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AutoX: Towards new tools and infrastructure for seamless reproducibility of Computational Research

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The advancement of scientific knowledge is driven by the ability to reproduce research findings. While there is an agreement about the importance of reproducibility, the core challenge, however, is that reproducible artifacts are usually put together after the research has been completed coupled with the lack of standards and motivation to carry out the task after the research has been completed. There is a need to develop a new culture for scientists that fosters incorporating reproducibility from the beginning to the end of their research endeavor. The amount of effort required to put together reproducible artifacts for published results and the lack of incentives have prevented the scientific community from sharing reproducible results, therefore hindering trustworthiness of their results.

During this presentation we will summarize the key takeaways of the 2019 National Academies of Science Engineering and Medicine report on reproducibility. We will review the catalogue of existing provenance capture and replay tools, discuss the experience of existing reproducibility efforts and what we see as existing gaps. We will share the preliminary results of our project to develop a set of tools that aim to seamlessly capture reproducible artifacts and thus lower the barriers for capturing artifacts while doing research. We will also conclude by sharing our current efforts to build an ecosystem of tools and services to support reproducibility and a summary of recent discussions held at a BoF we organized at the Supercomputing conference-SC22.

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