. Chung Han Wu "Low temperature preparation of wide band-gap metal oxide thin films with novel designed solution processes", Cornell (2011).
 10. Vladimir Pozdin, "Design and growth of organic semiconductors for organic thin film transistors", Cornell (2011).
 9. Yee-Fun Lim, "Solution processed solar cell technologies", Cornell (2011).
 8. John DeFranco, "Patterning and processing of organic electronic devices using photolithography", Cornell (2011).
 7. Matt Lloyd, "Organic photovoltaics from small molecules", Cornell (2007).
 6. Dan Bernards, "Leveraging ionic charge in organic semiconductor devices", Cornell (2007).
 5. Jason Slinker, "Electroluminescent devices from ionic transition metal complexes", Cornell (2007).
 4. Alex Mayer, "Growth and structure dynamics of pentacene thin films with applications to OTFTs and OPVs", Cornell (2006).
 3. Jeff Mabeck, "Chemical and biological sensing with organic thin-film transistors", Cornell (2006).
 2. Yuanjia Zhang, "Nanoscale organic thin film transistors", Cornell (2006).
 1. Yulong Shen, "Charge injection and transport in organic semiconductors", Cornell (2003).
- 7 current (13 past) postdocs supervised at Cambridge, 10 postdocs supervised at EMSE, 17 postdocs supervised at Cornell University.
 - Former graduate students/postdocs who are currently faculty members in academia: Aram Amassian (North Carolina State University), Damiano Barone (Methodist Hospital/Rice University), Alexander Boys (Dartmouth College), Alejandro Carnicer Lombarte (accepted offer from Houston Methodist Hospital/Weill Cornell), Fabio Cicoira (École Polytechnique de Montréal), Mary Donahue (University of Linköping), Chaoqun Dong (accepted offer from Columbia University), Hon Hang Fong (Shanghai Jiao Tong University), Paschalis Gkoupidenis (North Carolina State University),

Sanggil Han (Incheon University), Sahika Inal (King Abdullah University of Science and Technology), Esma Ismailova (Ecole des Mines de St. Etienne), Chen Jiang (Tsinghua University), Scott Keene (Rice University), Dion Khodagholy (Columbia University), Vladimir Pozdin (Florida International University), Chris Proctor (University of Oxford), Jason Slinker (University of Texas, Dallas), Jonathan Rivnay (Northwestern University), Alexandra Rutz (Washington University St. Louis), Eleni Stavrinidou (University of Linköping), Liangfeng Sun (Bowling Green State University), Sang Yoon Yang (KAIST), Ilke Uguz (Stevens Institute of Technology), Alex Zakhidov (Texas State University), Zhengtao Zhu (South Dakota School of Mines).

External examiner in habilitation committees

Clément Hébert, University of Grenoble Alpes, France (2024); Guillaume Wantz, University of Bordeaux, France (2013); Anne Charrier, University of Aix Marseille, France (2013); Jean Charles Ribierre, University of Strasbourg, France (2011).

External examiner/co-chair in Ph.D. committees

Jack Maughan, Trinity College Dublin, Ireland (2025); Michalis Chatzidis, Aristotle University of Thessaloniki, Greece (2024); Scott Greenhorn, University of Grenoble Alpes, France (2024); Kayla-Jade Butkow, University of Cambridge (UK) (2024); Alberto Perna, Italian Institute of Technology, Italy / Open University, UK (2024); Julian Butscher, University of St. Andrews, UK (2024); Carole-Anne Lernoud, University of Grenoble Alpes, France (2023); Rémy Cornuéjols, Aix Marseille University, France (2023); Ethan Thomas Sorrell, University of Cambridge, UK (2023); Begimai Adilbekova, KAUST, Saudi Arabia (2023); Eve McGlynn, University of Glasgow, UK (2023); Megan Renny, University of Colorado, USA (2023); Anna De Salvo, University of Ferrara, Italy (2023); Nathaniel Tye, University of Cambridge, UK (2023); Florian Missey, Aix Marseille University, France (2023); Noaf Salah Ali Alwahab, EPFL, Switzerland (2023); Claudia Cea, Columbia University, NY (2022); Tomi Baikie, University of Cambridge, UK (2022); Sebastian Horstmann, University of Cambridge, UK (2022); Silvia Demuru, EPFL, Switzerland (2022); Dimitrios Simatos, University of Cambridge, UK (2021); Micah Barker, University of Bordeaux, France (2021); Charlotte Hoskin, University of Oxford, UK (2021); Eduard Masvidal Codina, Universitat Autònoma de Barcelona, Spain (2021); Gerwin Dijk, Ecole des Mines de St. Etienne, France (2021); Sihai Luo, NTNU, Norway (2021); Aimie Pavia, Ecole des Mines de St. Etienne, France (2021); Myriam Abarkan, University of Bordeaux, France (2021); Zenon Toprakcioglu, University of Cambridge, UK (2021); Sofia Drakopoulou, University of Modena and Reggio Emilia, Italy (2021); Eleftheria Batagianni, University of Pau, France (2020); Konstantinos Petkos, Imperial College London, UK (2020); David Ohayon, KAUST, Saudi Arabia (2020); Iuliana Petruța Maria, Imperial College London, UK (2020); Chen Chen, University of Cambridge, UK (2020); Philippa Jane Hooper, University of Cambridge, UK (2019); Aidan Paul Wickham, Imperial College London, UK (2019); Paola Alberte, University of Nottingham, UK (2019); Damiano Barone, University of Cambridge, UK (2019); Edward Kah Wei Tan, University of Cambridge, UK (2019); Adam Kelly, Trinity College Dublin, Ireland (2018); Quentin Thiburce, Imperial College London, UK (2018); Muhammad Rizwan Khan Niazi, KAUST, Saudi Arabia (2018); Jason Marroquin, Monash University, Australia (2018); Seong-Min Kim, Gwangju Institute of Science and Technology, South Korea (2018); Alexander Giovannitti, Imperial College London, UK (2017); Amber Tiwari, University of Bari, Italy (2017); Nerea Casado, University of the Basque Country, Spain (2017); Caroline Duc, University of Lille, France (2017); Silvia Conti, University of Cagliari, Italy (2017); Preethi Seshadri, University of Bari, Italy (2017); Gaurav Pathak, University of Zagreb, Croatia (2017); Behzad Farzaneh, Imperial College London, UK (2017); Sandra Jenatsch, EPFL, Switzerland (2017); Erica Zeglio, University of Linköping, Sweden (2016); Anna Hofmann, University of Bordeaux, France (2016); Ioannis Petsagkourakis, University of Bordeaux, France (2016); Aziliz Lecomte, INSA Toulouse, France (2016); Celia Pacheco Moreno, Imperial College London, UK (2016); Jorge Herrera Morales, University of Grenoble, France (2015); Fulvio Michelis, Ecole Polytechnique, France (2015); Cristina Roldán

Carmona, University of Cordoba, Spain (2014); Peter-Herbert Lienerth, University of Strasbourg, France (2014); Paul Prevot, University of New South Wales, Australia (2013); Chang Hyun Kim, Ecole Polytechnique, France (2013); Giuseppe Tarabella, University of Parma, Italy (2012); Micael Charbonneau, University of Grenoble, France (2011); Matteo Tonezzer, University of Trento, Italy (2011); Mark-Jan Spijkman, University of Groningen, the Netherlands (2011); Loig Kergoat, Université Paris Diderot-Paris 7, France (2010); Ruben Costa, University of Valencia, Spain (2010); Andrea Maurano, Imperial College London, UK (2010); Omid Yaghmazadeh, Ecole Polytechnique, France (2010); Mahiar Hamedi, University of Linköping, Sweden (2008); Oana Jurchescu, University of Groningen, the Netherlands (2006); David Nillson, University of Linköping, Sweden (2005); Sjoerd Veenstra, University of Groningen, the Netherlands (2001).

UNIVERSITY MANAGEMENT & ADMINISTRATION

Head of Department of Bioelectronics, Ecole des Mines de Saint Etienne (9/2009 – 9/2016)

I started the Department of Bioelectronics (BEL - www.bel.emse.fr) in the Georges Charpak – Provence campus of the Ecole des Mines de St. Etienne. My job included setting the scientific direction of the Department, recruiting permanent staff (faculty and engineers), coordinating our contribution to the School's curriculum, and raising funds to build the Department's laboratories. Several research and training grants have been obtained by international, EU, French, and regional agencies, foundations and industry, including an ERC Starter Grant (won by Roisin Owens to develop in vitro diagnostics). These programs led to (cumulative) funding corresponding to >100 human-years of postdoc/student salary. As a result, at the end of my tenure, BEL had 5 permanent staff (including myself) and a total of ~30 researchers (45% women), with expertise in physics, engineering, biology and neuroscience.

Lester B. Knight Director, Cornell NanoScale Science and Technology Facility (8/2006 – 8/2009)

The Cornell NanoScale Science and Technology Facility (CNF - www.cnf.cornell.edu) is a National Science Foundation-supported user facility, with the mission to support a broad range of nanoscale science and technology projects by providing state-of-the-art infrastructure coupled with extensive staff support. With a 1,600 m² cleanroom, nanofabrication equipment of \$140M replacement value, an annual budget of \$6.7M, and 25 full-time staff, CNF serves over 600 users a year (2009 figures). About 50% of the users are from outside Cornell (academia and industry). My job as the Director included setting the scientific direction for the facility, attracting new users, and fundraising to keep the facility at the state-of-the-art.

Current service roles

- Theme Leader, Bioengineering Research, Department of Engineering (since 2020)
- Theme Leader, Devices and Systems for Healthcare, Electrical Engineering Division (since 2019)
- Member, School of Technology Research Committee (since 2019)
- Member, Department of Engineering Research Committee (since 2019)
- Member, Electrical Engineering Division Executive Committee (since 2019)
- Member, Institute for Neuroscience Executive Committee (since 2022)
- Member, NanoDTC Executive Committee (since 2019)

TECHNOLOGY TRANSFER

Involvement in spinoffs and startups

- Orthogonal Inc. (www.orthogonalinc.com). The company develops and sells fluorinated photoresists, used in the photolithographic patterning of flat panel displays. I serve as an advisor on the technical and business side of the company.
- Panaxium (<https://panaxium.com/>). The company develops a cortical microelectrode array. I serve as the principal scientific advisor.
- Opto.bio (<https://www.opto.bio/>). The company develops neurotechnology solutions for hard-to-treat cancers. I serve as an advisor to the technical side of the company.
- Bainbridge Bio (<https://www.bainbridge.bio/>). The company develops a biosensing platform through the miniaturization of aptamer-based sensors. I serve as an advisor to the technical side of the company.
- Emm (<https://www.emm.co/>). The company develops a smart menstrual product. I serve as an advisor to the technical side of the company.
- Omini (<https://www.linkedin.com/company/ominilabs>). The company develops a personalized multiplex blood testing platform to monitor chronic diseases. I serve as a technical consultant.