

SOPHIA N. ECONOMIDOU, MEng, PhD

Athens, Greece
+30 6948563178
sophia_oikon@hotmail.com
economidou.s@unic.ac.cy



PROFILE

Biomechanical Engineer with over 12 years of research experience, holding a PhD from the School of Pharmacy at the University of Kent, UK, and postdoctoral research credentials from University College London. I possess a strong record in the development of medical devices, guiding projects from the R&D phase through to regulatory approval and commercialisation. My academic contributions include co-authorship of several highly cited scientific articles and a book chapter. In recognition of my teaching experience, I have been awarded an Associate Fellowship by the UK Higher Education Academy. Currently, I hold the role of Assistant Professor in Pharmaceutical Technology at University of Nicosia, Athens.

EDUCATION

PhD in Pharmacy **May 2017-April 2021**

University of Kent, Medway School of Pharmacy

Thesis title: 3D Printed Microneedles for Transdermal Drug Delivery

Design and engineering of novel medical devices for drug transportation through the skin. Use of advanced 3D printing processes and microelectromechanical systems for device development. Research on diabetes, cancer, osteoporosis, *in-vitro* and mechanical characterisation studies and animal testing.

Diploma in Mechanical and Aeronautics Engineering (MEng) **July 2014**

University of Patras, Polytechnic School

Division: Applied Mechanics, Technology of Materials and Biomechanics (Grade: 7.64)

PROFESSIONAL AND RESEARCH EXPERIENCE

Assistant Professor in Pharmaceutical Technology **September 2026-Today**

**University of Nicosia Athens, Department of Health Sciences,
School of Life and Health Sciences**

AI Research Engineer

March 2026 – August 2026

Biological Lattice Industries Corp. & NCSR Demokritos

Development of AI-enabled workflows and AI agentic systems for pharmaceutical and life sciences clients. Working with major pharmaceutical companies towards the integration of AI systems in their operational and research pipelines. Responsibilities:

- Designing AI agents
- Developing workflow automation systems
- Building tools for experimental and computational design
- Translating complex scientific and engineering workflows into scalable AI-powered solutions.

Bioengineering Researcher

Sept 2023 – February 2026

The Autonomous Science Lab, Superlabs @ NCSR “Demokritos”

- Research on data- and simulation-driven design optimisation of architected structures including tissue engineering scaffolds and microneedles.
- 3D printing of medical devices
- Machine Learning-assisted optimization of manufacturing processes
- Research on the mechanical testing of biomaterials and development and calibration of Finite Element Analysis models. This work aimed at generating knowledge and tools on mechanical biocompatibility of medical devices.

Director of Engineering

January 2024 – July 2024

Biological Lattice Industries Corp. & NCSR Demokritos

- Leading the Engineering Team consisting of engineers and designers, while liaising with manufacturing subcontractors to manage and enhance collaborative efforts.
- Evaluating product design, manufacturing, and testing outcomes, ensuring the upkeep of comprehensive product development documentation.
- Overseeing product development planning, resource allocation, and milestone tracking to guarantee timely and successful execution of development timelines.
- Design and implementation of the company’s Quality Management System (QMS) in accordance with ISO 9001 standards. Conducting preparatory actions for ISO 13485 compliance.
- Development of product Technical File for CE marking and management of the certification process, working closely with relevant certification bodies.

Postdoctoral Bioengineering Researcher

Nov 2022–August 2023

University of Piraeus, Laboratory of Advanced Manufacturing Technologies and Testing

Research on 3D printed medical devices.

Project: OrThOP3Dics: Topological optimisation of 3D printed, personalised spinal braces (state-funded research project).

Postdoctoral Bioengineering Researcher, Head of Microsystems

May 2021-Oct 2022

University College London (UCL) & Biosensors Beyond Borders Ltd (BBB)

Joined project between academia and industry, focusing on the design, manufacturing and commercialisation of novel medical devices for point-of-care diagnostics. Responsibilities:

- Medical device design and prototyping
- Bench and in-vitro testing
- Preparation of clinical trials
- Maintaining a Quality Management System (QMS) as per ISO 13845
- Preparation of Technical file for CE marking
- Preparation of dossier for 510(k) submission to the FDA

Mechanical Engineer

March 2016-June 2016

EUCAT SA, Athens, Greece

Development of technical file for CE Marking for a novel transportable MOT unit.

Research Engineer

August 2014-January 2017

University of Piraeus, Laboratory of Advanced Manufacturing Technologies and Testing

Project title: **In Situ Monitoring Additive Rapid Manufacturing (S.M.A.R.T.)** (EXCELLENCE II state-funded research project).

Optimisation of 3D printing processes through the integration of sensors (thermal sensors, optical fibers) for in situ real-time process monitoring and structural lifecycle health monitoring.

Research Assistant

September 2012-April 2014

Composite Materials research Group (CMG), University of Patras

Research fields: Experimental mechanics on polymers and metals combined with theoretical modeling, composite materials, interface, biomaterials, titanium nanotubes, pull-out effect.

TEACHING EXPERIENCE

Training Leader

November 2021

Fleming Corporate Learning

Creation and delivery of training course for academics and pharma scientists. Course title: "3D Printing of Solid Dosage Forms & Medical Devices".

Graduate Teaching Assistant
University of Kent, Kent, UK

May 2017-April 2021

Teaching assistance, lab demonstrations, lectures, marking and mentoring.

Teaching Assistant

September 2014-January 2017

University of Piraeus, Dept. of Industrial Management and Technology

Teaching of technical courses (Statics, Dynamics) at the undergraduate level.

TRAININGS AND LICENCES

ISO 13485:2016, FDA Quality System Requirements (QSR), Medical Device Single Audit Program (MDSAP), US Regulatory Requirements

October 2022

Training provided by Emergo by UL

Associate Fellowship Scheme (30-credit course)

January 2019-January 2020

University of Kent, Centre for the Study of Higher Education

Awarded an *Associate Fellowship of the UK Higher Education Academy*.

Training in animal testing (rodents)

March 2019

Royal Veterinary College, London

Training (E1 & L, PIL A & B, PIL C) to perform experimental procedures in rodents.

Awarded a *Personal Licence* under the Animals (Scientific Procedures) Act 1986 (rodents), UK Home Office

AWARDS AND GRANTS

UKRI-BBSRC Innovation placement mobility grant (Flexible Talent Mobility Account) **2021-2022**

Obtained a grant from the UK Research and Innovation-Biotechnology and Biological Sciences Research Council (UKRI-BBSRC) to conduct research work bridging Industry and Academia.

Medway School of Pharmacy, full 3-year PhD studentship

2017-2020

Studentship covering full tuition and stipend.

Eurobank Ergasias SA, "The great moment for education"

2008

Scholarship for the highest grade in national exams for admission in university

Hellenic Ministry of Education

2008

Award for excellence (school year 2007-2008)

Lions Club Rhodes

2007

Scholarship for the best student (school year 2006-2007)

PUBLICATIONS & ACADEMIC EXPERIENCE

Peer-reviewed Journals

1. **S.N. Economidou**, D. Douroumis, F. Turlomousis (2026). Computational Tools for the Development of Microneedles: From Physics-Based to Data-Driven and Knowledge-Driven Tools (Submitted).
2. C. Protopappa, L.A. Junqueira, S.S. Kolipaka, **S.N. Economidou**, D. Pappas, D. Douroumis, M. Vlachou (2026). Hot-Melt Extrusion of Bupropion with Three Ethylcellulose Grades for Pellet Feedstock Preparation and Screw-Based 3D Printing of Sustained-Release Tablets, *AAPS PharmSciTech*.
3. M.J. Uddin, **S.N. Economidou**, L. Guiraud, M. Kazi, F.K. Alanazi, D. Douroumis (2024). Monoclonal Antibody Delivery Using 3D Printed Biobased Hollow μ Ne3dle Arrays for the Treatment of Osteoporosis. *Molecular Pharmaceutics*.
4. **S. N. Economidou** and D. Douroumis (2021). 3D printing as a transformative tool for microneedle systems: Recent advances, manufacturing considerations and market potential. *Advanced Drug Delivery reviews*, 173, 60-69.
5. **S. N. Economidou**, C. P. P. Pere, and M. Okereke (2021). Optimisation of Design and Manufacturing Parameters of 3D Printed Solid Microneedles for Improved Strength, Sharpness, and Drug Delivery, *Micromachines*, 12(2), 117 (Corresponding Author).
6. **S. N. Economidou**, Md. J. Uddin, M. J. Marques, D. Douroumis, W. T. Sow, H. Li, A. Reid, J. F.C. Windmill and A. Podoleanu (2021). A Novel 3D Printed Microneedle Microelectromechanical System for Controlled, Personalized Transdermal Drug Delivery, *Additive Manufacturing*, 38, 101815 (Corresponding Author).
7. M. S. Hossain Mithu, **S. Economidou**, V. Trivedi, S. Bhatt, and D. Douroumis (2021). Advanced Methodologies for Pharmaceutical Salt Synthesis, *Crystal Growth and Design*, 21, 1358-1374.
8. Qiongxi Pan, Chenyuan Gao, Yingying Wang, Yili Wang, Cong Mao, Quan Wang, **Sophia N. Economidou**, Dennis Douroumis, Feng Wen, Lay Poh Tan, Huaqiong Li. Investigation of bone reconstruction using an attenuated immunogenicity xenogenic composite scaffold fabricated by 3D printing, *Bio-Design and Manufacturing*, 3 (4) (2020), 396-409.
9. Md J. Uddin, N. Scoutaris, **S.N. Economidou**, C. Giraud, B.Z. Chowdhry, R.F. Donnelly, D. Douroumis (2020). 3D printed microneedles for anticancer therapy of skin tumours, *Materials Science and Engineering: C*, 107, 110248.
10. **S.N. Economidou**, C.P. Pissinato Pere, A. Reid, Md J. Uddin, J.F.C. Windmill, D.A. Lamprou, D.Douroumis (2019). 3D printed microneedle patches using stereolithography (SLA) for intradermal insulin delivery, *Materials Science and Engineering: C*, 102, 743-755.
11. C.P. Pissinato Pere, **S.N. Economidou**, N. Scoutaris, C. Ziraud, J.S. Boateng, B.D. Alexander, D. Douroumis (2017). 3D printed microneedles for insulin skin delivery, *International Journal of Pharmaceutics*, 544 (2), 425-432.
12. **S.N. Economidou**, D.A. Lamprou, D. Douroumis (2017). 3D printing applications for transdermal drug delivery, *International Journal of Pharmaceutics*, 544 (2), 415-424.

13. **Economidou S.N.** and Karalekas D. (2016). Optical sensor-based measurements of thermal expansion coefficient in additive manufacturing, *Polymer Testing*, 51, 117-121.

Reviewed for Journals

1. Additive Manufacturing (Elsevier, I.F. 11.6)
2. Biomedical Microdevices (Springer, I.F. 3.8)

Book Chapters

Karalekas D., Joe K., Sanjayan J., **Economidou S.N.**, (2018). Additive manufacturing of polymeric materials: Characterization of fused deposition modeling polymeric structures using embedded fiber Bragg grating sensors (Chapter 5), in *Additive Manufacturing: Materials, Processes, Quantifications and Applications*, Jing Zhang Yeon-Gil Jung (eds.), Elsevier, May 2018 (ISBN:9780128121559).

Conferences

1. **S.N. Economidou**, M.J. Marques, A. Podoleanu, Md J. Uddin, D. Douroumis (2019). 3D printed microneedles combined with a microelectromechanical system (MEMS) for transdermal drug delivery. *PharmSci 2019, Academy of Pharmaceutical Sciences*, Greenwich, London (2019).
2. **S.N. Economidou**, M.J. Marques, A. Podoleanu, Md J. Uddin, D. Douroumis (2019). A smart 3D printed microneedle-based microelectromechanical system (MEMS) for controlled transdermal drug delivery. *Controlled Release Society Annual Meeting*, Valencia, Spain (speaker).
3. **S. N. Economidou**, C. P. Pissinato Pere, D. Douroumis (2018). On The Pain Free Treatment Of Diabetes: 3D Printed Microneedles For Insulin Administration, *CELLINK Collaborative Partnership Conference*, Miami, USA (speaker).
4. **S.N. Economidou**, C.P. Pissinato Pere, D.A. Lamprou, D. Douroumis (2018). Fabrication Of 3D Printed Microneedles For Transdermal Delivery Of Insulin, *United Kingdom and Ireland Controlled Release Society (UKICRS) annual conference*, Belfast, UK (speaker).
5. **S.N. Economidou**, Ch. Kousiatza, N. Chatzidai, D. Karalekas (2016). Intra-Layer Thermal Monitoring in the Fused Deposition Modeling Technique, *17th International Conference on Experimental Mechanics (ICEM 17)*, July 3-7, 2016, Rhodes, Greece (speaker).
6. Ch. Kousiatza, **S.N. Economidou**, N. Chatzidai, D. Karalekas (2016). On the Investigation of Temperature Profiles Generated During the 3D Printing Process of Thin Plates, *17th International Conference on Experimental Mechanics (ICEM 17)*, July 3-7, 2016, Rhodes, Greece.
7. Kousiatza Ch., **Economidou S.**, Chatzidai N. and Karalekas D. (2015). Investigating additively manufactured parts performance through the use of fiber optic sensors, *International Conference "Science in Technology" (SCinTE2015)*, Athens, 5-7 November 2015 (4 pp).
8. **S.N.Economidou**, Ch.Kousiatza, D.Karalekas (2015). On the direction-dependent thermal behavior of layered structures fabricated via Fused Deposition Modeling, *18th International Conference on Composite Structures, ICCS18-2015*, 15-18 June 2015, Lisbon, Portugal (speaker).

9. Ch.Kousiatza, **S.N.Economidou**, D.Karalekas (2015). Evaluation of residual strain field and temperature mapping in 3D printed layered polymer plates, 18th International Conference on Composite Structures, ICCS18-2015, 15-18 June 2015, Lisbon, Portugal.
10. **S.N.Economidou**, D.Karalekas (2015). Post-Built Warpage Investigation of 3D Printed Layered Structures via Digital Image Correlation, 8th National Conference on Non-Destructive Testing (NDT) of the Hellenic Society of NDT, 8-9 May 2015, Athens, Greece (speaker).
11. **S.N.Economidou**, D.V.Portan, A.Basturescu, L.Kontaxis, G.C.Papanicolaou (2014). Electrochemical manufacturing of TiO₂ nanotubes: effect on the interfacial pull-out mechanism, Session in English, 9th Workshop of the Hellenic Society for Biomaterials, 7-8 November 2014, Athens, Greece (speaker).
12. **Economidou S.N.**, Portan D.V., Papanicolaou G.C. (2013). On the Titanium-Polymer Interfacial Pull-out Mechanism, Session in English, 8th Workshop of the Hellenic Society for Biomaterials, 15-16 November 2013, Athens, Greece (speaker).
13. **Economidou S.N.**, Portan D.V., Papanicolaou G.C. (2013). Theoretical and Experimental Investigation of the Interfacial Pull-Out Mechanism of Various Materials Embedded in a Polymeric Matrix, Poster Session, 5th International Conference on Structural Analysis of Advanced Materials, ICSAAM-2013, 23-26 September 2013, Island of Kos, Greece (poster).
14. Papanicolaou G.C., Portan D.V., **Economidou S.N.** (2013). The Role of the TiO₂ Nanotubes on the Titanium-Polymer Interfacial Pull-out Mechanism, 3rd International Conference of Engineering Against Failure, ICEAF-2013, 26-28 June 2013, Island of Kos, Greece.

LANGUAGES

Greek	Fluent, first language
English	Fluent, IELTS C2 (2017) Certificate of Proficiency in English (C2), University of Michigan (2007)
French	Intermediate knowledge, Diplôme d'études en langue française DELF B1 (2011)

SOFTWARE AND PROGRAMMING SKILLS

Programming Languages	Python, MATLAB, C++, Fortran (basics)
Software	MS Office, Origin, Autocad, PTC Creo, Solidworks, COMSOL Multiphysics, GitHub, monday.com