Yizhou Yu, MPhil

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SCIENTIFIC CAREER & EDUCATION:

PhD & MPhil studentships, PI: Dr L. Miguel Martins October 2019 – Present

MRC Toxicology Unit, University of Cambridge

Research topic: Mechanisms of mitochondrial toxicity in Alzheimer's disease (AD)

- AD is the most common neurodegenerative disease, but there is currently no disease modifying treatment.
- I analysed the transcriptome, proteome and metabolome of a fly model of AD and identified mitochondrial dysfunction as a key pathological feature. I showed that protecting mitochondria alleviates AD pathology in flies and human patients.
- I developed *in silico* workflows for behavioural, transcriptomic, proteomic and metabolomic analyses in flies, and genomic and phenotypic analyses using medical records from 500 000 human patients. I applied biochemistry assays and confocal microscopy in flies and cells.
- Funded by the University of Cambridge Vice-Chancellor's fund and MRC, £32 000 per year for 4 years

Co-founder, International Sleep Charity September 2018 – Present

internationalsleepcharity.org Charity Number: 1123736

- Poor sleep causes a range of negative physiological consequences and may lead to dementia in the long term.
- I developed a machine learning-based short questionnaire hosted on Amazon Web Services to screen for sleep disorders. I also lead a research team of 10 individuals to do epidemiological research and meta-analyses.
- I gained experience in applying for ethical permission as well as leadership and time management skills.
- Funded by SleepHubs Ltd, £10 000

Research intern, PI: Prof Masud Husain April 2019 – April 2020

Department of Clinical Neurosciences, University of Oxford

Research topic: Magnetic resonance imaging signatures of cardiovascular, cerebrovascular and genetic risk factors for AD using data from the UK Biobank.

- Cerebrovascular diseases and AD share risk factors and overlap neuropathologically.
- I used machine learning to analyse ~30 000 neuroimaging and phenotypic data and found that poor sleep, a putative cause for AD, is associated with increased cerebrovascular damage.
- Funded by Alzheimer's Research UK, £3350

Research intern, PI: Dr Giorgio F. Gilestro (lab.gilest.ro) April 2018 – September 2019

Department of Life Sciences, Imperial College London

2019 **The effect of reduced sleep on nicotinamide adenine dinucleotide levels in the brain of *Drosophila*.**

- Funded by the Genetics Society, £2000 - Top Project Award in the Genetics Society research competition.

2018 **The effect of pheromone treatment on the cognition of sleep-deprived *Drosophila*.**

- Funded by the Biotechnology and Biological Sciences Research Council, £2100

- How sleep deprivation leads to decreased cognitive performance is unclear.
- I showed limitations in current tools to assay learning in *Drosophila* and contributed to developing a high-throughput associative learning paradigm based on the Ethoscope.

Research intern, PI: Prof. Armand M. Leroi June 2017 - June 2018

Department of Life Sciences, Imperial College London

Research topic: Simulations of the evolutionary ecology of fiction books as human artefacts undergoing selection.

- How does human knowledge evolve, and why does one book become more successful than another one?
- I modelled different evolutionary scenarios and showed that decision-making when choosing new books has a large random component and follows a Wright-Fisher model, rather than being solely based on content.
- Funded by the Imperial College Data Science Institute, £1500

Imperial College London BSc Biological Sciences: October 2016 – June 2019
Overall 1st Class Honours

Upper Canada College & Collège Jean de Brébeuf: August 2008 – May 2016
International Baccalaureate Diploma, Ontario High School Diploma, Québec Secondary School Diploma

SELECTED ACADEMIC AWARDS:

- Best speaker award (*Parp* mutations protect from Alzheimer's disease pathology), Symposium for Biological and Life Sciences (https://symbls22.com/), 2022.
- Best scientific poster award (Personalised medicine in Alzheimer's disease), Precision Health Initiative Launch Symposium, 2022.
- Best scientific poster award (*Parp* mutations protect from Alzheimer's disease pathology), by Gordon Research Conference (Neurobiology of Brain Disorders), 2022.
- Edwin Leong Travel Grant by Hughes Hall, University of Cambridge, 2022.
- Travel award, by Federation of European Neuroscience Societies & International Brain Research Organisation, 2022.
- Best speaker award (*Parp* mutations protect from Alzheimer's disease pathology), by Alzheimer's Research UK, 2022.
- Best speaker award (*Parp* mutations protect from mitochondrial toxicity in Alzheimer's disease), by the British Neuroscience Association, 2021.
- Rob Clarke Award for best undergraduate project (Molecular modelling of the $GABA_A$ receptor reveals a novel gating mechanism), by The Physiological Society, 2019.
- Award for Best Student Research Project (Reactive oxygen species as a signalling mechanism of homeostatic sleep regulation), by The Genetics Society, 2019.
- Leadership award (A novel study on noise frequencies in a general medicine ward at a UK district general hospital), by The Wessex Safety, Quality and Improvement Conference, 2019.
- Colours Award for outstanding contributions to the student experience, Imperial College Union. Awarded consecutively for 2018 and 2019.
- Best Innovative Project at the fully-funded Tsinghua International Summer School, 2017.
- Best Grades in Spanish *ab initio*, Upper Canada College, 2016.
- Distinction for proficiencies in French, Public Service and Academics, Collège Jean de Brébeuf, 2014.

LEADERSHIP & TEACHING EXPERIENCE:

- **Supervision for degree projects (MSc or BSc)** at the University of Cambridge
  - Bryan Tan: Multi-omic & multi-tissue Mendelian randomisation prediction of AD risk 2023
  - Ryan Kinkela: Sleep recording in a *Drosophila* model of AD 2023
  - Krishna Amin: *In silico* screening of MAP4K3 inhibitors 2022
    Grade: First class honours, highest grade in the cohort

- Rayo Akande: Meta-analysis on the protective effect of vitamins in AD 2021
  Grade: First class honours

- **Head of Branch**, Cambridge Innovation Forum: 2019-2021
- **Private tutor**. I taught biology and data analysis for BSc and MSc students on an *ad hoc* basis 2019-2021
- **Representative of graduate students**, University of Cambridge, Faculty of Biology 2019-2020
- **Vice President and departmental representative**, Imperial College London 2016-2019
- **Peer tutor**, Imperial College London. I led weekly review sessions at the Life Sciences department. 2018-2019

INVITED TALKS:

- **Interviewed** by France24. (27 April 2020). Title: Preliminary study links severity of illness to air pollution
- Invited **speaker** at the Imperial College Lates podcast. (27 October 2020). Title: *Wellbeing for a winter lockdown*.
- Invited **speaker** at the Imperial College Welfare Week. (24 May 2020). Title: *What do we know about sleep and how to sleep better?*. Saint Mary's Hospital, London, UK.
- Invited **speaker** at the Wellbeing Conference. (4 July 2019). Title: *What do we know about sleep and how to sleep better?*. Commerzbank London, UK.
- Invited **speaker** at the Lifestyle Medicine conference. (27 April 2019). Title: *Sleep: current research and clinical perspectives*. King's College London, UK.
- Featured on BBC One (27 February 2019, 18:30 pm): Sleep in a busy city like London.

INTERESTS & ACTIVITIES:

- Varsity/Senior Rowing: Hughes Hall University of Cambridge, (2019-present), Imperial College London (2016-2017), Upper Canada College (2014-2016), Montreal Rowing Club (2015-2017)
- I provide *ad hoc* consultancy services to Sleephubs and Mindset to develop machine learning and neural network models, as well as to implement web applications using Amazon Web Services

SELECTED PUBLICATIONS & GITHUB REPOSITORIES (in order of relevance):

- H-index: 4, Citations: 600

1. **Yu Y**, Fedele G, Celardo I, Loh SHY, Martins LM. (2021). Parp mutations protect from mitochondrial toxicity in Alzheimer's disease. *Cell Death & Disease*. doi.org/10.1038/s41419-021-03926-y. **first author** https://github.com/M1gus/AD_Parp
2. Travaglio M, **Yu Y**, Popovic R, Selley L, Leal NS, Martins LM. (2020). Links between air pollution and COVID-19 in England. *Environmental pollution*. doi.org/10.1016/j.envpol.2020.115859. **co-first author** https://github.com/M1gus/AirPollutionCOVID19
3. **Yu Y**, Travaglio M, Popovic R, Leal NJS, Martins LM. (2021). Alzheimer's and Parkinson's diseases predict different COVID-19 outcomes, a UK Biobank study. *Geriatrics*. doi.org/10.3390/geriatrics6010010 **co-first author** https://github.com/M1gus/AD_PD_COVID19
4. Leal NJS, **Yu Y**, Chen Y, Fedele G, Martins LM. (2021). Paracetamol is associated with a lower risk of COVID-19 infection and decreased ACE2 protein expression: a retrospective analysis. *COVID*. https://doi.org/10.3390/covid1010018 **co-first author** https://github.com/M1gus/NSAIDs_Ace2
5. Travaglio, M., Michopoulos, F., **Yu, Y.**, Popovic, R., Foster, E., Coen, M. and Martins, L.M., 2023. Increased cysteine metabolism in PINK1 models of Parkinson's disease. *Disease Models & Mechanisms*. https://doi.org/10.1242/dmm.049727

6. Popovic R, Celardo I, **Yu Y**, Costa AC, Loh SHY, Martins LM. (2021). Combined Transcriptomic and Proteomic Analysis of Perk Toxicity Pathways. *Int. J. Mol. Sci*. doi.org/10.3390/ijms22094598 https://github.com/M1gus/Perk/
7. **Yu Y**. (2022). A concise, machine learning-based questionnaire that screens for insomnia and apnoea in the general population. *Manuscript submitted*. **first and corresponding author**
8. Hardy R, Chung I, **Yu Y**, Loh SHY, Morone N, Soleilhavoup C, Travaglio M, Serreli R, Panman L, Cain K, Hirst J, Martins LM, MacFarlane M, Pryde KR. (2022). The antipsychotic medications aripiprazole, brexpiprazole and cariprazine are off-target respiratory chain complex I inhibitors. *Manuscript submitted*. https://github.com/M1gus/Aripiprazole
9. Kuleindiren, N., Rifkin-Zybutz, R.P., Johal, M., Selim, H., Palmon, I., Lin, A., **Yu, Y.**, Alim-Marvasti, A. and Mahmud, M., 2022. Optimizing existing mental health screening methods in a dementia screening and risk factor app: observational machine learning study. JMIR Formative Research, 6(3), p.e31209.
10. Rifkin-Zybutz, R., Selim, H., Johal, M., Kuleindiren, N., Palmon, I., Lin, A., **Yu, Y**. and Mahmud, M., 2021. Preliminary validation study of the Mindset4Dementia application: assessing remote collection of dementia risk factors and cognitive performance. BMJ Innovations, 7(4).

SELECTED CONFERENCE PROCEEDINGS:

1. **Yu Y**, Celardo I, Fedele G, Loh SHY, Martins LM. (2019). An exploratory analysis of proteotoxicity in a fly model of Alzheimer's disease. *Alzheimer's Research UK Annual Conference*. Whales, UK.
2. **Yu Y**, Tai XY, Husain M, Veldsman M. (2019). Investigating the impact of poor sleep on cardiovascular health and cerebrovascular burden in healthy ageing using the UK Biobank data. *BMJ Open Respiratory Research.* 6: doi: 10.1136/bmjresp-2019-bssconf.38 ‡
3. Qiu C, **Yu Y**, Cheema A, Harvey CJ. Morrell MJ. (2019). The need to educate university students about sleep. *BMJ Open Respiratory Research.* 6:doi: 10.1136/bmjresp-2019-bssconf.9 ‡
4. Jackson S, Stanley N, Berg S, Oulton C, Yu Y. (2019). A short device-based questionnaire "SleepHubs Check-up" to engage the general population in understanding more about their sleep. *BMJ Open Respiratory Research.* 6:doi: 10.1136/bmjresp-2019-bssconf.74 ‡
5. **Yu Y**, Colaianni D, Qiu C, Gilestro G. (2019). Reactive oxygen species as a signalling mechanism of homeostatic sleep regulation. In: *A Century of Genetics*. Edinburgh: Genetics Society. ‡
6. Chen Y, **Yu Y**, Tristem M. (2019). The cross-species transmission and infection dynamics of retroviruses. In: *A Century of Genetics*. Edinburgh: Genetics Society. The poster was upgraded to a talk to the whole audience. ‡
7. **Yu Y**, Veldsman M, Tai XY, Husain M. (2019). Markers of poor sleep and their relationship to MRI markers of vascular burden. In: *ARUK Dementia Research Day*. Reading University: ARUK.‡
8. **Yu Y**. (2019). Molecular modelling of the $GABA_A$ receptor reveals novel gating mechanism. In: *Physiology 2019*. Aberdeen. ‡
9. Qiu CS, Sadnan G, **Yu Y**, Adebiyi E, El-Koubani O, Keshvari M, Mitchell B, Jagannath D. (2019). A novel study on noise frequencies in a general medicine ward at a UK district general hospital. In: *Annual Wessex Safety, Quality and Improvement Conference*. London: University of Southampton. doi:10.1136/bmjresp-2019-bssconf.8.

‡: Travel grant awarded

SCIENTIFIC WRITINGS:

- Editor in Chief of Broadsheet (rcsu.org.uk/broadsheet/) April 2019 - October 2019
- **Yu Y**, Lee C. (2019). Time to go to sleep. *Felix*. London: Imperial College London.
- **Yu Y**. (2019). Sleep to remember. *BrightBrains British Neuroscience Association* (Summer 2019, item 7)

- **Yu Y**. (2019). Imperial College, How was your sleep? *Broadsheet,* issue 16, pp22-24. London: Imperial College London.