

IreneYang

BMedSci, BEng (Hons I), DPhil (Oxon)

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EMPLOYMENT

Sept '23 – Current

INNOVATION ACADEMIC RESEARCH FELLOWSHIP – University of Edinburgh, Scotland

- + Prestigious academic research fellowship (full time salary + independent research funding)
- + Title: Developing a novel, simple, affordable and clinically relevant fracture monitoring tool using engineering & machine learning techniques

Apr '22 – Sept '23

POSTDOCTORAL RESEARCH FELLOW – University of Edinburgh, Scotland

- + Project: UltraSurge - Surgery enabled by ultrasonics (EPSRC grant no.: EP/R045291/1)
- + Activities:
 - Mechanical rig design and development (Arduino coding)
 - Robot Operating Systems (ROS) programming (Python)

Mar '18 – Sep '18

PRODUCT DEVELOPER – IDE Group, Australia

- + Project: ELION HIV point-of-care diagnostic device
 - Client: Atomo Diagnostics
- + Activities: Verification & validation testing and management

Jan '16 – Jun '17

RESEARCH ASSISTANT – Westmead Children's Hospital, Australia

- + Projects:
 - Design of a tension band plate for genu varum/ genu valgum
 - Design of a wrist fusion plate for Fixed Flexion Deformity (FFD) in Cerebral Palsy
 - Design and development of a low cost intra-medullary nail for bone fractures
- + Activities: Summer research, honours and medical student supervision

EDUCATION

Oct '18 – Jun '22

DPHIL MUSCULOSKELETAL SCIENCES – University of Oxford, United Kingdom

- + *Reducing dislocations in the Domed Lateral Oxford Knee.*
- + Supervisors: Prof. David Murray, Associate Prof. Stephen Mellon
- + Final viva date: March 2022.

Jan '11 – Dec '15

B. MECHANICAL ENGINEERING (HONS) – University of Sydney, Australia

- + *The design, development and manufacture of a tension band plate.*
- + Supervisors: Prof. David Little, Ass. Prof. Aaron Schindeler
- + Award: Class I Hons, Biomedical Engineering major.

Jan '11 – Dec '15

B. MEDICAL SCIENCE – University of Sydney, Australia

- + Major: Biochemistry
- + Award: Bachelor's degree with distinction

Jan '06 – Dec '10

GAUTENG DEPT EDUCATION MATRIC CERT. – Crawford College, South Africa

- + Subjects: English, Afrikaans, Mathematics, Science, Biology, History, Life Orientation, Additional Mathematics, Mathematics (Geometry)
- + Award: 9 distinctions, top 51 in South Africa

SKILLS

Languages
Skills/certifications

Fluent: English, Fuzhouhua

Semi-fluent: Afrikaans, Mandarin

Cochrane systematic review, Solidworks (3D CAD design), 3D printing (FDM, SLS, SLA), 3D image segmentation (MIMICS), MATLAB, Photoshop, Microsoft Office, Python coding

Courses

Oxford Biodesign program, Acumen & IDEO.org human centred design course, IDE Group Medical Device Development course

GRANTS

Sept '23

INNOVATION ACADEMIC RESEARCH FELLOWSHIP (Salary + £45,000) - University of Edinburgh, Scotland

June '23

- + Project: Developing a novel, simple, affordable and clinically relevant fracture monitoring tool using engineering & machine learning techniques
- BIG IDEAS ACCELERATOR FUND (£10, 000) - University of Edinburgh, Scotland**
- + Project: Developing a novel, simple, affordable and clinically relevant fracture monitoring tool using engineering & machine learning techniques

PRIZES / AWARDS

Feb '23

INTERNATIONAL TRAVELLING FELLOWSHIP – British Orthopaedic Research Society/Bone & Joint Research Journal, UK (£5,000)

- + Selection process: Paper application for shortlisting, interview for award (selection panel: UK wide professors from engineering, biology and orthopaedic surgery).
- + Details: Present research at the 2023 Orthopaedic Research Society (ORS) conference (USA), and at leading research labs/institutes in Denver, Philadelphia, Boston, NY and Ottawa (Canada).
- + Value: National early career leader in orthopaedic engineering research, international conference presentation to lead future research, international networking opportunity.

Dec '22

GIANT (GLOBAL INNOVATION AND NEW TECHNOLOGY) CONFERENCE TRAVEL FUNDING – University of Edinburgh (iTPA/Edinburgh Innovations), UK

- + Selection process: Email application for award.
- + Details: Five funded places to attend the 2022 GIANT conference in London.
- + Value: Recognition of research impact & research commercialisation potential.

Feb '21 & Feb '22

OXFORD/SANTANDER TRAVEL ABROAD BURSARY (£341) – University of Oxford, UK

- + Selection process: Paper application for award.
- + Details: 2021 funding forfeited (pandemic). Re-application granted to fund local & international travel costs, accommodation and living costs to present research at the 2022 Orthopaedic Research Society (ORS) conference (USA).
- + Value: Recognition of research excellence & research impact.

Feb '22

TRAVEL BURSARIES: 1) NEW COLLEGE (£1,125), 2) NDORMS (£750) – University of Oxford, UK

- + Selection process: Paper application for award.
- + Details: Funding granted to fund local & international travel costs, accommodation and living costs to present research at the 2022 Orthopaedic Research Society (ORS) conference (USA).
- + Value: International research excellence

Sep '21

2ND PRIZE ENGINEERING SCIENCE DOCTORAL RESEARCH AWARDS (£100) – Association of British Turkish Academics, UK

- + Selection process: Paper application for shortlisting, candidates compete via live presentation for award (selection panel: general audience and funding body representatives).
- + Details: Academic presentation competition.
- + Value: National research excellence, recognition of novel research.

Jun '21

1ST PRIZE HEALTHCARE TECH AWARDS (£500) – Institute Of Mechanical Engineers, UK

- + Selection process: Paper application, narrated slideshow presentation recording for shortlisting, shortlisted applicants compete via live presentation for award (selection panel: general audience and industry professionals).
- + Details: Academic presentation competition.
- + Value: National research excellence, recognition of novel research.

Jun '21

1ST PRIZE BOTNAR STUDENT SYMPOSIUM – University of Oxford, UK

- + Selection process: Candidates compete via live presentation for award (selection panel: general audience and department professors).
- + Details: Academic presentation competition.
- + Value: Departmental research excellence, recognition of novel research.

Jul '20

1ST PRIZE MEDICAL SCIENCES DIVISION RESEARCH SLAM – University of Oxford, UK

- + Selection process: Department wide competition, candidates compete via live presentation for award (selection panel: general audience and department professors).

Aug '19

- + Details: "Reducing Dislocation of the Mobile Bearing in the Oxford Domed Lateral Implant."
- + Value: Departmental research excellence, recognition of novel research.

PHD TRANSLATIONAL RESEARCH FELLOWSHIP (€5,000) – European Institute of Innovation and Technology Health, European Union

- + Selection process: paper application (UK and EU applicants combined), panel interview for award (selection panel: Oxford Innovations representative, department and UK professors).
- + Details: €5,000 grant, one week translational fellowship training camp at Oxford University.
- + Value: European research excellence, novel implant design ideas, translational research leader.

Oct '18

OXFORD CLARENDON SCHOLARSHIP (Full tuition & college fees, living stipend) – Oxford University Press, University of Oxford, UK

- + Selection process: All postgrad applicants to Oxford University considered, panel interview for award (selection panel: department professors).
- + Details: Three years full international student university fees, college fees and living stipend to read for a DPhil at Oxford University.
- + Value: Top 2% of all graduate applicants (individual excellence & research impact),

Jan '14

SYDNEY MEDICAL SCHOOL RESEARCH SCHOLARSHIP (\$2,000) – University of Sydney, AUS

- + Selection process: Paper application for award, department wide competition.
- + Details: Two months research funding and living stipend.
- + Value: Individual excellence (undergraduate research), paid summer research internship.

Jan '13

1ST PLACE HEALTH SCIENCE PROSEOTION COMPETITION (\$500) – University of Sydney, AUS

LEADERSHIP

Academic

Journal contributions (2022 - Current)

- Associate editor and reviewer - Bone and Joint Research (BJR) Journal
- Reviewer - Frontiers in Bioengineering and Biotechnology Journal

Committees (2022)

- International Combined Orthopaedic Research Societies (ICORS) committee member

Student supervision (2022 - Current)

- Monu Jabbal (Doctor of Medicine, University of Edinburgh)

PUBLICATIONS

Research papers

I. Yang, G. Agustoni, D. Murray, S. Mellon (2023), Mechanisms of mobile bearing dislocation in lateral unicompartmental knee replacement. Proc Inst Mech Eng H. 2023 Sep 30:9544119231195678. doi: 10.1177/09544119231195678. Epub ahead of print. PMID: 37776125.

I. Yang, J. D. Gammell, D. Murray, S. Mellon (2022), Application of a robotics path planning algorithm to assess the risk of mobile bearing dislocation in lateral unicompartmental knee replacement. Sci Rep 12, 2068. <https://doi.org/10.1038/s41598-022-05938-w>

I. Yang, J. D. Gammell, D. Murray, S. Mellon (2021), The Oxford Domed Lateral Unicompartmental Knee Replacement implant: Increasing wall height reduces the risk of bearing dislocation. Proc Inst Mech Eng H. 2022 Mar;236(3):349-355. doi: 10.1177/09544119211048558. Epub 2021 Oct 26. PMID: 34696644; PMCID: PMC8822200.

I. Yang, T. Hamilton, S. Mellon, D. Murray (2021), Systematic review and meta-analysis of bearing dislocation in lateral meniscal bearing unicompartmental knee replacement: Domed versus flat tibial surface, vol 28, pp.214-28, The Knee.

I. Yang, J. D. Gammell, D. Murray, S. Mellon (2020), Application of a robotics path planning algorithm to assess the risk of mobile bearing dislocation in lateral unicompartmental knee replacement. The 20th Annual Meeting of the International Society for Computer Assisted Orthopaedic Surgery, EasyChair series EPIC Series in Health Science, vol 4, pp. 301-5.

J. Kennedy, H. Mohammad, I. Yang, S. Mellon, C. Dodd, H. Pandit, D. Murray (2020), Oxford Domed Lateral Unicompartmental Knee replacement: 10 year survival clinical outcome, Journal of Bone and Joint Surgery [Br], 102-B(8):1033-40.

IP (Patents, licenses)

Conference presentations

I. Manavitehrani, P. Ebrahimi, I. Yang et al. (2019), *Current Challenges and Emergent Technologies for Manufacturing Artificial Right Ventricle to Pulmonary Artery (RV-PA) Cardiac Conduits*. Cardiovasc Eng Tech 10, 205–215. <https://doi.org/10.1007/s13239-019-00406-5>

I. Yang, M. Gottliebsen, P. Martinkevich et al. (2018), *Guided Growth: Current Perspectives and Future Challenges*. Journal of Bone and Joint Surgery [Am] Rev. 2017 Nov;5(11):e1. doi: 10.2106/JBJS.RVW.16.00115. PMID: 29112518.

I. Yang, T. Cheng, D. Little (2015), *Orthopaedic device for correction of deformities in bone*, patent no.: US10842509B2. Licence: Orthopediatrics Corp., 2016.

I. Yang, T. Cheng, D. Little (2016), *Wrist fusion plate*, Licence: Orthopediatrics Corp.

I. Yang, R. Buchanan, N. Alnamnam, X. Li, M. Lucas, H. Simpson (Sept, 2023), *Cutting fresh human cortical bone using an ultrasonic cutting tool: cutting forces of orthopaedic surgeons*. Scottish Ultrasound Annual Scientific Symposium 2023. Edinburgh, UK.

I. Yang, R. Buchanan, N. Alnamnam, X. Li, M. Lucas, H. Simpson (Sept, 2023), *The use of an ultrasonic tool to cut human bone: cutting speed and forces of orthopaedic surgeons*. Cambridge, UK.

A. Marek, N. Alnamnam, X. Li, A. Luczak, I. Yang, M. Lucas, H. Simpson, F. Pierron (Jul, 2023), *Ultra-high speed imaging for studying ultrasonic cutting of bone & cartilage*, European Society of Biomechanics. Maastricht, NL.

N. Al-Namnam, A. Luczak, I. Yang, X. Li, M. Lucas, A. C. Hall, A. H. Simpson (Feb, 2023), *Chondroprotection during cutting of human articular cartilage using an ultrasonic scalpel: An in vitro study*, Orthopaedic Research Society conference. Texas, USA.

I. Yang, N. Al-Namnam, A. Marek, X. Li, M. Lucas, A. H. Simpson (Feb, 2023), *Ultrasonic cutting tools for orthopaedic surgery: Mechanical test rig design and preliminary testing in human bone*, Orthopaedic Research Society conference. Texas, USA.

I. Yang, J. D. Gammell, S. Mellon, D. Murray (Feb, 2022), *A novel computational dislocation analysis tool using robotics path planning algorithms for mobile bearing lateral unicompartamental knee replacement surgery*, Orthopaedic Research Society conference. Florida, USA.

I. Yang, Linda Chikotho, Girish Gangan, Chris Lavy et al. (April, 2022), *Panel discussion – Orthopaedic devices: Inequalities, challenges and opportunities (Virtual session)*, International College of Surgeons United States Section Annual meeting.

I. Yang, J. D. Gammell, D. Murray, S. Mellon (Sept, 2021), *Modifying the Design of The Oxford Domed Lateral Unicompartamental Knee Replacement Implant Reduces the Risk of Medial Bearing Dislocation*, British Orthopaedic Research Society conference. Virtual.

I. Yang, J. D. Gammell, S. Mellon, D. Murray (Feb, 2021), *The Oxford Domed Lateral Implant: increasing tibial component wall height reduces the risk of medial dislocation of the mobile bearing*, Orthopaedic Research Society conference. Virtual.

H. Mohammad, J. Kennedy, I. Yang, S. Mellon, H. Pandit, C. Dodd, D. Murray (Oct, 2020), *The 10 Year Clinical Outcomes Of The Oxford Lateral Domed Unicompartamental Knee Replacement*, EFORT conference. Virtual.

I. Yang, J. D. Gammell, S. Mellon, D. Murray (Oct, 2020), *Application of a robotics path planning algorithm to assess the risk of mobile bearing dislocation in lateral unicompartamental knee replacement*, EFORT conference. Virtual.

I. Yang, J. D. Gammell, S. Mellon, D. Murray (Mar, 2020), *Application of a robotics path planning algorithm to assess the risk of mobile bearing dislocation in lateral unicompartamental knee replacement*, STEM for Britain competition. Parliament, UK.

I. Yang, S. Mellon, D. Murray (Sept, 2019), *Dislocation of the mobile bearing in the Lateral Oxford Unicompartamental Knee Replacement (LOUKR): the effect of knee flexion*, British Orthopaedic Research Society/Bone Research Society (BORS/BRS) conference, Cardiff, UK.

I. Yang, S. Mellon, D. Murray (Jul, 2019), *Dislocation of the mobile bearing in the Lateral Oxford Unicompartamental Knee Replacement (LOUKR): the effect of knee flexion*, Medical Science Division DPhil Day, Tingewick Hall, Oxford, UK.

I. Yang (Nov, 2016), *All things 3D: 3D printing, 3D scanning and 3D animation*, Australian Institute of Medical and Biological Imaging (AIMBI) Changing perspectives Conference, Sydney, Aus.

I. Yang, T. Cheng, D. Little (Oct, 2016), *Optimisation of the telescopic rod using 3D Computer Aided Design (CAD) Software and Finite Element Analysis (FEA)*, Australian Orthopaedic Association (AOA) conference, Cairns, Aus.

Invited talks

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I. Yang (May, 2021), *Orthopaedic Implant design*, Jiangmen Central Hospital, Zhuhai, People's Republic of China.

I. Yang, S. Mellon, D. Murray (July, 2020), *Using Robotics to Address the Problem of Mobile Bearing Dislocation in the Oxford Domed Lateral Implant*. MSD Research SLAM, NDORMS, Oxford, UK. Virtual.

I. Yang, S. Mellon, D. Murray (Sept, 2019), *A New design for the lateral Oxford Unicompartmental Knee Replacement*, IDEAL Collaboration Sandpit session, Trinity College, Oxford, UK.

I. Yang (Jun, 2019), *Ethics in Surgical Implant Innovation*, Global Scholars Symposium, Rhodes House, Oxford, UK.

I. Yang, T. Cheng, D. Little (Aug, 2016), *Optimisation of the telescopic rod using 3D Computer Aided Design (CAD) Software and Finite Element Analysis (FEA)*, Westmead Hospital Research Symposium, Westmead Children's Hospital, AUS.

OTHER

Volunteering

New College Oxford

- Peer supporter (2020, 2021), Welfare Officer (2020), Equality & Diversity Officer (2019).

St John's Ambulance: First Aider (2018, 2019)

Oxford Clarendon Council: Cultural Secretary (2018)

Hobbies

Oil painting, sketches (pencil, colour pencil), photography, blogging, hiking.

I. Yang, New College Arts Anthology: **2020** (p. 82), **2021** (p. 27, 68-9), Oxford University, UK.