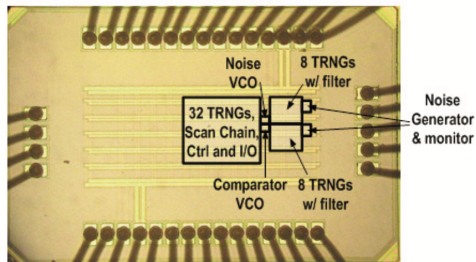
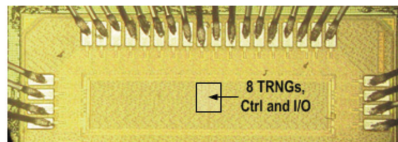


# Scalable, Reliable, Energy-efficient True Random Number Generators

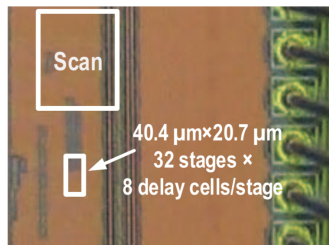


65nm Die Micrograph

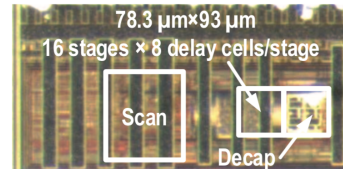


28nm Die Micrograph

K. Yang et al., ISSCC 2014



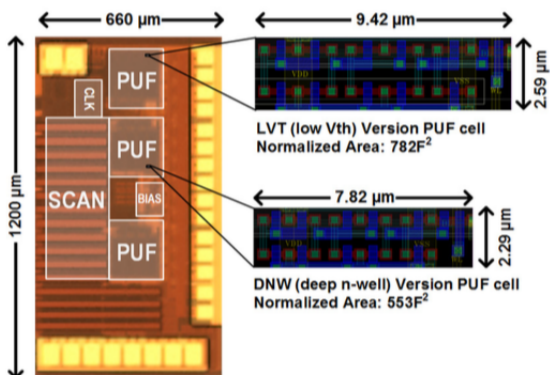
40 nm prototype



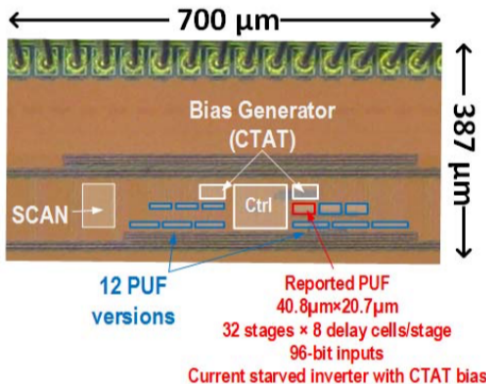
180 nm prototype

K. Yang et al., JSSC 2016

## Robust Physically Unclonable Functions

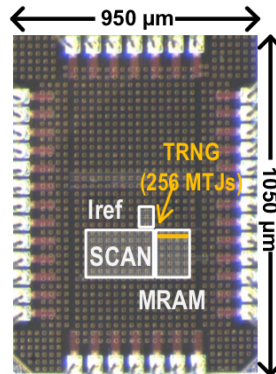


K. Yang et al., ISSCC 2017



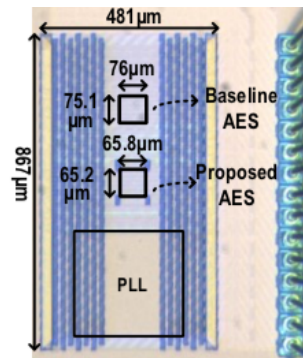
K. Yang et al., ISSCC 2015

## MTJ-based TRNG



K. Yang et al., VLSI 2018

## Lightweight AES



Y. Zhang et al., VLSI 2016