An NSF Invitational Workshop on Distributed Information, Computation, and Process Management for Scientific and Engineering Environments (DICPM) was held at Herndon, Virginia, on May 15-16, 1998. The workshop brought together domain specialists from engineering and the ocean, atmospheric, and space sciences involved in the development and use of simulations of complex systems, and computer scientists working on distributed repositories, visualization, and resource management. The objective was to formulate directions for future research efforts to facilitate effective collaboration and to help increase access to information and sharing of results and tools useful in large-scale, distributed multidisciplinary scientific and engineering environments. The simulation of complex systems encompasses many domains, including physical systems, with a large variety of interacting processes and dynamic phenomena at disparate spatial and temporal scales, and sophisticated man-made systems, such as those involved in the design and manufacturing of land, air, ocean, and space vehicles. Research advances in the research on these complex systems generate new requirements for computational environments and infrastructure.

Through presentations and focused teams, the 51 participants, drawn from academia (35), industry (4), and government (12), engaged in discussions on distributed and collaborative systems; multidisciplinary scientific simulation; metadata for data and software; distributed workflow management; scientific and engineering repositories; and standardization efforts. The consensus of the workshop was that future research efforts for enabling multidisciplinary collaboration need to focus on the application of current computer science research (e.g., integration and heterogeneity; distributed resource discovery; performance and management issues for large distributed datasets and processes) to scientific and engineering problems; while at the same time strengthening these computer science research areas. A consensus also emerged that the problems inhibiting the widespread exploitation of multidisciplinary scientific and engineering collaboration are threefold: (1) Insufficient support for computational infrastructure to make information accessible for interpretation and for sharing results and tools; (2) Institutional barriers to multidisciplinary cooperation (e.g., educational focus, funding, publication policy, promotion criteria, etc.); and (3) Communication barriers stemming from the narrow specialization of technical expertise. Towards alleviating these barriers to effective multidisciplinary activities, the workshop participants made the following proposals:

1. The allocation of support and incentives for multidisciplinary projects by the appropriate facilitators in the research community, industry, and government, which will foster cooperation between computer and domain scientists, and encourage team-based approaches to multidisciplinary problems;
2. The establishment of a national (and possibly, international) digital library for the physical, biological, and social sciences and engineering, which will disseminate research knowledge and resources beyond conventional domain boundaries; and
3. The establishment of a global distributed information registry and repository (a "virtual scientific marketplace") for expert knowledge, simulation and analysis tools, and procedures, which will facilitate multidisciplinary collaboration.

More details on the workshop, its final report, lists of participants, and their position papers, can be found at: *<http://deslab.mit.edu/DesignLab/dicpm/>*. A copy of the *Proceedings* can be ordered, at reproduction and mailing cost, by emailing to: *DICPM@deslab.mit.edu*.

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