Course Announcement

The Department of Electrical and Computer Engineering Santa Clara University

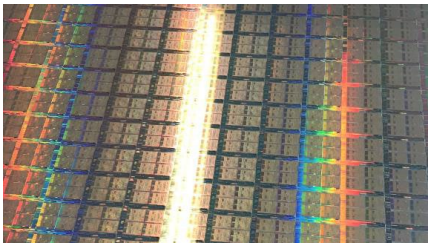
ELEN 379: Topics in Micro/Nanoelectronics: Nanolithography for Integrated Circuits

Instructor: Dr. Ronald Goossens

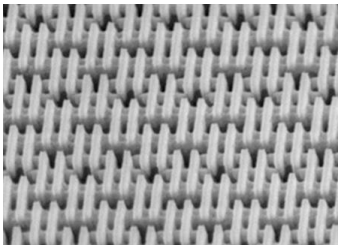
Term: Spring Quarter 2022 (March 30 – June 8)

Class Time: Wednesday 5:10 pm - 7:00 pm

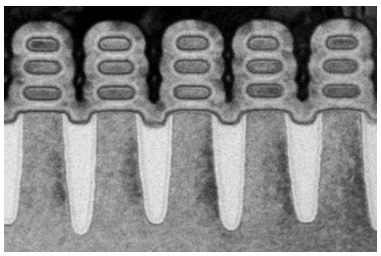
BULLETIN DESCRIPTION: Photolithography is a key component in the fabrication of integrated circuits (IC). Ever since the realization of the first IC at Fairchild in 1961, photolithography has been the most critical technology for IC's continued miniaturization, whose trend follows the so-called Moore's Law. Six decades later, nanolithography still holds the key in most advanced IC manufacturing, using the latest technology called extreme-ultraviolet lithography (EUVL). In this course, we plan to systematically introduce the nanolithography technology as a stand-alone subject while emphasizing the physics of imaging as its core. The student will get an overview of this technology required for working in the semiconductor industry as well as a foundation needed for further study of specialized topics in nanolithography such as resolution enhancing techniques and optical proximity correction.



Wafer Apple G4 dies, 90 nm SOI (IBM)



FinFETs, 7nm EUV technology (TSMC)



3nm gate-all-around technology (Samsung)

Ronald Goossens holds a Masters in Astronomy and a PhD in Physics from Utrecht University. During his career, he worked for Philips Research, Stanford University, National Semiconductor (now Texas Instruments), Semiconductor Research Corporation, SUN Microsystems. Since 2005, he has worked at ASML in a variety of roles, always with focus on solving complex imaging problems for customers.

Textbook: *Principles of Lithography*, 4th ed., H. J. Levinson:
https://spie.org/Publications/Book/2525392

Prerequisites: ELEN 201 or an introductory course on electromagnetics