



Our vision and mission

The 2015 Paris Agreement sought to unite countries in the fight against climate change by devising strategies to keep the global temperature rise to a maximum of 1.5° C. While a significant focus is on emissions reductions, the Intergovernmental Panel on Climate Change (IPCC) says this will not be enough to avoid dangerous levels of global warming.

Alongside adaption and mitigation, the world must actively remove historical emissions of carbon dioxide (CO₂) already in the atmosphere through Carbon Dioxide Removal (CDR). Our vision is to provide a role model of best practice for an environmentally, socially and ethically responsible transition to Net Zero Australia using a portfolio of approaches for CDR.

Our approach

Under the Net Zero Initiative, the University of Sydney brings together experts across the sciences, engineering, policy, business and law to address the key research questions and accelerate commercialisation, particularly regarding the development and roll-out of CDR technologies.

Our research

A key Enabling Research Theme of the Net Zero Initiative (NZI) is 'Carbon Removals' through which we are developing more efficient processes for CDR and working to create an economic, social and political ecosystem in Australia that supports CDR solutions to reach our Net Zero goals.

CO₂ removal can be achieved in two ways. The first is by enhancing carbon storage in natural ecosystems. The second is by using Direct Air Capture (DAC) to separate CO₂ from ambient air, then store it. The latter also provides a sustainable source of CO₂ for use.

'Direct Air Capture' (DAC) is a major pillar of Carbon Removals research at the NZI. We are investigating technological solutions while developing strategies to foster environmental justice and social license to operate. The challenges we are addressing include:

- Improving materials and reducing costs for DAC;
- Understanding and developing methods for long duration carbon removal;
- Reducing barriers to implementing a portfolio of carbon removal approaches;
- Closing relevant policy and legislative gaps.

Meet our research experts

Our interdisciplinary research team leverages outstanding capabilities and infrastructure. Experts working under this pillar include:

Professor Deanna D'Alessandro: School of Chemistry. Specialises in Metal-Organic Frameworks (MOFs) for DAC.

Professors Alex McBratney and Budi Minasny: Sydney Institute of Agriculture. Specialises in soil carbon sequestration and monitoring.

Professors Tim Langrish, Andrew Harris, PJ Cullen and Antonio Tricoli, A/Professor John Kavanagh, Drs Fengwang Li, Gustavo Fimbres-Weihs and Li Wei: School of Chemical & Biomolecular Engineering. Specialises in continuous flow scale-up of materials for commercial applications, techno-economic assessment, carbon dioxide conversion.

A/Professor Amanda Tattersall and Katie Moore: Sydney Policy Lab. Specialises in social acceptance.

Professor Chris Wright, Dr Tanya Fiedler, Dr Danny Gozman and A/Professor Tom van Laer: University of Sydney Business School. Specialises in social acceptance, communications, carbon markets.

Professor David Scholsberg: Sydney Environment Institute. Specialises in environmental justice.

Professor Susan Park and Dr Gareth Bryant: Arts & Social Sciences. Specialises in global governance and political economy.

Dr Erin Kelly and Professor Maree Teeson: Matilda Centre. Specialises in climate anxiety.

Contact us

For further information or to discuss in greater detail, please contact:

Net Zero Initiative

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How your business will benefit

By partnering with us, your business will be able to:

- collaborate with leading academic and industry experts from the University of Sydney to address the challenges faced by your business;
- help shape the next generation of postgraduate students with skills relevant for your business needs;
- host one of our talented PhD students, who will be placed in your business for up to one year; and
- benefit (pending eligibility) for the Australian Government's R&D Tax Incentive Scheme.

Current projects

We have a strong track record of partnering with industry to investigate and develop new renewable energy technologies. A key example of our impact in this space includes our work on developing novel Metal-Organic Frameworks (MOFs) for DAC. Our team at the University of Sydney in partnership with industry leaders on this project, Southern Green Gas (SGG) and AspiraDAC are supercharging direct air capture technology's potential to address the issue of historical emissions. SGG and AspiraDAC are driving the creation of a new negative emissions industry in Australia, through the world's first solar-powered DAC project. This project is supported by the Musk Foundation XPRIZE in Carbon Removals (Student Team Prize), as well as grants to SGG and AspiraDAC.



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