4. "PROGRAMMING BITS AND ATOMS"

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Today's computers and networks are many orders of magnitude more powerful then their predecessors, but they still share implicit assumptions including: the physical representation of information depends on the devices transporting it, circuits are constructed from components on cards in cases, and programs manipulate descriptions of things rather than the things themselves. While these might appear to be tautological statements, I will explore the consequences of relaxing them including, respectively, interdevice internetworking, conformal computing, and digital fabrication. Breaking down these boundaries between bits and atoms can help improve not just the performance but also the relevance of advanced computing for some of the greatest emerging challenges and opportunities in developed and developing countries.

Neil Gershenfeld is the Director of MIT's Center for Bits and Atoms. His unique laboratory is breaking down boundaries between the digital and physical worlds, from creating molecular quantum computers to virtuosic musical instruments. Technology from his lab has been seen and used in settings including New York's Museum of Modern Art and rural Indian villages, the White House and the World Economic Forum, inner-city community centers and automobile safety systems, Las Vegas shows and Sami herds. He is the author of numerous technical publications, patents, and books including *"Fab", "When Things Start To Think", "The Nature of Mathematical Modeling"* and *"The Physics of Information Technology"* and has been featured in media such as The New York Times, The Economist, and the McNeil/Lehrer News Hour, and has been selected as a CNN/Time/Fortune Principal Voice and as one of the top 100 public intellectuals. Dr. Gershenfeld has a BA in Physics with High Honors and an honorary Doctor of Science from Swarthmore College, a Ph.D. from Cornell University, was a Junior Fellow of the Harvard University Society of Fellows, and a member of the research staff at Bell Labs.

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