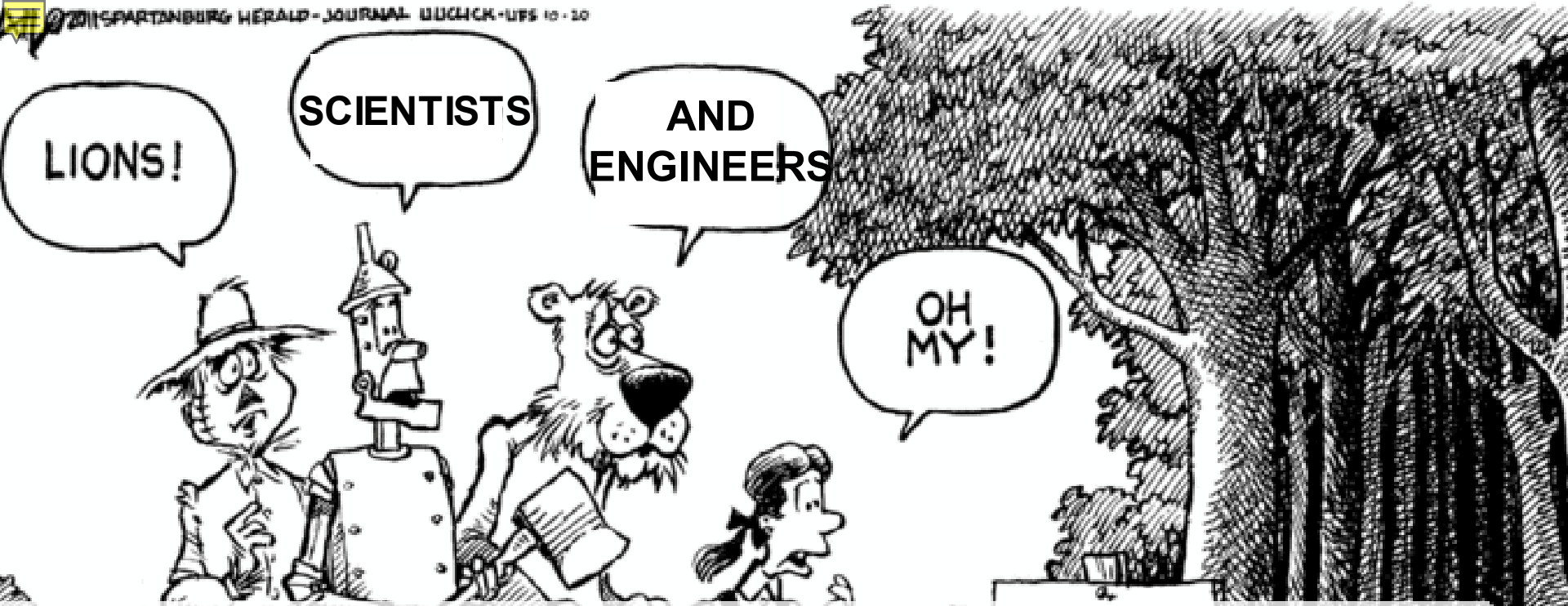

Integrating Earth Systems Science and Engineering: What can Earth systems science and engineering provide for each other?

Jennifer Jacobs, Ph.D., P.E.
Professor, Department of Civil and Environmental Engineering
Earth System Research Center, EOS
University of New Hampshire
Director, The Infrastructure and Climate Network (ICNet)
Chapter Lead, Chapter 12 Transportation, 4th National Climate Assessment

Compelling Vision or Clearly Defined Problem

U.S. 2020 Billion-Dollar Weather and Climate Disasters

*This map denotes the approximate location for each of the **16 separate billion-dollar weather and climate disasters** that impacted the United States **from January–September 2020**.*

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The Infrastructure & Climate Network (ICNet)

Founded in 2012, the ICNet is a network over 250 academics, students, and practitioners who are dedicated to accelerating climate science and engineering research in the US and beyond

NSF RCN-SEES: Engineering Research Collaboratory for Sustainable Infrastructure in a Changing Climate

Forming (2013, 2014): Clarification, Discovery, Networking

Storming (2015): Refine, Coordinate, Assemble

Norming (2016, 2017): Expand, Coordinate, Collaborate, New Knowledge

Performing (2018 - present): Innovation, Continuity, Sustainability, Partnerships

"I have been part of the ICNet effort since 2012 and I have been amazed, humored and frustrated in equal measure at the communications difficulties and mutual misunderstandings between researchers and practitioners. It probably took 2 to 3 years before things started to clear up, and this after the luxuries of time and face-to-face meetings"

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Accelerating Convergence

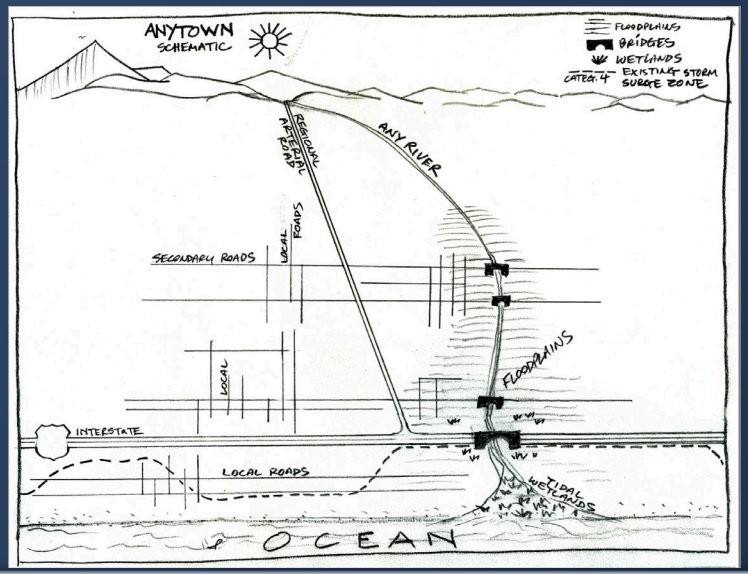
Part of the challenge in collaborations is that the work that has been done is not all in one place. The work addresses different topics, different disciplines, different problems, and appears in different journals and is supported by different funders.

Five steps

- Get to know each other's frames
- Acknowledge differences
- Incorporate other concepts into your own framing
- Explore and work with the differences
- Forge new frames

Social Science Super Heroes

boundary spanning, network mapping, logic models, group/collaborative processes, cognitive models, decision support, educational interventions



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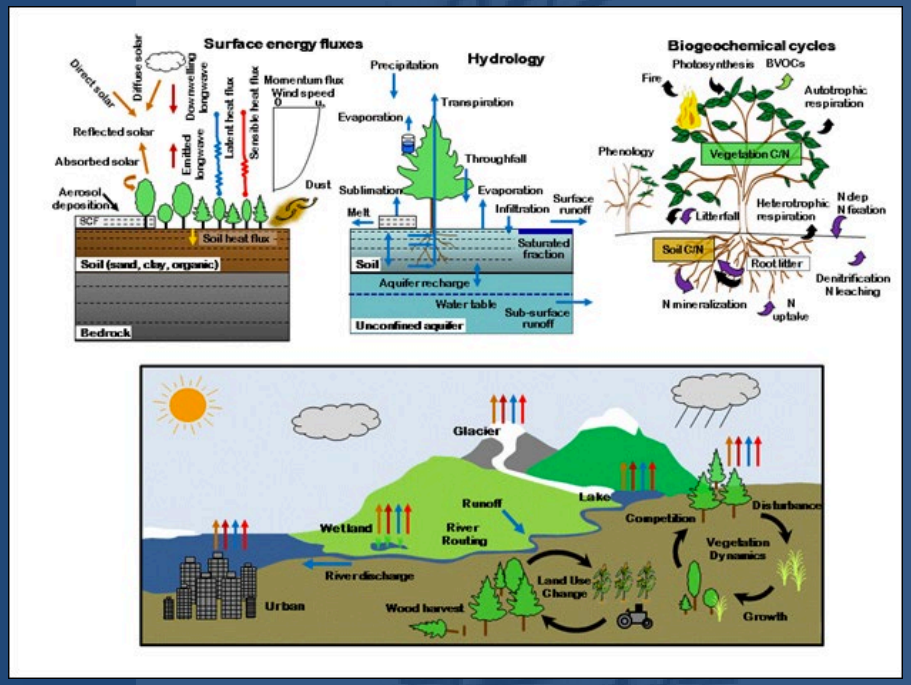
Identify potential synergistic opportunities within current facilities, infrastructure, and coordinating mechanisms

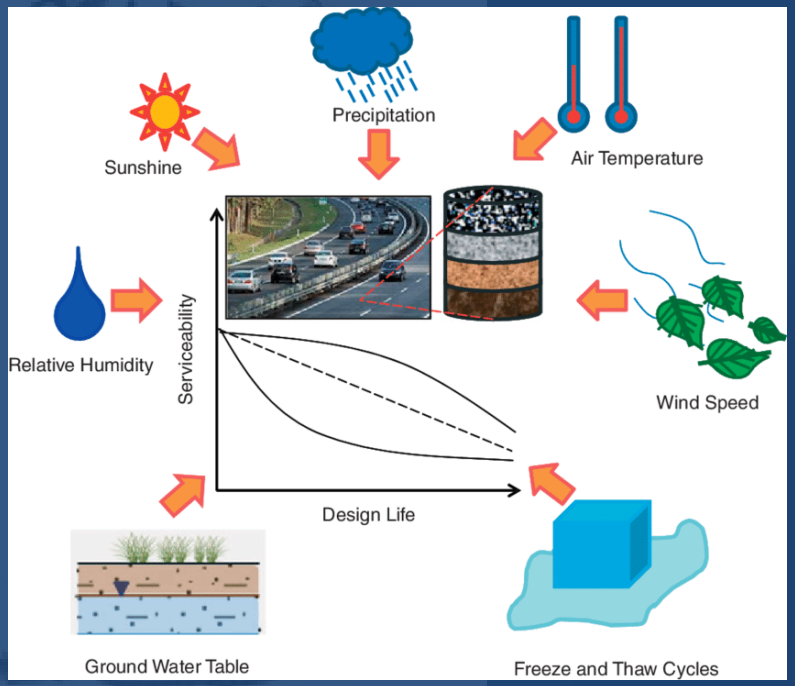
Your road weather information stations (RWIS) don't produce high quality

How do you know? You didn't know RWIS existed till 5

The Community Land Model

Mechanistic-Empirical Pavement Design Guide





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Thank You

I would also like to acknowledge the ICNet community for their amazing contributions to advancing our ability to provide climate resilient transportation infrastructure.

40 undergraduate students, 30 graduate students, and 15 postdoctoral scientists in ICNet.
40% of the ICNet members are women.
Over 75 publications and over 150 presentations meetings and invited talks have resulted.
The ICNet webinar series reached over 1000 participants directly and the recorded lectures have been used in undergraduate, graduate, and professional development curricula throughout the world.

I would also like to acknowledge the National Science Foundation support for the RCN-SEES: Engineering Research Collaboratory for Sustainable Infrastructure in a Changing Climate (CBET 1231326 and the REU supplement) and the current ICNet Global Project (CBET 1927357) under the AccelNet Solicitation 19-501.

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