4. SCHOLARLY COMMUNICATION

Introduction

LEE DIRKS | Microsoft Research

JIM GRAY'S PASSION FOR eSCIENCE WAS ADMIRED BY MANY, but few were aware of his deep desire to apply computing to increase the productivity of scholars and accelerate the pace of discovery and innovation for scientific researchers. Several authors in Part 4 of this book knew and worked with Jim. All of the authors not only share his vision but are actively endeavoring to make it a reality.

Lynch introduces how the Fourth Paradigm applies to the field of scholarly communication. His article is organized around a central question: what are the effects of data-intensive science on the scientific record? He goes on to ask: what has become of the scholarly record—an ever-changing, ever-evolving set of data, publications, and related supporting materials of staggering volume? In this new world, not only does the individual scientist benefit (as the end user), but through data-intensive computing we can expect more cross-domain ventures that accelerate discovery, highlight new connections, and suggest unforeseen links that will speed science forward.

Ginsparg delves into the nuts and bolts of the rapid transformation of scholarly publications. He references key examples of cutting-edge work and promising breakthroughs across multiple disciplines. In the process, he notes the siloed nature of the sciences and encourages us to learn from one another and adopt best practices across discipline boundaries. He also provides a helpful

roadmap that outlines an ideal route to a vision he shared with Jim Gray of "community-driven scientific knowledge curation and creation."

Van de Sompel and Lagoze stress that academics have yet to realize the full potential benefits of technology for scholarly communication. The authors make a crucial point that the hardest issues are social or dependent on humans, which means they cannot be easily resolved by new applications and additional silicon. They call for the development of open standards and interoperability protocols to help mitigate this situation.

The issues of sharing scientific data at an international level are addressed by Fitzgerald, Fitzgerald, and Pappalardo. Scientists sometimes encounter the greatest constraints at the national or regional level, which prevent them from participating in the global scientific endeavor. Citing a specific example, the authors appeal for coordination beyond the scientific community and recommend that policymakers work to avoid introducing impediments into the system.

Wilbanks puts a fine point on a common theme throughout this section: in many ways, scientists are often unwittingly responsible for holding back science. Even though, as professionals, we envision, instrument, and execute on innovative scientific endeavors, we do not always actually adopt or fully realize the systems we have put in place. As an amalgamated population of forward-thinking researchers, we often live behind the computational curve. He notes that it is crucial for connectivity to span all scientific fields and for multidisciplinary work and cooperation across domains, in turn, to fuel revolutionary advancements.

Hannay closes the section by highlighting the interconnectedness of our networked world despite lingering social barriers between various scientific fields. He notes that science's gradual shift from a cottage enterprise to a large-scale industry is part of the evolution of how we conduct science. He provides intriguing examples from around the world of research that can point a way to the future of Web-based communication, and he declares that we are living in an awkward age immediately prior to the advent of semantic reality and interconnectedness.

Research is evolving from small, autonomous scholarly guilds to larger, more enlightened, and more interconnected communities of scientists who are increasingly interdependent upon one another to move forward. In undertaking this great endeavor together—as Jim envisioned—we will see science, via computation, advance further and faster than ever before.