CV – Prof Gianluca Tozzi

Overview

I am a global authority in the field of mechanics of biological tissues and biomaterials using experimental techniques such as such as digital volume correlation (DVC) based on X-ray microscopy (e.g. X-ray computed tomography), aimed at informing new treatments and surgical practice for traumatic and pathological conditions in healthcare.
During my academic career I have published over 70 peer-reviewed papers in high-quality journals (e.g. Acta Biomaterialia, Scientific Reports), contributed to over 100 published/unpublished conference abstracts/proceedings/other publications/media and my research work has led to collaborations with leading UK and International Universities.
I have been PI/CI of numerous external grants awarding funding in excess of £2.5M by a number of sources (e.g. Solent LEP, Royal Society, STFC-Diamond, Industry); plus, recently submitted grants.
I sit on the scientific/technical committee of the British Society for Strain Measurement, on the executive board of the Tomography for Scientific Advancement Society and I am on the editorial board of high-profile journals such as the Journal of Microscopy and Materials.
I am currently directing the technical development of the forthcoming Innovation Centre at London South Bank University and was Founding Director of Zeiss Global Centre at the University of Portsmouth. I mentored several academic staff, supervised eight PDRAs (four first), eight PhDs (four first) and over 70 undergraduate/postgraduate projects.
In my teaching activity I have successfully coordinated and delivered Engineering modules spanning from first year undergraduate to master level.

Education/Qualifications

1. *Fellow of the Higher Education Academy (July 2014)*
   APEX programme, University of Portsmouth, Portsmouth, UK.
2. *PhD in Bioengineering (April 2012)*
   School of Engineering, University of Portsmouth, Portsmouth, UK. *Thesis:* In vitro studies of bone-cement interface and related work on cemented acetabular replacement.
3. *5-year MSc (Laurea Magistrale) in Mechanical Engineering (July 2008)*
   Engineering Faculty, University of Bologna, Bologna, Italy. *Thesis:* Chemical and mechanical damage analysis of the neck-stem joint of retrieved Ti6Al4V stems with modular necks.

Appointments

1. *Research Professor of Bioengineering (Jan 2022 - present)*
   School of Engineering, London South Bank University, London, UK. *Main duties:* Technical direction of the new Innovation Centre at LSBU, Providing research leadership and introducing X-ray Microscopy at the Centre for BioEngineering in the School of Engineering.
2. *Reader in Bioengineering (Sept 2018 – Oct 2021)*
   School of Mechanical and Design Engineering, University of Portsmouth, Portsmouth, UK. *Main duties:* Founding Director of Zeiss Global Centre (https://www.rms.org.uk/community/facilities-database/facilities-database-details.html?slug=zeiss-global-centre), School Research and Innovation committee, PI on X-ray Microscopy for Healthcare, Contributor of REF2021 Impact Case Study (UoA 12: Engineering), Module Coordinator of Advanced Materials.

3. *Honorary Visiting Scholar (Apr 2017 - Jun 2017)*
   School of Computer Science, Engineering & Mathematics, Flinders University, Adelaide, Australia. *Main duties:* Providing expertise and guidance in Digital Volume Correlation of biological tissues and biomaterials at Flinders University and for the whole of Australia.
4. *Senior Lecturer in Mechanical Engineering (Oct 2015 – Aug 2018)*
   School of Engineering, University of Portsmouth, Portsmouth, UK. *Main duties:* Director of Zeiss Global Centre, Coordinator of Biomedical Engineering Research Group, PI on X-ray Microscopy for Healthcare, Unit Coordinator of Mathematical Principles and Advanced Materials.
5. *Lecturer in Mechanical Engineering (Aug 2013 - Sept 2015)*
   School of Engineering, University of Portsmouth, Portsmouth, UK. *Main duties:* PI on X-ray Microscopy for Healthcare, Unit Coordinator of Mathematical Principles.
6. *Research Associate in Bioengineering (Feb 2012 - Jul 2013)*
   School of Engineering, University of Portsmouth, Portsmouth, UK. *Main duties:* Development of advanced applications in X-ray Microscopy for Healthcare (i.e. Digital Volume Correlation).

Research grants (including N=2 pending)

1. NERC Equipment (CI), 2022: 'MicroCT System for Anthroengineering and Evolutionary Biomechanics'. Award: £482,225 FEC. Decision pending.
2. STFC-Diamond (CI), 2022: 'SR-XCT assessment of full-field deformation in hierarchical electrospun scaffolds for tendon and ligament tissue regeneration'. Award: £57,600 (National Facility). Decision pending.
3. ProCon X-ray (Industrial Funding, PI), 2022-2023: 'Introduction of CT PORTABLE at LSBU and UK'. Award: £75,400.
4. Zeiss Microscopy (Industrial Funding, PI), 2021: 'Technology development at the Zeiss Global Centre'. Award: £182,908. Completed.
5. GlaxoSmithKline (Industrial Funding, PI), 2021: 'Development of Imaging Capability to Evaluate Abrasion, Biofilm and Stain Removal from Dentures'. Award: £49,979. Completed.
6. STFC-Diamond (MG27983, CI), 2021: 'Combined imaging and diffraction of the ultrastructure of the implant/tissue interface in bioactive bone implants'. Award: £19,200 (National Facility). Completed.
7. Zeiss Microscopy (Industrial Funding, PI), 2020: 'Strain measurement in soft tissues and biomaterials using high-resolution X-ray computed tomography (XCT) and digital volume correlation (DVC)'. Award: £27,000. Completed.
8. Biotrics Bioimplants (Industrial funding, PI), 2020: 'In situ XCT & DVC of MG-based bone-screw and plate -screw systems'. Grant extension. Award: £92,475. Completed.
9. University of Portsmouth (H&W Theme Grant, CI), 2020: 'The use of XCT mechanical testing and digital volume correlation to evaluate the stress distribution in bone of dental implant generated load'. Award: £10,000. Completed.
10. GlaxoSmithKline (Industrial funding, PI), 2019: 'Development of Imaging Capability to Evaluate Biofilm Removal from Dentures'. Award: £24,527. Completed.
11. STFC-Diamond (SM24466, PI), 2019: 'Correlation between nanostructure and mechanical properties of biomaterial-mediated newly formed bone'. Award: £38,400 (National Facility). Completed.
12. STFC-Diamond (BI22642, PI), 2019: 'Cryo-SXT of differentiating mesenchymal stem cells growth on scaffolds of different stiffness'. Award: £19,200 (National Facility). Completed.
13. STFC-Diamond (MG22575, PI), 2019: 'In situ real time assessment of hard/soft tissue deformation using digital volume correlation'. Award: £57,600 (National Facility). Completed.

14. GlaxoSmithKline (Industrial funding, PI), 2018: ‘Multiscale imaging and mechanical evaluation of biomaterials in the oral cavity’. Award: £32,019. Completed.
15. Biotrics Bioimplants (Industrial funding, PI), 2018: ‘In situ XCT & DVC of MG-based bone-screw and plate -screw systems’. Award: £92,475. Completed.
16. University of Portsmouth (TRIF2018, CI), 2018: ‘3D printing of complex scaffolds for the repair of osteochondral defects’. Award: £28,600. Completed.
17. University of Portsmouth (TRIF2018, CI), 2018: ‘Biofilm composition as a predictive biomarker for prosthetic joint infection’. Award: £20,000. Completed.
18. University of Portsmouth (TRIF2018, CI), 2018: ‘Generating and characterising material of extreme strength from limpet teeth’. Award: £28,677. Completed.
19. GlaxoSmithKline (Industrial funding, PI), 2017: ‘Development of imaging capability to evaluate the effects of corsodyl on bacterial plaques’. Award: £99,000. Completed.
20. MIUR-Italy (PNRA Call, CI), 2017-2019: ‘Antartic biomineralizers as proxies of climate change: in situ monitoring and transplantation experiment’. Award: 100,000€. Completed.
21. UCL (Facilities funding, PI), 2017: ‘DVC application to clinical CT images’. Award: £5,000. Completed.
22. UCL (Facilities funding, PI), 2017: ‘Optimisation and commercial manufacture of tooth-coloured composite dental-fillings with added poly-antimicrobial (PAM) and remineralising calcium phosphate (CaP)’. Award: £4,000. Completed.
23. Biotrics Bioimplants (Industrial funding for PhD Scholarship, PI), 2018-2021: ‘4D microCT evaluation and digital volume correlation (DVC) of Mg-based alloys’. Award: £52,500. Completed.
24. STFC-Diamond (MX18351, PI), 2017: ‘Cyro-SXT of osteoblasts and biomineralisation inducted in vitro under applied mechanical stimuli’. Award: £12,800 (National Facility). Completed.
25. STFC-Diamond (SM18350, CI), 2017: ‘Applying synchrotron near-field IR nanospectroscopy to map composition variations at 3D printed multi-material interfaces’. Award: £76,800 (National Facility). Completed.
26. University of Portsmouth (RIDF2017, PI), 2017: ‘Development of first in vitro protocol for bone formation from osteoregenerative biomaterials’. Award: £18,500. Completed.
27. LaVision UK Ltd/Innovate UK (PI), 2017: ‘DVC-FEA validation for bone mechanics’. Award: £10,128. Completed.
28. STFC-Diamond (MT16497, PI), 2017: ‘Digital volume correlation (DVC) accuracy and strain accumulation in bone induced by SR-microCT: the effect of heat generation on tissue damage’. Award: £57,600 (National Facility). Completed.
29. Flinders University (Visiting International Research Fellowship, PI), 2017: ‘Application of Digital Volume Correlation for measuring strain in bone, biomaterials and porous structures under load’. Award: 9,480AUD. Completed.
30. GlaxoSmithKline (Industrial funding, PI), 2016: ‘Multiscale imaging and mechanical evaluation of biomaterials in the oral cavity’. Award: £94,000. Completed.
31. STFC-Diamond (MT14080, PI), 2016: 'SR-microCT assessment of bone-biomaterial integration for osteoregenerative biomaterials’. Award: £76,800 (National Facility). Completed.
32. University of Portsmouth (PhD Scholarship, PI), 2016: ‘Multi-scale evaluation of bone combining indentation, in situ XCT mechanics and digital volume correlation’. Award: £60,500. Completed.
33. Solent LEP Local Growth Deal (LGFSOL22, CoPI), 2016-2020: ‘University of Portsmouth – Future Technology Centre’. Award: £1,050,000. Completed.
34. GlaxoSmithKline (Industrial funding, PI), 2015: ‘Quantifying and imaging heterogeneities within dental adhesive and their impact on adhesion performance’. Award: £24,515. Completed.
35. Institute of Physics and Engineering in Medicine (IPEM bursary, PI), 2015: ‘Evaluation of digital volume correlation (DVC) in pedCAT clinical CT’. Award: £600. Completed.

36. University of Portsmouth (RDF2015/IBBS, CI), 2015: 'Multidisciplinary development of an engineered multicomponent platform for patient tailored bone fracture repair interventions'. Award: £32,400. Completed.
37. University of Portsmouth (RDF2015, CI), 2015: 'Technology development: Generation of a unique dual function P2X7 receptor knock-in/knock-out mouse enabling genetic-proteomic and functional analyses in health and disease'. Award: £25,000. Completed.
38. University of Portsmouth (PhD Scholarship, PI), 2015: 'X-ray biomechanical imaging and digital volume correlation of bone: from osteoregeneration to structure'. Award: £60,500. Completed.
39. European Society of Biomechanics (ESB Mobility Grant, CI), 2014: 'Application of digital volume correlation to investigate the strain distribution in augmented vertebral body'. Award: 4,000€ (~£3,361 to PI as personal support and consumables). Completed.
40. Royal Society (RG130831, PI), 2014: 'Micromechanical evaluation of bone-cement augmentation following vertebroplasty'. Award: £13,800. Completed.
41. University of Portsmouth (RDI2014, PI), 2014: 'Biomechanical evaluation of a novel cement formulation for vertebral augmentation'. Award: £6,000. Completed.

Teaching and education

Undergraduate and Postgraduate teaching and supervision

1. *Undergraduate*
   At the University of Portsmouth I delivered Mechanical Engineering Principles (~250 students) 2013-2016, Introduction to Technology Concepts (~80 students) 2013-2018, Introduction to Thermodynamics and Fluid Mechanics (~250 students) in 2019, Engineering Mathematics and Numerical Analysis 2019-2020. I Delivered and coordinated Mathematical Principles (~300 students) until 2017*. I have supervised over 50 projects.
2. *Postgraduate*
   At the University of Portsmouth I coordinated** and delivered Advanced Materials (Level 7; ~70 students) 2017-2021. I have supervised over 20 projects of which one was awarded best MSc project in 2017.

   During my coordination ENG410 always had high student satisfaction bigger than 4 and conforming 1st attempt average ranging 65-68%.* ***Criteria:* *≥4.0 good, <3.75 Cause for concern;* ***Unit conforming if 1st attempt average is:*** *≥50% and ≤70%.*
   During my coordination ENG762S2 always had high student satisfaction bigger than 4 and conforming 1st attempt average during my coordination increasing from 51% in 2018 to 64% in 2021.* ***Criteria: *≥4.0 good, <3.75 Cause for concern;* ***Unit conforming if 1st attempt average is:*** *≥50% and ≤70%.*