EPSTEIN INSTITUTE SEMINAR ▪ ISE 651

"Schema Evolution for Scientific Asset Management"

ABSTRACT – Scientists rely on accurate, up-to-date descriptions of data, known as metadata, often handled in specialized databases and organized according to a database schema. Without such schema and descriptive metadata, scientific data would be lost. Yet it is among the most challenging to manage due to schema evolution brought on by rapidly advancing experimental methods, emerging technologies, and increased reliance on data analytics.

This presentation will outline a ``data-centric'' approach to scientific discovery where data rather than processes are the central artifacts and ``scientific asset management'' as a means to structure the organization and interactions with data. We then introduce a user-oriented framework for schema evolution based on an algebra of schema modification operators for simplifying the tasks needed to evolve schemas for scientific data. We extend the framework with model management operators for coupled evolution of model mappings used by database applications. Finally, we provide an analysis and experimental evaluation of the effectiveness and efficiency of the approach to reduce the time and effort needed to evolve schemas for scientific data.

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SPEAKER BIO – Rob Schuler is a Senior Computer Scientist and Research Lead at the University of Southern California's Information Sciences Institute. His research interests include scientific data management, cyberinfrastructure, and distributed systems. He has served in technical and leadership roles for large-scale NIH, DOE, and NSF initiatives including FaceBase, Biomedical Informatics Research Network, Earth System Grid, and Globus. Previously, Rob co-founded a software startup for digital media management with clients ranging from new media technology companies to major publishing and media corporations. Earlier, he worked for Xerox Corp. on the research and development of digital rights management technology acquired by Microsoft Corp. Rob holds a Ph.D. in Computer Science from USC.

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