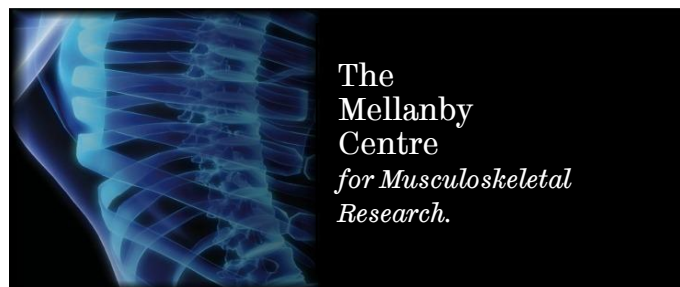




University of Sheffield



The Mellanby Centre

The University of Sheffield's Medical School has a strong track record in basic, translational and clinical bone research (<https://www.sheffield.ac.uk/mellanby>). The recent era began with the establishment of the Department of Chemical Pathology in 1974 by Professor Jack Martin and continued as the Department of Human Metabolism and Clinical Biochemistry under the leadership of Professor Graham Russell for 25 years to 2001. Its standing in bone research is best illustrated in an independent assessment by Evidence Ltd, which ranked the University of Sheffield top in the UK (www.evidence.co.uk). In agreement with this, ISI Thomson ranked the University of Sheffield number one in the UK and among the top six in the world for its research into osteoporosis (<http://esi-topics.com/osteo/inst/c1a.html>).

The Medical School is unique in the UK and one of only a limited number of institutes worldwide, where clinical research interests in bone span skeletal diseases of childhood through to the elderly person, and cover both benign and malignant bone disease. Our clinical research for example, is in the metabolic bone diseases such as osteoporosis, childhood bone diseases (including osteogenesis imperfecta and osteopetrosis) in the tumour-induced bone diseases such as multiple myeloma and metastatic bone disease (breast and prostate bone metastases), the related topic of tumour microenvironment and in osteoarthritis and rheumatoid arthritis.

The Mellanby Centre for Musculoskeletal Research is a key component of the Arthritis Research/Medical Research Council Centre for Musculoskeletal Ageing (CIMA, <http://www.cimauk.org/>) and the Paget's Disease Centre of Excellence.

Our clinical research is underpinned by a world-class programme of basic biomedical research, which has been further strengthened by continued investment. This includes the newly refurbished Henry Wellcome Laboratories in the Medical School and these include two 'core' laboratories one for 'bone biochemistry' and the other for bone analysis called skelet.AL and each of which are supported by full time technicians. These laboratories contain the latest automated immunoassay analysers and 'state of the art' high resolution microCT imaging equipment and the equipment and expertise for undertaking quantitative dynamic bone histomorphometry. For clinical research, we have the NIHR funded Clinical Research Facility, which has state of the art bone imaging such as high resolution peripheral computed tomography. Few institutes in the UK or Europe have such well-established core facilities. The University has recognised our pre-eminence in this field and has created the Mellanby Centre for Musculoskeletal Research. The Centre is being directed by Professor Richard Eastell.

The Centre will undertake to:

- Establish a focus for bone research at the University of Sheffield called the 'Mellanby Bone Research Centre' (MBRC)
- Foster the development of inter-disciplinary research across the University of Sheffield
- Develop collaborative research programmes and grant applications within the MBRC
- Position the MBRC to apply for externally funded Centre status
- Develop our links with the pharmaceutical and biotechnology industry
- Widen the profile of bone research at the University of Sheffield

Professor Richard Eastell MD, FRCP, FRCPath, FMedSci

Professor of Bone Metabolism, University of Sheffield; NIHR Senior Investigator; Director, Mellanby Centre for Musculoskeletal Research

Understanding the causes of bone diseases and improving their treatment



Professor Eastell graduated in Medicine from Edinburgh University in 1977 and trained as an endocrinologist in Edinburgh, London (Northwick Park Hospital) and the USA (Mayo Clinic) before coming to work in Sheffield in 1989. Currently the head of the Academic Unit of Bone Metabolism, he was awarded funding from the National Institute for Health Research (NIHR) in April 2008 to set up the Sheffield Biomedical Research Unit (BRU) in Bone Diseases and has since been appointed as an NIHR Senior Investigator. Professor Eastell is also an Honorary Consultant Physician in metabolic bone disease at the Northern General Hospital, Sheffield.

Richard has received several awards; these include Hospital Doctor of the Year in the osteoporosis category (1997), the Corrigan Medal of the Royal College of Physicians of Ireland (1998), the Kohn Foundation award from the National Osteoporosis Society (2004) and the Society of Endocrinology Medal (2004). He has authored or co-authored over 300 papers on osteoporosis and related topics and is also Associate Editor for the journal Bone and a member of the editorial board of Osteoporosis International. Richard is Past President of the European Calcified Tissue Society and Bone Research Society and Past

Chairman of the National Osteoporosis Society.

Well known for his work on biochemical markers of bone turnover and the definition of osteoporotic vertebral fractures, Richard's research interests are also wide ranging. He leads an active group that conducts research into all aspects of osteoporosis, funded by the NIHR, MRC and arc and

in collaboration with important international research groups, such as the Universities of Kiel (Germany) and California, San Francisco (USA) and the Mayo Clinic (USA). The main foci of Richard's current research include anabolic treatments for osteoporosis, novel tests for bone turnover markers and biomechanics of hip and spine fracture.

Vertebral fracture in the lumbar spine resulting from osteoporosis.



Professor Janet Brown MB BS, MSc, MD, FRCP

Professor of Translational Medical Oncology, University of Sheffield

Understanding the impact of cancer on the skeleton and optimisation of prevention and treatment strategies



As a clinician scientist, Janet's research is both lab-based and clinically-based and is focused on the effects of cancer on the skeleton, including the development, prevention and treatment of bone metastasis and the skeletal impact of cancer treatments. Her laboratory group is focused on proteomics, genomics and other approaches to develop biomarkers to predict risk of bone metastasis and response to treatment, in the context of understanding the biological mechanisms by which bone metastasis develops, especially in breast cancer.

Her clinical practice includes breast, prostate and renal cancers, all of which are associated with bone metastasis and she runs a range of clinical trials (Phase I, II and III), as national Chief Investigator or as local

Principal Investigator, focusing especially on bone-targeted agents and their combination with other novel therapies. Within the Mellanby Centre, she has special expertise in the assessments of bone endpoints in clinical studies of new anti-cancer agents and the measurement and interpretation of bone turnover markers, with several ongoing collaborations with other UK centres.

Janet has published around 100 papers in peer-reviewed journal and 200 abstracts. Her research is funded by Cancer Research UK, NIHR, Yorkshire Cancer Research, Weston Park Cancer Charity, Breast Cancer Now and Prostate Cancer UK.

Dr Paul Arundel

Consultant in Paediatric Metabolic Bone Disease, Sheffield Children's NHS Foundation Trust

Paediatric bone diseases – improving phenotyping, management and outcomes



Dr Paul Arundel is the Clinical Lead for the Paediatric Metabolic Bone Disease Service at Sheffield Children's Hospital. His work encompasses the delivery and improvement of care to children and young people with a wide range of bone diseases through collaboration and multidisciplinary team working. He enjoys close links with co-located specialist orthopaedic, spinal, neurosurgical, genetics and radiological services. Links with the Mellanby Centre for Musculoskeletal Research and INSIGNEO in Sheffield allow translation of basic science advances into novel therapeutic interventions at all ages from infancy through to young adulthood.

He has worked in Sheffield alongside Professor Nick Bishop in both a clinical and research capacity since 2007, following completion of his sub-specialist training in paediatric endocrinology and diabetes. Since 2010 he has been a full-time research-active NHS consultant. He jointly led the implementation of the nationally commissioned Highly Specialised Service for Children with Severe, Complex and Atypical Osteogenesis Imperfecta and maintains close links with the other three nationally-commissioned centres. He is a member and former secretary (2011-2014) of the British Paediatric and Adolescent Bone Group, a network which includes most of the clinicians and researchers from across the British Isles with an interest in children's bone disease and health. He is on the

National Osteoporosis Society's Vitamin D Working Group.

Within Sheffield, he works as part of a group which has expertise in the phenotyping of children with bone fragility at multiple levels including clinical assessment, functional assessment, use of biochemical and imaging biomarkers, bone tissue assessment using histological and microindentation-based approaches. He has been a sub-investigator on clinical trials of both licensed and novel interventions including risedronate, anti-RANK ligand antibody and recombinant alkaline phosphatase. He was part of the task force developing the International Society for Clinical Densitometry Pediatric Position Statements on the definition of osteoporosis and prediction of fracture risk. Clinical activity and interests extend into the full range of skeletal disorders in childhood including:

- Osteogenesis imperfecta and other inherited forms of bone fragility
- Secondary osteoporosis
- Achondroplasia and other skeletal dysplasias
- Vitamin D
- Disorders of calcium and phosphate metabolism including X-linked hypophosphataemic rickets
- Hypophosphatasia
- Polyostotic fibrous dysplasia and McCune Albright Syndrome

Dr Meena Balasubramanian MBBS, DCH, FRCPCH, MD

Consultant Clinical Geneticist, Sheffield Children's NHS Foundation Trust; Honorary Senior Lecturer, University of Sheffield

Understanding genetic aetiology and phenotypic variability in bone fragility and translational biology of bone disease

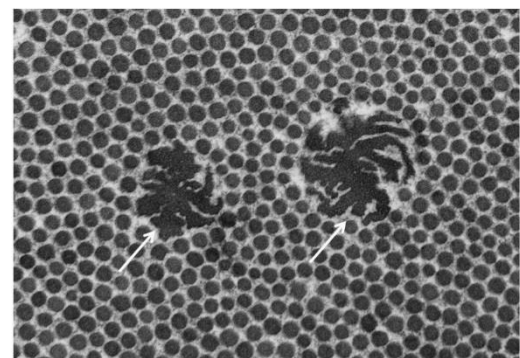


Dr Balasubramanian completed her Paediatric training before undertaking specialist training in Clinical Genetics in Southampton and Sheffield. Her MD is on atypical presentation of Osteogenesis Imperfecta (OI) obtained from the University of Sheffield in 2012. She has been a Consultant in Clinical Genetics at Sheffield Children's Hospital since 2012 and provides genetics input to the national OI service, seeing patients referred across UK. She has led several projects focused on genetics of OI and currently pursuing research projects focussed on identifying novel genetic causes in OI and exploring newer targets for therapy for OI.

Meena's research interests include in-depth phenotyping of rare bone diseases through skin and bone tissue analyses (funded by NIHR RD-TRC) combined with detailed clinical phenotyping and molecular genotyping. Advances in genomic medicine has led to increased use of next generation sequencing to identify new candidate genes and explore their phenotypic associations. Meena is the Bone fragility lead for Genomic Clinical Interpretation Partnership (GeCIP), part of the 100,000 Genomes project initiative to establish genetic causes of rare diseases in UK. She works across faculties in Sheffield, including projects with INSIGNEO on digital disease phenotyping; industry in identifying new targets for treating bone fragility. She has close links with clinicians in other regional metabolic and genetic

centres; patient support groups including Brittle Bone Society.

Meena's other areas of specialism, include Genetics in autism & Paediatric Dysmorphology. She has published over 40 first and senior-author publications in these areas and text books including a recent molecular medicine series on OI.



Electron microscopy image from skin biopsy of a patient with OI demonstrating collagen flowers

Dr Pinaki Bhattacharya

Lecturer in Solid Biomechanics, University of Sheffield and the Insigneo Institute for in silico Medicine

Understanding mechanisms of bone disease progression across space and time scales



Dr Pinaki Bhattacharya lectures in the Department of Mechanical Engineering at the University of Sheffield. He is also a member of the Insigneo Institute for in silico Medicine – a unique collaboration between the Sheffield Teaching Hospitals NHS Foundation Trust and the University of Sheffield. Pinaki obtained his PhD in biomechanics (2012) from Purdue University (West Lafayette, USA) and undertook post-doctoral research in biomechanics at KU Leuven (Leuven, Belgium) and the University of Sheffield (UK). Earlier, he studied and worked in India, obtaining his first degree in engineering from IIT Kharagpur, followed by industry and academic experiences in computer-aided engineering.

Presently, Pinaki is interested in developing mechanistic theories that explain the progression of bone diseases such as osteoporosis. These “multiscale theories” integrate disease characteristics (and its determinants) from regions of space and time that

are vastly different in scale, such as microscopic changes in bone morphology occurring over months and whole body movements occurring over a few minutes of walking. Pinaki is equally interested in developing clinical tools that leverage these theories in medical practice: be it to predict the risk of disease in a patient-specific manner, or to determine the efficacy of an intervention, or to design novel multifactorial interventions tailored to a group of patients. As such, this research is central to the mission of the Insigneo Institute, that is to produce a transformational impact on healthcare. Pinaki’s work on the complexity of bone disease progression is supported by the EPSRC. As a Technology Working Group member of the Royal Osteoporosis Society’s Osteoporosis and Bone Research Academy, Pinaki promotes technological solutions that will bring in a step change in prediction, prevention and diagnosis of fragility fractures.

Professor Nick Bishop MB, ChB, MRCP, MD, FRCPCH

Professor of Paediatric Bone Disease, University of Sheffield; Director of the Children's Clinical Research Facility

Understanding the causes of bone fragility in children and improving treatment for children with disabling bone diseases



The UK's only Professor of Paediatric Bone Disease. Trained in Manchester (clinical), Cambridge (MRC and Wellcome Fellowships) and Montreal (visiting Professor at McGill). Appointed to Chair in Sheffield in 1998. Clinical research group focuses on treatment of childhood bone fragility and rare bone diseases; basic science group on early life events and skeletal development, as well as pathophysiology of childhood bone diseases.

Nick's main interest is in the causes and treatment of bone fragility in children. His work has shown that in mild osteogenesis imperfecta (OI), oral bisphosphonate therapy can reduce fracture risk by as much as 50%; he is working both with pharma and charitable organisations to study other interventions in more severely affected children. He is collaborating

with colleagues locally and nationally to develop a pipeline for the development of new treatments in OI and other bone fragility disorders, and with colleagues across Europe to develop clinical networks that will deliver improved health care. He works with colleagues in Sheffield and Southampton to study the effects of antenatal vitamin D supplementation on skeletal development and responsiveness to mechanical stimulation both in model systems and in children. With local collaborators he has developed a novel biomarker of skeletal responsiveness to mechanical loading that is being used in multiple ongoing studies. Nick's research is funded by the Medical Research Council, medical research charities including ARUK, ORUK, SPARKS and the Sir Halley Stewart Trust, and the biotechnology and pharma industries.

Professor Ashley Blom MBChB, MD, PhD

Vice President and Head of the Faculty of Medicine, Dentistry and Health

Optimising joint replacement



Professor Ashley Blom joined the University of Sheffield as the new Vice-President and Head of the Faculty of Health in 2023 from Bristol where he was the Head of the Bristol Medical School. Ashley is an Orthopaedic surgeon whose research covers a broad range of basic science and applied methodologies primarily focussing on arthroplasty. He is part of the team that holds the contract to analyse the National Joint Registry, the largest arthroplasty database in the world. Ashley is an NIHR Senior Investigator, Fellow of the Academy of Medical Sciences and past President of the European Orthopaedic Research Society.

Research Interests

Arthroplasty, particularly hip and knee replacement.

Research Group Members

Ashley collaborates with a diverse group of clinicians and methodologists nationally and internationally.

Teaching Interests

Musculoskeletal conditions.

Professional activities

Arthroplasty surgeon at Sheffield Teaching Hospitals.

Dr Andy Chantry MB ChB, MRCP

Consultant Haematologist, Sheffield Teaching Hospitals NHS Foundation Trust; Honorary Clinical Lecturer, University of Sheffield

The use of bone anabolic agents in myeloma bone disease



Dr Andy Chantry is a Senior Clinical Lecturer in the Dept of Oncology and Metabolism, University of Sheffield and leads the Sheffield Myeloma Research Team (SMaRT). He is also an Honorary Consultant Haematologist in the Dept of Haematology, Sheffield Teaching Hospitals NHS Foundation Trust. Nationally, he is an executive member of the United Kingdom Myeloma Research Alliance (UKMRA), through which all significant UK Myeloma Clinical Trials are designed and developed. He is also an executive member of the United Kingdom Myeloma Forum, the national body for Haematologists with a special interest in myeloma leading clinical and research led developments in the UK. He is a member of the UKMF National Guidelines Group with a special interest in myeloma bone disease. Locally, he is an executive member of the local Cancer Clinical Trial Executive Committee and a member of the Sheffield Experimental Cancer Medicine Centre. He is an executive member of the Mellanby Centre for Bone Oncology and a member of Insigneo, the Centre for *in Silico* Medical Research.

His principal research interests are anabolic strategies in the treatment of myeloma bone disease and novel strategies to target myeloma tumour. Anabolic targets include components of the Wnt signalling pathway and the TGF- β signalling pathway in combination with both standard anti-resorptive strategies (zoledronic acid) and novel bisphosphonates. Novel anti tumour strategies include targeting the quiescent myeloma cells that remain after chemotherapy has been administered and patients enter plateau phases during which time it is hypothesized that quiescent myeloma cells reside in protective niches within the bone marrow micro-environment. His research team are modelling this putative niche, attempting to disrupt the niche and the array of adhesion molecules thought to bind quiescent myeloma cells to other cellular components of the niche and thus target the previously protected myeloma cells using conventional and novel chemotherapies and also including adapted viral therapy. Since appointment in 2012, he has been awarded over £2million in research grants notably from Bloodwise (formerly Leukaemia and Lymphoma Research).

Professor Robert Coleman MBBS, MD, FRCP, FRCPE

Professor of Medical Oncology, University of Sheffield

Development of new strategies for the prevention and treatment of cancer induced bone disease



Professor Robert (Rob) Coleman graduated from King's College Hospital Medical school, University of London in 1978. Following clinical training in oncology in London and Edinburgh and completion of a research doctorate (MD) in the field of bone metastases, he became senior lecturer and honorary consultant in the newly formed Academic Unit of Clinical Oncology at Weston Park Hospital in 1991 and was subsequently promoted to Reader in 1996, and Professor in 1999. For more than 25 years he has been instrumental in developing clinical cancer research in the city and surrounding clinical network and is passionate about improving the care of cancer patients through research. During that time he has held many leadership roles within the University and the NIHR Cancer Research Network. Since 2014 he has been part-time Medical Director for the independent medical education provider, priME Oncology™ alongside his on-going, but now part-time clinical academic role within the university.

Rob established a highly successful cancer clinical trials facility, which has both led and participated in a broad range of clinical trials and provides the research infrastructure for the North Trent Cancer Research Network and Experimental Cancer Medicine Centre.

These trials have ranged from early phase drug development studies to large III randomized trials.

Since the mid-1980s, Rob's main research interest has been into cancer induced bone disease with a particular focus in breast cancer. His research in this area is wide ranging and internationally recognized and includes:

- clinical aspects of care
- the development of bone targeted agents in oncology
- use of bone targeted treatment to prevent metastasis
- evaluation of bone biomarkers in oncology to aid drug development and provide both prognostic and predictive information of clinical value
- the assessment of adverse effects of cancer treatments on bone health and evaluation of various treatment strategies.

Rob has authored or co-authored 400 publications of original research and numerous invited reviews and book chapters. He is the founding editor of Journal of Bone Oncology, on the editorial board of several oncology journals and a reviewer for numerous journals. He is also a Trustee for Breast Cancer Now, St Luke's Hospice and Weston Park Hospital Cancer Charity

Dr Enrico Dall'Ara PhD

Senior Lecturer in Musculoskeletal Multiscale Imaging, University of Sheffield

Characterisation of biological tissues with experimental, imaging and computational tools

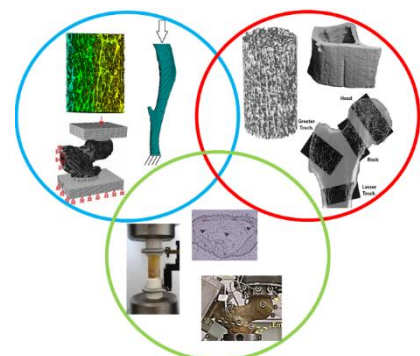


Dr Dall'Ara graduated in Mechanical Engineering from the University of Bologna (Italy) in 2006, worked as junior researcher at the Rizzoli Orthopaedic Institutes in 2007, and obtained a PhD in Biomechanics from the Vienna University of Technology (Austria) in 2012. In 2013 he won an Intra-European Marie Curie Fellowship and in 2015 he was appointed as lecturer in Multiscale Musculoskeletal Imaging at the Department of Oncology and Metabolism of the University of Sheffield.

Enrico is part of INSIGNEO, the institute for *in silico* Medicine, and the SkeletAI analysis laboratories, working on novel imaging and computational models for preclinical and clinical applications.

His main research interests are bone mechanics, developments of validation and calibration studies for *in silico* models at different dimensional scales, and bone remodelling.

Since 2007 he published more than 30 papers in peer reviewed international journals and contributed to more than 50 abstracts at international conferences.



Synergy among computational, experimental and imaging approaches for studying bone

Dr Sarah Davis MPhys

Health Economics Lead, University of Sheffield

Cost-effectiveness modelling, technology appraisal and clinical guideline development



Sarah Davis graduated with a Masters in Physics from the University of Oxford in 2003. Her work in the field of osteoporosis began in 2004 when she took up a graduate placement position as an Operational Researcher at the School of Health and Related Research (SchARR) at the University of Sheffield. Here she used the Sheffield Osteoporosis model, developed by Professor Matt Stevenson, to estimate the cost-effectiveness of pharmaceutical treatments for osteoporosis to inform national guidance on treatments for osteoporosis in postmenopausal women (covering alendronate, etidronate, risedronate, raloxifene, strontium ranelate and teriparatide) published by the National Institute for Health and Care Excellence (NICE). She also collaborated with Professor Kanis and Professor Stevenson on a National Institute for Health Research (NIHR) Health Technology Assessment (HTA) funded report on the treatment of glucocorticoid-induced osteoporosis.

She is currently a Senior Lecturer in Health Economics at the University of Sheffield where she is a member of the SchARR Technology Assessment Group (SchARR-

TAG). She was the project lead for SchARR-TAG on the NICE Technology Appraisal of bisphosphonates to prevent fragility fracture. One of the aims of this appraisal was to provide a link between fracture risk assessment using online tools such as QFracture and FRAX, and thresholds for cost-effective treatment. For this appraisal, she developed a new Sheffield Osteoporosis model for estimating the cost-effectiveness of bisphosphonates at varying levels of fracture risk whilst taking into account the variety of different risk factor combinations that may result in a particular risk score. She used a flexible discrete event simulation methodology which facilitates the simulation of a diverse population with varying patient characteristics and allows for an individual's characteristics and clinical history to influence their pathway through the model.

She is also Deputy Director of the NICE Decision Support Unit, which provides a methodological and training resource to the NICE Technology Appraisals Programme, and a member of the NICE Highly Specialised Technologies Evaluation Committee.

Professor Paul Dimitri BSc, MBChB, FRCPCH, PhD

*Professor of Child Health and Consultant in Paediatric Endocrinology;
Director of Research & Innovation, Sheffield Children's NHS
Foundation Trust*

Investigating the impact of body composition on skeletal growth and developing novel skeletal imaging



Professor Paul Dimitri is an Honorary Professor of Child Health and a Consultant in Paediatric Endocrinology at Sheffield Children's Hospital. He is also Director of Research and Innovation at Sheffield Children's Hospital and Division Lead for the Division of Child Health, Genetics, Non-malignant Haematology and Reproductive Health and Child Health at the NIHR Yorkshire and Humber Clinical Research Network. Paul studied Medicine at the University of St Andrew's, Scotland where he received a medal in pathology and the University of Manchester where he received a Distinction in Paediatrics. He moved to Sheffield in 1998 where he trained in Paediatrics and Paediatric Endocrinology. In 2010 he was Awarded a PhD in Medicine from the University of Sheffield for his work on the relationship between obesity and skeletal health in children, and received his Fellowship of the Royal College of Paediatrics and Child Health. He was subsequently appointed as a Consultant in Paediatric Endocrinology in 2010 and an Honorary Professor of Child Health in 2014.

Paul's research focus is on the impact of obesity on skeletal development and the development of novel skeletal imaging modalities. He has been invited to give lectures both nationally and internationally and has published in key peer-reviewed journals in his field of research.

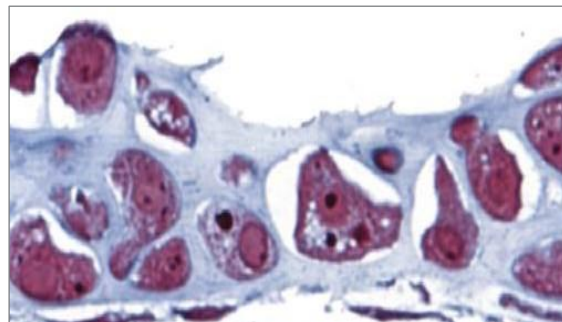
He was awarded the Michael Blacow Memorial Prize

by the RCPCH for his work relating to the impact of childhood obesity on skeletal health, and has received two research prizes from the British Society of Paediatric Endocrinology and Diabetes to support his work. Paul has led on an initiative to establish a National Paediatric Health Technology Network for Children in England (NITCH – Technology Innovation Transforming Child Health), dedicated to the development of technology and digital solutions to improve the health of children and young people and to enable greater independence. He is also the Director of SIIRCH (The South Yorkshire Institute for Innovation and Research in Child Health) designed to support cross-disciplinary collaborative research to improve child health and the lives of children. He has recently led on the development of the National Institute of Children's Sports and Exercise Medicine (NICSEM). NICSEM is the first dedicated Institute for children's sport and exercise medicine in the UK and provides access to highly specialised clinical services relating to physical activity and sports in children and young people. NICSEM also supports the development of world class research that will deliver long-term systematic change to benefit the health of the children and young people.

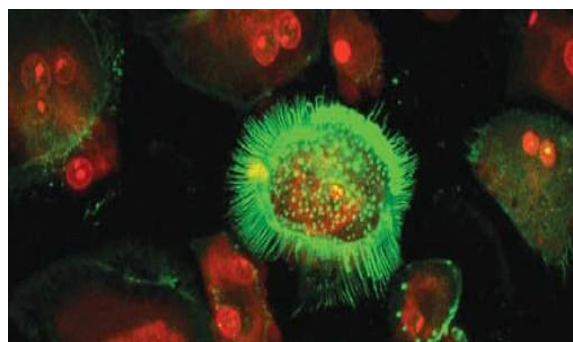
Professor Alison Gartland BSc, PhD

Professor of Bone and Cancer Biology, University of Sheffield

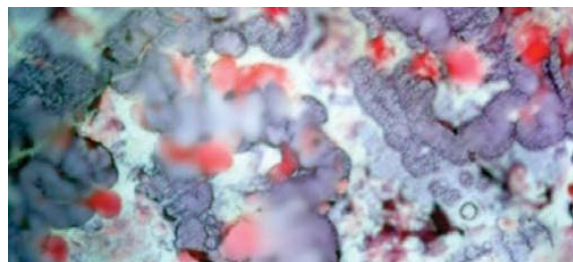
Understanding the basic cellular and molecular mechanisms of musculo-skeletal diseases



Cross-section through a primary chondrocyte culture *in vitro*



P2X7R-induced ethidium bromide uptake (red) in human osteoclasts *in vitro*



TRAP stained human osteoclasts (red) resorbing the surface of ivory (blue-purple)

Professor Alison Gartland studied for her PhD at The University of Liverpool, completed Post-Doctoral Researcher positions at IGMM, CNRS France and University of Massachusetts Medical School, USA. She is a Reader in Bone and Cancer Cell Biology at The University of Sheffield with expertise in purinergic signalling, bone and cancer cell biology, *in vitro* and *in-vivo* murine models of MSK disorders, including in the setting of cancer. Her principal research area focus is on developing fundamental understanding of the

basic cellular, molecular and genetic mechanisms responsible for musculoskeletal disease and cancer.

Professor Gartland has over 40 publications in leading journals in the field of bone and cancer and has also authored several book chapters on human bone cell culture technique. Current projects include looking at the mechanisms of breast cancer metastasis to bone, effect of metal ions on bone cell function, and P2 receptors in bone health and disease.

Dr Alanna Green PhD, FHEA, BBiomedSci (Hons)

Principal Investigator, University of Sheffield

New therapeutic approaches to treat incurable cancers in bone



Dr Alanna (Leni) Green is a Research Fellow and Head of the Cancer and Bone Laboratory at The University of Sheffield, UK. Leni completed her PhD in 2016 at the St Vincent's Institute of Medical Research, The University of Melbourne, Australia, where she discovered retinoic acid receptors regulate bone biology and in turn blood cell production. She also identified a new subpopulation of bone lining cells that form a niche for B-lymphopoiesis. In her first postdoctoral position at The University of Sheffield, she developed advanced preclinical models of myeloma and showed a bone anabolic can heal myeloma bone disease. This was followed a second postdoctoral position as a Project Leader in Sheffield with Prof Thomas Helleday, leading a programme of work on new cancer drugs targeting one-carbon metabolism enzyme, MTHFD2.

Dr Green's group now focuses on bone control of cancer processes. Her team are developing novel

therapeutic strategies for targeting cancer dormancy to eradicate disease in myeloma and cancers in bone.

Leni has been recognised as one of the best young researchers in the bone field, receiving over 20 awards for her research including the AIMM-ASBMR John Haddad Young Investigator Award and election to the ECTS Academy. She has 18 peer-reviewed publications (10 as first author, 1 senior author and 4 corresponding author) in top journals including JBMR, Bone, Blood, Nature Cancer and Nature Metabolism. She has given 7 invited talks and 25 conference presentations. Leni is on the Bone Research Society Committee, an Editor for the International Federation of Musculoskeletal Research Society's initiative HubLE, in the National Cancer Research Institute (NCRI) Bone Metastasis Working Group and regularly reviews papers and grants. Leni's work is currently funded by Blood Cancer UK and Sheffield Hospitals Charity.

Professor Paul Hatton BSc, PhD.

Professor of Biomedical Engineering, University of Sheffield; Head of Oral Biomaterials Research Group; Co-Director Sheffield Medical Innovation Centre

The development of medical devices and regenerative therapies for the repair of skeletal tissues



Professor Paul Hatton graduated with a BSc in Applied Biology from Lanchester Polytechnic in Coventry in 1985, and completed a PhD in the Department of Biomedical Sciences at Sheffield City Polytechnic in 1989. He spent three years as a postdoctoral researcher in the Department of Biomedical Sciences at the University of Sheffield before taking up a lectureship in the School of Clinical Dentistry in 1992. Paul was awarded a personal chair in 2003, and was President of the UK Society for Biomaterials from 2004 to 2007 before election to the European Council of the Tissue Engineering & Regenerative Medicine International Society (TERMIS) until 2012. He is currently the Director of Research at the School of Clinical Dentistry.

His principal research expertise is in medical devices and regenerative medicine for the repair of musculoskeletal tissues. He also has a longstanding interest in the application of electron microscopy to the study of musculoskeletal tissue-material interaction.

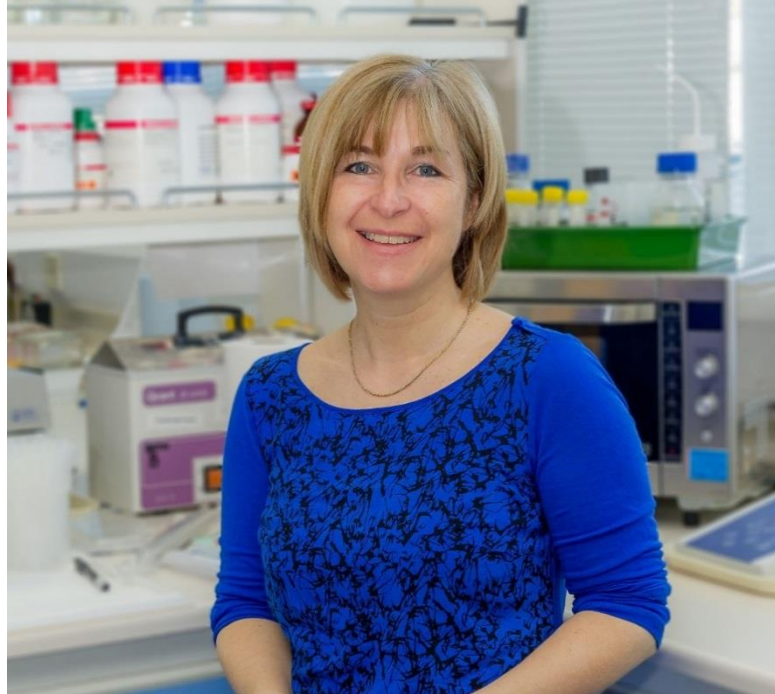
His interdisciplinary research group works on innovative and emerging technologies ranging from nanostructured materials through to regenerative therapies that have the potential to improve the repair of human musculoskeletal tissues and functional structures. In addition to his pioneering research, Paul is very active in undergraduate and postgraduate education, and is well known for his passionate support of academic-industrial collaboration and knowledge exchange. He was until early 2016 the Co-Director of the Sheffield Healthcare Gateway.

Professor Hatton's recent and current research is supported by the European Commission (EC), industry, Innovate UK, and the Engineering and Physical Sciences Research Council (EPSRC). He is the Sheffield lead for our participation in the EPSRC Centre for Innovative Manufacturing of Medical Devices (MeDe Innovation), a national programme led by the University of Leeds and involving Newcastle, Bradford and Nottingham universities.

Professor Ingunn Holen BSc, MSc, PhD

Professor of Bone Oncology, Leader of Laboratory Research Team, Clinical Oncology, University of Sheffield

Bone metastases in breast and prostate cancer – molecular mechanisms and effect of therapies

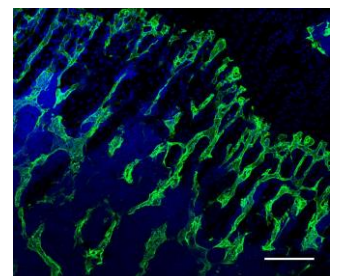


Professor Holen completed her PhD at the University of Oslo and the Norwegian Radium Hospital, Oslo, Norway in 1995, before joining the University of Sheffield as a Research Associate in the Department of Human Metabolism and Clinical Biochemistry. In 2001 she was appointed Lecturer in Bone Oncology in the Academic Unit of Clinical Oncology, with responsibility for establishing a laboratory research programme for the studies of therapeutic approaches in advanced breast cancer. Dr Holen was promoted to Senior Lecturer in 2005, appointed as Reader in Bone Oncology in 2009 and is currently Professor of Bone Oncology. She is Chair of the Scientific Advisory Board and member of the Scientific Committee of Breast Cancer Now, member of the NIHR DRF Panel and is a member of several Journal Editorial Boards.

Research in Ingunn's team is focused on tumour-induced bone disease in breast and prostate cancer, with particular emphasis on effects of therapeutics including bisphosphonates. Her main interest is elucidating the molecular mechanisms involved in tumour cell-bone cell interactions, and how these can be targeted by anti-cancer therapies. This work also includes investigating the role of the microenvironment in driving bone metastases, the effects of female hormones, and how therapeutic agents affect the tumour vasculature. Ingunn has several collaborative projects both with other researchers in the medical school, nationally and internationally. She works closely with the clinical staff in their academic unit on translational research projects, transferring the results from our laboratory projects into clinical feasibility studies. Following on from a CRUK

program grant (with Professor Peter Croucher and Dr Colby Eaton) entitled 'Defining the Bone Metastasis Niche' her team performs studies of the cellular mechanisms required for solid tumours to successfully colonise the skeleton. Together with colleagues in Leeds, Glasgow and London she has established a national in vivo tissue bank for breast cancer research funded by an "Infrastructure for Impact" grant awarded by the NC3Rs (<https://www.nc3rs.org.uk/>). This initiative is entitled SearchBreast (<https://searchbreast.org/>) and allows researchers to connect with partners who are willing to share archived material on a collaborative basis thereby not having to carry out in vivo studies. She was part of a European consortium awarded a Marie Curie Initial Training Network (BONE-NET).

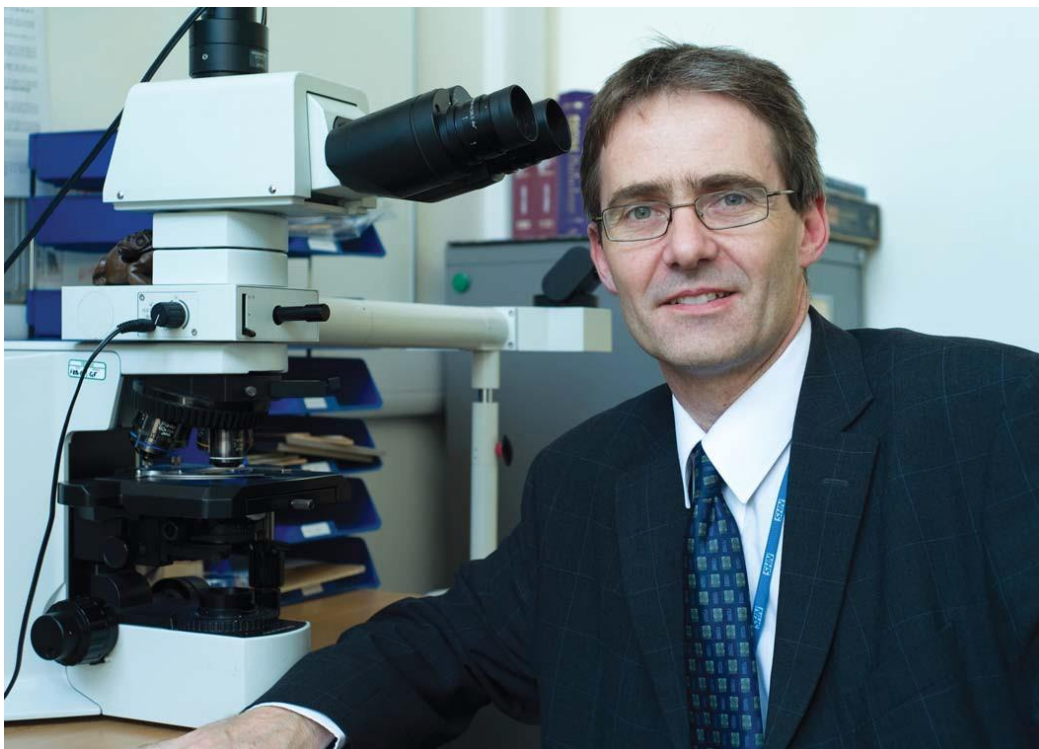
Ingunn's research is funded by a number of local and national charities, including Weston Park Hospital Cancer Charity, Yorkshire Cancer Research. Industry, the EU, MRC, CRUK, Breast Cancer Now and the NC3R



Endomucin expressing (in green) microvasculature in the mouse tibia

Dr David Hughes BMedSci, MB ChB, PhD, FRCPath
Consultant Histopathologist and Deputy Medical Director, Sheffield Teaching Hospitals NHS Foundation Trust; Honorary Senior Lecturer, University of Sheffield

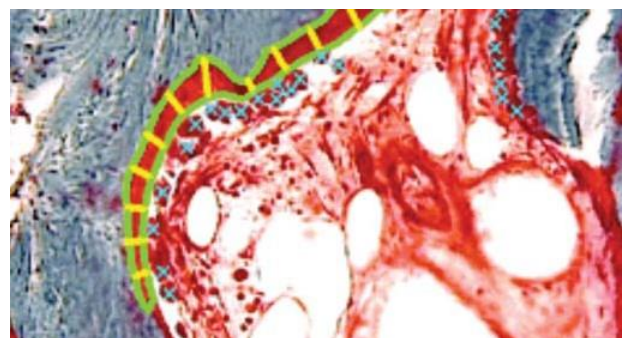
Applying the insights of morphology to understanding bone disease



Dr Hughes obtained a BMedSci at the University of Sheffield in 1985 and went on to complete a PhD in 1988 and to graduate in Medicine in 1989 at the same University. He then worked as a Clinical Lecturer in Pathology at the University of Edinburgh between 1990 and 1995. During this period he also undertook a sabbatical (1994-95) as Visiting Assistant Professor at the University of Texas Health Science Center, San Antonio. Dr Hughes then worked as a Clinical Lecturer in Pathology at the University of Sheffield between 1995 and 1998. Since then, David has worked as an NHS Consultant Histopathologist at Chesterfield Royal Hospital (1998-2003), the Royal Orthopaedic Hospital, Birmingham (2003-5) and Sheffield Teaching Hospitals from 2005 onwards.

David's initial research was the investigation of the role of cytokines in bone metabolism and through his PhD, he developed an interest in understanding the mechanism of action of bisphosphonates. This interest was carried forward during his sabbatical in San Antonio, establishing the pro-apoptotic effect of bisphosphonates on osteoclasts and during his clinical lectureship in Sheffield he contributed to the work of the team of Dr (now Professor) Mike Rogers in demonstrating the role of the mevalonate pathway in bisphosphonate action. More

recently, David has worked collaboratively, using his skills in tissue interpretation to contribute to a variety of projects such as describing the phenotype of IL-1 receptor antagonist knockout mice and tissue engineering using conditionally-immortalised chondrocyte progenitors. David contributes histology support and advice to a number of Mellanby Centre projects. He is also the reference pathologist for the national VORTEX and Axitinib-STS sarcoma clinical trials.



Histomorphometric analysis of bone

Dr Michelle Lawson BSc, PhD, AFHEA

Lecturer in Bone and Cancer Biology, Department of Oncology & Metabolism, University of Sheffield

The use of novel-bone targeted therapies to treat multiple myeloma



Dr Shelly Lawson is a Lecturer in the Department of Oncology and Metabolism at the University of Sheffield and is the co-lead of the Sheffield Myeloma Research Team (SMaRT). She is also a committee member of the Bone Research Society and is the organiser of their "Basic course in bone and cartilage biology and disease" held at the University of Sheffield every 2 years. In addition, she is member of the International Bone and Mineral Society and the Cancer and Bone Society. Her main research interests are targeting dormant myeloma cells in bone and developing better treatments to repair myeloma-induced bone disease. Over the last 10 years she has established several preclinical murine models of myeloma and developed a novel multiphoton microscopy technique to visualise single dormant cancer cells inside bone. This has led to an increased understanding of the role of the bone microenvironment in myeloma and how it influences tumour growth. More recently her work has focussed

on therapeutic agents that can repair myeloma-induced bone disease.

She is currently investigating the use of bisphosphonates as drug carriers to target anti-myeloma therapies to bone. This work could potentially lead to significant patient benefit by increasing drug specificity and effectiveness, as well as reducing drug dosage and any side effects.

Dr Lawson is also involved with number of collaborative research projects which include the use of oncolytic viral therapy (Fiona Errington-Mais, University of Leeds), drug redeployment (Farhat Khanim, University of Birmingham), the role of PADI2 (Daniel Tennant, University of Birmingham), E3 Ligase inhibition (Lisa Crawford, Queens University, Belfast), BMP signalling (Claire Edwards, University of Oxford) and targeting drug resistance in myeloma (Udo Opperman, University of Oxford). Since 2012 she has been awarded over £2M in research funding.

Professor Christine Le Maitre PhD, FHEA

Professor, Department of Oncology and Metabolism, University of Sheffield

Musculoskeletal Cell Biology and Tissue Regeneration



Professor Christine Le Maitre is a Professor of Musculoskeletal Cell Biology and Tissue Regeneration in the Department of Oncology and Metabolism, in the Medical School where she co-leads the Osteoarthritis and Disc Research Group in the Bone and Joint theme, she is also a Principal Investigator at the Insigneo Institute for *in silico* Medicine, at the University of Sheffield. Professor Le Maitre is also a member of the Integrated Musculo-Skeletal Biomechanics research group, with a particular interest in mechanobiology within musculoskeletal health and disease. She is also a member of the Society of Back Pain Research, AO spine, the British Orthopaedic Research Society, Orthopaedic Research UK, the Orthopaedic Research Society and the associated spine section, Tissue Cell Engineering Society, Tissue, Engineering and Regenerative Medicine International Society and is current Chair lady for the UK based Charity DISCs.

Professor Le Maitre's research investigates the cellular pathogenesis of musculoskeletal conditions. Including intervertebral disc degeneration and its links to low back pain; osteoarthritis; and bone physiology; working in close collaboration with relevant clinical partners and collaborators nationally and internationally. With a particular interest in the interaction of cells, biomechanics and matrix biology. Professor Le Maitre's research has provided key insights to the normal physiology of musculoskeletal conditions and identified dysregulated cellular mechanisms during pathogenesis of intervertebral disc degeneration and osteoarthritis. Including the roles of inflammatory cytokines, cellular senescence and altered mechano-transduction pathways. With a passion for developing alternative disease models, which utilise human 3D cell and tissue cultures within physiologically relevant environments. These systems are utilised to understand normal physiology and pathogenesis and test new therapeutic strategies.

Such as 3D culture systems to maintain the phenotype of isolated chondrocytes, nucleus pulposus cells, annulus fibrosus cells, osteoblasts and osteocytes, or drive stem cell differentiation enabling cell and mechanobiology to be investigated using primary human cell sources. Professor Le Maitre has developed several complex tissue culture systems enabling maintenance of cell/matrix interactions from osteochondral and IVD tissue explants to whole organ culture systems. Current PhD students under her supervision are also developing 3D printed models of cortical and trabecular bone and bone infection models. The improved understanding in pathogenesis of musculoskeletal conditions have led to strategies for next generation therapies involving stem cells, biomaterials and gene therapy approaches to inhibit disease processes and support regeneration. Investigating a range of potential cell sources to promote regeneration including bone marrow and adipose stromal cells; and induced pluripotent stem cells (iPSCs). Her work has investigated these cell strategies either alone or in combination with smart biomaterials which can restore the biomechanical environment, whilst inhibiting catabolic signalling processes and supporting stem cell differentiation. She has also investigated the potential of gene therapy approaches to modulate abnormal cytokine signalling to inhibit cellular pathogenesis, providing the correct tissue niche to support repair and regeneration. Her work on next generation therapies has led to patent generation, industry collaborations and potential commercialisation opportunities.

Professor Le Maitre's research to date has led to >100 publications with >8,600 citations a current H index of 43 and i10 index 78 (Feb 2023), with over £22 million in research grant income and £10 million in doctoral training grant income to date and is involved in a number of large consortia projects, including iPSPINE and Disc4all.

Dr Claudia Mazzà PhD

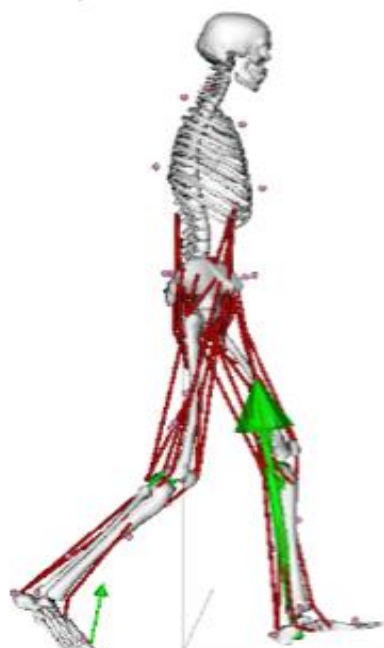
Lecturer in Mechanical Engineering, University of Sheffield

Understanding the biomechanics of human movement



Claudia received her PhD in Bioengineering in 2004 from the University of Bologna. She carried out her PhD and post-doctoral research activities at the Department of Human Movement Sciences at the University of Rome "Foro Italico", where she was appointed Assistant Professor from 2006 to 2013. She joined the Insigneo Institute for *in silico* medicine and the Department of Mechanical Engineering at the University of Sheffield as a Lecturer in Feb 2013.

Claudia's research is currently funded by the EPSRC and by the EU and focuses on the biomechanics of human movement and on the definition of experimental and modelling techniques for the assessment of an individual's locomotor and postural abilities. Her latest research evolves around the joint use of gait analysis and MRI for the modelling of the human joints and the use of wearable sensors for both clinical and home monitoring. She has co-authored over 40 journal papers and collaborates with a number of research groups both at national and international level.



Professor Eugene McCloskey MD, FRCPI

Professor in Adult Bone disease, University of Sheffield; Sheffield Director of the MRC ARUK Centre for Integrated research in Musculoskeletal Ageing

Characterising the risk factors for bone diseases and integrating them into management tools



Dr McCloskey graduated in Medicine from Trinity College, Dublin in 1983. He is currently Professor in Adult Bone Diseases in the Academic Unit of Bone Metabolism and Mellanby Centre for Musculoskeletal Research at the University of Sheffield. In addition to clinical work as an Honorary Consultant Physician in metabolic bone disease at the Northern General Hospital, Sheffield, he is also the current president of the Bone Research Society (2014-16) and the Sheffield Director of the MRC ARUK Centre for integrated research in Musculoskeletal Ageing (CIMA). He has published over 250 peer-reviewed publications, book chapters and reviews and is an acknowledged authority in the fields of vertebral fracture definition, osteoporosis epidemiology, fracture risk and bone health in cancer. He contributed to the development of the FRAX tool for fracture risk assessment and the subsequent guideline from the National Osteoporosis Guideline Group. He is on a number of editorial boards and is a member of committees within organisations including the International Osteoporosis Foundation (Board and Committee of Scientific Advisors) and the Board of the European Society for Clinical and Economic Aspects of Osteoporosis and Osteoarthritis

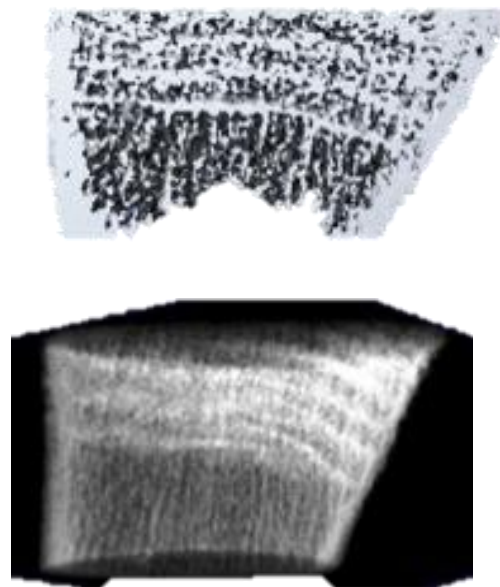
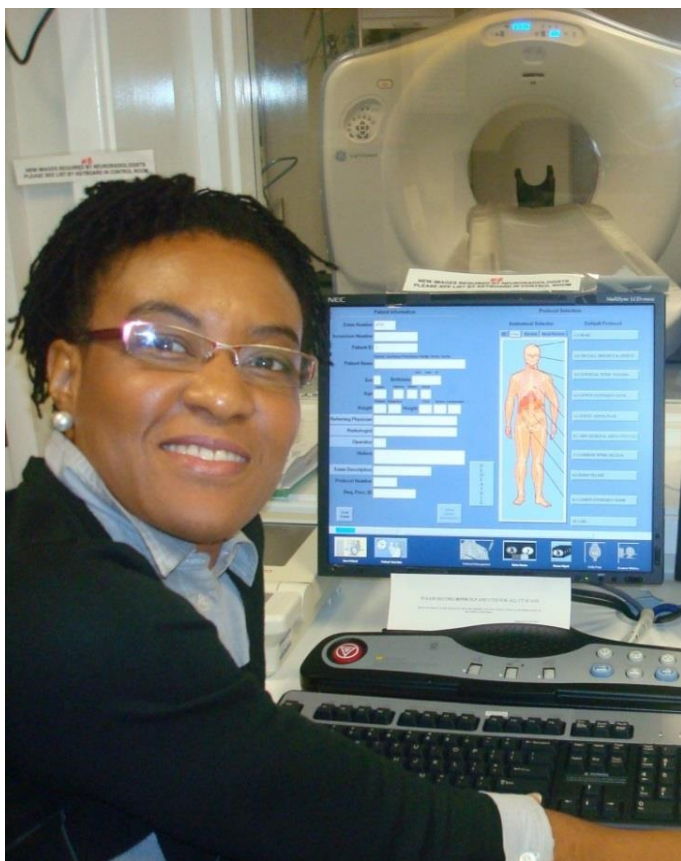
(ESCEO).

Eugene has been principal and co-investigator in a number of MRC, ARUK and/or pharmaceutical-funded osteoporosis studies. He is acknowledged as an expert in vertebral fracture definition and epidemiology, as well as non-invasive assessments of bone strength and fracture risk. He has been involved with writing national and international guidelines in osteoporosis and cancer-related bone disease as well as contributing to Health Technology Assessments. He has important collaborations with national and international research groups including the Universities of Liverpool, Newcastle and Southampton, Erasmus Medical Centre (Rotterdam), Harvard Medical School (Boston) and the University of Queensland (Brisbane). In addition to continuing development of the FRAX tool, his current research foci include novel risk factor models for fracture (including collaborations with Insigneo), sarcopenia, and the potential interactions between physical and pharmacological therapies for the treatment of musculoskeletal frailty.

Professor Amaka C Offiah, BSc, MBBS, MRCP, FRCR, PhD

Chair in Paediatric Musculoskeletal Imaging, University of Sheffield

The optimisation of current and development of novel methods of imaging the paediatric musculoskeletal system



High resolution peripheral quantitative computed tomography (HRpQCT) scan of the wrist in a child with osteogenesis imperfecta, showing the characteristic "zebra-lines" of pamidronate therapy

Professor Amaka Offiah obtained her MBBS while working at Oldchurch Hospital, Essex then trained as a radiologist in Sheffield. Amaka moved back to London, to Great Ormond Street Hospital and the Institute of Child Health, where in 2005, she obtained a PhD for her thesis, "Optimisation of the digital radiographic imaging of suspected non-accidental injury". Amaka returned to Sheffield in November 2009, as a HEFCE-funded Clinical Senior Lecturer in the Academic Unit of Child Health, and was promoted to Reader in Paediatric Musculoskeletal Imaging in January 2015 and Honorary Consultant Paediatric Radiologist at Sheffield Children's Hospital.

Amaka's main research interest lies in the imaging of suspected child abuse and skeletal dysplasias and in methods of determining which children have fragile bones prone to fracture and which do not, including optimizing

current and development of novel methods of distinguishing brittle from normal bones, understanding the mechanisms of injury in infants and young children and improving the detection and dating of the subtle fractures seen in abuse. Other areas of research relate to optimizing the diagnosis of vertebral fractures in children and developing an MRI-based scoring system for juvenile dermatomyositis.

Amaka is Vice Chair of the Sheffield Local Research Ethics Committee, Chair of the Skeletal Dysplasia Group for Teaching and Research, Chair of the European Society of Paediatric Radiologists Child Abuse Taskforce and was the Royal College of Radiology 2013 Roentgen Professor – being the first female and first paediatric radiologist to receive this award.

Professor Penny Ottewell BSc, PhD

Lecturer in Bone Oncology, University of Sheffield

Molecular mechanisms that drive breast cancer metastasis to bone and identification of therapeutic interventions



Penelope (Penny) Ottewell completed her PhD at The University of Liverpool, UK in 2005, before joining the University of Sheffield as a Research Associate in the Department of Oncology. In 2011 she was awarded an International Bone and Mineral Society 'Gregory Mundy' fellowship and was appointed a lecturer in Bone Oncology in the Academic Unit of Clinical Oncology in 2013. Penny is a member of the Executive Committee of the British Association for Cancer and the Young Investigators committee for the International Bone and Mineral Society.

Research in Penny's team is focused on advanced breast cancer and the molecular mechanisms that drive metastasis to bone. Penny has ongoing collaborations with researchers at the Universities of Manchester and Nottingham, UK, as well as international collaborators based in Germany, Switzerland and Japan.

Penny specialises in using transgenic and humanised models of breast cancer bone metastasis to identify molecular changes that tumour cells undertake as they undergo different stages of the metastatic process.

As a result of her early work in this field Penny team are currently investigating the significance of the cytokine IL-1B on breast cancer development and bone metastasis. Projects carried out in Penny's team include: 1) Establishing novel 3D ex-vivo models of human breast cancer bone metastases. 2) Identifying the role of tumour and bone derived IL-1B in breast cancer growth and bone metastasis. 2) Investigating the efficacy of targeting IL-1B for prevention and/or treatment of bone metastasis. 3) Elucidating how IL-1B and its receptor IL-1R1 interact with current treatments for breast cancer and bone metastasis.

Dr Nicola Peel DM, FRCP

Consultant Physician and Honorary Senior Clinical Lecturer in Metabolic Bone Medicine, Sheffield Teaching Hospitals NHS Foundation Trust

Evaluation of techniques used in the diagnosis and monitoring of osteoporosis and other metabolic bone diseases



Dr Nicola Peel graduated in Medicine from the University of Nottingham in 1984 and undertook general medical training in Sheffield. Her initial involvement in bone disease developed as an ARC clinical research fellow in Sheffield evaluating determinants of osteoporosis in steroid-treated rheumatoid arthritis.

After completing rheumatology training in Newcastle, Nicola returned to Sheffield in 1997 as Senior Research Fellow and Honorary Consultant Physician. Since 2000 she has worked as a full-time NHS consultant in Metabolic Bone Medicine and has led the clinical service since 2002. However, she has remained actively involved in research and has jointly supervised clinicians undertaking PhDs and student doctors undertaking intercalated BMedSci degrees. Current projects include the application of bone densitometry techniques and biochemical markers of bone turnover in a study designed to modify bone loss following spinal cord injury and clinical trials in rare bone diseases including hypophosphatasia and x-linked hypophosphataemia.

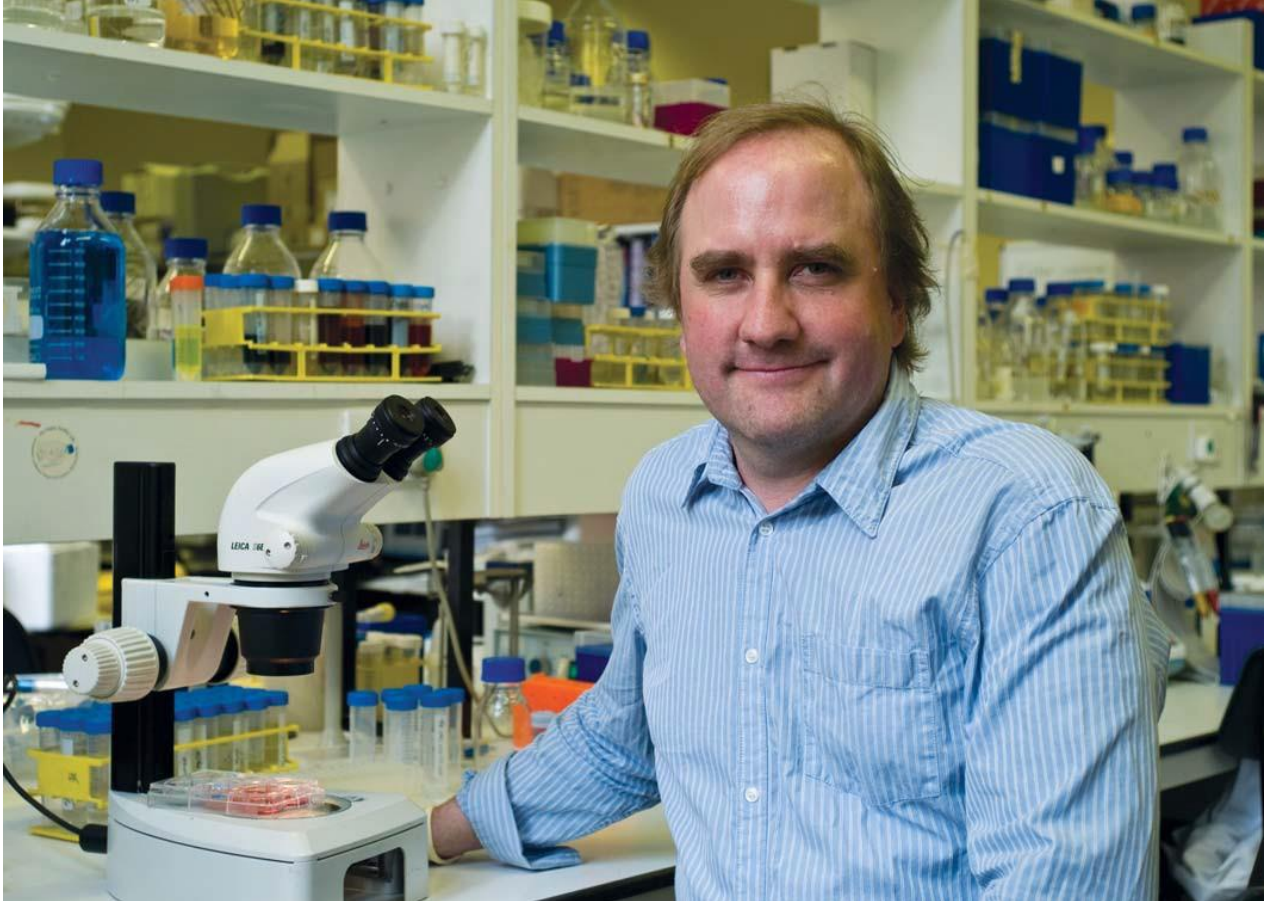
As Clinical Lead, Nicola aims to integrate the clinical service with the work of the Academic Unit enabling recruitment of NHS patients into clinical trials and early implementation of innovative techniques into clinical practice. This has included the use of biochemical markers of bone turnover to monitor osteoporosis therapy in primary care and the systematic use of Vertebral Fracture Assessment scanning into the fracture risk assessment pathway. She is committed to delivery of evidence-based practice and complements her research involvement with systematic clinical service evaluation. This has been facilitated by the establishment of a comprehensive clinical database.

Nicola is director of the Sheffield Paget's disease Centre of Excellence and deputy chair of the South Yorkshire and North Derbyshire Musculoskeletal Biobank. She undertakes a number of roles within for the National Osteoporosis Society including as Clinical & Scientific Lead for the conference committee, faculty member for the certification training programme for bone densitometry and as a peer reviewer for osteoporosis and metabolic bone services.

Dr Henry Roehl BSc, MSc, PhD

Senior Lecturer in Biomedical Sciences, University of Sheffield

Zebrafish musculoskeletal development



Zebra fish embryo

Dr. Henry Hamilton Roehl earned a Masters degree in 1994 and a Doctorate in 1997 while working in the laboratory of Judith Kimble at the University of Wisconsin-Madison, USA. At this time, his research was focused on the elucidation of Notch signal transduction in the nematode *C.elegans*. He received a European Molecular Biology Organisation long term fellowship that allowed him to pursue postdoctoral research in the laboratory of Nüsslein-Volhard at the Max Planck Institute for Developmental Biology in Tuebingen, Germany. Here he switched focus to the analysis of musculoskeletal development using the zebrafish as a model organism.

He joined the University of Sheffield as a lecturer in 2002. More recently, he has continued to analyse osteoblast differentiation, focussing on how developmental signalling pathways coordinate the differentiation of osteoblasts. He was a member of the EU FW6 consortia entitled 'ZFModels' (2003-2008) and 'Cells into Organs' (2003-2009). He has been a member of the Medical Research Council, College of Experts (UK) since Jan 2006 and a member of the Multiple Hereditary Exostoses, Scientific Advisory Board (USA) since March of 2008.

Dr Henry Roehl's research is funded by the Wellcome Trust and Cancer Research UK.

Professor Graham Russell PhD, DM, FRCP, FRCPath, FMedSci, FRS

Professor of Musculoskeletal Pharmacology, and Botnar Research Centre, University of Oxford; Mellanby Centre for Musculoskeletal Research, University of Sheffield

Understanding the causes of bone and joint diseases and the pharmacology of drugs to improve their treatment



Graham's research interests include bone cell biology, cytokines, pathogenic mechanisms in bone and joint diseases such as arthritis, myeloma, bone metastases, and osteoporosis, and the evaluation of new therapeutic agents and their modes of action.

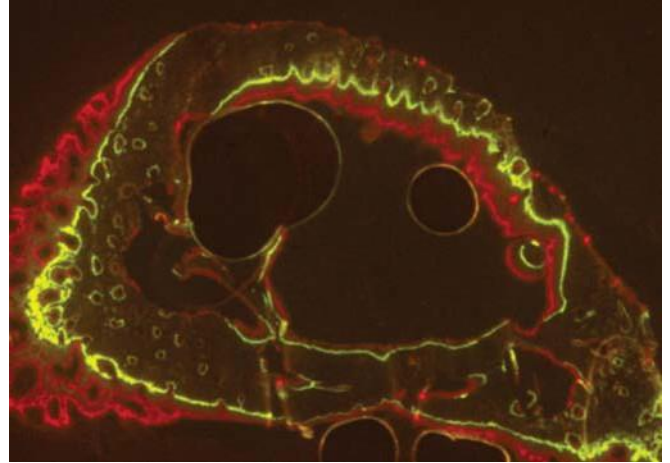
Throughout he has played a central role in studying the biological effects of bisphosphonates, and in their clinical development and evaluation for the treatment of skeletal diseases. During the 1990s, Michael

Rogers and others within his group in Sheffield elucidated the molecular mechanisms of action of bisphosphonates, and showed that nitrogen-containing bisphosphonates act as inhibitors of mevalonate metabolism resulting in inhibition of protein prenylation. His current research focuses on understanding their structure activity relationships, the design of novel compounds, and the detailed mechanisms of their actions on the skeleton and other system.

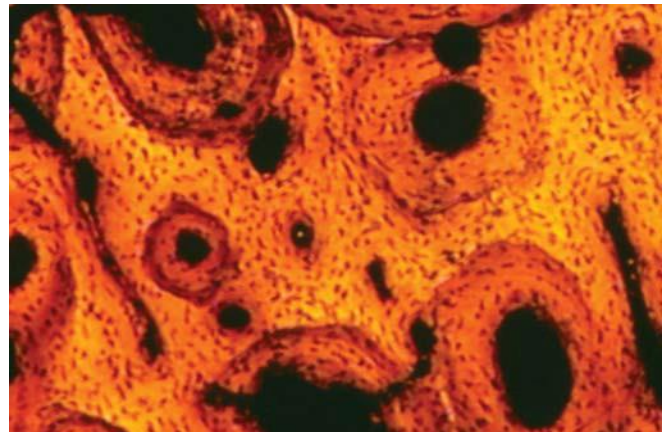
Professor Tim Skerry B Vet.Med, PhD, Cert.SAO, FRCVS

Professor of Orthopaedic Biology, University of Sheffield

Adaptive responses in bone and drug discovery



Section showing new bone formation shown by incorporation of fluorescence



Fossil tibia of an iguanodon (c. 150M year)

Bone Biology

Tim's interest for many years has been the mechanism by which bone responds to exercise. Much of that work has been focused on use of subtractive techniques to determine potential targets for interventions, but more recently the work has grown towards more translational studies.

In a project funded by the EPSRC, Dr Corinne Nigam has been using RNA-seq methods to compare transcriptomes of skull and tibial osteocytes from the same individuals in a range of species. This work is to determine how the skull is able to resist the systemic influences that lead to bone loss in the rest of the skeleton as a result of the menopause or weightlessness.

Jasmine Samvelyan is a Student funded by the MRC/ARUK Centre for Integrated research into Musculoskeletal Ageing (CIMA), and is investigating the interactions of gut derived hormones and mechanical influences on bone, in order to understand how to optimise timing of meals and exercise in humans.

Together with Dr Gareth Richards, Tim has developed an interest in signalling of a small family of cell surface receptors that interact with accessory proteins to modulate their activity. The calcitonin receptor and calcitonin like-receptor have altered selectivity for different hormones depending upon interactions with so-called receptor activity modifying proteins (RAMPs). Other receptors have their responses to hormone stimulation altered by RAMP interactions. Together Tim and Gareth work on understanding the physiology of those receptors and their signalling, and in a translational programme funded by the Wellcome Trust (awarded to Tim, Gareth, Professor Joe Harrity and Drs Matt Tozer and Karl Gibson) on development of small molecule drugs to target specific receptor RAMP combinations for therapeutic purposes, focusing initially on applications in cancer. Tim and Gareth also have developed a monoclonal antibody against one of those accessory proteins (RAMP3), which is in the process of commercial development through a licensing deal with University spinout company Medella Therapeutics.

Drug Discovery

Dr Syazrah Salam

Consultant, Sheffield Teaching Hospitals NHS Trust; Clinical Research Fellow, University of Sheffield

Chronic kidney disease-mineral bone disorder and bone fragility in renal osteodystrophy



Syazrah graduated from the University of Sheffield in 2004. She is a consultant nephrologist at the Sheffield Kidney Institute and was awarded a Kidney Research UK Clinical Research Training Fellowship during her nephrology training. She was awarded her PhD from the University of Sheffield in 2020. Her PhD focussed on assessing non-invasive tests (bone turnover markers and high resolution bone imaging) as an alternative to bone biopsy in diagnosing renal osteodystrophy (ROD) in advanced chronic kidney disease (CKD). Her research in CKD mineral bone disorder also includes vascular calcification.

Fracture risk is high in patients with advanced CKD but the pathophysiology is complex and not fully understood. This is Syazrah's current research focus and she has been awarded the European Calcified Tissue Society Clinical Research Fellowship in 2022 to study bone quality in ROD. She is also a steering committee member of the European Renal Osteodystrophy Initiative (part of the European Renal Association) since 2016. She was awarded the Royal College of Physicians Turner-Warwick Lecture in 2020.

Dr Marian Schini MD, PhD, FHEA

Clinical Research Fellow, University of Sheffield

Osteoporosis and calcium metabolism disorders



Marian completed her training in Endocrinology in 2014. She has been working as a clinical research fellow for the University of Sheffield since 2015, with an interest in osteoporosis and calcium metabolism disorders. She was funded by CIMA to undertake a PhD, focusing on the prevalence and natural history of normocalcaemic hyperparathyroidism and hypoparathyroidism. After completing her PhD in 2020, she was appointed as a consultant at the Metabolic Bone Centre at Sheffield Teaching Hospitals, but maintained her role as a fellow with the University of Sheffield, to pursue her research interest in bone metabolism further.

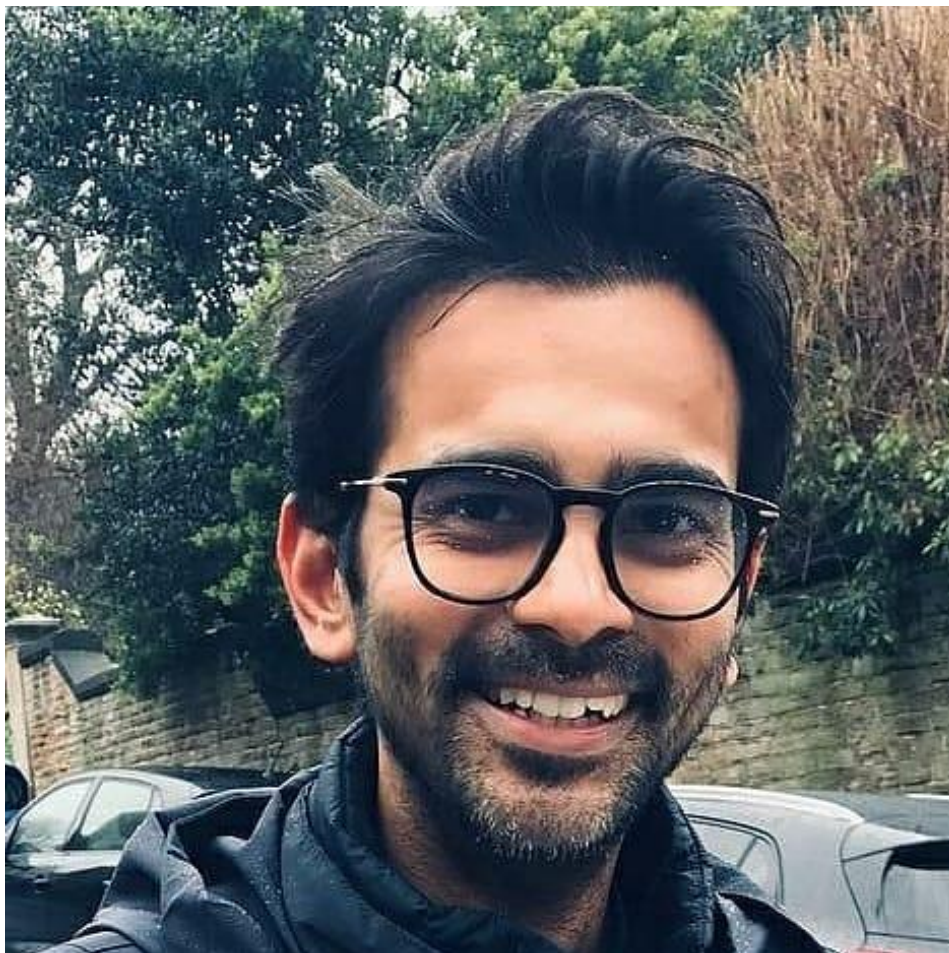
Marian has been involved in several research projects in collaboration with researchers from the University of

Sheffield, national and also international higher institutions. These projects have led to a number of publications and awards. She is the primary investigator for the POSE study (PINP and Osteoporosis in Sheffield Evaluation), a project aiming to investigate the use of PINP to monitor osteoporosis treatment in clinical practice by non-specialist practitioners. She is also the lead investigator in studies investigating current osteoporosis treatments further, like denosumab and zoledronic acid. Marian has supported and continues to support a number of clinical trials as both a primary and sub-investigator. Some of these studies are on rare disorders of bone metabolism, for which Marian has developed a special interest.

Dr Karan M Shah BTEch, MSc, PhD

*Research Associate in Bone Oncology in the Division of Clinical Medicine,
University of Sheffield*

Molecular mechanisms that drive pre-metastatic niche formation and organotropism in cancer



Karan completed his PhD at The University of Sheffield, UK in 2014, with a research focus on understanding the role of metal debris on bone cells in the context of hip prostheses. Subsequently, he joined the Department of Oncology and Metabolism as a Research Associate to continue his research on the effects of metals on bone cell physiology. In 2014, he was awarded the William H. Harris Award for 'outstanding work in orthopaedic research related to the hip' by Orthopaedic Research Society.

In 2016, Karan took a post with Prof. Alison Gartland and investigated the role of lysyl oxidase and purinergic signalling on breast cancer metastasis to bone. It is during this post, that he developed a strong interest in understanding how primary tumour facilitates pre-

metastatic niche formation in specific distant organs.

His current research aims to understand how primary tumour facilitates pre-metastatic niche formation in specific distant organs. To that end, he is exploring the role of extracellular vesicles (EV) in metastasis and organotropism in osteosarcoma – a primary bone cancer. Specifically, he is interested in the mechanisms that regulate EV release from tumour cells, and the effects these EVs have on the cells of the distant metastatic sites. He is also interested in the molecular mechanisms that govern pathogenesis of osteoarthritis and works closely with Prof Mark Wilkinson to understand single-cell regulatory dynamics of knee OA. Karan specialises in working with primary bone cells and pre-clinical models of primary bone cancers and metastases.

Dr Tatiane Vilaca PhD

Research Associate, University of Sheffield

Diabetes and Bone



Dr Tatiane Vilaca is a Postgraduate Research Associate at the University of Sheffield. She trained as an Endocrinologist in Brazil and completed her PhD at the University of Sheffield in 2020 having studied bone health in diabetes. She investigated several aspects of bone health in this disease including microarchitecture using high resolution peripheral quantitative computed tomography, the effects of neuropathy and other potential mechanisms associated with bone fragility in diabetes, such as the role of AGEs.

She has a special interest in the effects of chronic diseases and medications on bone and the underlying mechanisms. She has several publications on the effect of chronic diseases on the risk of fractures. She has also investigated the endocrine mechanisms associated with favourable bone structure in obesity.

Tatiane has vast experience on systematic reviews; she has led three systematic reviews on the risk of fractures in diabetes and chronic kidney disease and another one on osteomalacia following repeated iron infusions. She has also taken part in other reviews, investigating the risk of fractures in Parkinson's disease and microRNA profile in sarcopenia and obesity. These projects are the results of several collaborations within the University of Sheffield (e.g., ScHARR) and international groups from the USA and Denmark.

Currently, Tatiane is involved in a family mapping project in hypophosphatasia and a project investigating the mechanisms associated with the overshoot on bone turnover after stopping denosumab.

Dr Jennifer Walsh PhD_{RRCP, FHEA}

Senior Clinical Lecturer, University of Sheffield; Honorary Consultant Physician, Sheffield Teaching Hospitals NHS Foundation Trust

Bone microarchitecture and endocrine interactions



Dr Jennifer Walsh graduated with the University of Sheffield in 1997. She trained in Endocrinology, and was awarded her PhD on Peak Bone Mass in 2008, funded by an ARUK Clinical Research Fellowship.

She has a translational clinical research programme; current projects include high-resolution pQCT imaging for bone microarchitecture, the interactions of fat and bone, vitamin D physiology, phenotyping of hypophosphatasia, and a clinical trial of testosterone in male cancer survivors.

She has published on peak bone mass, skeletal effects of hormonal contraception, obesity and bone and bisphosphonate treatment for osteoporosis.

She has had prizes and commendations from the European Calcified Tissue Society, American

Society for Bone and Mineral Research and Late Effects of Cancer annual conferences.

She holds grant funding from the Department of Health, National Institute for Health Research, Cancer Research UK, National Osteoporosis Society and local charities.

Her clinical interests are in young adult endocrinology and bone disease and late effects of cancer. She is a member of the Brittle Bone Society Medical Board and the Society for Endocrinology Special Interest Groups for Bone and Mineral and Late Effects of Cancer.

She completed the RCP/UCL Postgraduate Diploma in Medical Education in 2012. She leads musculoskeletal and research modules for Sheffield Medical School and is South Yorkshire Training Programme Director for Diabetes and Endocrinology.

Dr Ning Wang PhD, FHEA, MRes, MSc, BSc

Research Associate, University of Sheffield

Understanding the impact of exercise on cancer induced bone diseases



Wang is a Principle Investigator in the Department of Oncology & Metabolism, University of Sheffield. He undertook his undergraduate (BSc) and postgraduate (MRes) training in biology at Ocean University of China. Dr Wang acquired his PhD degree in bone biology at The University of Sheffield in 2010 and thereafter have taken part in multidisciplinary studies in cancer-induced bone disease as a post-doctoral research associate in several research groups.

His current main research interests are focused on understanding how exercise induced cellular changes affect cancer dormancy and bone metastasis, using multi-disciplinary research approaches. Specifically, characterizing dormant metastasis initiating cells and investigating interactions between these cells and the

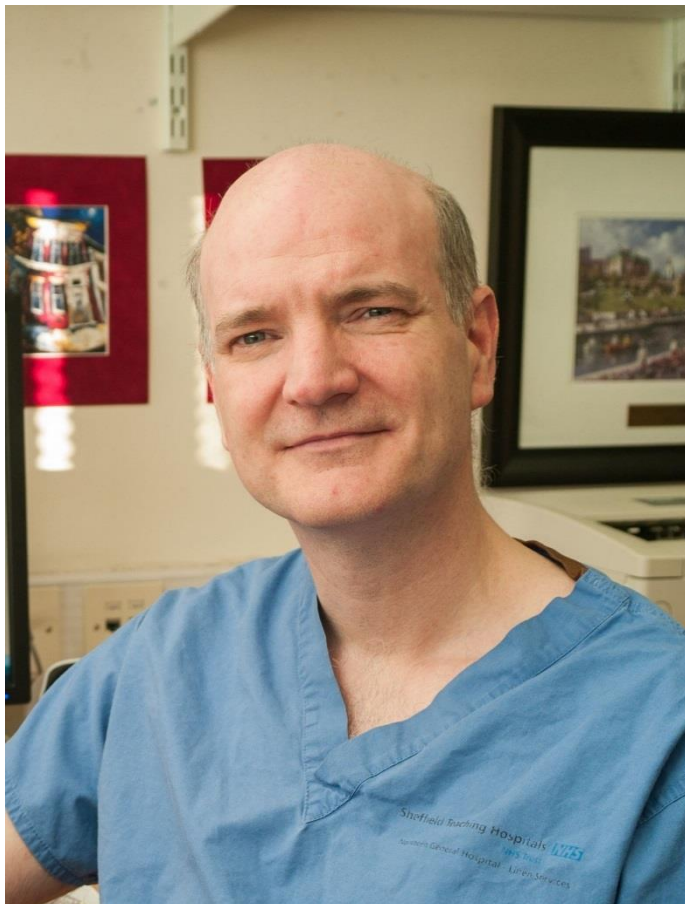
bone microenvironment. In addition, investigating the role of purinergic signalling in other musculoskeletal diseases such as osteoporosis and osteoarthritis is also his research interest. The purposes of these innovative studies are to conduct world-leading research but more importantly to translate research results into clinical benefits for patients at the earliest opportunity.

Since 2012, Dr Wang has published 20+ peer-reviewed manuscripts in high impact international journals such as JBMR and FASEB J. He is a current member of the ECTS Academy and regularly refereeing papers for peer-reviewed international journals (e.g. JBMR, Int J Cancer, Bone). His current research is supported by Prostate Cancer UK, The Royal Society, Weston Park Cancer Charity and Mexican CONACyT scheme.

Professor Mark Wilkinson MB ChB, PhD, FRCS (Orth)

Professor of Orthopaedics, University of Sheffield; Honorary Consultant Orthopaedic Surgeon, Sheffield Teaching Hospitals NHS Foundation Trust

Understanding the causes of musculoskeletal diseases associated with joint replacement and developing new approaches to their treatment



X-ray of hip joint prosthesis

Mark Wilkinson graduated in Medicine from the University of Sheffield in 1991 and trained as an orthopaedic surgeon in North Trent and Wrightington. As a specialist registrar in orthopaedics, Mark received Clinical Research Fellowship awards from the Arthritis Research Campaign and The Royal College of Surgeons of England. In 2001 he completed his PhD in the Academic Unit of Bone Metabolism, University of Sheffield. Following a period in clinical practice he returned to the University of Sheffield after receiving a 5-year Clinical Senior Lectureship Award from HEFCE/UKCRC in 2007. He was awarded the chair in orthopaedics in 2012.

Mark is also an honorary consultant in Orthopaedics at the Northern General Hospital, Sheffield, with a specialist interest in hip and knee arthroplasty.

Mark's research interests include genetic and metabolic aspects of joint diseases and host responses to prosthetic materials. He was a member of the arcOGEN consortium that identified many of the known risk alleles for osteoarthritis. He conducted the first genome-wide association studies of developmental dysplasia of the hip, and of osteolysis and heterotopic ossification after hip replacement, identifying several novel risk alleles. He published the first studies in humans to show that

bisphosphonates may suppress bone loss after hip replacement, and the first studies to show the systemic effects of metal exposure after hip resurfacing. His work also includes the identification of novel techniques for quantitation of bone mass and architecture, and exploration of the molecular mechanisms that underpin the development of osteoarthritis.

Mark has received several awards, including young investigator awards from the Orthopaedic Research Society, USA (2002) and the National Osteoporosis Society (2000), The British Orthopaedic Association Robert Jones Gold Medal and Association Prize (2003), The British Hip Society McKee Prize (2001, and 2008) and the William Harris Award from the Orthopaedic Research Society (2007). He has co-authored more than 90 papers. Mark is the chair of the South Yorkshire and North Derbyshire Musculoskeletal Biobank, chair of the National Joint Registry Research Committee, and a member of its steering committee. He is a member of the Board of Directors of the Orthopaedic Research Society (United States), and an editorial board member for the Journal of Orthopaedic Research. His sources of research funding include HEFCE, Arthritis Research UK, Orthopaedic Research UK, the Cavendish Foundation, and industry.

Dr Caroline Wilson PhD, MRCP

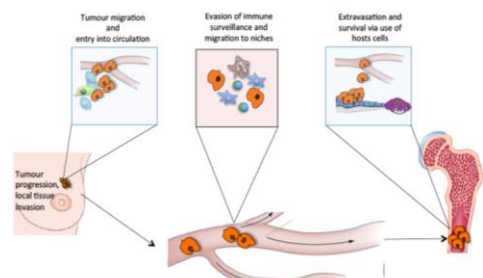
*Medical Oncology Consultant and Honorary Clinical Senior Lecturer,
University of Sheffield*

Breast cancer and bone metastasis



Caroline graduated with distinction from Sheffield Medical School in 2002 and subsequently completed her junior doctor training in Sheffield, Australia and New Zealand. She began her higher specialist training in Medical Oncology in 2007 and in 2011 she took time out of her clinical training to carry out her PhD in Sheffield Medical School, focusing on the influence of hormones on breast cancer in the bone microenvironment.

After completing her PhD she was appointed as a consultant at Weston Park Cancer Hospital where she specializes in the treatment of breast cancer. Her research time is funded by Weston Park Cancer Charity, and focuses on new therapies and therapeutic combinations for breast cancer and breast cancer bone metastases including immune-therapy. She has been primary author and co-author on multiple papers on breast cancer, bisphosphonates and bone metastases published in journals including the Lancet Oncology, Annals of Oncology, Clinical Cancer Research, JAMA oncology. She is also a reviewer for several journals.



Bone Densitometry and Imaging Suite

The Bone Densitometry and Imaging Suite is based within the NIHR Clinical Research Facility (CRF) at the Northern General Hospital. The Mellanby Centre for Musculoskeletal Research employs dedicated and highly experienced scanning technicians to perform a wide range of bone densitometry techniques using specialised imaging equipment. The Bone Densitometry and Imaging Service is managed by Dr Margaret Paggiosi.

The Bone Densitometry and Imaging Suite is equipped with a dual energy x-ray absorptiometry (DXA) densitometer (Discovery A, Hologic Inc.) for the measurement of bone mineral density (BMD) in the whole body, hip, spine and wrist. Body composition (including android and gynoid fat) can also be determined when performing DXA of the whole body.



The Discovery A dual energy x-ray absorptiometry (DXA) densitometer (Hologic Inc)

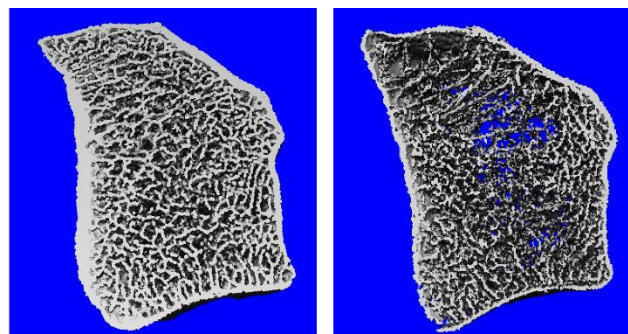
Funding from the NIHR was used to purchase a high resolution peripheral quantitative computed tomography (HR-pQCT) device; the XtremeCT (Scanco Medical AG). This is also housed in the Bone Densitometry and Imaging Suite.



The XtremeCT device (Scanco Medical AG)

The XtremeCT, which acquires high resolution (to 82 μm) 3D images using a very low dose of ionising radiation (3 μSv per scan), is used to study the densitometric, geometric, microarchitectural and biomechanical properties of bone. Primarily, *in vivo* examinations of the wrist and lower leg are performed but cadaveric (*ex vivo*) studies can also be

conducted. A number of image analysis approaches are available including finite element analysis which reveals information about the biomechanical properties of bone.



High resolution peripheral quantitative computed tomography (HR-pQCT) of the radius. Images show healthy bone (left) and osteoporotic bone (right)

Researchers based at the Metabolic Bone Centre, Northern General Hospital have studied the effects of growth, ageing, treatment and disease on the densitometric, microarchitectural and biomechanical properties of bone. We are currently performing a detailed evaluation into the fracture healing process.

In-depth imaging studies of the spine, for the identification of osteoporotic vertebral fractures, can also be performed. The presence of vertebral fractures is a strong independent risk factor for future fracture and is, therefore, an important indicator of patients most likely to benefit from treatment for osteoporosis. Our studies are based on both vertebral fracture assessment (VFA) by DXA and spinal radiography. A combination of VFA and bone density measurements offers a low radiation assessment of an individual's risk of fracture.



An osteoporotic vertebral fracture

Accurate identification of osteoporotic vertebral fractures still remains challenging. Researchers based at the Metabolic Bone Centre have been at the forefront of work in this area for over a decade. This has led to the development, evaluation and clinical implementation of the algorithm-based qualitative (ABQ) approach. Furthermore, researchers from Sheffield have advised the International Society for Clinical Densitometry (ISCD) on the development of guidelines for the application of VFA in clinical practice. Our current research focusses on the development of an automated approach to vertebral fracture identification. Our work has been funded by ARC, MRC and the National Osteoporosis Society.

The Bone Densitometry and Imaging Service provides imaging resources for both clinical trials and investigator-led projects.

For more information visit our website:
www.mellanbycentre.org
Or contact Dr Margaret Paggiosi:
m.a.paggiosi@sheffield.ac.uk



Cancer Clinical Trials Centre, Weston Park Hospital

Weston Park Hospital has a purpose built clinical research facility, the Cancer Clinical Trials Centre (CCTC) that is funded jointly by the Weston Park Hospital Cancer Appeal, NIHR and the University of Sheffield. The CCTC provides dedicated facilities for the assessment and treatment of patients, office space for staff with fully networked computer systems, a laboratory and certain specialist activities such as bone densitometry. Integration between University and NHS staff is excellent.

The Cancer Clinical Trials Centre hosts the North Trent Cancer Research Network (NTRN) that provides infrastructure for the conduct of clinical trials in Sheffield and across the North Trent Network of associated Foundation Trust hospitals. It also provides the research infrastructure for the Experimental Cancer Medicine Centre (ECMC), a joint translational research venture between clinical oncology and several of the laboratory based academic units within the medical school. In 2015, the Weston Park Hospital Clinical Research Unit opened and replaced our previous treatment facility. This day unit is designed for the delivery of a wide range of research treatments in a safe and comfortable environment.

The CCTC has a well-established track record in clinical research across a broad range of cancer sites and clinical situations. The emphasis is on drug development and improvements in delivery of radiotherapy but there are also research interests in bone oncology, biomarker development, rehabilitation, late effects of cancer treatment and tumour imaging.

Since 2001, more than 10% of all patients with cancer have been entered into a nationally approved clinical trial or well designed research study, with a little over half of these patients taking part in randomised controlled trials. The burden of clinical trial related follow-up is ever increasing and utilises a significant amount of both specific research funds and NHS resources. More than 80% of our overall research activity and 95% of therapeutic trial recruitment is into NIHR approved trials.

In partnership with the Academic Unit of Clinical Oncology, the CCTC has more than £10 million in active research grants. Academic and NHS consultant staff have a high publication output with more than 50 manuscripts a year published in high quality peer reviewed journals. Many of the senior medical staff are members of National Cancer Research Institute (NCRI) Clinical Study Groups and have experience of being a Chief Investigator, and/or membership of Data Monitoring and Safety Boards, Trial Steering Committees and Trial Management Groups.

Head of Unit: *Professor Rob Coleman*

Academic Directorate Lead and NIHR Cancer Lead: *Jon Wadsley*

Senior Research Nurse Lead: *Alison Clarke*

Senior Manager: *Wendy Wilson*

Informatics: *Janet Horsman*

Data Management Lead: *Lucy Birch*

Contact: 0114 2265008

Sheffield CR-UK/DoH Experimental Cancer Medicine Centre

Director - Dr Sarah Danson, Tel: 0114 226 5235

The Sheffield Experimental Cancer Medicine Centre (ECMC) provides early phase clinical trials to the patients of South Yorkshire (population 1.8 million) and beyond. Sheffield ECMC is funded jointly by Cancer Research UK and the Department of Health and has supported work covering a range of priority areas, from innovative treatments to biomarkers to in-house translational research, whilst delivering high quality early phase trials.

Sheffield has an international reputation for bone oncology research, both clinical and translational, and has been key to the registration of bisphosphonates and RANK ligand inhibitors in cancer. Sheffield ECMC has built on this area of strength. Our translational research includes novel combinations with radium-223; prevention of metastasis by bone-targeted agents; biomarker development; relationships between metastasis development and reproductive hormones; patient selection and prediction of treatment benefit; delineation of novel mechanisms of bone metastasis; and treatments for cancer-related bone pain. Sheffield ECMC has led research in the development of novel biomarkers of bone metastases, and has linked with national and international studies in breast, prostate, renal and lung cancer. Sheffield ECMC has developed early phase studies using data from our own discoveries. The Trojan horse study (Brown/Danson) uses macrophage-targeted therapy in prostate cancer. This approach (Lewis/Muthana) is also being assessed in breast cancer and myeloma.

In recent years, the bone oncology team of Professor Coleman (clinical) and Professor Holen (translational) has been expanded with the appointments of Professor Brown (breast and prostate cancer), Dr Chantry (myeloma), Dr Wilson (breast cancer), Professor Heymann (primary bone tumours) and Professor Clezardin (patient selection and novel mechanisms). These appointments demonstrate the commitment of the University and Sheffield ECMC to remain at the forefront of bone oncology research and significantly strengthen international collaborations, for example with INSERM in France.

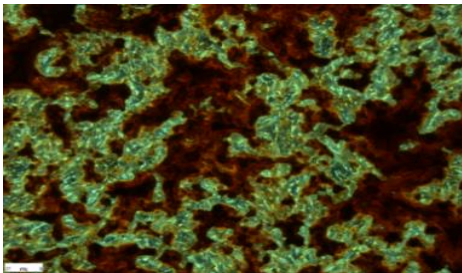
Radiotherapy research is a further area of strength of Sheffield ECMC. Sheffield leads several early phase clinical trials of improved radiotherapy delivery for non-small cell lung cancer (Hatton) and is a world-leader in inhaled gas MRI, which provides clinically relevant functional information for lung cancer radiotherapy (Wild/Hatton). With regards to chemotherapeutic trials, some are Sheffield-led, such as HSV1716 in mesothelioma (Woll) and olaparib in small cell lung cancer (Woll).

Sheffield ECMC is proud of its work in rare tumours, which require more effective collaboration than needed in trials of more common tumours. Sheffield ECMC has led on clinical trials in Kaposi's sarcoma and angiosarcoma (Woll/Young), thyroid cancer (Wadsley) and gestational trophoblastic disease (Coleman/Winter). Recently, we achieved a Bloodwise Trials Acceleration Programme award to support early phase trials in haematological malignancies.

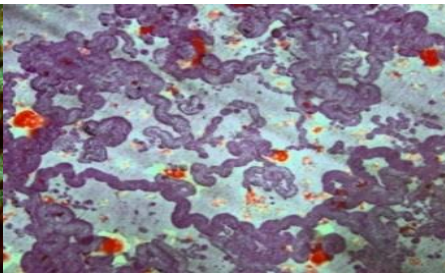
Sheffield ECMC has a robust governance infrastructure. At the core are an ECMC Executive and the Clinical Trials Executive, which assesses scientific credibility and prioritises trials. Sheffield has a long history of patient input in all areas of cancer research, with active patient membership on the ECMC Executive and the Clinical Trials Executive. Trial ideas are presented to our local consumer research group, which provides invaluable insight and feedback.

South Yorkshire & North Derbyshire Musculoskeletal Biobank

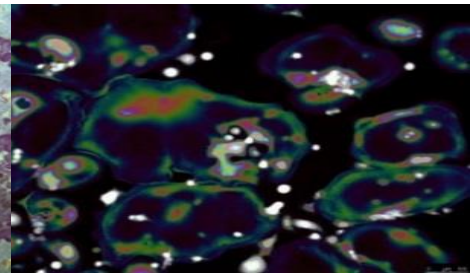
The Academic Unit of Bone Metabolism within the University of Sheffield Mellanby Centre for Musculoskeletal Research manages the South Yorkshire and North Derbyshire Musculoskeletal Biobank. Our research interests span musculoskeletal disorders of childhood through to the elderly person, and cover both benign and malignant diseases. Our clinical research covers osteoporosis, osteoarthritis and prosthesis-related bone loss, childhood bone diseases, tumour-induced bone diseases such as multiple myeloma, and metastatic bone disease.



Mineralisation by human osteoblasts



Resorption trails by human osteoclasts on dentine surface

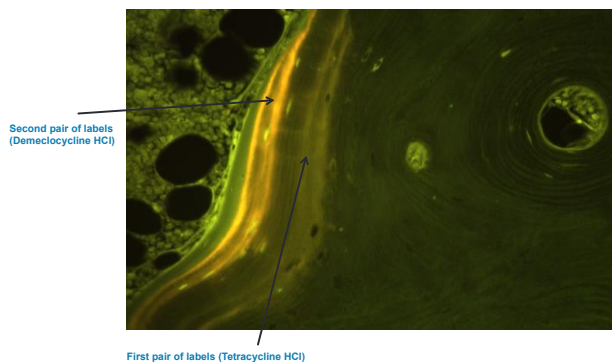


Fluorescence image of calcein loaded human osteoclasts for visualisation of metal uptake

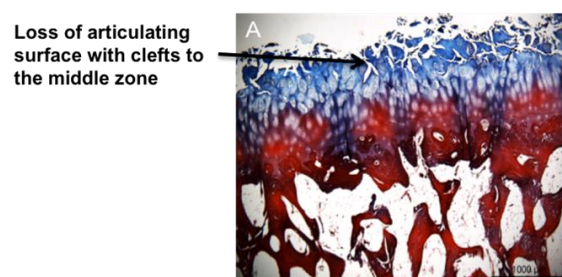
The aim of the biobank is to make use of these clinical and tissue resources to address research questions relevant to musculoskeletal disease. The biobank holds tissue samples obtained from donors and completed, ethically approved projects with appropriate consent for biobank storage and use for future research projects. Samples are stored in the Sheffield Biorepository, which is an HTA licensed facility. The biobank operates under the guidance of a steering committee to assure compliance with current best ethical practice.

All applications for use of tissue through the SYNDMB are submitted in collaboration with a member of the Academic Unit of Bone Metabolism and reviewed by the SYNDMB Steering Committee, which includes representatives from the Biorepository, STH Research Office, Lay members of the public and clinicians from the Metabolic Bone Centre and Orthopaedics.

Fluorescent quadruple labelling of trabecular bone



Osteoarthritic cartilage



Contact : Joanna Chowdry - je.chowdry@sheffield.ac.uk

Bone Biochemistry Laboratory

The Bone Biochemistry Laboratory is based at the Medical School. The Mellanby Centre for Musculoskeletal Research employs dedicated and highly experienced laboratory technicians to perform measurements of bone turnover markers and other biochemical tests. The laboratory uses several automated immunoassay analysers. The Bone biochemistry service is managed by Fatma Gossiel.

The Laboratory is equipped with a Vitros 250 and Vitros Eci analysers (Ortho-Clinical Diagnostics), a Cobas E411 analyser (Roche Diagnostics) and an IDS-iSYS analyser (Immuno Diagnostic Systems). This equipment enables the staff to perform high throughput measurements of the bone resorption markers: C-terminal crosslinking telopeptides of type I collagen (CTX) and N-terminal crosslinking telopeptides of type I collagen (NTX) and the bone formation markers: procollagen type I N-propeptide (PINP), bone alkaline phosphatase (bone ALP) and osteocalcin (OC).

Automated immunoassay analysers

The IDS-iSYS Multi-Disciplined automated immunoassay analyser uses of chemiluminescence and spectrophotometric methodologies. It measures levels of CTX, intact PINP, OC, bone ALP and hormones including parathyroid hormone (PTH), IGF-1, 25 OH D and 1,25- (OH)₂ vitamin D in human serum and plasma samples.



The IDS-iSYS analyser



The Bone Biochemistry Laboratory

The Cobas e411 uses electrochemiluminescence methodology to measure levels of CTX, total PINP, OC, PTH and 25-(OH) vitamin D in serum and plasma samples.



The Cobas e411 analyser

The laboratory staff also perform biochemical measurements using manual enzyme-linked immunosorbent assay (ELISA) format. These include: sclerostin, DKK1, α and β -CTX, Fetuin-A, periostin, FGF-23 and vitamin D binding protein.

Researchers at the Academic Unit of Bone Metabolism, University of Sheffield have studied the effects of growth, age, gender, treatment and diseases on bone turnover markers and other related biochemical tests. Levels of bone turnover markers are assessed in clinical trials and other investigator lead studies. We perform detailed investigations into the effects of anabolic and catabolic agents on bone turnover markers and other biochemical tests, in osteoporosis. Our studies are based on using bone turnover markers for treatment monitoring and to assess bone quality. Researchers have been at the forefront of work in this area for over 20 years.

The Bone Biochemistry Laboratory performs measurements and provides advice about the most appropriate bone turnover markers to use, sample collection and storage. We collaborate and provide an assay service to other University departments, external institutions and industry. For further information, visit our website: www.mellanbycentre.org

Or contact Fatma Gossiel: f.gossiel@sheffield.ac.uk

skelet.AL

Skeletal Analysis Laboratories



Innovative, customized solutions for analysis of the skeleton

<http://skeletal.group.shef.ac.uk/>

Who we are:

Part of the Mellanby Centre for Musculoskeletal Research, skelet.AL has a diversified expertise in imaging, histology and bone biology. Established in 2003 (formerly the Bone Analysis Lab), it provides state of the art bone analysis services to members of the University of Sheffield Faculty of Medicine, Dentistry and Health, as well as the Musculoskeletal research and industry communities more generally.

Our approach:

Flexible:

- You can choose to simply use our equipment and perform your own analysis.
- Receive training or ask us to perform the experiments on your behalf.
- Receive advice on the design of experiments or interpretation of the data.

Versatile:

- From *in-vivo* experiments and sample preparation to data analysis and writing of the reports.

Cutting edge:

- Always developing new expertise and technologies.
- Always adapting existing technologies to new applications.

Friendly:

- We welcome all queries, and do our best to provide the answers you seek.

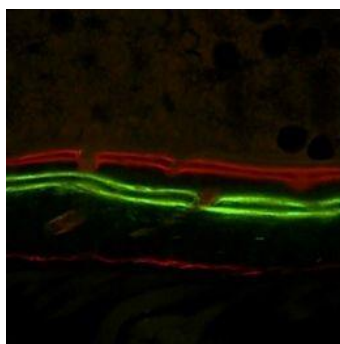
Our services:

We offer a wide range of services for bone analysis:

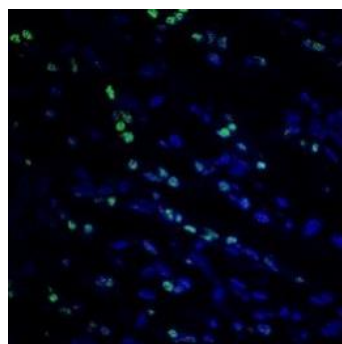
- *In-vivo* and *ex-vivo* Micro-CT.
- Histology and histomorphometry.
- Immunohistochemistry and image analysis.
- Biomechanical testing.

For more information, visit our website: <http://skeletal.group.shef.ac.uk/>

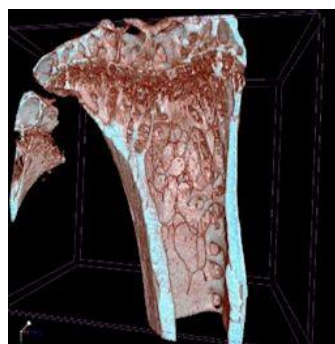
Contact: Prof. Iliaria Bellantuono i.bellantuono@sheffield.ac.uk



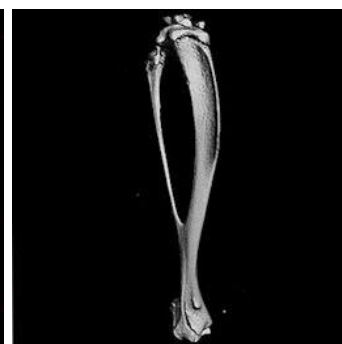
Dynamic istonmorphometry



Immunofluorescence_
Osterix on mouse



Ex vivo micro-CT of mouse
proximal tibia bone section



In vivo-CT of mouse
whole tibia