



UNIVERSITY OF CALIFORNIA, IRVINE

Department of Materials Science and Engineering

Interface Reactions and Transport in Heterogeneous Heterostructures



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Thursday, January 27, 2022, 2:00-3:20 p.m.

Location: <https://uci.zoom.us/j/98283794389?pwd=RlpiSXg4RHBCQzNRN0pLSzIrc2tkUT09>

Meeting ID 982 8379 4389 — Passcode 380564

Abstract: The study of interfaces for both epitaxial and wafer-bonded systems draws from materials science, electrical engineering, and mechanical engineering and involves advanced materials characterization techniques. Low temperature wafer bonding has been leveraged to produce a wide array of materials combinations, most notably silicon-on-insulator structures. However, modifications to epitaxial and bonded interfaces can impact the electrical or thermal transport across such interfaces. In this presentation, we provide a few examples in semiconductor and metal-based systems to address the ability to study and modify different, technologically important, interface combinations as a function of processing, such as annealing. The materials combinations will range from Si|Si and Si|Ge to wide bandgap materials combinations including GaN|Si to b-Ga₂O₃ | SiC as well as metal|metal thermocompression bonding. Our main goal is to be able to study and engineer the interfaces to optimize properties and ultimately, device performance. These studies are part of a MURI program “Leveraging a New Theoretical Paradigm to Enhance Interfacial Thermal Transport In Wide Bandgap Power Electronics”.

Bio: Professor Mark Goorsky is a leader in wafer bonding, layer exfoliation and transfer, and chemical mechanical polishing of semiconductors and optical materials. Goorsky also provides expertise in materials characterization of semiconductor materials and devices, with emphasis on structural (x-ray scattering and electron microscopy) and chemical (electron energy loss spectroscopy, energy dispersive elemental analysis) techniques. He received the university-wide 2016 UCLA Distinguished Teaching Award and the Harvey L. Eby Award for the “Art of Teaching, was a member (2011-2015) of the US Air Force Science Advisory Board, was (2002-2019) associate editor for the Journal of Crystal Growth, was awarded the T.S. Walton Award from the Science Foundation of Ireland in 2010 (where he participated in projects to understand the integration of germanium and III-Vs with silicon) and received (1995-2000) a National Science Foundation CAREER AWARD. He has been on the faculty at UCLA since 1991. He was department chair from 2005-2010 and currently serves on the university-wide Undergraduate Council.