Vision
Advancement of Very Large Scale Integration (VLSI) technologies is the driving force for next generation wireless communications. Every generation of VLSI technology offers a new opportunity for more powerful and smaller wireless devices, but it also poses a technical challenge to curb ever growing power consumption. Low power VLSI design for wireless devices will remain as a critical research need for future wireless communication devices.

Mission
Wireless@Virginia Tech’s VLSI for Telecommunications Group’s mission is to develop innovative low-power VLSI designs for industry and academia, while providing a high caliber educational experience for graduate and undergraduate students pursuing careers in VLSI design. Our goal is to become a nationally renowned group in VLSI for wireless communications through quality publications and sponsored research, and the VT-VT group is striving toward the goal through hard work and dedication.

Technical Approach
We combine expertise in circuit and system design to create a broad research framework for low power VLSI design. Broad knowledge and ample experience of Wireless@Virginia Tech in wireless system design is a distinctive advantage of the Center, which can be exploited for low power design at the system and architectural levels. We also investigate integration of digital circuits into analog/mixed signal and RF circuits, where digital circuits can assist in the reduction of the power for those circuits.

The Need for Research
Development of low-power circuit and system design is essential for current and future wireless devices. Virtually all wireless devices include digital, analog/mixed signal and RF circuits, and hence low power design should target all of those circuits. The main focus of the VT-VT Group is to address the technical needs.
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Areas of Research

- Analog, mixed-signal and RF circuit design
- Low-power VLSI system and circuit design
- Low-power application specific microcontroller units
- Power-line communications for vehicles, ships and airplanes
- Power conditioning circuits for energy harvesting
- Ultra wideband (UWB) circuits
- Wireless body area networks
- Wireless sensor nodes for structural health monitoring

VLSI circuit design limited only by the imagination.

Using state-of-the-art fabrication to bring our imagination into reality.

A prototype for wireless sensor nodes for structural health monitoring

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