Scaling Science like Systems Rock, Paper, Scissors and a Hard Place

Jon Crowcroft,9.9.25

The Pace of Science

- Papers

  - Publish or Perish- now seeing > 10,000 AI papers per year – you can't read more than 1%

  - There are > 50,000 papers on LLMs alone, since "attention is all you need"

- Patents

  - Bo[ng]us incentives

- Software Releases

  - Useful for training GenAI coders, but any other actual impact?

Possible Factors

– There are, it is true, more scientists

– Perhaps there is more money

– Are there really more problems?

– Or minimal publishable unit?

        refinement of process? More venues?

– Wafer thin advances?

        how many lives did an LLM save this year…

– Lack of artefacts + deep fake papers

see msg from USENIX Security '25 Program Co-Chairs

Why is this a problem?

– FOMO?

– "Science" means Knowledge, as in what Human Know

Mitigations and Solutions

- **Will AI speed up literature reviews or derail them entirely?**
    - https://www.nature.com/articles/d41586-025-02069-w
- **Scaling the academic publication process to internet scale**
    - 10.1145/1435417.1435430
- **Open Conference of AI Agents for Science 2025**
    - https://agents4science.stanford.edu/

Solutions from Systems

- Congestion Control
    - 1984 internet broke&2024 science broke
- Federation, Hierarch, De-duping & Consensus
    - We could apply all these techniques and more to papers/patents/systems
- Reflection
    - Maybe role for LLMs is in Artefact Eval of Human Generated Systems?

Four Questions for Today

1. Is there really a scale problem with Science?
2. Do we need better metrics for Quality of Science?
3. As we use more tech, how do we keep human scientist in-the-loop?
4. What about ownership of automated science?

Suggestions?