Existence of broken Lefschetz fibrations

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In this talk, we will address several existence problems regarding broken Lefschetz fibrations and pencils on closed smooth oriented 4-manifolds. The first half of the talk will be expository, where we will focus on two approaches:

(i)   via handle body manipulations; and
(ii)   via topological modifications of singularities of generic maps, after Saeki and Levine.

I will then present the most recent results utilizing these techniques.