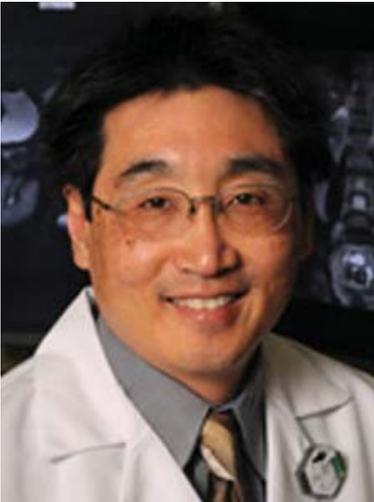# Paul J. Chang, M.D.,
MI12 Plenary Lecture Summary

By Joseph M. Reinhardt, The Univ. of Iowa
(MI12 Symposium Chair, 2/7/12)

Dr. Chang's talk, titled "Re-Engineering Medical Imaging in an Electronic and Flattened World: Meaningful Innovation and Translation," covered a wide range of topics ranging from health care and imaging economics, the evolution of PACs systems, how health care and health care practitioners have become commodities to be acquired at the lowest price, especially in radiology and imaging, and suggestions for how radiologists and engineers, scientists, and software developers can work together to bring innovation to medicine to improve patient outcomes. Dr. Chang pointed out forcefully that if radiology and imaging become commodities selected based on lowest price, then so will medical imaging and image processing.

Chang described three components of the value proposition for innovation in medicine: value depends on accuracy, efficiency, and safety. Solutions that ignore one of these factors to optimize the others are doomed to fail.

He contrasted the behaviors and attitudes of a typical radiologist vs. a typical technology developer. A radiologist prefers a practical solution that will increase value. Researchers and vendors are technology-driven. The problems facing health care practitioners are constantly changing and are often ill-defined, while the developer prefers precise specifications. The radiologist needs the solution now, or yesterday if possible. In contrast, the developer will follow a disciplined and methodical process that will produce a solution when "it is ready".

Dr. Chang gave a number of examples to show why health care development projects often fail. The major themes surrounding these examples were to avoid designs that are driven from asking the wrong question, as wrong questions lead to wrong answers. He recommended agile programming and extreme programming, especially with developers embedded alongside users, as a way to really define what is important about a problem and possible solutions. Chang insisted focus groups and expert user advisory boards were not useful ways to design solutions, since they suffered from effects of "self resonance".

In the end, Chang emphasized that radiology needs innovative solutions to improve value (measured by accuracy, efficiency, and safety) and stay relevant in health care, and technology developers need to understand the radiologist's role as the user. There is still much room for innovation and improvements in medical imaging technology, and by understanding each other and working together these two groups can improve the quality of care for the patient.