Digital Imaging and Cytogenetics  
A Historical Perspective  

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Abstract  

For over forty years two seemingly unrelated fields have formed an unlikely partnership due to a subtle symbiosis. These two fields are cytogenetics and digital imaging. Cytogenetics is the biological study of the genetic makeup of cells. It is used extensively in genetic diagnosis and cancer research. Digital imaging is the computer engineering technique of processing pictures in a computer. It is widely used in medicine, military, industrial, entertainment, and aerospace applications. Digital imaging has contributed to cytogenetics instrumentation that reduces the workload in clinical labs and produces quantitative data for both research and diagnosis. At the same time, cytogenetics has furnished the problems that have prompted the development of a broad range of techniques that prove useful in fields far beyond genetics. This talk traces the parallel and interacting histories of these two fields. Breakthroughs in one have led to advances in the other throughout their development. This illustrates how necessity in one field is the mother of invention in another, and how both have benefited from their interaction.