



**Name** **Richard OC Oreffo**

**Current Positions** **Director; Centre for Human Development, Stem Cells and Regeneration, University of Southampton**  
**Professor of Musculoskeletal Science, Faculty of Medicine, University of Southampton**  
**Senior Visiting Professor, College of Biomedical Engineering, China Medical University, Taiwan**

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**E-Portfolio Website**

**Personal Website** <https://www.southampton.ac.uk/medicine/about/staff/roco.page>

### Education

**2015** DSc. Skeletal Tissue Engineering, University of Oxford.  
**1983-1986** D.Phil. University of Oxford. Thesis “Vitamin A and Bone”  
**1980-1983** BSc Hons II I, Biochemistry, University of Liverpool.

### Expertise

Nanotechnology  
Biomedical Engineering  
Stem Cell Biology  
Fracture  
Tissue Engineering  
Cell Culture  
Regenerative Medicine  
Cell Biology  
Physiology  
Molecular Biology

### Research Interests

Richard Oreffo holds the chair of Musculoskeletal Science and is co-founder and Director of the Centre for Human Development, Stem Cells and Regeneration. He has held positions in USA, AstraZeneca, and University of Oxford before being appointed to a lectureship in 1999 at the University of Southampton. Richard is internationally recognised for his work on skeletal biology and the mechanisms involved in skeletal stem cell differentiation and bone regeneration.

Richard leads a multidisciplinary research group focused on developing strategies to repair bone & cartilage with translation through to patient benefit a personal key driver. His research led to the first 3D titanium bone stem cell impaction graft operation in the UK.

Richard manages a significant research grant portfolio and has published over 310 peer-reviewed full papers (*H-index 69; >17,500 citations ISI WoS; H-index 80 and >26,000 citations Google Scholar*) including breakthrough publications on skeletal stem cells and nanotopography, bone regeneration as well as epigenetics and holds 6 patents.

Richard holds a number of visiting Professorships including at China Medical University, The Chinese University of Hong Kong and Taipei Medical University, as well as advisory board positions on EU/SME and Pharma. In 2015, Richard was awarded a Doctor of Science by the University of Oxford. He is founder / CSO and a Director at [Renovos Biologics Limited](http://RenovosBiologicsLimited); is on the editorial boards of five journals, a Fellow of the Royal Society of Biology

and, in 2019 was elected a Fellow of International Orthopaedic Research. In June 2020, Richard established [The Cowrie Scholarship Foundation](#) to support disadvantaged Black British students to attend leading UK Universities.

### Selected Grants:

1. 3D imaging at millimetre to nanometre scales for regenerative medicine £1,170,000 Using multiple complimentary modalities: MRC - UKRMP (Oreffo PI); Jan 2014
2. Acellular Approaches for Therapeutic Delivery: UKRMP Hub Application £257,000 MRC (Southampton component - Oreffo co-I); 16/09/2013-End date 15/09/2017
3. BioDesign: EU FP7; Start date: 01/01/2012-End date 31/12/2016 £570,000
4. Combining stem cell science and tissue engineering to study the £1,670,000 development and repair of human skeletal tissue. Awarding Organisation: BBSRC LOLA 5 year Programme Grant (Oreffo PI); Start date: 01/09/2009-End date 31/01/2015
5. Smart scaffolds for skeletal stem cell fate and function £540,000 BBSRC (Oreffo PI); 15/03/2014-End date 14/02//2017
6. The use of microRNAs and nanotopography to modulate skeletal stem cell fate and function; BBSRC (Oreffo PI); 25/08/2014-End date 24/08/2017 £486,141
7. Handheld microindentation – a direct assessment of bone fracture risk £437,000 Awarding Organisation: EPSRC; Start date: 01/11/2011-End date 31/07/2015
8. Title of Project: Centre for Multi-disciplinary Computer assisted Tomography £1,900,000 EPSRC; Start date: 01/08/2009-End date 31/07/2014

### Selected Publications

Authored or co-authored over 300 peer-reviewed research papers, >30 review articles / book chapters, and >450 peer-reviewed abstracts. Editor of the textbook “Epigenetic aspects of Chronic Diseases” (Highly Commended in 2012 BMA Medical Book Awards) and an inventor on six patents. **H-index= 67, >16,350 citations** – WoS ISI all databases May 2020.

1. Black C, Kanczler JM, de Andrés MC, White LJ, Savi FM, Bas O, Saifzadeh S, Henkel J, Zannettino A, Gronthos S, Woodruff MA, Hutmacher DW, Oreffo ROC. Characterisation and evaluation of the regenerative capacity of Stro-4+ enriched bone marrow mesenchymal stromal cells using bovine extracellular matrix hydrogel and a novel biocompatible melt electro-written medical-grade polycaprolactone scaffold. **Biomaterials**. 2020 Jul;247:119998. doi: 10.1016/j.biomaterials. 2020.119998. Epub 2020 Apr 1.
2. Kim YH, Yang X, Shi L, Lanham SA, Hilborn J, Oreffo ROC, Ossipov D, Dawson JI. Bisphosphonate nanoclay edge-site interactions facilitate hydrogel self-assembly and sustained growth factor localization. **Nature Commun**. 2020 Mar 13;11(1):1365. doi: 10.1038/s41467-020-15152-9.
3. Cidonio G, Glinka M, Dawson JI, Oreffo ROC The cell in the ink: Improving biofabrication by printing stem cells for skeletal regenerative medicine. **Biomaterials**. 2019 Jul;209:10-24. doi: 10.1016/j.biomaterials.2019.04.009. Epub 2019 Apr 14. PMID: 31022557
4. Cidonio G, Alcalá-Orozco CR, Lim KS, Glinka M, Mutreja I, Kim YH, Dawson JI, Woodfield TBF, Oreffo ROC. Osteogenic and angiogenic tissue formation in high fidelity nanocomposite Laponite-gelatin bioinks. **Biofabrication**. 2019 Jun 12;11(3):035027. doi: 10.1088/1758-5090/ab19fd.
5. Dalby MJ, Gadegaard N, Oreffo RO Harnessing nanotopography and integrin-matrix interactions to influence stem cell fate. **Nature Materials** 2014 May 21; 13(6):558-69. doi: 10.1038/nmat3980.
6. Kingham E, White K, Gadegaard N, Dalby MJ, Oreffo RO. Nanotopographical Cues Augment Mesenchymal Differentiation of Human Embryonic Stem Cells. **Small**. 2013 doi: 10.1002/sml.201202340. PMID: 23362187
7. de Andrés MC, Imagawa K, Hashimoto K, Gonzalez A, Roach HI, Goldring MB, Oreffo RO. Loss of methylation in CpG sites in the NF-κB enhancer elements of inducible nitric oxide synthase is responsible for gene induction in human articular chondrocytes. **Arthritis Rheum**. 2013 Mar;65(3):732-42. doi: 10.1002/art.37806.

8. McMurray RJ, Gadegaard N, Tsimbouri PM, Burgess KV, McNamara LE, Tare R, Murawski K, Kingham E, *Oreffo RO*, Dalby MJ Nanoscale surfaces for the long-term maintenance of mesenchymal stem cell phenotype and multipotency. **Nature Materials**. 2011; 10(8):637-44.
9. JI Dawson, JM Kanczler, XB Yang, GS Attard, *ROC Oreffo* (2011) Clay Gels for the Delivery of Regenerative Microenvironments. **Advanced Materials**, 23(29), 3304-3308
10. Kanczler JM, Ginty PJ, White L, Clarke NM, Howdle SM, Shakesheff KM, *Oreffo ROC*. The effect of the delivery of vascular endothelial growth factor and bone morphogenic protein-2 to osteoprogenitor cell populations on bone formation. **Biomaterials**. 2010 Feb;31(6):1242-50.
11. MJ Dalby, N Gadegaard, R Tare, A Andar, MO Riehle, P Herzyk, CDW Wilkinson, *ROC Oreffo* (2007) The control of human mesenchymal cell differentiation using nanoscale symmetry and disorder. **Nature Materials** Dec 6 (12):997-1003; doi:10.1038/nmat2013
12. Roach HI, Yamada N, Cheung KS, Tilley S, Clarke NM, *Oreffo RO*, Kokubun S, Bronner F. Association between the abnormal expression of matrix-degrading enzymes by human osteoarthritic chondrocytes and demethylation of specific CpG sites in the promoter regions. **Arthritis Rheum**. 2005 Oct;52(10):3110-24.
13. Yang X, Tare RS, Partridge KA, Roach HI, Clarke NMP, Howdle SM, Shakesheff KM, and *Oreffo ROC* (2003) Induction of human osteoprogenitor chemotaxis, proliferation, differentiation and bone formation by osteoblast stimulating factor-1/pleiotrophin. Osteoinductive biomimetic scaffolds for tissue engineering - **J Bone & Min Res** 18(1):47-57.
14. Yang XB, Roach HI, Clarke NMP, Howdle SM, Quirk R, Shakesheff KM and *Oreffo ROC* (2001) Human osteoprogenitor growth and differentiation on synthetic biodegradable structures after surface modification. **Bone** 29:523-531

#### Selected Patents

Patent Number GB 2425074 (A)	Cellular Adhesion on polymer microarrays	Oct 2006
Patent Number US2009171467 (A1)	Implantable Cartilage Tiss. Repair Device	July 2009
World Patent WO2010023463A2	Polymer Blends	Mar 2010
Patent Number W02010094944 (A1)	Retention of Stem Cell Phenotype	Aug 2010
Patent Application number 1407248.2 – International PCT filed	Polymer-Clay composite and Organoclay	April 2014 April 2015
US Divisional Patent App 16/274,047	Polymer-clay composite and organoclay	Aug 2019
Patent Application PCT/GB2019/052647	Structured Gels	Sept 2019
Patent Application WO 2020/058724	Structured Gels	March 2020