

Company: Western Sydney University, Sydney, NSW Australia

Nomination Submitted by: PNP Group

Company Description: Western Sydney University is a multi-campus public research university in Greater Western Sydney, ranked in the world's top 250 and known for innovation and community impact. The School of Engineering, Design and Built Environment offers programs in engineering, architecture, construction and design, combining research excellence with strong industry links.

Nomination Category: Individual Awards Categories

Nomination Sub Category: Most Innovative Woman of the Year - Industry

Nomination Title: Prof. Olivia Mirza - Macro Synthetic Fibre Reinforced Concrete (MSFRC)



1. Which will you submit for your nomination in this category, a video of up to five (5) minutes, explaining the achievements since July 1, 2023 of the nominated woman, OR written answers to the questions? (Choose one):

Written answers to the questions

2. If you are submitting a video of up to five (5) minutes in length, provide the URL of the video here, OR attach it to your entry via the "Add Attachments, Videos, or Links to This Entry" link above, through which you may also upload a copy of your video. If you are submitting written answers to the questions for this category, provide them in the spaces below:

This nomination recognises Professor Olivia Mirza for her pioneering contributions to innovation in structural engineering and sustainable infrastructure. She is best known for advancing Macro Synthetic Fibre Reinforced Concrete (MSFRC), applied at scale in the Parramatta Light Rail Stage 1, and for leading research in green concrete and recycled fibre systems that support Australia's net-zero carbon goals. By bridging research, industry, and policy, Professor Mirza has delivered solutions that redefine durability, cost-efficiency, and sustainability in infrastructure delivery. In parallel, through her leadership as President of Engineers Australia Sydney Division, she has amplified the adoption of innovative practices across the profession, inspiring the next generation of engineers to pursue sustainable, technology-driven solutions.

3. Briefly describe the nominated individual: history and past performance (up to 200 words):

Total 195 words used.

Professor Olivia Mirza is a highly accomplished academic and engineering leader at Western Sydney University, with a career spanning more than 20 years dedicated to advancing structural engineering and sustainable infrastructure. Beginning her career as a civil and structural engineer, she quickly established herself as a respected researcher and educator, contributing to both industry practice and the development of future engineers.

She is widely recognised for her pioneering work on Macro Synthetic Fibre Reinforced Concrete (MSFRC). Her research demonstrated the material's ability to enhance durability, minimise cracking, and reduce maintenance costs, directly influencing its adoption in the Parramatta Light Rail Stage 1—one of the largest applications of this technology in Australia. She has also contributed to the development of Australian Bridge Standards and partnered with Transport for NSW on critical infrastructure projects.

Beyond research, she is a champion for diversity and inclusion. Professor Mirza founded *Women of Wisdom*, a program supporting female engineering students, and the *Aspire Indigenous Program*, which empowers Indigenous high school students to pursue careers in STEM. As President of Engineers Australia Sydney Division (2022–2024), she continues to bridge research and practice, deliver sustainable solutions, and inspire the next generation of engineers.

4. Outline the nominee's achievements since July 1 2023 that you wish to bring to the judges' attention (up to 250 words):

Total 211 words used.

Since July 2023, Professor Olivia Mirza has advanced her pioneering work in sustainable infrastructure through significant research achievements and industry collaborations.

She has extended her internationally recognised research on Macro Synthetic Fibre Reinforced Concrete (MSFRC) by integrating recycled plastic fibres and advancing composite systems designed to increase durability, reduce cracking, and lower long-term maintenance costs. These innovations push the boundaries of fibre-reinforced concrete, with applications extending beyond transport infrastructure into broader construction and healthcare environments. Her work is helping to establish practical circular economy solutions by re-purposing waste plastics into high-value engineering materials.

In parallel, Professor Mirza has progressed research into green concrete technologies, embedding recycled aggregates and low-carbon binders into new material systems. This research directly supports Australia's net zero carbon commitments by reducing emissions associated with concrete production, one of the world's largest contributors to industrial carbon output.

Her recent collaborations with Transport for NSW and local governments have translated these advances into real-world infrastructure applications, providing the evidence base required for wider industry adoption. Publications, industry reports, and trial implementations since 2023 demonstrate measurable progress towards low-carbon, sustainable alternatives for the construction sector.

Professor Mirza's achievements over the past year highlight her unique ability to combine research excellence with practical outcomes that drive sustainable engineering innovation at scale.

5. Explain why the achievements you have highlighted are unique or significant. If possible compare the achievements to the performance of other players in your industry and/or to the nominee's past performance (up to 250 words):

Total 234 words used.

Professor Olivia Mirza's achievements since July 2023 are unique and highly significant, as they demonstrate not only research excellence but also leadership in sustainability and practical industry impact.

Her work on green concrete and net-zero carbon solutions directly addresses one of Australia's most pressing challenges: decarbonising infrastructure. While many academics confine their focus to laboratory trials or theoretical modelling, Professor Mirza bridges the gap between science, industry, and policy. By integrating macro synthetic fibres with recycled plastics, she has advanced sustainable concrete systems that are now being trialled in construction and healthcare contexts. This real-world translation distinguishes her from many peers whose sustainability research has not yet been adopted at scale.

Her leadership also stands out in the way she combines circular economy principles with engineering performance. Few researchers in her field have demonstrated the dual achievement of reducing environmental impact while delivering cost-efficient, durable infrastructure outcomes. The successful application of her MSFRC research to the Parramatta Light Rail Stage 1 set an early benchmark, and her recent advances build significantly on that legacy by embedding low-carbon technologies into infrastructure delivery since 2023.

Compared to other players in the industry, Professor Mirza's ability to integrate recycled materials, align with policy goals, and influence standards positions her at the forefront of sustainable engineering. Her achievements are not only academically rigorous but also measurable, scalable, and transformative—ensuring her research drives genuine progress toward Australia's net-zero targets.

6. Reference any attachments of supporting materials throughout this nomination and how they provide evidence of the claims you have made in this nomination (up to 250 words):

Total 242 words used.

The supporting materials attached to this nomination provide strong evidence of the breadth and depth of Professor Mirza's achievements.

Her research outputs and project reports (Camille et al., 2022; Camille, Mirza, Kirkland, et al., 2024; Camille, Mirza, Senaratne, et al., 2024; Senaratne et al., 2016; Wells et al., 2025) demonstrate measurable progress in sustainable materials, including case studies on green concrete and circular economy applications of recycled plastics. These documents provide technical validation of her leadership in advancing net-zero carbon solutions.

1. [SEMC 2025 Keynote Invitation](#) – Recognising her global research excellence, Professor Mirza was invited as a keynote speaker for the 2025 Structural Engineering, Mechanics and Computation (SEMC) Conference.
2. [Research Week 2025](#) – Academia-Industry Collaboration – Demonstrating her ability to bridge academia and industry, driving impactful, practical research that translates directly into industry applications.
3. [Camille, C., Mirza, O., Kirkland, B., & Clarke, T. \(2024\)](#). Numerical investigation of prestressed concrete sleepers reinforced with high-performance macro synthetic fibres. *Engineering Failure Analysis*,
4. [Camille, C., Mirza, O., Senaratne, S., Kirkland, B., & Clarke, T. \(2024\)](#). Life cycle cost analysis of macro synthetic fibre reinforced concrete for railway sleeper applications. *Structure and Infrastructure Engineering*, 20(3), 353-367.
5. [Senaratne, S., Gerace, D., Mirza, O., Tam, V. W. Y., & Kang, W. H. \(2016\)](#). The costs and benefits of combining recycled aggregate with steel fibres as a sustainable, structural material. *Journal of Cleaner Production*, 112, 2318-2327.
6. [Structural behaviour of prestressed concrete sleepers reinforced with high-performance macro synthetic fibres](#) - ScienceDirect

Attachments/Videos/Links:

[Prof. Olivia Mirza - Macro Synthetic Fibre Reinforced Concrete \(MSFRC\)](#)



[REDACTED FOR PUBLICATION]