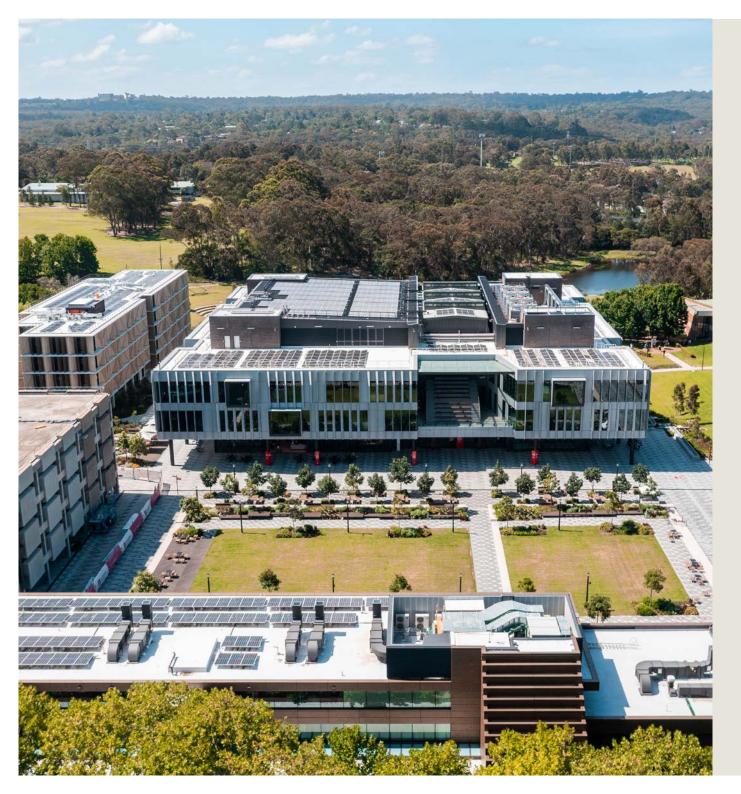# Macquarie University Australian Pharmaceutical Scholarship Program

The Macquarie University Australian Pharmaceutical Scholarship (MUAPS) program is a one-of-a-kind opportunity for outstanding higher degree research students seeking to evaluate questions relevant to the pharmaceutical sector, supported by industry-leading pharmaceutical sector benefactors.

The Macquarie University Australian Pharmaceutical Scholarship (MUAPS) program is a groundbreaking initiative of the Macquarie University Centre for the Health Economy (MUCHE) with renowned pharmaceutical companies Amgen Australia, Janssen Australia, MSD Australia, Pfizer Australia and Roche Australia.

MUAPS seeks to improve the knowledge of health and policy research, particularly about pharmaceuticals and their contributions to the health of Australians. During candidature, students are supervised by MUCHE researchers undertaking innovative research in three broad areas:

- pharmaceutical policy research themes, such as access to medicines and reimbursement
- medicine management research themes, such as medication adherence and choice
- advancement of analytical method, such as using real-world data to better inform government policy decisions.

Pharmaceutical companies interested in supporting the program are encouraged to contact MUCHE Director, Professor Henry Cutler, or Interim Deputy Director, Associate Professor Bonny Parkinson.

Celebrating our candidates

MUAPS is celebrating the exceptional contributions of our first cohort of Master of Research (MRes) and Doctor of Philosophy (PhD) candidates. These are the next generation of researchers who are making substantial contributions to pharmaceutical policy, medicine management, and evaluation methods.

KYU PARK

Dr Kyu Park is now a Senior Research Associate in the Risk and Actuarial Studies Department at the University of New South Wales (UNSW). His research projects focus on the development of longevity and health risk models and the optimal design of health and aged care insurance products with applications to various public sector support policies for retirement incomes and aged care. He completed a PhD in Actuarial Studies and Business Analytics at MUCHE for his work on applying cutting-edge analysis techniques to find causes and cost impacts of medication adherence in the aged population.

In the MUAPS program, Kyu was supervised by Professor Henry Cutler, Director of MUCHE, and Professor Leonie Tickle, Deputy Dean of Research, Macquarie Business School. During his thesis, 'Identifying temporal patterns of adherence to antidepressants, bisphosphonates and statins, associated patient factors and healthcare cost outcomes', Kyu had the opportunity to publish research findings in the high-profile peer-reviewed journals, *Applied Economics*, *PLoS ONE* and *SSM – Population Health*.

ZACHARY TIRRELL

Zachary Tirrell is a PhD candidate at MUCHE, conducting qualitative and quantitative research on the risks associated with new medicines in Australia. He has a range of risk and actuarial experience, including teaching Enterprise Risk Management to Australian actuaries. His research examines the use of cost minimisation analysis in past submissions to the Pharmaceutical Benefits Advisory Committee (PBAC), exploring how market access teams manage risks in the submission process and the application of game theory to the Australian market access environment.

During the MUAPS Program, Zachary was supervised by Associate Professor Bonny Parkinson and Professor Martin Hoyle at MUCHE for his MRes, 'Bring out your dead: Review of the Australian Pharmaceutical Benefits Advisory Committee methodology guideline and recommendations for submissions with a cost minimisation economic evaluation'. Zachary presented his research findings at the Professional Society for Health Economics and Outcomes Research (ISPOR) (2023) conference in Boston, USA. ISPOR is the leading professional society for health economics and outcomes research globally.

MEIMEI CHEN

Meimei Chen recently completed her MRes and is a PhD candidate at MUCHE, specialising in causal inference, machine learning and econometrics. Her MRes innovatively developed and applied a new machine learning technique to survival analysis. Meimei had the opportunity to present findings at the 43rd Annual Australian Health Economics Society Conference (2022) and the 11th Annual Australian Health Economics Doctoral Workshop (2023). Meimei's work has also been featured by the Australian Health Economics Society. Currently, Meimei is working on her doctoral thesis, which is titled 'Machine learning for causal inference and preference heterogeneity'.

Full list of recent candidates

KYU PARK

Kyu is now a Senior Research Associate at UNSW's Risk and Actuarial Studies Department. Kyu earned his PhD through the MUAPS program at MUCHE in Actuarial Studies and Business Analytics. His research analysed medication adherence causes and cost impacts in the aged population using group-based trajectory modelling.

PHD 2018–2021
Supervisors: Henry Cutler, Leonie Tickle

PHD THESIS TITLE
Identifying Temporal Patterns of Adherence to Antidepressants, Bisphosphonates and Statins, Associated Patient Factors and Healthcare Cost Outcomes

PUBLICATIONS
Park, K., Tickle, L. & Cutler, H. (2023). How temporal patterns of medication adherence to antidepressants, bisphosphonates and statins are associated with healthcare cost *Applied Economics*.

Park, K., Tickle, L. & Cutler, H. (2022). A systematic review and meta-analysis on impact of suboptimal use of antidepressants, bisphosphonates, and statins on healthcare resource utilisation and healthcare cost. *PLoS ONE*. 17(6):e0269836.

Park, K., Tickle, L. & Cutler, H. (2022). Identifying temporal patterns of adherence to antidepressants, bisphosphonates and statins and associated patient factors. *SSM – Population Health*, 17: 100973.

OTHER ACTIVITIES ATTENDED
Working with MBS and PBS data, Sax Institute, 2018, Sydney

ZACHARY TIRRELL

Zachary is a PhD candidate at MUCHE. His research focuses on the risks associated with new medicines in Australia. With diverse experience in risk and actuarial matters, he also teaches Enterprise Risk Management to Australian actuaries part-time.

MRES 2020–2021
Supervisors: Bonny Parkinson, Martin Hoyle

MRES THESIS TITLE
Bring Out Your Dead: Review of the Australian Pharmaceutical Benefits Advisory Committee Methodology Guideline and Recommendations for Submissions with a Cost Minimisation Economic Evaluation

OTHER ACTIVITIES ATTENDED
Introduction to Health Economics and Outcomes Research, ISPOR, 2020, online

PHD 2021–
Supervisors: Bonny Parkinson, Martin Hoyle, Sean Lybrand

PHD THESIS TITLE
The Influence and Management of Risk and Uncertainty by Pharmaceutical Companies Introducing New Medicines to Australia

CONFERENCE PRESENTATIONS
Tirrell, Z. Bring out your dead: A review of the cost minimisation approach in health technology assessment submissions to the Australian Pharmaceutical Benefits Advisory Committee, poster presentation, ISPOR 2023, May 2023, Boston.

OTHER ACTIVITIES ATTENDED
Collecting, managing and analysing qualitative interview data, Australian Consortium for Social and Political Research Inc. (ACSPRI), 2021, online

ARCS Annual Conference, 2022, Sydney

ISPOR Health Technology Assessment Summit, 2022, Sydney

Elements of Pharmaceutical/Biotech Pricing, ISPOR 2023, Boston

Case Studies in Pharmaceutical/Biotech Pricing II, ISPOR 2023, Boston

QUNFEI CHEN

Qunfei is a PhD candidate at MUCHE. Her thesis is about the role of uncertainty in health technology assessment in Australia. She specifically focuses on the uncertainties in the economic model and surrogate outcomes for recommendations regarding the funding of medicines by the PBAC. After extensively reviewing the uncertainties in the submissions evaluated by the PBAC between 2014 and 2021, she developed a framework for the characterisation of uncertainties and explored how the uncertainties influenced recommendations. She also found decision inefficiency between the regulator and the PBAC based on misalignment of acceptance of surrogate outcomes. Her research is closely related to pharmaceutical policy and fills some evidence gaps in the context of Australia, which will provide empirical evidence for informing decision-making by the PBAC in the future.

PHD 2020–
Supervisors: Martin Hoyle, Yuanyuan Gu, Varinder Jeet, Kompal Sinha, Bonny Parkinson

PHD THESIS TITLE
The Role of Uncertainty in Health Technology Assessments in Australia

CONFERENCE PRESENTATIONS
Chen, Q. How uncertainties in model-based economic analysis influence the subsidy of medicines in Australia. 43rd Annual Australian Health Economics Society Conference, September 2022, Brisbane.

OTHER ACTIVITIES ATTENDED
Health Econometrics and Policy Evaluation, University of Oxford, 2020, online

Hamburg University International Summer School (Health Economics), 2021, online

ISPOR Health Technology Assessment Summit, 2022, Sydney

Survival Analysis for Health Technology Assessment, University of Glasgow, 2022, online

ZOBAIDA AHMED PIU

Zobaida is a PhD candidate at MUCHE, focusing on preferences for over-the-counter oral contraceptive pills in Australia. After completing her Master in Health Economics from the University of Dhaka, where she held academic positions (lecturer and research associate), Zobaida joined Macquarie University and completed her Master of Research in Economics with High Distinction in 2021. Her research interests are reproductive health, health literacy, choice modelling and econometrics, both in the Australian and in Asian contexts.

PHD 2021–
Supervisors: Yuanyuan Gu, Bonny Parkinson, Kompal Sinha

PHD THESIS TITLE
The Economic Exploration of Oral Contraceptive Pills in Australia: Consumer Preference and Welfare

PUBLICATIONS
Ahmed Piu, Z., Gu, Y., Sinha, K., Mutowo, M., Gauld, N. & Parkinson, B. (Submitted) A qualitative exploration of the over-the-counter availability of oral contraceptive pills in Australia.

CONFERENCE PRESENTATIONS
Ahmed Piu, Z. Consumer preference for over-the-counter oral contraceptive pills in Australia: a discrete choice experiment, 14th Meeting of the International Academy of Health Preference Research, June 2023, Sydney.

OTHER ACTIVITIES ATTENDED
Hamburg University International Summer School (Health Economics), 2021, online

Discrete Choice Analysis, University of Sydney, 2021, Sydney

Training on NVivo for Qualitative Research: Analysing Qualitative Data, Macquarie University, 2021, Sydney

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MEIMEI CHEN

Meimei is a PhD candidate at MUCHE, focusing on causal inference, machine learning and econometrics. Meimei obtained a Master of Research in Economics from Macquarie University with High Distinction in 2022. She also completed a master degree in statistics at UNSW in 2021 with High Distinction.

MRES 2021–2022
Supervisors: Martin Hoyle, Yuanyuan Gu

MRES THESIS TITLE
Machine Learning for Precision Medicine and Health Economics: A Novel Model for Survival Analysis and Subgroup Identification

PUBLICATIONS
Chen, M., Hoyle, M., Gu, Y., & Kreif, N. (2022). Machine learning for precision medicine and health economics, Health Economics Connect. https://ahes.org.au/portfolio-items/machine-learning/

CONFERENCE PRESENTATIONS
Chen, M. Machine learning for precision medicine and health economics: a novel model for survival analysis and subgroup identification. 43rd Annual Australian Health Economics Society Conference, September 2022, Brisbane; and at the 11th Annual Australian Health Economics Doctoral Workshop, September 2022, Brisbane

OTHER ACTIVITIES ATTENDED
Hamburg University International Summer School (Health Economics), 2022, Germany

PHD 2023–
Supervisors: Yuanyuan Gu, Henry Cutler

PHD THESIS TITLE
Machine Learning for Causal Inference and Preference Heterogeneity

PUBLICATIONS
Beard, J. R., & Chen, M. (2023). Intrinsic capacity as a composite outcome measure: opportunities and challenges. The Journal of Nutrition, Health & Aging, 27:398-400.

OTHER ACTIVITIES ATTENDED
12th Australasian Workshop on Econometrics and Health Economics, April 2023, Hobart

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NOURA SABA

Noura is a PhD candidate at MUCHE, focusing on health preferences and policy evaluations for mental ill health. Noura is also a Research Assistant at MUCHE. She is currently undertaking research on men's preferences for suicide prevention services. Before joining MUCHE, Noura published two journal articles and worked as an economics academic tutor at Macquarie University Business School.

MRES 2021–2022
Supervisors: Henry Cutler, Yuanyuan Gu

MRES THESIS TITLE
Preferences for Depression Treatment and the Role of Health Literacy

CONFERENCE PRESENTATIONS
Saba, N. Preferences for depression treatment and the role of health literacy, 43rd Annual Australian Health Economics Society Conference, September 2022, Brisbane

OTHER ACTIVITIES ATTENDED
Hamburg University International Summer School (Health Economics), 2021, online

Fundamentals of Choice Modelling, Australian Consortium for Social and Political Research Inc. (ACSPRI), 2021, online

PHD 2022–
Supervisors: Henry Cutler, Yuanyuan Gu

PHD THESIS TITLE
Mental Health Care Utilisation in Australia: Exploring the Impact of Attitudes, Co-payments, and Pharmacy Locations

CONFERENCE PRESENTATIONS
Saba, N. Preferences for depression treatment and the role of health literacy, 14th Meeting of the International Academy of Health Preference Research, June 2023, Sydney

OTHER ACTIVITIES ATTENDED
Introduction to the HILDA survey, 2022, online

ABS DataLab Safe Researcher Training, 2023, online

MONA AGHDAEE

Mona is a PhD candidate and part-time Research Fellow at MUCHE. She has substantial experience as a health economist with a remarkable track record in co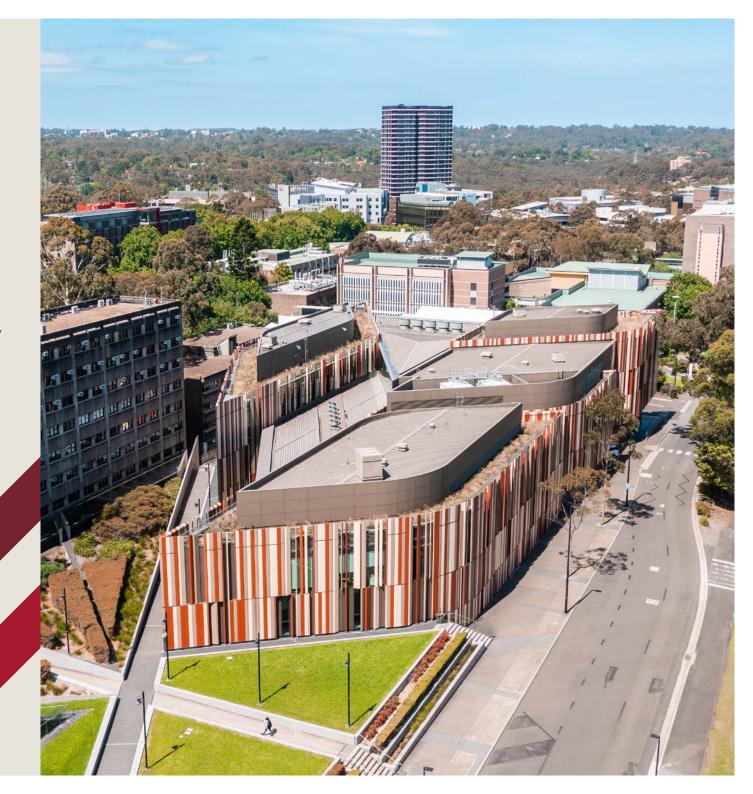nsulting work. Mona has also collaborated with the World Health Organization on multiple consultancy projects, focusing on immunisation financing and policy evaluation. Her academic background in mathematics and statistics has equipped her with a significant advantage in conducting research, particularly in the areas of policy analysis and modelling in health economics. Mona's studies are focused on health outcome measures and machine learning. For her PhD, she will be exploring the application of artificial intelligence in health economics and health outcome measures, a subject that reflects her passion for innovative research.

PHD 2023–
Supervisors: Henry Cutler, Bonny Parkinson, Shlomo Berkovsky

PHD THESIS TITLE
Applications of Machine Learning in Health Outcome Research

About the Macquarie University Centre for the Health Economy

Macquarie University is recognised as one of Australia's leading research universities, with an enviable reputation for excellence. While still relatively young, success has positioned our distinctive approach to deliver groundbreaking research with world-changing impact. We are consistently ranked in the top one per cent of universities worldwide.

The University's objectives are to accelerate world-leading research, to prepare world-ready higher degree research candidates, and to actively engage externally as a world-recognised research collaborator and partner of choice. We believe collaborating with industries, governments, communities, professions and academic colleagues around the world is paramount to our success.

The Macquarie University Centre for the Health Economy (MUCHE) is a strategic University initiative created to undertake innovative research on health and aged care. We are one of four research centres within the Australian Institute of Health Innovation, Australia's largest and most integrated health systems research institute.

MUCHE's vision is to create a world where decision-makers and the public are empowered with trusted and impactful research. Our mission is to be Australia's most influential health economics research centre in academic and public policy debate.

We undertake research funded by competitive academic grants and by government and non-government organisations. We actively promote our research through clear communication to inform public debate, assist decision-making, and help formulate strategy and policy.

We investigate the health economy at the macro level, focused on the interdependency of these systems with each other and the broader economy. We investigate factors beyond the health and aged care sectors that impact the health and wellbeing of populations.

Researching the health economy requires many skill sets and experiences. Solving complex problems within health and aged care requires teams with multidisciplinary skills working closely together. We actively collaborate with Macquarie University academics within the Macquarie University Business School; Faculty of Medicine, Health and Human Sciences; and Faculty of Science and Engineering.

We collaborate with Macquarie University research hubs and centres, and with world-leading academics from universities in Australia, Europe and Asia. We take pride in combining our professional approach to partner engagement with our academic approach to research, to deliver innovative and translational publications and outcomes.

For further information about the program or MUCHE, please contact me (**E:** henry.cutler@mq.edu.au) or Interim Deputy Director, Associate Professor Bonny Parkinson (**E:** bonny.parkinson@mq.edu.au).

Professor Henry Cutler
INAUGURAL DIRECTOR
MACQUARIE UNIVERSITY CENTRE FOR THE HEALTH ECONOMY (MUCHE)
AUSTRALIAN INSTITUTE OF HEALTH INNOVATION
MACQUARIE UNIVERSITY BUSINESS SCHOOL

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