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The OR Society Blackett Lecture – NetwORks and Policies: *OR* to the Rescue

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On 5 December 2024, members and non-members of The Operational Research Society gathered for the *2024 Blackett Lecture* at the *Royal Society*. *Professor Anna Nagurney* delivered showcasing the transformative power of operational research (*OR*) in tackling global challenges. Her presentation, titled *"NetwORks and Policies: OR to the Rescue"*, emphasized *OR*'s role in addressing interconnected issues like climate change, pandemics, and inequality. *Anna Nagurney*, a distinguished professor at the University of Massachusetts Amherst, is renowned for her contributions to network economics, game theory, and supply chain optimisation.

Prof. Nagurney's lecture underscored *OR*'s growing relevance across industries, including transportation, healthcare, and energy. Reflecting on *Lord Blackett*'s legacy, she noted his likely enthusiasm for *OR*'s expansion into diverse fields like sports, government, and industry. Highlighting *OR*'s increasing popularity among students, she emphasised its vital role in addressing modern problems.

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>> Her passion for OR was sparked during her early career in high-tech defence, working on naval submarine projects. This experience inspired her to pursue a PhD at Brown University under *Dr. Stella Dafermos*, a trailblazer in transportation systems and network optimization. Recalling her mentor's influence, *Anna Nagurney* shared her journey of balancing work, studies, and marathons while carving her path in *OR*.

▲ Special conference by the *OR Society Blackett Lecture 2024*.

Central to *Anna Nagurney*'s lecture were practical applications of *OR*, particularly network optimization. She illustrated the *Braess Paradox*, where adding capacity to a transport network can increase congestion due to individual, selfish routing decisions. Historical examples, such as reduced traffic congestion in Stuttgart, New York City, and Seoul following road closures, brought this principle to life. *A. Nagurney* also traced effective network management back to ancient Rome, where policies like restricting chariot use during peak hours alleviated congestion.

Anna Nagurney explored *OR*'s impact on public policy, focusing on congestion pricing. Pioneered by *William Vickrey* and advanced by scholars like *Dr. Dafermos*, these strategies have reduced traffic congestion in cities such as London by encouraging behavioural changes.

Her recent research delves into supply chain complexities, a challenge highlighted during the COVID-19 pandemic. By modelling supply chains as interconnected networks, *Anna Nagurney* has identified vulnerabilities and developed strategies to optimize operations and enhance resilience. Her studies on perishable goods integrate insights from physics and biology to model degradation, while her work on labour shortages in food supply chains has informed strategies for improving their robustness.

Professor Nagurney's lecture celebrated *OR*'s ability to address global challenges and inspire innovation. Through her pioneering research and advocacy, she continues to motivate a new generation of professionals and policymakers to apply *OR* in creating a more resilient and equitable future.

You can listen to the lecture here: https://www.youtube.com/watch?v=S-LsIEsi-m0&t=12s.

▲ *Professor Anna Nagurney*