

Dr Artemis Stamboulis BSc, MSc, PhD

Senior Lecturer in Biomaterials and Nanomaterials

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About

Artemis Stamboulis has research interests in the microstructural characterisation of materials for biomedical applications. She has published over 40 research papers in international scientific journals. Artemis has an active research group and has supervised more than 30 postgraduate students.

Artemis teaches at both undergraduate and postgraduate level (MRes in Biomaterials) and is interested in Education Research and particularly in Threshold Concepts in Engineering, a research activity that is funded by the Royal Academy of Engineering.

Qualifications

- PhD in Polymer Science and Engineering, National Technical University of Athens, 1997
- MSc in Polymer Science and Technology, UMIST, 1992
- BSc in Chemistry, Kapodistrian University of Athens, 1989

Biography

Artemis qualified with a BSc in Chemistry from the Kapodistrian University of Athens in 1989. She was then awarded an MSc from UMIST in 1992 and went on to study for a PhD in the area of polymer composites and electrical conductivity at the National Technical University of Athens where she also received a scholarship to collaborate and work in the Polymer Physics department at the Technical University of Berlin under the supervision of Prof. Georg Hinrichsen. After graduating, she was awarded a Marie Curie Fellowship to work on Natural Fibre Composites at the Department of Materials at Imperial College followed by two other postdoctoral positions working with Profs Larry Hench and Robert Hill in the field of Biomaterials. In 2004, she accepted a position as lecturer in the Nanotechnology Research Institute/NIBEC in the University of Ulster in Belfast and since January 2005 she has been a Senior Research Fellow and is now a Senior Lecturer researching Biomaterials in Birmingham.

The Biomaterials Group currently consists of 12 PhD students and more than 5 MRes and MPhil students. Artemis has developed strong research links with Japan and India via funding from the EPSRC and the British Council and she is very keen on student's exchange.

Her research focuses on the processing and characterisation of the microstructure of polymers, glasses and glass ceramics that find application in Medicine and Dentistry.

She also has strong interest in teaching and education research and currently she is holding two HE STEM research projects on Engineering Threshold Concepts funded by the Royal Academy of Engineering.

Teaching

Undergraduate:

- LH Advanced Biomaterials
- LH Advanced Materials in Sports
- LC Mechanics and Materials in Sports

Postgraduate:

- MRes in Biomaterials
- MRes in the Science and Engineering of Materials
- Biomaterials Module coordinator
- Tissue Engineering Module Coordinator
- Degradation of Materials in the Body

Research

Research themes

- Development and characterisation of polymer nanocomposites for medical applications
- Development of biomedical glasses and glass ceramics and structural characterisation by multinuclear MAS-NMR spectroscopy
- Antibacterial hydroxyapatite coatings for orthopaedic applications

- Antibacterial biomimetic structures
- Development of glass ionomer cements with enhanced properties
- Nanostructures for biomedical applications
- Materials surface modification and cell-material interactions

Research activity

- UK-Japan consortium
- UK-India research collaboration UKIERI

Education research

HE STEM Royal Academy of Engineering:

- Uncovering threshold values in first year engineering courses and implications for curriculum design:

www.hestem.ac.uk/activity/uncovering-threshold-values-first-year-engineering-courses-and-implications-curriculum-desi
(<http://www.hestem.ac.uk/activity/uncovering-threshold-values-first-year-engineering-courses-and-implications-curriculum-desi>)

- Engineering thresholds in curriculum review

www.hestem.ac.uk/activity/engineering-thresholds-curriculum-review (<http://www.hestem.ac.uk/activity/engineering-thresholds-curriculum-review>)

Further information:

www.ee.ucl.ac.uk/~mflanaga/thresholds.html (<http://www.ee.ucl.ac.uk/~mflanaga/thresholds.html>)

Collaborations

- Prof. Caroline Baillie, University of Western Australia (www.sese.uwa.edu.au/research/staff-profiles (<http://www.sese.uwa.edu.au/research/staff-profiles>))
- Dr Mick Flanagan, University College London (www.ee.ucl.ac.uk/~mflanaga/ (<http://www.ee.ucl.ac.uk/~mflanaga/>))
- Dr Kathleen Quinlan, University of Oxford (www.education.ox.ac.uk/about-us/directory/dr-kathleen-m-quinlan/ (<http://www.education.ox.ac.uk/about-us/directory/dr-kathleen-m-quinlan/>))

Biomaterials Research Group

The Biomaterials Research Group led by Dr Artemis Stamboulis was formed in late 2005 and is focusing on three major research areas:

- Microstructural characterisation of biomedical glasses and glass ceramics
- Biomedical Polymers: processing and characterisation
- Bioceramics: processing and characterisation

Current PhD students and projects

- Miss Georgia Kaklamani, Active Screen Plasma Nitriding surface modification of biomaterials, E-mail: georgina_kaki@hotmail.com (mailto:georgina_kaki@hotmail.com)
- Miss Zahira Jaffer, Ceramic coatings for orthopaedic applications: Materials Characterisation and Biocompatibility, E-mail: zxj392@bham.ac.uk (<mailto:zxj392@bham.ac.uk>)
- Miss Mitra Kashani, Novel dental cements, E-mail: mx643@bham.ac.uk (<mailto:mx643@bham.ac.uk>)
- Mr Jonathan Boissonade, MEMS for dental and bone cements, E-mail: jib590@bham.ac.uk (<mailto:jib590@bham.ac.uk>)
- Mr Mark Blevins, Electrospinning of bacterial polymers, E-mail: mab668@bham.ac.uk (<mailto:mab668@bham.ac.uk>)
- Mr Olubayode Ero-Philips, Development and characterisation of electrospun polymer-HA composite scaffolds, E-mail: ooe843@bham.ac.uk (<mailto:ooe843@bham.ac.uk>)
- Mr Soroosh Bagheriasl, Bacterial polyhydroxybutyrate: Synthesis and characterisation, E-mail: sorooshbagheriasl@gmail.com (<mailto:sorooshbagheriasl@gmail.com>)
- Miss Maryam Askari Louyeh, Antibacterial coatings for orthopaedic applications, E-mail: mary.louyeh@gmail.com (<mailto:mary.louyeh@gmail.com>)
- Mr Praveen Ramakrishnan, Spark plasma sintering of ionomer glasses, E-mail: pxr861@bham.ac.uk (<mailto:pxr861@bham.ac.uk>)
- Miss Souma Tahir, Bacterial cellulose scaffolds
- Mr Christopher Few, Flame retardant wood based composites

Current MRes students:

- Mr Ben Pearson: Structural characterisation of bacterial poly-g-glutamic acid
- Mr Hamidreza Hodaieian, Degradation of Biodegradable Mg Alloys in Simulated Body Fluid
- Miss Zuzanna Trzcinska, Antibacterial nanostructures
- Mr Thomas Sibley, Mechanical properties of polymeric foams used in cricket batting gloves for optimum protection

Graduated PhD students

- Dr Fei Wang, Cation substitution in ionomer glasses: Effect on glass structure and crystallisation (University of Birmingham Thesis 2009)
- Dr Amber Fareed, Reinforced dental glass ionomer cements: from conventional to nanocomposites (University of Birmingham Thesis 2009)

Other activities

Membership of

- Hellenic Chemical Society
- UK Society for Biomaterials
- Hellenic Society for Biomaterials
- International Association for Dental Research (IADR)
- British Society for Dental Research (BSDR)
- The American Ceramic Society

Publications

1. R.A. Martin, Z.Jaffer, G.Tripathi, S. Nath, M. Mohanty, V. FitzGerald, P. Lagarde, A-M. Flank, A. Stamboulis, B. Basu, (2011), An X-ray micro-fluorescence study to investigate the distribution of Al, Si, P and Ca ions in the surrounding soft tissue after implantation of a calcium phosphate-mullite ceramic composite in a rabbit animal model, **Journal of Materials Science: Materials in Medicine**, in press
2. Handley-Sidhu S., Renshaw J., Moriyama S., Stolpe, B., Mennan C., Bagheriasl S., Yong P., Stamboulis A., Paterson-Beedle M., Sasaki K., Patrick R., Lead J., Macaskie L.,(2011), Uptake of Sr^{2+} and Co^{2+} into Biogenic Hydroxyapatite: Implications for Biomineral Ion Exchange Synthesis, **Environmental Science and Technology**, in press
3. M.D. O'Donnell, N. Karpukhina, A.I. Calver, R.V. Law, N. Bubb, A. Stamboulis, R.G. Hill, (2010), Real time neutron diffraction and solid state NMR of high strength apatite–mullite glass ceramic, **Journal of Non-Crystalline Solids** 356: 2693–2698
4. G. Kaklamani, N. Mehrban, J. Chen, J. Bowen, H. Dong, L. Grover and A. Stamboulis, (2010), Effect of plasma surface modification on the biocompatibility of UHMWPE, **Biomedical Materials** 5
5. A. Stamboulis, F. Wang, (2009), Ionomer Glasses : Design and Characterisation, In *Advanced Biomaterials, Fundamentals, processing and applications*, edited by B. Basu, D.S. Katti, A. Kumar, published by Wiley and The American Ceramic Society, New Jersey
6. N. Shang, G.R.S. Iyer, P. Papakonstantinou, P. Wang, A. Zakharov, U. Palnitkar, I-Nan Lin, M. Chu, A. Stamboulis,(2009), Self-Assembly Growth, Microstructure and Field Emission High Performance of Ultra-Thin Diamond Nanorods, **ACS Nano**, 3(4):1032-1038
7. N. Shang, P. Papakonstantinou, M. McMullan, M. Chu, A.Stamboulis, A.Potenza, S. S. Dhese, H. Marchetto, (2008), Catalyst-Free Efficient Growth, Orientation and Biosensing Properties of High-Purity Multilayer Graphene Nanoflake Films with Sharp Edge Planes, **Advanced Functional Materials**, 18 (21): 3506-3514
8. N.G. Shang, P. Papakonstantinou, J. McLaughlin, W.C. Chen, L.C. Chen, M. Chu, A. Stamboulis, (2008), Fe catalytic growth, microstructure and low threshold field emission properties of open ended tubular graphite cones, **Journal of Applied Physics** 103 (12)
9. R.L. Sammons, P.M. Marquis, C.J. Hewitt, P. Yong, M. Kashani, A. Stamboulis, M. Jenkins and L.E. Macaskie, (2008), Polyhydroxybutyrate accumulation by a *Serratia* sp., **Biotechnology Letters**, 30(3):481-491
10. R. G. Hill, A. Calver, A. Stamboulis, N. Bubb, (2007), Real-Time Nucleation and Crystallization Studies of a Fluorapatite Glass–Ceramics Using Small-Angle Neutron Scattering and Neutron Diffraction, *Journal of the American Ceramic Society* 90 (3): 763–768
11. S. Matsuya, A. Stamboulis, R.G. Hill, R.V. Law, (2007), Structural characterization of ionomer glasses by multinuclear solid state MAS-NMR spectroscopy, **Journal of Non-Crystalline Solids** 353: 237–243
12. H. Dowling, A. Stamboulis and G.J.P. Fleming, (2006), The influence of montmorillonite clay reinforcement on the performance of a glass ionomer restorative, **Journal of Dentistry**, 34 (10): 802-810
13. R.G. Hill, A. Stamboulis and R.V. Law, (2006), Characterisation of fluorine containing glasses by ^{19}F , ^{27}Al , ^{29}Si and ^{31}P MAS-NMR spectroscopy, **Journal of Dentistry**, 34(8):525-532
14. A. Stamboulis, R.G. Hill, R.V. Law, (2005), Structural Characterisation of fluorine containing glasses by ^{19}F , ^{27}Al , ^{29}Si and ^{31}P MAS-NMR spectroscopy", *Journal of Non-Crystalline Solids* 351:3289-3295
15. A. Stamboulis, S. Matsuya, R.G. Hill, R.V. Law, K. Udoh, M. Nakagawa and Y. Matsuya, (2006), Setting studies in glass ionomer cements by MAS-NMR spectroscopy, **Journal of Dentistry**, 34(8):574-581
16. A. Stamboulis, R.G. Hill, R.V. Law, S. Matsuya, (2004), A MAS NMR study of the crystallisation process of apatite-mullite glass-ceramics, **Physics and Chemistry of Glasses**, 45(2):127-133
17. R.G. Hill, A. Stamboulis, R.V. Law, J. Hawes, J. Henry, (2004), A MAS-NMR study of the crystallisation process of barium fluorophlogopite glass-ceramics, **Physics and Chemistry of Glasses**, 45(2):121-126
18. R.G. Hill, A. Stamboulis, R.V. Law, A. Clifford, M. Towler, C. Crowley, (2004), The influence of strontium substitution in fluorapatite glasses and glass ceramics, **Journal of Non-Crystalline Solids**, 336:223–229
19. A. Calver, R.G. Hill, A. Stamboulis, (2004), Influence of fluorine content on the crystallisation behaviour of apatite-wollastonite glass-ceramics, **Journal of Materials Science Letters**, 39:2601 – 2603
20. A. Stamboulis, R.G. Hill, R.V. Law, (2004), Characterisation of the structure of calcium alumino silicate and calcium fluoro alumino silicate glasses by Magic Angle Nuclear Magnetic Resonance, **Journal of Non-Crystalline Solids**, 333(1):101-107
21. A. Stamboulis, R.V. Law, R.G. Hill, (2004), Characterisation of commercial ionomer glasses using Magic Angle Nuclear Magnetic Resonance (MAS-NMR), **Biomaterials**, 25(17):3907-3913
22. A.R. Boccaccini, A. Stamboulis, A. Rashid, J. Roether, (2003), Composite surgical sutures with bioactive glass coating, **Journal of Biomedical Materials Research Part B: Applied Biomaterials**, 67B: 618-626
23. P. Islam, R.G. Hill and A. Stamboulis, (2003), Activation Energy For Crystal Growth in Stoichiometric Anorthite ($\text{CaAl}_2\text{Si}_2\text{O}_8$) and $\text{Ca}_2\text{Al}_2\text{Si}_2\text{O}_9$ Glasses, **Journal of Materials Science Letters**, 22(18): 1287-1289
24. A. Stamboulis, A.R. Boccaccini, L.L. Hench, (2002), Mechanical properties of biodegradable polymer sutures coated with bioactive glass, **Journal of Materials Science: Materials in Medicine**, 13: 843-848
25. A. Stamboulis, A. R. Boccaccini, L. L. Hench, (2002), Novel bioabsorbable polymer-bioglass® composites for tissue engineering applications, **Advanced Engineering Materials**, 4(3):105-109
26. A. Bismarck, I. Aranberri, J. Springer, T. Lampke, B. Wielage, A. Stamboulis, Ilja Shenderovich and Hans-Heinrich Limbach, (2002), Surface characterisation of flax, hemp and cellulose fibres; Surface properties and the water uptake behaviour, **Polymer Composites**, 23 (5): 872-894
27. A. Stamboulis, C. Baillie, T. Peijs, (2001), Effects of environmental conditions on mechanical and physical properties of flax fibres, **Composites: Part A**, 32:1105-1115

