

Invited Talk #21

Energy-Efficient SRAM with Emerging Technologies

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Abstract— As data-centric applications increasingly demand high energy efficiency, there is a growing need for embedded SRAM arrays with high capacity and low operating voltages. To enhance computing capabilities, these applications require large memory capacities and compact cell areas. As computing cores continuously access on-chip SRAM caches, optimizing the density, performance, and energy efficiency of SRAM caches becomes crucial for future high-performance computing. This presentation focuses on recent studies exploring emerging technologies for SRAM, with a specific emphasis on CFET-based SRAM design. While CFET has demonstrated excellent scalability and alignment with SRAM scaling trends, the 6T CFET SRAM faces challenges such as read/write conflicts and the need for assist circuits. To overcome these hurdles, we propose an energy- and area-efficient 8T CFETBEOL SRAM design that offers exceptional speed, low dynamic energy consumption, and superior stability. This innovative design holds great promise as a suitable candidate for high throughput data-centric applications.

Biography



Dr. Vita Pi-Ho Hu received her B.S. degree in Materials Science & Engineering and her Ph.D. degree in the Institute of Electronics from National Chiao Tung University in Hsinchu, Taiwan, in 2004 and 2011, respectively. Her research interests include Ferroelectric FET, emerging memory, advanced nanoelectronics, low-power/high-performance SRAM, monolithic 3D IC, and design technology co-optimization. She has authored or co-authored over 100 refereed journal and conference papers related to her research interests. She currently serves as an associate professor in the Department of Electrical Engineering at National Taiwan University. Dr. Hu received the Outstanding Paper Award at the 2011 IEEE ICIDT, the Postdoctoral Research Award from the Taiwan Semiconductor Industry Association (TSIA) in 2014, the Best Paper Award at the IEEE IPFA in 2015, the Excellent Young Researcher Project Award from the Ministry of Science and Technology (MOST) in 2016, the Exploration Research Award from the Pan Wen Yuan Foundation in 2017, the MOST Young Scholar Fellowship in 2018, the Outstanding Youth Award from the Electronics Devices and Materials Association (EDMA) in 2019, the Ta-You Wu Memorial Award in 2021, and the outstanding women in science award in 2023. Prior to joining NTU, she held the position of assistant professor in the Department of Electrical Engineering at National Central University from 2015 to 2019. Dr. Hu was a Visiting Scholar in the Department of Electrical Engineering and Computer Science at the University of California, Berkeley, USA, during July-August 2017 and July-August 2018. Additionally, she has been a technical committee member of the IEEE ISQED since 2018 and served as a committee member for IEDM in 2022-2023.