

# Dr. Costel Constantin

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Host: Jerry Floro

Talk Title: Growth, Electrical and Magnetic  
Characterization of Nitride Dilute  
Magnetic Semiconductors

**Date:** Monday, October 5th

**Time:** 4:00 to 5:00 PM

**Refreshments:** 3:30 to 4:00

**Room:** Wilsdorf 101

## Abstract:

Spintronics is an emerging technology which exploits for the first time the electrons' spin while making use of their charge. While traditional electronics are based on charge carrier control (e.g., n- or p-type), functional magnetic semiconductors called dilute magnetic semiconductors (DMS) would also allow control of the quantum spin (e.g., up or down). Future spintronic devices can take advantage of the new type of electronic conduction control and can be quite faster and more efficient as compared to the traditional counterparts. However, one of the greatest challenges in making DMS useful is obtaining reliable Curie (i.e., ferromagnetic) transition temperature above 300K. In this presentation, I will present the current efforts in obtaining reliable (e.g., above 300K) Curie temperature for manganese doped gallium arsenite (MnGaAs) and manganese doped gallium nitride (MnGaN) DMS materials. I will describe the growth, electrical and magnetic characterization of manganese doped scandium nitride (MnScN) and iron doped scandium nitride (FeScN) grown on scandium nitride/magnesium oxide [ScN/MgO(001)] by molecular beam epitaxy as possible nitride DMS materials.