



Charles Sturt  
University

Gulbali Institute  
Agriculture Water Environment

# Gulbali PhD scholarship prospectus 2025

Challenge Project: Biosurveillance of  
Emerging Zoonotic Viruses in Australia

# Charles Sturt University

## Who we are

Charles Sturt University is Australia's leading regional university – with a global perspective.

Our history of innovation and educational empowerment reaches back as far as 1895 with the establishment of the Bathurst Experimental Farm. That was the first step in connecting people, communities and industry to make a real difference. Professionally. Socially. Economically.

Formally incorporated in 1989, we are Australia's largest regional university. We have campuses across New South Wales, and teaching partnerships in Canberra, Goulburn and Wangaratta.

We also have diverse international partnerships and provide online education nationally and across the globe.

Our university is grounded in the qualities we draw from our regional roots – our sense of community, our will for hard work, and our resilience when times get tough. We have turned the challenge of connecting multiple campuses across hundreds of kilometres into an opportunity – to apply the lessons we have learned to connect students across Australia and the world.

Our student body – numbering some 43,500 – stretches from the banks of the Murrumbidgee River

to the oceans in Port Macquarie. And our alumni – 220,000 strong and counting – are applying their learning everywhere too, from the red centre and the white wilds of Antarctica, to the heart of the world's megacities.

And that's not just the case for our students. We have research and industry partnerships that reach across the nation and around the globe – sharing knowledge, driving change, fostering growth.

## Yindyamarra winhanganha

It means the wisdom of respectfully knowing how to live well in a world worth living in. And it's what we strive for. Every day. How? By making connections.

Connecting our students with the knowledge and wisdom to shape the world and reach their potential.

Connecting our research to real-world issues.

Connecting new technologies with traditional wisdom to protect ecosystems and forge a more sustainable future.

And connecting people, industry and government to share ideas, build knowledge and find innovative solutions to today's – and tomorrow's – challenges.

## Our vision

Our vision as Australia's leading regional university, is to advance the careers of our students, inspire research excellence and drive regional outcomes with global impact.

We seek to empower the leaders of tomorrow through innovative education and applied research, and we have a strong commitment to learning from and working with Australia's First Nations Peoples.

It's why we are committed to the transformative University Strategy 2030. It's our commitment to our communities. To our partners. To our students. To our regions. A long-term strategy deepens our relationships, enabling us to build a stronger tomorrow together.

Students	Research	People	Social responsibility
			
We connect our students with the knowledge and wisdom to shape the world	We collaborate with our partners on research with impact	We are capable, inspired and empowered to deliver excellence	We engage regionally and globally to drive sustainable prosperity

# Studying in Australia

## An experience like no other

At Charles Sturt, we're geographically gifted. We have five campuses across regional Australia in Albury-Wodonga, Bathurst, Wagga Wagga, Orange and Port Macquarie.

Our campuses are safe, close-knit communities. Your lectures, tutorials, practical workshops, cafés, gym and the all-important library, are just a short walk from one another.

Our PhD Supervisors have small student cohort sizes which means targeted and specialised tuition.

At Charles Sturt, we have a strong student community. You'll study alongside students from across the country and the world - 24% of our students are international students from 113 countries - making lifelong friends along the way.



## Gulbali Institute

### Agriculture, Water and Environmental Research

We acknowledge and pay respect to our Wiradjuri First Nations people by using their native language in the naming of this research institute.

“Gulbali ngurambang” is Wiradjuri which translates to “to understand country”. After consultation with First Nations people, we use this phrase respectfully as the name of our research institute.

The Gulbali Institute creates impactful integrated agriculture, water and environment research, grounded in Charles Sturt’s footprint across the Murray-Darling Basin, but with impact across Australia and globally.

We emphasize return on investment to increase productivity for farmers, improve natural environments, and reduce risk in agricultural and environmental management.

The Gulbali Institute will maintain Charles Sturt’s existing research program and its strong relationships, particularly with Research Development Corporations, key State and Commonwealth departments and agencies, and private industry to achieve outstanding outcomes.

The Institute will undertake multi- and interdisciplinary research and innovation, focusing on large scale programs in the field of:

- Biosecurity
- Agricultural Innovation,
- New Food and Beverages,
- Sustainable Aquatic Systems
- Cultural Connection and Environmental stewardship

### Find out more

→ <https://www.csu.edu.au/research/gulbali>

# The Gulbali PhD program

## Details and rationale

The Gulbali PhD program is a range of prestigious scholarships for both domestic and international research candidates. In most cases, these scholarships are available to Australian or New Zealand citizens or Australian permanent residents. We are seeking highly talented researchers who are global thinkers, seeking to address grand challenges, which align with the key Gulbali research institute focal areas.

## Selection Criteria

- a) Previous Academic Performance: This assessment considers the level of the applicant's highest, relevant, qualification in line with CSU entry requirements for PhD courses (See note\*\* on Page 6).
- b) Research and/or Professional Experience: Evidence of an applicant's research achievements and relevant professional experience. This includes such aspects as peer-reviewed research outputs, high esteem academic awards and prizes, relevant research and/or professional experience.
- c) Research Alignment and Supervisor Capacity at Charles Sturt: Alignment with both CSU and/or industry strategic research priorities and strengths. This includes the strength of alignment with the Charles Sturt 2030 Research strategy: the supervisory capacity, FoR alignment with Coaldrake, and the expected impact and end user engagement of the proposed research.
- d) Degree of support from Gulbali projects, teams and/or supervisors.
- e) Research Question and proposed methodology.

## Who is eligible?

- Prospective PhD students interested in joining Gulbali projects and/or teams and/or propose a project with a strategic link to the Gulbali institute mission/objectives
- High quality international and domestic students meeting minimum requirements for Charles Sturt University
- Students considering entry into a PhD program into session 2 2025

## How to apply?

Gulbali will run a two-stage EOI process which will be advertised on the Charles Sturt University scholarships page and through national media.

The first stage will require applicants to complete an online form and submit, along with a professional CV and transcripts.

Candidates will then be shortlisted and top applicants, and supervisors, will be invited to complete the Charles Sturt admissions process.

Closing date for EOIs is **8<sup>th</sup> February 2025**.

Shortlisting will take place in **late February 2025**, with highly ranked students invited to submit enrolment applications by **2 March 2025**.

## Key Details

### Commencement:

Students must commence in **Session 2 2025**.

### Study load:

Only full-time applicants will be accepted for shortlisting.

### Stipend:

This scholarship is valued at \$35,000 per annum, payable in fortnightly instalments. First Nations applicants will have a stipend valued at \$50,000 per annum.

### Top Ups:

Various industry and university top ups of up to \$10,000 per year are available, by application, following acceptance of enrolment. The principal Supervisor will advise eligibility.

### Tuition Fees:

Domestic candidates: Fee exemption for a period equivalent to four years (eight sessions) for PhD at full-time study.

International candidates: Fee exemption for a period equivalent to three years (six sessions) for PhD at full-time study.

### Operating Funds:

Scholarship candidates are allocated an allowance to assist with the reimbursement of costs associated with a candidate's research. The annual amount reflects whether the project is linked to specific field or education codes, lab-based, non-lab based and/or First-Nations focused.

### Selection:

A weighting system will be established to rank candidates. Shortlisting will take place by an expert committee of research active academics.

### Visa:

International students will require a valid student visa and insurance to commence. Processing can take up to 4 months. Limited relocation funds (up to \$5,000) are available.

### English language proficiency:

Shortlisted International students must upload evidence of English language proficiency, as part of the enrolment process, in line with any of the following minimum CSU standards:

1. Providing evidence of having completed a sufficient standard of study in English.
2. Having obtained an Academic IELTS (or equivalent) within the last 2 years with a minimum overall score of 6.5 and no individual score below 6.0
3. Written evidence of a degree that was conducted and examined solely in English.
4. Level 109 of the ELS examination with a score above B (reading and writing) and above P (speaking and listening) in the last 12 months
5. Applicants can request (in writing) that alternative evidence be considered. These are individually decided by the Pro Vice Chancellor (Research and Innovation).

## Charles Sturt University Doctor of Philosophy entry requirements:

### **\*\*Note on CSU Doctor of Philosophy entry eligibility:**

Applicants must have achieved at least one of the following:

- a. Qualified for the award of a master by research with an acceptable level of performance.
- b. Completed a bachelor degree followed by a one-year honours degree with class 1 or class 2(1) honours, specialising in the same discipline or a closely similar discipline.
- c. Gained class 1 or class 2(1) honours in a bachelor degree of at least four years full-time duration, specialising in the same discipline or a closely similar discipline.
- d. Commenced a masters by research at the University and shown exceptional ability in a research project that is clearly capable of being extended to a doctoral level.
- e. Qualified for the award of a coursework masters:
  - i. including a research component subject or research component subjects totalling at least 16 Charles Sturt University points, or equivalent; and
  - ii. normally with a grade average equivalent at class 2(1) honours or better.
- f. Completed another appropriate combination of undergraduate and postgraduate qualifications (such as relevant graduate diplomas) and research experience that demonstrates capacity for research at a doctoral level.

### Critical dates

Dates are fixed and tied around the need to allow sufficient time for proposals, assessments, enrolment, screening, and (if applicable) visa applications. The timeline below is targeting census date 2024 teaching session one.

The timeline below is targeting census date 2025 teaching session two.

- By 20th December 2024: Call of EOI's opens.
- By 8th February: EOI's due to be submitted to challenge program lead.
- By 28th February: Challenge program lead submits three preferred students to Gulbali.
- By Thu 2nd March: Gulbali Leadership team review recommended candidates.
- By Fri 3rd March. Challenge program lead makes verbal offer to students.
- By 15th March. CSU issues written offer and student accepts.
- By 31st March. Student submits Visa application (if applicable).
- By 8th August. Student commences in second session.

# Challenge Project

## Biosurveillance of Emerging Zoonotic Viruses in Australia

### Project Summary

The Biosurveillance of Emerging Zoonotic Viruses in Australia (BEZVA) project is aligned with Gulbali grand challenges on biosecurity to combat invasive species and viruses so that we can produce the highest quality farm produce and enable healthy communities. The BEZVA is also addressing the Gulbali Grand Challenge of climate change adaptation and the series of grand challenges that flow from it. CSU, in partnership with leading national and international research institutes, will play a pivotal role in safeguarding Australia's public health, agricultural economy, and biodiversity. The four-year BEZVA project will work on exotic viruses' threats to animals to humans, especially in the context of Australia's multibillion-dollar agricultural sector. The BEZVA project will address this by building local and national expertise in key areas such as viral detection, molecular virology, disease modeling, and biosurveillance.

Central to BEZVA is its focus on the One Health approach, which emphasises the interconnectedness of human, animal, and environmental health. By integrating this multidisciplinary perspective, the project will provide a comprehensive framework for understanding and preventing the transmission of zoonotic diseases at their source. High-risk hosts such as bats and rodents, which are natural reservoirs for numerous viruses, including coronaviruses, henipaviruses, and lyssaviruses, will be the primary focus of the biosurveillance efforts. These animals are often implicated in viral spillover events, which can result in outbreaks of diseases that have the potential to affect both livestock and human populations. Through extensive molecular and serological testing of both archived and newly collected samples, the project will enhance Australia's ability to identify and characterise these emerging viral threats in a timely manner. The project's risk-based sampling framework is a key innovation. This approach strategically targets regions and species that are most likely to experience viral spillover, amplification, and transmission, based on environmental, ecological, and behavioral factors. By focusing on these high-risk areas, BEZVA will not only provide an early warning system for zoonotic disease threats but also contribute critical data to inform national and global disease mitigation strategies. The integration of climate change modelling into these efforts further strengthens the project's ability to predict how shifts in human and animal distributions, driven by environmental changes, will affect viral spillover rates. This multidisciplinary approach will not only improve Australia's preparedness for future zoonotic disease outbreaks but also contribute to global efforts to understand and address the complex interplay between climate change and disease emergence.

Beyond its immediate scientific goals, the BEZVA project is also focused on building long-term infrastructure and capacity for zoonotic disease surveillance and response. The project will foster collaboration between Australia's CDC secretariat, regional stakeholders, and international partners, including the Australian Centre for Disease Preparedness (ACDP), the World Health Organization (WHO), and the United States Centers for Disease Control and Prevention (CDC). These partnerships will be essential in creating robust, collaborative systems for detecting and managing zoonotic diseases, both domestically and globally. Partnerships with institutions such as the ACDP, USDA, and NIH will play a crucial role in enhancing Australia's role in global health security. These collaborations will help ensure that the biosurveillance systems and strategies developed through BEZVA can serve as a model for other nations facing similar challenges. The project will also drive innovation in zoonotic disease prevention by fostering collaboration between academic institutions, governmental bodies, and international organizations. Key objectives of the BEZVA project include developing a comprehensive bio-surveillance system specifically targeting zoonotic viruses in bats and rodents in Australia, building local expertise in zoonotic disease modelling, molecular virology, and disease surveillance, and establishing enduring partnerships with national and international organisations. The project will also investigate the environmental and behavioral factors that influence zoonotic spillover risks, particularly in the context of climate change. These findings will be instrumental in shaping public health strategies, biosecurity measures, and policy reforms aimed at reducing the risk of zoonotic disease emergence in Australia. On a global scale, zoonotic diseases continue to pose a significant threat to both human and animal populations. The BEZVA project's focus on high-risk interfaces in Australia places it in a unique position to address critical gaps in biosurveillance, both within the country and beyond. The project's findings will have important implications, contributing valuable data and insights that can be used by the international community to prevent and manage future pandemics.

## Project outcomes and outputs

The BEZVA project is well-positioned to deliver significant outcomes that will strengthen Australia's capacity to respond to emerging zoonotic threats and enhance CSU's standing as a leader in global health security research. Central to these outcomes is the training and development of the next generation of infectious disease researchers. Three PhD fellows will be supervised by an interdisciplinary team of leading experts in molecular virology, structural biology, epidemiology, and bio-surveillance. These fellows will gain critical skills in zoonotic disease detection, virus characterisation, and disease modelling, positioning them to make substantial contributions to Australia's infectious disease workforce and deliver critical insights into the molecular mechanisms driving zoonotic spillover events. Their successful completion of the project will not only enhance their individual careers but also contribute to strengthening the workforce both nationally and globally, addressing the critical shortage of specialists equipped to tackle future epidemic and pandemic threats. As part of the project's broader impact, CSU will build highly efficient, interdisciplinary One Health research teams. These teams will integrate expertise across the fields of animal health, biology, environmental science, and human health to address complex zoonotic disease challenges. By fostering collaboration across sectors, BEZVA will contribute to a stronger research infrastructure at CSU, increasing the university's capacity to attract external funding, build long-term research partnerships, and serve as a national and global leader in zoonotic disease research. One of the tangible financial outcomes of the project is the generation of approximately \$2.5M in additional revenue for the Higher Education Research Data Collection (HERDC), reflecting the high-impact research outputs expected from the project.

The BEZVA project will deliver a range of significant outputs, advancing both Australia's capacity for zoonotic disease research and global efforts to combat emerging infectious threats. A key deliverable is the production of >20, Q1 peer-reviewed publications in leading scientific journals (targeting Science, Nature, PNAS, Cell and Lancet publishing group). These papers will focus on viral discovery, transmission dynamics, and innovative bio-surveillance strategies, helping to shape global knowledge on zoonotic diseases. Such publications will also enhance the academic reputation of CSU, contributing to the institution's growing profile in infectious disease research. Importantly, the papers will provide evidence-based recommendations for global health policy, particularly around mitigating zoonotic risks and preventing future pandemics.

Beyond research outputs, the BEZVA project will establish robust interdisciplinary research teams within CSU, applying a One Health approach to infectious disease challenges. These teams will integrate expertise from animal health, environmental science, and human health, building a collaborative framework for addressing complex zoonotic transmission issues. By fostering this multidisciplinary research environment, CSU will increase its research capacity and become a leader in One Health initiatives, attracting top-tier talent and competitive research funding. This structure will provide a long-lasting legacy for the university, solidifying its role in addressing global health security challenges.

Additionally, USDA has expressed their interest in the BEZVA project – this has significant potential to expand its biosurveillance research hub into Pacific Island countries. This expansion is particularly critical given the diverse zoonotic risks posed by these regions, which act as potential gateways for the introduction of emerging viral threats into Australia. By extending biosurveillance efforts to these neighboring areas, the project will not only help detect and mitigate zoonotic risks at their source but also enhance Australia's early-warning system for infectious diseases that could threaten both human health and the agricultural sector.

In terms of practical outcomes, BEZVA will develop new capabilities in the fields of molecular virology, disease modelling, and epidemiology that will directly contribute to Australia's ability to prevent and respond to future zoonotic disease threats. The project will generate actionable data on emerging viruses circulating in Australia's wildlife, contributing to the development of diagnostic tools, vaccines, and therapeutic strategies. These innovations will not only be of immediate benefit to Australia but will also be shared globally, supporting international efforts to mitigate the risks of zoonotic diseases.

In summary, the anticipated outputs of the BEZVA project include the publication of high-impact research, the establishment of interdisciplinary One Health research teams, and the formation of strategic partnerships with both national and international research organisations. These outputs will not only elevate CSU's role in global zoonotic disease research but also leave a lasting impact on Australia's capacity to prevent and respond to future zoonotic threats. The project's legacy will extend beyond its immediate outcomes, establishing a foundation for ongoing contributions to global health security, biosecurity, and pandemic prevention efforts.



# PhD Project: 01

## Research Question

What factors drive spillover risk of coronaviruses and henipaviruses to Australians?

## Principal supervisor

Dr. Ariful Islam

## Faculty/institute

Gulbali Institute

## Proposed campus

Wagga Wagga



## PhD project abstract

This project will focus on epidemiology and virology of emerging zoonotic viruses circulating in bats and rodents across Australia. This research will explore the hypothesis that environmental changes drive the emergence of zoonotic diseases by altering viral diversity in wildlife populations. We will investigate how factors such as human and livestock interaction with wildlife facilitate opportunities for viral spillover. By applying ecological theories of species distribution to viral communities, we aim to understand the role of environmental and host factors in shaping virus transmission and spread. The project will involve longitudinal monitoring of viral populations to track changes in geographic and host distribution, genetic sequences, and viral evolution. Expanding the characterisation of these viruses will enhance our understanding of their genetic diversity, geographic range, and potential to cause human and animal outbreaks. A key aspect of this research will be the use of a risk-based sampling strategy, targeting regions and conditions most likely to foster viral spillover, amplification, and transmission. This will ensure the efficient detection of viruses in prioritised viral families and contribute to a better understanding of factors driving disease emergence in Australia. Ultimately, this research will support the development of more effective surveillance and prevention strategies for zoonotic diseases in Australia.

## Preferred candidate experience, skills and knowledge

This project will seek a highly motivated student with skills and knowledge in novel viral discovery, bioinformatics and disease surveillance. Previous experience on collecting biological samples from wild bats and rodents would be an advantage.

## Campus location and place of work

This work will be undertaken at the Wagga Wagga campus of Charles Sturt University. Some work activities will be undertaken at partner facilities of ACDP, Geelong.

## Direct enquiries to

Dr. Ariful Islam @ [aislam@csu.edu.au](mailto:aislam@csu.edu.au)

# PhD Project: 02

## Research Question

What are serological patterns and spillover factors for henipaviruses, coronaviruses, and filoviruses?

## Principal supervisor

Dr. Ariful Islam

## Faculty/institute

Gulbali Institute

## Proposed campus

Wagga Wagga



## PhD project abstract

In this student project, we will collect serum samples from bats and rodents (linked to PhD Project 1) to conduct high-throughput serological testing, focusing on henipaviruses, coronaviruses, and filoviruses. Since viral infections in hosts are often self-limiting, traditional PCR tests targeting viral shedding or high-throughput molecular assays typically detect fewer positive cases compared to serological tests, which can identify up to 100% of individuals previously exposed to a virus. Using advanced serological techniques, we will screen for serological evidence of viruses carried by bats and rodents, focusing on their potential to spill over into livestock, humans, and peri-domestic animals in Australia. We will assess whether bats and rodents exhibit co-immunity – immune responses to one viral family that may affect susceptibility or immunity to others – thereby improving our understanding of the dynamics of viral infections within and between species. We will also investigate the ecological and behavioral factors driving the risk of spillover from bats and rodents to humans, livestock, and peri-domestic animals in Australia. This will include studying changes in habitat use, migration patterns, and interactions with livestock or humans, which may affect the likelihood of transmission. By analysing these factors, we aim to identify the specific conditions under which spillover occurs and the viral strains most likely to cross species barriers.

## Preferred candidate experience, skills and knowledge

The applicant should have a background in epidemiology or data science and an ability to work with GIS, R, or Python. You will be able work in a team environment, interacting with epidemiologist, disease ecologists and virologist, and have excellent communication and scientific writing skills. Previous experience on collecting biological samples from wild bats and rodents would be an advantage.

## Campus location and place of work

This work will be undertaken at the Wagga Wagga campus of Charles Sturt University. Some work activities will be undertaken at partner facilities of ACDP, Geelong.

## Direct enquiries to

Dr. Ariful Islam @ [aislam@csu.edu.au](mailto:aislam@csu.edu.au)

# PhD Project: 03

## Research Question

How do molecular differences in zoonotic strains of coronaviruses, and lyssaviruses affect host-virus interactions and the potential for cross-species transmission in the context of bio-surveillance and disease spillover risk?

## Principal Supervisor

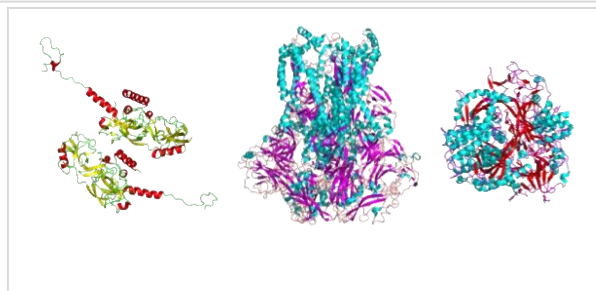
Dr Crystall Swarbrick

## Faculty/Institute

Gulbali Institute

## Proposed campus

Wagga Wagga



## PhD project abstract

This student project will utilise structural biology to investigate the molecular differences between zoonotic strains of coronaviruses, betacoronaviruses, henipaviruses and lyssaviruses. Utilising a One Health approach, the project will explore how these molecular variations influence host-virus interactions, providing insights into viral evolution, host adaptation, and potential risks to both animal and human health, particularly in high-risk Australian ecosystems. The student will employ advanced structural biology techniques, including cryo-electron microscopy (cryoEM), alongside biophysical assays, to analyse novel sequences identified through the BEZVA project's bio-surveillance efforts. The research will focus on viral tropism, with proteins from target species being expressed and purified to rapidly investigate novel viral sequences.

## Preferred candidate experience, skills and knowledge

The ideal candidate will have an honours or master's degree in molecular biology or virology. They should be passionate about research and be able to work within a regional research environment setting. They should be able to work well within a team and carry out their own independent research.

## Campus location and place of work

National Life Sciences Hub (NaLSH), Wagga Wagga campus

## Direct Enquiries to:

Dr Crystall Swarbrick at [cswarbrick@csu.edu.au](mailto:cswarbrick@csu.edu.au)