



# DEPARTMENT OF COMPUTER SCIENCE

TEXAS TECH  
Whitacre College of Engineering

## On-Device AI to Better Mobile and Implantable Devices in Healthcare

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Tuesday, September 9, 2025

3:30 p.m.

Zoom:

<https://texastech.zoom.us/j/94498622562?pwd=NbqHnXJavSAEOxsXGYFMjMOFJyXO5u.1>

Meeting ID: 944 9862 2562

Passcode: 12345

**Abstract:** The increasing prevalence of chronic diseases, an aging population, and a shortage of healthcare professionals have prompted the widespread adoption of mobile and implantable devices to effectively manage various health conditions. In recent years, there is growing interest to leverage the rapid advances in artificial intelligence (AI) to enhance the performance of these devices, resulting in better patient outcomes, reduced healthcare costs, and improved patient autonomy. Due to privacy, security, and safety considerations, inferences must often be done on the edge, with limited hardware resources. This is compounded by inter-patient and intra-patient variability, heavy dependence on medical domain knowledge, and lack of diversified training data. In this talk, we will demonstrate how techniques such as hardware and neural architecture co-design and fairness-aware pruning can transform the landscape of mobile and implantable devices. Additionally, we will showcase the world's first smart Implantable Cardioverter Defibrillator (ICD) design enabled by our research.

**Bio:** Dr. Yiyu Shi is currently a professor in the Department of Computer Science and Engineering at the University of Notre Dame, the site director of National Science Foundation I/UCRC Alternative and Sustainable Intelligent Computing, and the director of the Sustainable Computing Lab (SCL). He is also a visiting scientist at Boston Children's Hospital, the primary pediatric program of Harvard Medical School. He received his B.S. in Electronic Engineering from Tsinghua University, Beijing, China in 2005, the M.S and Ph.D. degree in Electrical Engineering from the University of California, Los Angeles in 2007 and 2009 respectively. His current research interests focus on hardware intelligence and biomedical applications. In recognition of his research, more than a dozen of his papers have been nominated for or awarded as the best paper in top journals and conferences, including the 2023 IEEE/ACM William J. McCalla ICCAD Best Paper Award, 2021 IEEE Transactions on Computer-Aided Design Donald O Pederson Best Paper Award. He is also the recipient of Facebook Research Award, IBM Invention Achievement Award, NSF CAREER Award, IEEE Region 5 Outstanding Individual Achievement Award, IEEE Computer Society Mid-Career Research Achievement Award, among others. He has served on the technical program committee of many international conferences. He is the deputy editor-in-chief of IEEE VLSI CAS Newsletter, and an associate editor of various IEEE and ACM journals. He is an IEEE CEDA distinguished lecturer and an ACM distinguished speaker.

