Hazards of working across disciplines: how models (and modellers) can bridge the gaps

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Abstract: Climate change, water security, sustainable development - these and other wicked problems cannot be solved within any one discipline. Unintended consequences and perverse outcomes often arise from well-intentioned actions, because it's difficult to predict the future impacts of current decisions. Perfect forecasting wouldn't solve these problems either, because stakeholders disagree on what future they want, and who should pay for it.

Taming wicked problems therefore requires collaboration across traditional boundaries: not just between different branches of science, but right across the disciplinary divide to humanities, economics etc. Working across different fields of expertise is easier said than done, however. Building successful transdisciplinary collaboration takes time and effort, results are not guaranteed, and outcomes can be hard to publish. In an increasingly competitive job market, it can be risky to spread your finite resources too thin: moving between disciplines can make you a "jack of all trades, master of none". On the up side, crossing traditional divides brings inspiration and innovation: big advances often occur when ideas and techniques are taken from one field, and applied in a completely new context.

In this talk, I discuss how modellers can seize the benefits and avoid the perils of working across disciplines. Using examples spanning engineering, ecology and social science, I demonstrate how models can be used as a bridge across different areas of knowledge, enhancing collaboration by establishing a shared understanding of how a system works. Models can expose hidden assumptions, clarify trade-offs, identify missing information, highlight points of difference and tell stories.

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