

A Landscape of the New Dark Silicon Design Regime

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The rise of dark silicon is driving a new class of architectural techniques that “spend” area to “buy” energy efficiency. In this talk we examine two new frameworks employed by computer architects to understand the challenges and opportunities that await us. The first is the utilization wall [3], a simple model that architects use to understand how technology scaling under post-Dennard assumptions will affect hardware design. The second framework is the *four horsemen taxonomy* [2] that comprises four key approaches that future chip designers will use to attack the dark silicon problem. We describe recent research projects that typify these approaches, including GreenDroid [6], a massively heterogeneous 28 nm processor being developed at UCSD. Finally, we conclude with some directions (and non-directions) that the human brain could offer for refactoring the computational stack for dark silicon [1].

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References:

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