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LONG ISLAND CHAPTER

METALLAGRAM

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WELCOME TO THE 2021-2022 YEAR

Next Meeting . . . . . Wednesday, September 22, 2021

Where . . . . . Pollo Rico Latin Bistro, Centereach, NY

Topic: Development of SiC Materials for Next Generation Power Electronics

Speaker: Michael Dudley, Stony Brook University

Social hour … 6:00 pm Dinner … 7:00 pm Meeting … 8:00 pm

Members … $25 Guests … $27 Students … $15

(New and recently transferred-in members free)

Reservations appreciated – contact Peter Indrigo

at pdi53@yahoo.com or 631-689-2186

Directions to Pollo Rico Latin Bistro

Pollo Rico is located at 2435 Middle Country Road (Rte. 25), Centereach. Probably the simplest way to get there from the LIE is to take Exit 62 (Nicolls Road) and go north on CR 97 (towards Stony Brook). Continue north for about 3 miles then take the exit to Rte. 25. At the traffic signals at the end of the ramp go left and head west (Smithtown). The restaurant will appear after about 1.5 miles, on the right side of the highway. Their telephone number is 631-471-0585. Their website is: http://www.polloricolatinbistro.com/

The Speaker

Michael Dudley graduated from Warwick, UK, University with a BSc in Physics and Materials Science in 1978 and a PhD in Engineering, working with Prof. Keith Bowen, in 1982. During his doctoral work he spent 1.5 years at the laboratory of Prof. André Authier in the Laboratoire Minéralogie-Cristallographie at the University of Paris (6) where he was advised by Prof. Jacques Miltat. Most of his experimental work was done at the synchrotron source, LURE, at Orsay. He carried out postdoctoral work at the University of Strathclyde (working with Professor John Sherwood, 1981-84) with much of the experimental work being done at the Synchrotron Radiation Source at Daresbury Laboratory. He moved to Stony Brook University in 1984 where he is currently a Professor in the Materials Science and Chemical Engineering Department. He was also Department Chair for 24 years. In 2018 he was the recipient of the SUNY Chancellor's Award for Excellence in Faculty Service. He is director of the Stony Brook Synchrotron Topography Laboratory and ran a synchrotron topography beamline at the NSLS, BNL for 25 years. Most of his experimental work is currently carried out at the Advanced Photon Source, at Argonne National Laboratory. His group has also carried out experiments at the European Synchrotron Radiation Facility in France, Diamond Synchrotron Source in the UK, and ANKA source in Germany. His current research focuses on crystal growth and characterization of defect structures in wide-bandgap semiconductor and related single crystals with a view to determining their origins and influence on device performance. He has co-authored some 448 refereed articles and 15 book chapters and edited 17 books. He has also chaired or co-chaired several international conferences and serves on the organizational committees for conferences such as the International Conference on Silicon Carbide and Related Materials (ICSCRM), the European Conference on Silicon Carbide and Related Materials (ECSCRM), a long ongoing series of Electrochemical Society Symposia on GaN Devices, the Electronic Materials Conference, and the Conference on Defects-Recognition, Imaging and Physics in Semiconductors (DRIP).

The Topic

As Si-based semiconductors are fast approaching their performance limits for high power devices, wide-bandgap semiconductors such as SiC with their superior electrical properties are likely candidates to replace them. Unfortunately, development of crystal growth processes for these materials has not yet reached the level of maturity long since attained for Si. Consequently, the performance and reliability of devices made from SiC has fallen short of predicted potential mainly due to the detrimental effects of defects introduced during crystal growth or subsequent processing steps. SiC crystals are notoriously difficult to grow and in this presentation I will provide an overview of methodologies employed to optimize the growth and processing of crystals/epilayers of these crystals of sufficient quality and size to meet the needs of the power electronics industry. This research involves the classic interplay between structure/microstructure, processing, properties and performance. I will discuss the detailed synchrotron topography studies my group has been carrying out to make all this possible. I will demonstrate how we have effectively become the "eyes" of the industrial crystal growth community providing key data informing the necessary interplay and feedback between growth engineers, thermal and stress modelers and device manufacturers.

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Long Island Chapter Meeting Schedule

Oct. 20, 2021	**Speaker: Kevin Nastos, D&B** **Topic: Waste water treatment** **Place: tbd**
Nov. 15, 2021	**Students Night** **Various speakers and poster presentations** **Place: tbd**

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