

# Undergraduate Research News Australasia

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## ACUR 2022 conference



## Editorial

**Welcome to the 22nd Issue of URNA where we celebrate the 10th anniversary of the ACUR Conference. This issue features some of the prize-winning presentations by undergraduate students who showcased their research at ACUR2022 in September 2022 at The University of Sydney.**

Close to 100 students came together from across the country to present their research,

mingle with like-minded students, network and exchange ideas. First, this issue reports on the ACUR2022 conference experience, adapted from the Teaching@Sydney blog. Then, it features five of the prize-winning research presentations. I also share with you some of the feedback and comments received from conference attendees and organisers. As usual, the Chair provides her report and alerts you to the ACUR Undergraduate Research Exchange Colloquium

that takes place on the 1st February in Sydney at Notre Dame University. She also welcomes new members to the ACUR Executive. Enjoy the celebratory issue, catch up on the ACUR2022 conference on Twitter #ACUR2022, and watch this short 3-minute-video showcasing 10 years of ACUR conference: <https://youtu.be/MzNgaplqqk>

**Lilia Mantai**, Editor

# Undergraduate research shines bright at the University of Sydney!

On the 28-30 September 2022, nearly 100 undergraduate research students from across the country came together at the Abercrombie Business School to present their research, network, and meet like-minded students. The energy and engagement of students with each other's research were astonishing across the two days of conference!

## Students shaping the conversation

*"As original undergraduate research is the focus of this conference, I really felt like I was a part of the conversation! (ACUR Conference presenter)"*

The ACUR Conference team received 110 submissions for spoken and poster presentations across a wide range of disciplines in Sciences and Humanities. The top 3 universities represented were: The University of Sydney (37 submissions), Macquarie University (23), and The Australian National University (10).

## Jam-packed conference program



Ninety-eight students eventually presented their research across two days, and close to 60 guests attended the conference including HDR students, guest panel and keynote speakers, workshop facilitators, review panel members, session chairs, and prize judges.

Delegates and guests experienced a conference jam-packed with engaging presentations, research skill workshops, breakfast with HDRs, and exciting keynotes by University of Sydney academic Dr Kate Bicknell and Dr Karl Kruszelnicki. The latter was a highlight for many attendees and many walked away with a proud selfie with the popular science communicator.



Dr Karl was generous with his time and stayed back for morning tea, quickly surrounded by young researchers, eager to talk about science and research.

## Sponsorship and Prizes

Major conference sponsorship was provided by UTS and UNSW, while Macquarie University sponsored a stunning conference dinner at the Women's College in the Sibyl Centre. [Business Co-Design](#) supported through photography, and the Art Gallery and HERDSA provided more prizes including tour vouchers, books, and an annual HERDSA membership. The following students received prizes that were presented by the University of Sydney Director of Graduate Research, Professor Louise Sharpe, and Emeritus Professor Angela Brew, the Chair of [ACUR council](#):

## Prizes

**Best overall abstract and oral presentation: Sponsored by UTS – \$1,000**

**Emma Gardiner**

*Macquarie University*

Presentation title: “Body size perception contrast effects: A result of memory bias or perceptual encoding?”

**Best oral presentation (Honours): Sponsored by UNSW Sydney – \$1,000**

**Layla Meharg**

*The University of Sydney*

Presentation title: “Investigating means of avoiding the “8-cell block” during in vitro development of bovine embryos”

**Best oral presentation (non-Honours): Sponsored by UNSW Sydney – \$1,000**

**Amelie Read**

*The University of Sydney*

Presentation title: “Unravelling the History of the Milky Way with Gaia”.

**Best poster presentation (Honours): Sponsored by UNSW Sydney – \$500**

**Akshaya Ramanathan**

*The University of Sydney*

Presentation title: “T cell Receptor Therapy”  
-A promising alternative and personalised treatment for cancer”



**Best poster presentation (non-Honours): Sponsored by UNSW Sydney – \$500**

**Jamilla Smith**

*Western Sydney University*

Presentation title: “Listen N Talk: language revitalisation and documentation in a phrase-based app”

**Prize for the Best Paper in Education Research: Sponsored by HERDSA – \$500 & one-year HERDSA student membership**

**Olivia Williams**

*Australian Catholic University*

Presentation title: “International Students, Neglected in a Time of Crisis. Gaps in Assistance for Overseas Students in Pandemic Time”

**Engagement award (Social Media): Art Gallery NSW**

**Oliver Medd**

*Australian National University*

## The value of coming together again

Needless to say but worth highlighting, undergraduate students have once again shown themselves to be capable and successful at conducting critical research and communicating it as well. Many have expressed how much they enjoyed this experience, feeling energised and inspired to pursue further research, feeling included and acknowledged for the work they have done, all while gaining more friends and connecting with like-minded people. A few delegates even got involved in ACUR’s student committee wishing to promote undergraduate research opportunities across Australia and New Zealand.

## Catch up on the conversation

If you wish to catch up on the ACUR2022 proceedings, read the presentation abstracts, and gain some further impressions of the two days, please check the website <https://www.acur.org.au/2022-conference/> and #ACUR2022 on Twitter.

Thanks to the conference organising team who worked hard to make this a successful event: Dr Lilia Mantai, Dr Daniel Johnstone, Olivia Urbaniak, Emma van der Schyff, and Nicky Gluch.

# Seeing is not necessarily believing



**Do you think that you can accurately perceive the size of your own body? My fascination with visual perception began when I was a child.**

My parents took to me to Puzzling World in Wanaka, New Zealand (that’s near my hometown). It is home to weird and whacky illusion rooms which warp your perception, such as a real-life Ames room and a stream where the water flows upwards! Growing up in the 90’s, Magic Eye books were all the rage too. I couldn’t get enough of the books that made two-dimensional pages ‘magically’ become three-dimensional figures popping out at me! Needless to say, M.C.

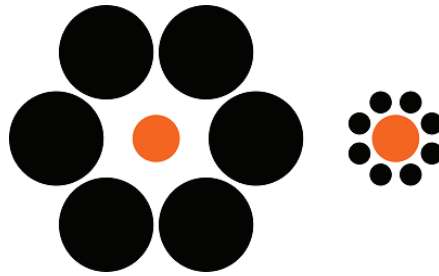
Escher became my favourite artist as I doodled impossible staircases across my schoolbooks.

Twenty years on, I took a perceptual psychology unit at university. The lecturer, A/Prof Kevin Brooks taught us the underlying neural mechanisms of some of the visual illusions I loved so much. I couldn’t get enough! Three years later, A/Prof Kevin Brooks became my supervisor and supported me to research another visual illusion; specifically, an Ebbinghaus illusion of bodies.

Our perception of the world is imperfect. Although the world is measurable, some

perceptual mechanisms can make us misperceive what is around us. Body size misperception is the inability to accurately estimate the size of one's body. It is a risk factor in the development and maintenance of anorexia nervosa and is also common in obese individuals. Visual contrast effects - when the size of an object is misperceived because of the surrounding objects - may contribute to such misperceptions. The Ebbinghaus illusion is an example of a visual size contrast illusion whereby two identical circles are surrounded by either larger or smaller circles. This configuration results in circles with larger surrounds being perceived as smaller and vice versa.

Further, research shows that such misperceptions may be larger when the



stimuli are remembered (memory) versus seen (perception). My thesis explored whether the size of a body was misperceived when it was surrounded by other sized bodies and whether this is the result of a memory bias and/or perceptual encoding.

I found that a body was perceived as larger when it was surrounded by smaller bodies

and vice versa. As such, my thesis furthers our knowledge on the perceptual mechanisms which may underly body size misperceptions. Further, it was found that this effect was stronger when the bodies were remembered which indicates that consuming media images of bodies and later 'remembering' these images may affect our judgement of body size.

Presenting my thesis at ACUR 2022 was an amazing experience. Meeting so many open minded, passionate, and interesting people had a big impact on me and gave me a glimpse into what a career in research may look like. Thanks to all the organisers and undergraduate presenters who made it unforgettable!

**Emma Gardiner, Macquarie University**  
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## RemarkCOWble molecules: Improving bovine embryo development in vitro



**Using IVF techniques to produce cattle provides an exciting opportunity to help meet the increasing dairy and protein demands of a rapidly growing global population.**

My work investigates how we can improve development rates of bovine embryos produced in vitro through adding supplements to culture media.

With the global population expected to exceed 9 billion by the year 2050, the demand for cattle products such as dairy and beef continues to grow. To meet the need of this increasing demand, we need to efficiently produce large numbers of quality cattle. In vitro fertilisation, or IVF, plays a critical role in our ability to improve agricultural productivity. Using IVF

techniques, we can do things like choose the sex of cattle or selecting animals with desirable genetics, such as a high milk production. All together this allows us to produce better-quality animals faster than traditional methods. This is particularly important for improving dairy cattle in developing nations, where often milk is the primary source of dietary protein.

So how do we perform IVF in the lab? First oocytes are retrieved from cows, and we fertilise these oocytes with sperm to form a zygote. The zygote then develops through the 2-cell, 4-cell and 8-cell stage, before becoming a morula which expands to form a blastocyst. At this blastocyst stage the embryo is ready to be transferred to a recipient cow where a pregnancy will hopefully develop. However, during the 8-cell stage in this development process, almost 80% of embryos undergo developmental arrest. This means these embryos stop growing and are therefore not viable to embryo transfer. The developmental arrest at the 8-cell stage is a major barrier to large scale bovine in vitro production. During this development process, the embryos are grown in a highly simplified culture media. My work is investigating what we can do to help overcome the 8-cell arrest and improve development rates. In my experiments, I add different supplements to this culture media and measure a range of embryo outcomes, such as development rate, embryo size and cell number, to investigate how these different supplements can impact embryo quality. We have had some exciting results so far, with one of our supplements that we have tested showing promise to improve development rates by up to 50%.

I find IVF as an area of research very fascinating and moving forward I believe it is going to have many applications across different industries, such as medicine, agriculture and even conservation. Ultimately, I would love to use my skills and knowledge in IVF research to assist in breeding conservation programs for endangered animals. My Honours year has equipped me with many great skills, and I am very excited to see where my research journey takes me.

**Leyla Meharg, The University of Sydney**  
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# Unravelling the history of the Milky Way

**For tens of thousands of years, we have been fascinated by the beauty of the night sky. Yet as we continue to peer upwards, we find ingrained within the positions and motions of stars, clouds of gas and dust, a deep and complex history that precedes us by billions of years.**

Research is vital to me as an aspiring astronomer. It is the fundamental pursuit of understanding, who we are and why we are here, a challenge from the universe that endlessly alights our curiosities. It is a sensation I truly believe everyone, of every background can appreciate. I also find great joy in this aspect of research, where we share our findings and convey our passions. I am greatly appreciative for the ACUR2022 conference providing such an opportunity.

At the beginning of my first year, I had no idea what shape my path would take. Presented with the many specialisations that compose the subject of Physics, I found myself at a crossroad much earlier than I expected. Luckily, my course offered many research opportunities for undergraduates and so I didn't have to wait until honours to begin my journey through research. The opportunity to listen and engage with experienced and



respected astronomers has been instrumental. In particular, last semester, I completed the project which I presented at the ACUR2022 conference, 'Unravelling the History of the Milky Way with the Gaia telescope', supervised by Dr Ciaran O'Hare. This project superseded my expectations and has propelled me forward with confidence into the complex and rewarding field of galactic archaeology.

It was an incredible experience to be able to work with data collected by the GAIA telescope, probing the fossils of merger events that the Milky Way underwent billions of years ago. I

found the concept thrilling, that in the mess of stars, gas and dust, we can uncover distinct ancient populations through their common motions and chemical compositions. I was like a toddler with LEGO, sitting in front of code, creating plots by mixing and matching variables to explore where distinct features might emerge. I also learnt a lot from my attempts to survey the rich scope of relevant literature and attempting to contextualise my research within the broader field of astronomy. Moreover, tracing the history of developments in our understanding of the Milky Way, keeping track of areas of concordance and contention, was a great way to expose myself to the research process and illuminate the form of a potential career in this field.

Discoveries in all fields of research, thrilling as they are beautiful, inspire us to continue to pursue those burning questions, and peer into the night sky. Even from this alone, the value of research is undeniable to me. With passion and an unsatiable curiosity, I intend to carry what I have already learnt about research and its process into my future career as an astronomer.

**Amelie Read, The University of Sydney**  
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# "TCR Therapy": A Personalised and translational cancer therapy alternative



**More than 700 Australian children are affected by cancer yearly! Traditional cancer therapies have limitations; therefore, there is an urgent clinical need for novel therapies that are safer and more effective.**

A child diagnosed with cancer is one of the most devastating news to the child and their family. However, traditional therapies like chemotherapy have limitations that significantly impact the quality of the child's life. This led my honours supervisor, Dr Kavitha Gowrishankar and her team to develop novel immunotherapies against paediatric cancers to mitigate the cancer burden. When I first met Kavi, I was so amazed by her work. Who knew we could manipulate our immune cells in such a way to target cancer proteins in a localised manner?

My supervisor introduced me to a type of immunotherapy called T cell receptor

(TCR) therapy. Multi-subunit TCRs are vital in activating T cells and identifying cancer antigens presented by cancer cells. In TCR therapy, the specific cancer antigen binding subunits of the TCRs are identified and incorporated into healthy normal T cells to generate transgenic (tg)TCR-expressing T cells. These tgTCR T cells will activate and lyse specific cancer cells.

We have decided to target the cancer antigen: PRAME (PReferentially Expressed Antigen in MELanoma). PRAME is overexpressed in several paediatric cancers like medulloblastoma and acute myeloid leukaemia but is not expressed in healthy somatic cells making PRAME an ideal target for immunotherapy!

I was nervous that I was given charge of developing something so novel and of a big deal! Fortunately, with the constant

support and guidance from my supervisors and RAs, I understood my project and isolated T cells that showed a highly specific response against PRAME. I identified the particular response using flow cytometry with intracellular staining. The assay checks for cytotoxic T cells that release cytokines involved in cancer cell lysis (IFN-g and TNF-a). 64.2% and 69.8% of cytotoxic T cells stimulated with total PRAME peptides secreted IFN-g and TNF-a, respectively, compared to negative controls. ~0.21% CTLs did not secrete IFN-g and TNF-a.

In the future, after running more functional assays, we will be able to identify the specific

TCRs and test their functions before clinical translation.

Additionally, our lab had already identified two such PRAME-specific TCRs which are being tested in my project.

Immunotherapies like TCR therapy targeting PRAME are highly beneficial and translational as PRAME is overexpressed in several paediatric cancers, posing a clinical significance. TCR therapy is also feasible and can be extended to target other cancer antigens similar to PRAME.

The whole research journey was such an adventure with ups and downs. I learned

extensively about being in the research field, my strengths, and my weaknesses. For example, I was overwhelmed by complex protocols like integrating TCR DNA sequence into T cells, or I got a poor expansion of cytotoxic PRAME-specific T cells. However, I kept repeating the protocol until I got precise results. I am honoured to contribute my work to the scientific field. My honours year has shown me how exhilarating research can be and my passion for researching immunotherapy.

**Akshaya Ramanathan, The University of Sydney**

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## Did we take care of our international students during the COVID-19 pandemic? Learn all about it.

**Research should be used to influence conversation that leads to positive change for marginalised and vulnerable groups in our community.**

My research on the experience of Victorian overseas students during the global health crisis was conducted as part of the 2021 Victorian Parliamentary Internship and sought to exemplify this sentiment.

Each year international students make the active choice to call Victoria home while they work towards qualifications. International education has been Victoria's largest services export industry for over a decade, however, they contribute more than can be determined by a monetary scale. This is why it is important that the well-being and success of Victorian international students is nurtured. The topic was considered after consultation with my assigned Member of Parliament, Dr Tien Kieu MLC.

My research set out to determine firstly, what was the impact of the pandemic on international students? Secondly, what were the broader consequences of these impacts and thirdly, how can this be resolved? To answer these fundamental questions I reviewed literature and data, and interviewed key organisations. I faced difficulty in the literature as there was limited coverage on the topic and no specific Victorian viewpoint. The lack of research ironically became an integral part of the report's purpose as it highlighted the imperative need for my report. This lack of research was surprising as through my interviews I identified considerable and



alarming adversities experienced. To overcome the limited literature I compared the research on previous international student hardship to the current adversity and found that the pandemic had exacerbated pre-existing struggles.

These struggles were categorised as physical impacts, mental impacts, education impacts and employment and financial impacts. To expand, my report found that these students had undergone quarantine and vaccine related

stressors. Secondly, a substantial number of overseas students suffered from poor mental health due to various factors, such as heightened racism. Thirdly, the report found that online learning brought forth numerous challenges. Fourthly, increased employment instability and loss of income due to COVID-19 caused severe financial outcomes for this group.

I then analysed the support given by Victorian Universities, the Victorian Government and the Australian Government in light of these impacts and I found that international students were extremely neglected in a time of crisis. The report determined that whilst Victorian Universities and the State Government made attempts to assist, there were multiple gaps in this support. Upsettingly my report concluded that the Federal Government did nothing to help international students. International students pay tax and full fees for their education yet when times get hard, they are given no sympathy or respect. As an interviewee put it, "It's quite an irony that you are a tax resident, but when it comes to international student rights... then it's not the same story".

These are the conversations I believe we should be having because the literature is not as abundant as the issue is. If you would like to discuss anything further on my research please feel free to email me or connect with me on LinkedIn. I would like to thank Dr Tien Kieu, Dr Niro Kandasamy, Dr Mark Chou, Dr Margaret Hutchison and Dr Benjamin Mountford for their support.

**Olivia Williams, Australian Catholic University**  
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# ACUR2022 impressions from students and staff



I found it very helpful to showcase my research to other researchers in different disciplines in terms of getting new ideas and a fresh perspective. The chance to have informal conversations with others working in healthcare and covid-related studies across different research groups and institutions was very beneficial."

**Ryan Cheng,**

*Business Honours student, The University of Sydney*



Organising ACUR2022 has been one of the highlights of my experience as a HDR student. Being able to connect with undergraduate researchers and help support their passion for research was an incredibly valuable experience."

**Olivia Urbaniak,**

*Conference Organiser, The Conservatorium of Music, Sydney*



The ACUR2022 Conference was an amazing opportunity for undergraduate students to present their research and meet other researchers from across Australia. For approximately 90% of the group, this was their first ever research conference. It was a privilege to have a hand in organising the schedule of events. The quality of the research and the thoughtful questions posed to the speakers made for an amazing two days. And the food and atmosphere were brilliant. Dr Lilia Mantai and Dr Daniel Johnstone were exceptional facilitators, the organising committee could certainly not have functioned without their unwavering support. I would encourage supervisors to look out for next year's conference and encourage their students to get involved. The work ACUR does in promoting undergraduate research makes for an invaluable opportunity for bright and budding researchers."

**Emma van der Schyff,**

*Conference Organiser, Faculty of Medicine and Health, The University of Sydney*



It was fantastic to attend the first in-person ACUR since Newcastle in 2019, and especially to see how much the students enjoyed connecting with each other in-person. Congratulations to yourself and your team- it was such an enjoyable experience and it was clear how much time, passion and commitment had gone into the design and delivery of the three days."

**Caitlin MacDonald,**

*Student Leadership and Development Officer, ANU*

## Featured ACUR Resource

A new microcredential (MC) course *Pitching Research Matters (PRM)* is now live on the *Bond University Learner Portal* and can be accessed [here](#) in ACUR resources. This course is ideal if you are currently a research-enabled student of "research process" or if you are a novice researcher frustrated, lost or even overwhelmed at the beginning of your research journey, or looking for a robust strategy to kick-start your research planning. And it's FREE!

## Letter from the Chair

It was wonderful to see students presenting their research at the recent ACUR conference held at The University of Sydney. Once again we were reminded of the importance of these events in bringing together highly committed and interested undergraduate students.



Conferences not only enable students to present their own research in a public forum, they also provide opportunities to network, to make new friends, to hear about the work that others are doing, to

learn from established experts, and to have fun!

As well as our annual student research conference, we also like to organise events where those responsible for planning and organising initiatives to engage undergraduate students in research and inquiry can meet to discuss strategic issues. So I'm pleased to say that the next event on the ACUR calendar is the 2nd ACUR Exchange Colloquium to be held in Sydney on the 1st of February 2023. The Colloquium will feature an exciting

line up of experts from different communities of practice: university - industry partnerships, work-integrated-learning, students as partners, as well as undergraduate research. We are still hoping that the Federal Minister of Education, Minister Jason Clare will accept our invitation to attend. The Colloquium will provide opportunities for university leaders and managers, and academic and professional staff to come together to examine the capabilities that students are gaining through such initiatives, to explore the synergies between these different communities and to underscore the role of undergraduate research in them. The Colloquium will address key challenges, showcase best practice, and examine work in progress. Further information is available on the [ACUR website](#). Register now so you don't miss out.

Does undergraduate research belong within the research portfolio in a university, or does it belong with learning and teaching? This is a question frequently faced by potential institutional members. In a sense it's both because on the one hand it can transform curricula, and on the other it can contribute to research output. As stated on our website,

'ACUR values the transformative power of research in all its forms as a vehicle for individual and collective learning and respects a diversity of approaches to undergraduate research engagement in line with the needs and requirements of universities and in support of their varied missions'. In some universities the Senior Sponsor for ACUR membership lies with the Deputy Vice Chancellor Research. In others it is the senior person responsible for learning and teaching who takes on this role. We are always ready to discuss with staff where ACUR institutional membership fits in their particular case.

I'm very pleased to say that we recently welcomed to the ACUR Executive team, four new members: Ian Fuller from Massey University, Olivia Urbaniak, Emma van der Schyff, and Nicky Gluch from The University of Sydney. We also welcomed Charles O'Neill from the ANU as the new Head of the Student Committee. The Student Committee changes each year as students move on from undergraduate studies. Charles is currently forming the new committee, so please contact him if you or your students wish to join that committee. New energy and commitment means that we will be able to improve the support we provide our members in promoting and advancing undergraduate research.

**Angela Brew**

# Student committee report

The Student Committee was reduced in size for 2022, to facilitate optimal cooperation and autonomy to achieve our goals. All members of the committee should be very proud of their work and have laid a solid foundation to be built upon in 2023 and beyond.

Throughout 2022 I worked with Oliver Hervir, Rachelle Tay, Veronica Padilla, and Olivia Jessop (previous head). Our work predominantly focused on establishing a student ambassador program throughout Australia and increasing membership outside the Eastern seaboard, making contact with Adelaide University, The University of Western Australia and Charles Darwin University. Veronica has been working on compiling a list of opportunities for undergraduate researchers including

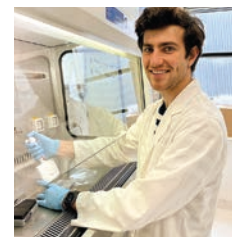


Charles O'Neill

scholarships, and we are now looking at the best way to publish this.

Ongoing projects include: better engagement with first nations research; increase the

diversity of the student committee including states and backgrounds, leveraging through the ambassador program. We also wish to revise the social media engagement and posting strategies to increase the reach of the wider ACUR community.



In 2023, Charlie O'Neil is taking on the Head role to continue working on these projects while I will continue on the committee as the descending head.

Max Kirkby

## Events announcements

**Fourth annual conference of the Association for Interdisciplinary Metaresearch & Open Science** will be held from 28-30 November 2022 at the University of Melbourne (Australia). Registrations & proposal submissions now open: <https://www.eventcreate.com/e/aimos2022>

**ACUR Colloquium 2023** will be held at Notre Dame University, (Sydney, Australia) on 1st February 2023. <https://www.acur.org.au/colloquium-2023/>

**The US National Conference on Undergraduate Research (NCUR) 2023** will be held at UW-Eau Claire (the US) from April 13-15, 2023 with pre-conference opportunities starting on April 12, 2023 <https://ncur.secure-platform.com/2023>

**The British Conference of Undergraduate Research (BCUR 2023)** will be held at the University of Warwick (the UK) in April 2023. Alongside BCUR, Warwick is also hosting the **World Congress on Undergraduate Research (WorldCUR)** [https://warwick.ac.uk/fac/cross\\_fac/iatl/student-research/bcur\\_worldcur\\_2023/faq](https://warwick.ac.uk/fac/cross_fac/iatl/student-research/bcur_worldcur_2023/faq)



### Creating career-ready graduates: The role of undergraduate research

Are **YOU** responsible for:

- Creating university industry partnerships?
- Providing internships and practicums for students?
- Leading Work-Integrated Learning?
- Engaging Students as Partners?
- Creating research experiences for undergraduates?

The 2nd ACUR Exchange Colloquium will provide opportunities for university managers and staff working on these initiatives to come together to explore how students' employment outcomes can be enhanced.

Date: 1st February 2023

Place: Notre Dame University, Broadway, Sydney

Cost: \$250 (reduced fees for ACUR members)

To register go to:  
<https://www.acur.org.au/colloquium-2023/>

## Contact Us

For further information, or to submit an item for consideration for the next newsletter, contact:

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