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Professor James Buckwalter honored for work on integrated circuits

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February 26, 2026

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Electrical and computer engineering professor James Buckwalter has been inducted as a senior member of the National Academy of Inventors for his work advancing the high-speed and high-frequency integrated circuit technologies that underpin modern wireless communication systems. The organization cited his remarkable achievements as an academic inventor and a rising leader in his field.

Buckwalter designs advanced integrated circuits that operate at radio frequency and millimeter-wave speeds, the ultra-high frequencies used in 5G networks, satellite communications, radar systems and emerging sensing technologies. His work bridges fundamental circuit innovation with real-world deployment, enabling faster data transmission, lower power consumption and more efficient wireless infrastructure.

A central aspect of his research involves complementary metal-oxide-semiconductors (CMOS) technology, which is the foundational semiconductor platform used to fabricate most modern microchips. The technology is also integral to making III-V integrated circuits, devices built from compound semiconductor

materials composed of elements from Groups III and V of the periodic table, namely those under nitrogen and boron, respectively.

By advancing circuit architectures that integrate CMOS with III-V materials, Buckwalter's work helps push the limits of speed, efficiency and scalability in next-generation communication systems. His patented technologies contribute directly to innovations in wireless connectivity, sensing and high-performance electronics.

Buckwalter joins a distinguished network of 945 senior members worldwide. "This year's Senior Member Class is a truly impressive cohort. These innovators come from a variety of fields and disciplines, translating their technologies into tangible impact," said Paul R. Sanberg, founder and president of NAI. "I commend them on their incredible pursuits and I'm honored to welcome them to the Academy."

The induction ceremony will take place at NAI's annual conference in June at the Loews Hollywood Hotel in Los Angeles.

This story was written in collaboration with staff at UCSB's Robert Mehrabian College of Engineering.

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