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Integrated Fluidic Circuits: The New Paradigm for Protein Crystallization. Kyle Self, Ph.D., A. May, Ph.D., S. Ng, Fluidigm Corporation, South San Francisco, CA.

One of the major barriers to the successful application of structural biology in drug discovery remains the identification of conditions for growth of diffraction-quality crystals of target proteins. We have commercialized an integrated *fluidic* circuit (IFC) that provides a fundamentally different approach to this problem. IFCs, analogous to their counterparts in the semiconductor industry, are miniaturized devices containing hundreds or thousands of integrated valves controlling fluid distribution between interconnected channels and reaction wells. This presentation will cover the following:

Gains in efficiency afforded by the use of free-interface diffusion, implemented on an IFC, as a means of screening for initial crystallization conditions, and the subsequent scale up to diffraction-quality crystals from those conditions.

Experimental data from protein crystallization studies conducted at academic and pharmaceutical organizations using IFCs and specialized hardware and software.

Real-world scenarios for integrating IFCs into the work flow of a high-throughput crystallization operation.

In addition to discussing the utility of IFCs for protein crystallization, we will also present data on their application in other high-throughput applications in drug discovery and our plan for continual improvements in experiment densities.