

MEET DR. MELINA VIDONI, EWATER SOLUTIONS

Dr. Melina Vidoni,
Software Development
Lead, eWater Solutions

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We are excited about the future of eWater Group. We are continuing our commitment to the pursuit of sustainable management of water resources through the sharing of best practices, capabilities, and knowledge of Australian water

expertise nationally and internationally.

And through this, we have made significant investments in the skills and expertise within our software development and hydrological division, eWater Solutions, which is responsible for Australia's National Hydrological Modelling Platform, eWater Source, as well as our other software tools, such as eWater MUSIC.

Our organisation is a high-calibre team of software developers, hydrologists, academics, sales and project managers, public policy and water industry experts will enable us to continue to meet the needs of our Australian and international owners, partners, and stakeholders.



As our Software Development Lead for the software and hydrological division of eWater Group, Dr Melina Vidoni brings an extraordinary breadth of technical and academic experience to our organisation, including extensive experience in technical debt identification and repayment strategies.

For those not in the know, originally coined by Ward Cunningham in 1992, an American computer programmer, technical debt was considered to be the result of software developers choosing a low-quality solution due to time constraints, wanting a faster or earlier release. This definition evolved over time, and by 2010 it was acknowledged that over 16 types of Technical Debt existed (Alves et al., 2014)

including process, people, requirements, and architecture debt, among others.

Nowadays, and taking a step further towards understanding technical debt in organisations', Gartner's definition posits that *technology debt* is the outstanding amount of money an organisation must spend on digital technology cost obligations to continue doing business, and the incremental burden of shortcuts caused due budget or managerial decisions.

This definition later evolved to include the decisions of all those who are somehow involved in software and, as researchers on the Software Engineering Institute demonstrated, can be highly affected by external, contextual factors.



Melina graduated from the Universidad Tecnológica Nacional (UTN) in Santa Fe, Argentina as an Information Systems Engineer before receiving her PhD, *summa cum laude*, at the same institution. After completing her PhD, Melina moved to Australia to pursue an academic career and gain international experience, including Lecturer at the *Australian National University in the CEC School of Computing*, where she specialised in technical debt identification and repayment strategies.

Melina's career at the Australian National University enabled her to foster her international collaborations with researchers from around the world, including Canada and Australia. It is this interest in technical debt and the development of scientific software that led her to eWater Group.

During one of her searches for internship positions for her research students, and possible partners interested in research translation, Melina found eWater Group.

"I have always been very keen on applicable, hands-on research outputs that could benefit the industry – and that

led me to start collaborating with a number of companies seeking to host scientific software, or to perform an agile transformation, acquiring over 12 years of research translation and coaching experience.”

“I was taken by the reach of eWater Source – Australia’s National Hydrological Modelling Platform. It is, by far, one-of-its-kind in terms of size, influence, and its immeasurable impact to foster and support data-driven, science-derived decision-making across Australia’s Government.”

“Being able to work with eWater, the custodians of a unique and powerful research-derived software, presents both an intellectual challenge (given my areas of research), but also a way to make a clear impact in the world – the sustainable and responsible management of water resources will benefit the entirety of Australia.

“eWater Solutions has a critical role to play in the current landscape of climate change and resilience, and the intrinsic need for humankind to protect its natural resources.”

Since starting at eWater Group in June last year, Melina has

had a positive and significant impact on the eWater Solutions team through her commitment to creating a culture of continuous improvement and collaboration, with the stakeholder at its centre.

“I am a big believer in fostering collaboration and empowering and pushing my team to be more responsive and agile to changes in the market and customer needs with a great emphasis on collaboration across our developers, research software engineers and hydrologists.”

“In our work with our owners, partners and stakeholders, it is critical we continue to adapt our software products to modern times, while continuing to provide operational excellence, as well as fostering and nourishing the reliability of our products.”



Melina’s leadership within the eWater Solutions team, and wider eWater Group, is part of our continued commitment to

innovate and strengthen our impact in Australia and internationally. This includes the role artificial intelligence plays in research software and water modelling, and of course the science and technology industry.

“In various areas of science, artificial intelligence is being used to analyse massive amounts of data, automate routine tasks, and make new discoveries that would have been unimaginable a few years ago.”

“AI is being increasingly integrated into scientific discovery, and so far, AI approaches have proven useful to accurately model complex, non-linear hydrological processes, to cross imaging data sources with data from sensing tools, always leveraging the power of the Internet of Things (IoTs) (Chang et al., 2023).”

“Deep learning has been successfully used to project the production and consumption of resources and deal with the increased demand (*Raya-Tapia et al., 2023*), to identify crop water stress (*Chandel et al., 2021*), and across multiple areas of the hydrological modelling, including urban water security, prediction of physical processes, and smart-city water

management (*Allen-Dumas et al., 2021*)."

"eWater and AWP are at the forefront of hydrological modelling in Australia. I could not think of any organisation better positioned than us to spearhead the translation of fresh, novel research into usable systems that will empower decision-makers to rely on trustable, sound science."

References:

Chang et al., 2023:

<https://www.mdpi.com/2073-4441/15/10/1846>

Raya-Tapia et al., 2023:

<https://doi.org/10.1016/j.envsci.2023.03.010>

Chandel et al., 2021:

<https://link.springer.com/article/10.1007/s00521-020-05325-4>

Allen-Dumas et al., 2021:

<https://www.frontiersin.org/journals/water/articles/10.3389/frwa.2020.562304/full>

Who is eWater Group?

Jointly owned by all Australian governments, eWater Group provides stewardship, management, development, enhancement, skills-building, research, access, and transparency in water management and modelling tools, capability, and capacity.

We do this in the interests of our government members, stakeholders, clients, and customers and on behalf of the Australian people who have invested in us.

eWater Group, and through our divisions, eWater Solutions and the Australian Water Partnership, support governments, organisations, and water managers to use our tools and products, expertise, and international development program management capabilities, including in their pursuit of integrated water resource management objectives and poverty reduction.

MEET OUR PEOPLE – DAXA BHUDIA, SOFTWARE DEVELOPER

We are diverse, and experienced, and most importantly we have a strong heritage of supporting sustainable water management.



We are incredibly lucky to have an organisation with people like Daxa Bhudia, our Software Developer, who brings a wealth of knowledge and experience to eWater Group.

Daxa has worked in the IT industry in both Australia and internationally for over eight years, and at eWater she is responsible for working on Australia's National Hydrological Modelling Platform, eWater Source.

Daxa's love for software development and IT began early in the halls of her high school in Bhuj, India, and led her to

complete her bachelor's degree in IT. From there, Daxa worked across various domains including accounting, ERP systems, supply chain management, healthcare, logistics, petroleum, and manufacturing, before she entered the world of hydrology and science and joined eWater in 2022.

“I was amazed with the products developed at eWater that how it helps so much across the world for managing water resources and water quality.”

“The region from where I come is very dry with low rainfall near to a salt desert in Kutch, [a district of Gujarat state in western India]. I have seen water crises in my childhood and heard stories from my parents about having to walk for so long in the morning just to get drinkable water. Even this is still the case in some of the regions in India.”

eWater Group is owned by Australian Federal, State and Territory governments to maintain and further develop Australia's world-class modelling tools, and to provide support and training nationwide and internationally. The Group manages three divisions – eWater Solutions, Australian Water Partnership and Mekong Water Solutions –

to deliver water management solutions for communities in Australia and overseas.

Daxa is a critical member of our eWater Solutions team which deliver eWater Source (Australia's National Hydrological Modelling Platform), together with other water management tools and support, for our Australian government partners, water managers in the public, private and research sectors, and various other clients.

Daxa's role includes working closely with our developers and hydrology teams to provide software development and hydrological modelling services that advance Australia's world-class water resource modelling tools, and our expertise, for our partners in Australia and around the world.

Daxa enjoys the problem-solving aspect of her role at eWater and finding innovative solutions to persistent and new challenges.

"I enjoy working on complex software, learning about hydrology, and incorporating it into the software. I always look forward to coming to work as it challenges my ability

and enables me to give 100 percent and do my best.”