

Electronics 5.0: New Materials and Devices for Edge Intelligence

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Abstract: The end of traditional transistor scaling brings unprecedented new opportunities to semiconductor devices and electronics. We are at the onset of a new technology revolution, which will focus on distributed intelligence and will be pushing the limits of edge sensing and computing. This seminar will describe some of our work on new materials and devices to enable this vision, including 1. Gallium Nitride CMOS FinFET amplifiers for much more efficient communications; 2. One-layer-thick molybdenum disulfide wi-fi energy harvesters to enable ubiquitous electronics; and 3. A new generation of cell-sized autonomous electronic microsystems to revolutionize invisible sensing. The seminar will conclude with a reflection on how the democratization of heterogeneous integration, the unique properties of extreme materials and the opportunities of distributed intelligence will transform our society just as Moore's law has done for the last 50 years.

Bio: Dr. Tomás Palacios is a Professor in the Department of Electrical Engineering and Computer Science at MIT. He received his PhD from the University of California - Santa Barbara in 2006, and his undergraduate degree in Telecommunication Engineering from the Universidad Politécnica de Madrid (Spain). His current research focuses on demonstrating new electronic devices and applications for novel semiconductor materials such as graphene and gallium nitride. His work has been recognized with multiple awards including the Presidential Early Career Award for Scientists and Engineers, the 2012 and 2019 IEEE George Smith Award, and the NSF, ONR, and DARPA Young Faculty Awards, among many others. Prof. Palacios is the founder and director of the MIT MTL Center for Graphene Devices and 2D Systems, as well as the Chief Advisor and co-founder of Cambridge Electronics, Inc. He is a Fellow of IEEE.