

# Thermal Ink Jet System to Enable Non-Traditional Applications

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## Abstract

*Thermal Inkjet (TIJ) drop-on-demand printheads have traditionally been limited to the jetting of colorant in imaging and marking applications. The complexity and size of the ink delivery systems and printheads as well as the generally closed firmware employed in consumer TIJ printers have dissuaded most researchers from attempting to use TIJ in the various emerging digital fabrication applications. This dearth of public activity has contributed to the wide perception that TIJ is not appropriate for applications that involve the jetting of non-aqueous or thermally-sensitive fluids.*

*In this talk, I will describe recent developments in non-colorant jetting applications using thermal inkjet technology. Methods to enable user control over jetting parameters (pulse widths, voltages, temperatures, number of nozzles) and to integrate these TIJ-based capabilities into larger systems are discussed. Methods to enable users to use a small (less than 150  $\mu$ L) quantity*

*of fluid to jet a large range of drop weights (from 2 pL to 220 pL) are also discussed.*

*In addition to describing these recent developments in TIJ capability, I will describe various applications that have been enabled by this capability and present theory and empirical data to show that TIJ is indeed capable of the ejection of non-aqueous fluids and thermally-sensitive materials (including enzymes and other proteins) without significant or meaningful degradation to these materials.*

## Author Biography

*Jeff Nielsen is a Senior Engineer at Hewlett Packard who has focused on thermal inkjet printhead technology since joining the company in 1993. He was the lead fluidics architect of HP's non-colorant thermal inkjet system. Jeff earned his Bachelors and Masters Degrees in Mechanical Engineering from the Massachusetts Institute of Technology.*