Study and research opportunities
Welcome to the Liggins Institute

Our vision is ‘a healthy start for a healthy life’ and our mission is to improve life-long health through excellent research into the long-term consequences of early life events.

Thank you for considering postgraduate study at the Liggins Institute. It is our pleasure to assist you as you take the next steps in your academic, clinical or research career.

This prospectus is a guide to our key research themes and what you can expect from being part of a research-focused institute with a worldwide reputation.

The Liggins Institute is a large-scale research institute at the University of Auckland. We are one of the world’s leading centres for research on fetal and child health, nutrition, development, epigenetics and translational and implementation science.

Our aim is to translate discoveries in basic science into strategies that will prevent or help people manage major health problems of the 21st century, such as obesity, heart disease and type 2 diabetes. Our vision is ‘a healthy start for a healthy life’ and our mission is to improve life-long health through excellent research into the long-term consequences of early life events.

The Liggins Institute is based at the University’s Grafton campus, in a new building that is part of the Faculty of Medical and Health Sciences, and directly opposite Auckland’s biggest teaching hospital where many of our clinical researchers are based. Our Institute has world-class laboratory facilities as well as a dedicated clinical research unit where we see study participants. Our central location puts you right in the heart of Auckland, currently ranked third out of 230 world cities for quality of living.*

Whether you want to advance your scientific or clinical knowledge, improve outcomes for future generations, or help develop New Zealand’s healthcare system, the Liggins Institute’s reputation and expertise offers you a strong foundation for a successful career.

I warmly invite you to explore our postgraduate prospectus and website to discover the range of research projects on offer, and I look forward to welcoming you to the Institute.

PROFESSOR FRANK BLOOMFIELD
Director, Liggins Institute
The University of Auckland

Why study with us?

As a Liggins student you’ll enjoy all the benefits of studying at New Zealand’s leading university with the added bonus of being part of a world-class research institute.

A unique multidisciplinary approach

At the Liggins Institute we draw on expertise from a range of complementary fields in order to view human health problems from different angles at once. Some research projects have direct clinical relevance and can be quickly applied as strategies that benefit community health. Others focus on uncovering the molecular mechanisms behind diseases such as type 2 diabetes and complications of pregnancy such as preterm birth.

Internationally recognised researchers

Enrol in a study programme and you’ll be supported by academic staff who are internationally known and respected. Many of our academics are involved in research projects across the University, and many others are practising clinicians. This ensures that you have access to a wide range of ideas, expertise, resources and opportunities.

World-class facilities

The Liggins Institute offers state-of-the-art laboratory facilities and equipment, including cell culture facilities, confocal microscopy, flow cytometry, mass spectrometry, DEXA scanning, Real-time PCR analysis, and SNP, methylation and expression analysis using a Sequenom Epityper. Our clinical research unit sees over 300 research participants each year, in a diverse range of studies including nutrition, pregnancy, and early childhood development. We also have a research farm for large animal studies and access to small animal facilities on the Grafton campus. All postgraduate students have access to desk space and computers.

Training and support throughout your studies

As a Liggins Institute student you will be supervised by a member of our research team who is a specialist in your field of interest. PhD students are supported by additional supervisors and advisers, often from different or complementary disciplines. You will receive high-level training in research and laboratory techniques, and will benefit from career opportunities and travel support to national and international conferences.

The Liggins legacy

Join the Liggins Institute and you’ll be following in the footsteps of one of New Zealand’s greatest perinatal scientists, Professor Sir Graham ‘Mont’ Liggins (pictured left), who discovered that antenatal corticosteroids administered to pregnant mothers at risk of delivering early could hugely increase the survival rate of premature babies. He showed that steroids could speed up the development of a baby’s lungs enough for those born very prematurely to breathe on their own. This life-saving treatment – first trialled by Mont in the 1960s – led to dramatically improved survival rates among premature babies all over the world. Mont’s work demonstrated how basic science can be translated into clinical practice that makes an impact on people’s lives, and is what we strive to achieve at the Liggins Institute today.
PhD student Stephanie Segovia is researching the impact of early-life nutrition on developmental programming. Her research at the Liggins Institute could help develop targeted and safe intervention strategies to prevent programmed obesity and metabolic diseases.

“I decided to embark on a PhD because I wanted to pursue my passion for nutrition and biomedical science in a research setting. My project focuses on developmental programming, which is the concept that the maternal, in utero environment has long-term outcomes for her offspring. Specifically, I’m looking at the effects of maternal obesity on long-term offspring health including obesity and type 2 diabetes.

My supervisors are extremely supportive, knowledgeable, and available when I need their help. They’re also good at giving me the independence to pursue what I’m interested in. Doing a PhD gives you the opportunity to travel the world. You could get sent to a conference and communicate with people who are experts in your field and that is amazing. You also develop a number of important skills, including communication, problem solving, critical thinking and time management, all of which are applicable to any field of work.”

Stephanie Segovia
PhD candidate in Health Sciences
Research themes

The Liggins Institute’s goal is to turn research discoveries into real strategies that will help people to prevent and manage major health problems in the 21st century and our four key research themes focus on achieving this.

Determinants of a healthy life

A genome is an organism’s complete set of DNA, including all of its genes. Understanding how the genome works is key to understanding why some people develop certain conditions and others do not.

During early life, both in the womb and in early childhood, the environment interacts with the genome to determine life-long disease risk. Understanding how the environment alters gene expression, for example through epigenetic modifications to the genome, could help us design interventions to decrease the risk of disease in later life.

In addition to our own genome, there are trillions of bacteria living in our bodies that are changing all the time. Some of these bacteria live in our cells and have the potential to change how our cells behave. This means it could be possible to use bacterial supplements to alter the likelihood of developing diseases like diabetes.

This ground-breaking area of science is a key research theme at Liggins because of its potential to understand why and how non-communicable diseases develop.

Healthy mothers, healthy babies

A mother’s environment, diet and lifestyle during pregnancy and even before conception can influence the outcome of her pregnancy and her child’s life-long health.

Babies who are born too small or too early are more likely to develop chronic adult conditions such as obesity, cardiovascular disease and diabetes. Babies whose mothers are affected by complications of pregnancy, such as pre-eclampsia, severe morning sickness and gestational diabetes also are at increased risk of these adult conditions.

In this area of research we look at how maternal, fetal and neonatal treatments – including nutrition and the intrauterine environment – can affect a baby’s growth, development and long-term health. Through experimental research, clinical trials and follow-up studies, our goal is to improve medical guidelines, practices and treatments that take place from before conception through to early childhood.

“"How we care for mothers and newborn babies can influence their health for the rest of their lives. As a researcher at the Liggins Institute, I am proud to follow the example of Professor Sir Mont Liggins, whose research led to a simple treatment that has saved the lives of millions of preterm babies. We are determined that our new research into the best ways of caring for vulnerable babies will make a difference to babies, their families, and the health and wellbeing of future generations.”

Distinguished Professor Jane Harding
Untangling the secrets to how our cells work is more complex than it seems. Delving deeper with modern omics-related technologies has opened new avenues and unveiled new processes that have a significant impact on how genes work. As it turns out, the way DNA folds up inside a cell is not random but a process central to the way the information content of DNA is realised. The physical proximity of regulatory regions and genes modifies the activity of the genes. Collectively, all of these dimmer switches moderate the activity of the genome and the genes it encodes. Our work is at the forefront of trying to interpret this.

Our genome changes throughout our life and these changes are dependent on our environment, food and age. How is that possible? Surely we are born with our DNA? Well, yes and no. We are actually more microbes than human cells – or at least equal numbers. The microbial population that co-exists with us collectively has more genes than our cells do. These genes have the potential to make a huge contribution to our development, health and well-being. Work to understand this relationship is now underway.”

Dr Justin O’Sullivan
Senior Research Fellow
Research themes

Nutrition for lifelong health

Good nutrition is important at every stage of life: from the health of parents at the time a baby is conceived, to the impact of diet on muscle health and insulin sensitivity in adulthood. High fat nutrition, undernutrition, low protein diets and unbalanced diets can all have an effect on the likelihood of developing chronic diseases. For babies, the nutritional environment they were conceived in can affect the regulation of key metabolic genes and influence their tendency towards obesity and related metabolic disorders as they grow up. We’re particularly interested in babies who are more at risk of developing chronic diseases in later life, such as those born very early or late, or small for gestational age.

Nutrition and activity during adolescence and adulthood also influence the likelihood of developing conditions like obesity and diabetes. We’re investigating the effect of micronutrients on the development of insulin resistance, and how muscle mass and heart function can be improved through exercise.

“The nutrition research at the Liggins Institute includes our ground-breaking work to better understand nutrition during pregnancy and how it affects a baby’s development, through to our studies that are examining the unique nutritional needs of premature babies. This research, when combined with sophisticated chemical analysis, has allowed us to examine breast milk to unravel more of the complexity of the unique nutritional bond between mother and baby. We still have so much to learn.”

Professor David Cameron-Smith
Dr Ben Albert is a paediatrician who decided to do a PhD at the Liggins Institute. Ben is investigating insulin sensitivity and why this hormone becomes less effective in people who are obese, leading to health issues like heart disease and diabetes.

“As a paediatrician, it’s very obvious to me that we’re seeing more and more children who are overweight and obese, many of whom already have long-term health conditions like diabetes and high blood pressure. The main thing that links obesity to all of these health problems is that insulin – the hormone that controls your blood sugar – becomes less effective.

We know that babies born to women who are overweight in pregnancy are much more likely to develop conditions like obesity and heart disease as they get older. I wanted to investigate whether there was something we could do during pregnancy to prevent this happening, and whether a novel treatment with something simple like fish oil could improve the way insulin was working. If we could do that we could probably dramatically improve the rates of diabetes and heart disease in New Zealand.

Excitingly, fish oil did have this beneficial effect in animals, so we are now looking to find out if it could also work in human pregnancy.”

Dr Ben Albert
Paediatrician and PhD graduate
Research themes

Research to Reality

We’re passionate about translating our research discoveries into real strategies that will help people to prevent and manage major health problems in the 21st century.

Research to Reality is all about finding the best ways to translate our research findings to educators, healthcare professionals and policy makers, so that these findings are implemented through change in practice. It’s also about communicating most effectively to bring about behavioural change.

This theme includes systematic reviews; meta-analyses and overviews; individual participant data analysis; development, implementation and audit of national and international guidelines, and projects that engage directly with those who are in positions to bring about behavioural change. Two key groups are school teachers, who can embed our research evidence into the science curriculum, and healthcare workers who engage with prospective mothers and with parents.

Clinical trials

Liggins researchers follow people at every age and stage to identify the determinants of a healthy start to life and to investigate the diet and exercise factors that influence health and disease in adulthood.

We carry out randomised controlled trials and observational studies in hospitals, at the Liggins’ purpose-built Maurice and Agnes Paykel Clinical Research Unit, and at our on-site Nutrition and Mobility Clinic.

These fully equipped facilities allow us to run complex metabolic studies in children, young people and adults. The Clinical Research Unit (CRU) has three comfortable assessment rooms for trial participants, as well as quiet rooms for questionnaires and psychological studies, a kitchen and a play area. Students and researchers using the CRU have access to a DEXA (Dual Energy X-ray Absorptiometry) scanner for measuring body composition; a Peripheral QCT (Quantitative Computed Tomography) scanner for measuring bone density; a portable ultrasound; a Leonardo Jump Plate for measuring power and balance, and all the standard medical equipment for cardiovascular assessments.

The unit is staffed by a friendly team of paediatric endocrinologists, paediatricians, paediatric and research nurses and administrative staff.

"Working in the Clinical Research Unit, my favourite part of my job is helping students set up a clinical study. This includes negotiating all aspects of the study from ethics approval to recruiting subjects, right through to meeting the participants and helping students carry out the assessments. I love watching our students grow in confidence and to see them succeed and complete their studies.”

Janene Biggs
Senior Clinical Research Nurse
If you have a good academic record in a relevant subject there are lots of opportunities for postgraduate research at the Liggins Institute. We welcome applications from students with a background in the following subjects and disciplines:

- biological sciences including molecular medicine, neuroscience, physiology
- clinical medicine and health sciences including obstetrics and gynaecology, paediatrics, nursing, nutrition, pharmacology, and endocrinology
- animal or veterinary science.

Specialisations on offer

Research projects for doctoral, masters and honours degrees and postgraduate diplomas are available in all four of our research themes. Most students study in the field of perinatal science, with opportunity to take on projects relating to subjects such as Community Health, Māori and Pacific Health and Nutrition and Dietetics too.

Opportunities for clinicians

For practising clinicians, postgraduate study is a wonderful opportunity to spend time investigating your field of interest. Postgraduate study develops a range of analytical and problem solving skills, as well as building expertise in your chosen area and developing a profile that will advance your career.

Summer studentships

Summer studentships are short-term scholarships for undergraduate students to get a taste of postgraduate study. The Liggins Institute offers a number of these funded research projects each summer vacation and for many former students it was the start of a research career.
PhD candidate Barbara Cormack is an experienced Paediatric Charge Dietitian at Starship Children’s Health. A growing interest and involvement in neonatal nutrition research led Barbara to her PhD at the Liggins Institute, where her research centres on the ProVIDe study, a multicentre trial of high protein intakes for extremely preterm babies.

“Birth at extremely preterm gestation or extremely low birthweight (<1,000 g) can be considered a nutritional emergency. Adequate protein intake in the weeks after birth is critical for optimum growth and development, but there is little evidence on the amount required. The ProVIDe study aims to assess whether administering a high-protein fluid in the week after birth will improve neurodevelopment. Because the intervention is so simple and inexpensive, if it’s successful it could be implemented in all neonatal units, thereby improving lifelong health.

The ProVIDe study began as a glimmer in my eye, but I needed a great deal of help to develop the study protocol and obtain funding, ethics approval and get the study up and running in New Zealand and Australia. Enrolling as a PhD student and gaining access to the experienced researchers and infrastructure at the Liggins Institute made my study a reality.

Deciding to enrol for a PhD is a big decision. I chose the Liggins Institute because I know they do exceptional health research and I wanted to learn how to do this too. I have not regretted my decision for a moment. I have been encouraged and well supported by the academic and support staff to achieve the best that I possibly can in my time here.”

Barbara Cormack
PhD candidate in Health Sciences
The University of Auckland offers a range of scholarships and awards for postgraduate students. From one-off payments to scholarships that pay your tuition fees and living costs for up to four years, there are around 400 awards on offer for lots of different criteria including:

- academic excellence
- financial hardship
- gender
- Māori and Pacific students
- students with disabilities.

You can check the University of Auckland website for more information and to search for scholarships: www.scholarships.auckland.ac.nz

There are no additional fees for international PhD students: as long as you live in New Zealand during your period of enrolment you will pay the same fees as New Zealanders.

University of Auckland PhD scholarships

University of Auckland PhD scholarships are awarded across the University to support academically excellent students. You are guaranteed one of these scholarships if you have a grade point average (GPA) of 8.0 or above from a New Zealand university, or if you are a Māori or domestic Pacific Island student with a GPA of 7.5 or above. If you have a GPA of 7.0 you may still be considered.

Liggins Institute scholarships

There are also a number of scholarships specifically for Liggins Institute students advertised throughout the year. Check the Liggins Facebook page or visit www.liggins.auckland.ac.nz/scholarships for the latest updates.

Find a project and a supervisor

Start by exploring our key research themes to find an area that particularly interests you. Alternatively visit www.liggins.auckland.ac.nz to read more about the leading international scientists who work at the Liggins Institute and their areas of interest.

You can also search FindaThesis (www.findathesis.auckland.ac.nz) for the current research projects at the Liggins Institute.

Apply for PhD study

Once you’ve decided on your research focus or project, you can apply for and start a PhD at the Liggins Institute all year round. You need a BSc (Hons), MSc degree or equivalent and a strong academic record, ideally with a GPA (Grade Point Average) of at least 7.0.

We welcome applications from students with backgrounds in biological, medical and health sciences, as well as applications from practising clinicians.

If this sounds like you, please contact the Liggins Institute Academic Director at ligginsstudentenquiries@auckland.ac.nz who will guide you through the application process and help you find a suitable supervisor.

Apply for Masters or Bachelors (Hons) programmes

The Liggins Institute also offers research projects for masters and honours degrees and postgraduate diplomas in a wide range of subjects. These programmes are coordinated through the Faculty of Medical and Health Sciences (FMHS) and you can apply via www.fmhs.auckland.ac.nz/study-options

“Postgraduate students are the lifeblood of our Institute and provide new perspectives and energy to the research environment. We always welcome applications from talented domestic and international students to explore their passion in a supportive and stimulating research environment”

Professor Mark Vickers
Associate Director – Academic
LIGGINS
INSTITUTE

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