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ACM TechBrief: Policies for Safer Algorithmic Systems Urgently Needed

New York, NY, January 26, 2023 – The Association for Computing Machinery’s global Technology Policy Council (TPC) has released “[Safer Algorithmic Systems](#).” It is the latest in a series of [ACM TechBriefs](#)—short technical bulletins that present scientifically grounded perspectives on the impact and policy implications of specific technological developments in computing.

In introducing the “Safer Algorithmic Systems,” TechBrief, lead author Ben Shneiderman—a Professor Emeritus at the University of Maryland—notes that the ubiquity of algorithmic systems creates serious risks that are not being adequately addressed.

“Algorithmic systems have improved an immense number of products and processes, but unsafe systems can cause profound harm—even physical injury and death,” notes Shneiderman. “It’s time to get serious about prioritizing and institutionalizing safeguards in the same way a new food product or pharmaceutical must go through a rigorous review process before it is made available to the public. What’s needed is a comprehensive approach that not only shapes the end-result technology of these systems, but also the organizational safety culture of the people and processes behind it.”

A recurring theme of the TechBrief is that while perfectly safe algorithmic systems are not possible, achievable steps can be taken to make them safer. To that end, it recommends that enabling safer algorithmic systems must be a high research and policy priority of governments and all stakeholders. The Brief also calls for organizational safety cultures to be broadly embraced and routinely woven into algorithmic system development and operation, and notes that safer algorithmic systems will require multiple forms of sustained internal and independent oversight.

“Unfortunately, it is often the case that a major accident or other highly-publicized instance of harm is needed to prompt an increased level of safety protocols for an industry,” added Stuart Shapiro, Chair of the ACM TPC’s TechBriefs Committee and Principal Cyber Security and Privacy Engineer at the MITRE Corporation. “In the ‘By the Numbers’ section of this TechBrief, we point out that various forms of harm

have already occurred because of insufficiently safe algorithmic systems. As AI and other complex consequential systems become more and more prevalent, the need to act to make them safer becomes more and more urgent. To that end, as with the other TechBriefs in this series, we hope that ‘Safer Algorithmic Systems’ will educate policy makers and the public about the real-world impacts of technological advances.”

The key conclusions of “Safer Algorithmic Systems” are:

- To promote safer algorithmic systems, research is needed on both human-centered and technical software development methods, improved testing, audit trails, monitoring mechanisms, as well as training and governance.
- Building organizational safety cultures requires management leadership, focus in hiring and training, adoption of safety-related practices, and continuous attention.
- Internal and independent human-centered oversight mechanisms, both within government and organizations, are necessary to promote safer algorithmic systems.

ACM’s TechBriefs are designed to complement ACM’s activities in the policy arena and to inform policymakers, the public, and others about the nature and implications of information technologies. As with other TechBriefs in the ACM series, “Safer Algorithmic Systems,” includes an overview of the major policy implications of the technology, key statistics to put the issues in context, a narrative introduction to educate the general public, and key conclusions. Previous ACM TechBriefs focused on [climate change](#), [facial recognition](#), [smart cities](#), [quantum simulation](#), and [election security](#). Topics under consideration for future issues include encryption security, media disinformation, content filtering, blockchain, accessibility and more.

About the ACM Technology Policy Council

[ACM’s global Technology Policy Council](#) sets the agenda for global initiatives to address evolving technology policy issues and coordinates the activities of ACM’s regional technology policy committees in the US and Europe. It serves as the central convening point for ACM’s interactions with government organizations, the computing community, and the public in all matters of public policy related to computing and information technology. The Council’s members are drawn from ACM’s global membership.

About ACM

[ACM, the Association for Computing Machinery](#), is the world’s largest educational and scientific computing society, uniting computing educators, researchers, and professionals to inspire dialogue, share resources, and address the field’s challenges. ACM strengthens the computing profession’s collective voice through strong leadership, promotion of the highest standards, and recognition of technical excellence. ACM supports the professional growth of its members by providing opportunities for life-long learning, career development, and professional networking.

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