



While the transistor revolutionized the field of electronics and paved the way for personal computers, it made way for several perpetual challenges: deliver more power in smaller sizes, enable real-time interaction with the real world, and constantly adapt to technological change. Solutions to those challenges can make possible, for example, biomedical ingestible pills, containing chips that aid, or give information about, the body; sensor networks that provide information about the environment or physical infrastructure; or wireless communication technology that uses less battery power but provides more range.

One of the challenges in making this new era a reality lies in advancing the development of single silicon chips that perform both analog and digital signal processing. Analog and digital signal domains have significant technical differences, yet new technology demands more and more complex mixed-signal design. The development pace is relentless, driven by demands for increased performance. New techniques need to be invented, and fundamental limitations must be better understood, to make such analog/digital circuits with improved performance possible.

Yannis P. Tsividis has been an important contributor to the field of silicon chips that mix analog and digital circuits. He and his students have done extensive research in this field at the device, circuit, system, and computer simulation level.

In 1976, Tsividis designed and built the first fully integrated MOS operational amplifier and demonstrated its use in a coder-decoder for digital telephony. These results were widely adopted by the industry in the first massively produced mixed-signal MOS integrated circuits, which incorporate both analog and digital functions on the same silicon chip.

Tsividis and his students have since been responsible for several important contributions, ranging from precision device modeling and novel circuit building blocks to new techniques for analog and mixed-signal processing, self-correcting chips, switched-capacitor network theory, RF integrated circuits, mixed analog-digital Very Large Scale Integrated (VLSI) computation and the creation of computer simulation programs. This work has resulted in several patents in several countries, and has been incorporated by the industry into products we use every day.

Tsividis is a fellow of the Institute of Electrical and Electronics Engineers.

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*Creating New Circuits for
Interfacing the Computer
to the Physical World*

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