



# PLANT SYNBIO AUSTRALIA

TRANSFORMING  
AGRICULTURE AND  
BIOMANUFACTURING  
THROUGH PLANT  
SYNTHETIC BIOLOGY

## Synthetic biology for Biofuels



[plantsynbio.au](https://plantsynbio.au)



The Australian National University (ANU) is a global leader in the plant science, molecular biology and systems innovation, advancing sustainable biofuel solutions.

By integrating expertise in plant genetics, genomics, photosynthesis, lipid metabolism and gene editing with engineering, policy and climate analysis, ANU supports the full life cycle of renewable biofuel development, from crop design to deployment.

Plant SynBio Australia is funded through Bioplatforms Australia under the National Collaborative Research Infrastructure Strategy (NCRIS) and institutional partners

# Improving biofuel productivity in plants

The Plant Synbio Australia ANU node (PSBA-ANU) is an important resource for ANU researchers seeking to improve the yield and energy density of biofuel feedstock from plants.

ANU researchers are working to enhance oil yield, composition and resilience through genetic innovation, while aligning crop production with environmental and policy frameworks. Their work also explores 'orphan' crops and marginal-land feedstocks to expand sustainable production across diverse Australian climates.

## Enhanced oilseed crops

A key focus is improving oilseed crops such as canola (*Brassica napus*) and emerging species like *Brassica carinata* to produce high-quality feedstocks for renewable diesel and sustainable aviation fuel (SAF).

Synthetic biology and gene editing are central to PSBA-ANU's approach. Researchers are using these techniques to engineer plants with increased oil accumulation, altered fatty acid profiles and improved stress tolerance.

## Our advanced synthetic biology tools enable:

- Redirection of carbon into energy-rich lipids
- Development and improvement of dual-purpose oilseed crops
- Creation of programmable traits for targeted biomass production.

Complementary research into  $C_4$  photosynthesis and high-biomass crops aims to boost plant productivity and resource-use efficiency for next-generation bioenergy systems.



## World class research infrastructure

PSBA-ANU's capabilities are supported by world-class infrastructure, including research facilities supported by the Australian Government's National Collaborative Research Infrastructure Strategy (NCRIS). These ensure seamless access to complementary technologies such as high-throughput phenotyping platforms and advanced metabolomics.

## Leading research partnerships

PSBA-ANU is also party to several interdisciplinary collaborations, including the ARC Training Centre for Future Crops Development and the Agrifood Innovation Institute (AFII), which strengthen innovation, workforce development and industry translation.

Through strong partnerships with government, industry and research organisations, we are able to connect innovation and discovery with real-world applications across the biofuel value chain.

This integrated approach ensures that new biofuel solutions are scientifically robust, economically viable and environmentally sustainable, to help fuel Australia's transition to a low-carbon future.



## Find out more or partner with us

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