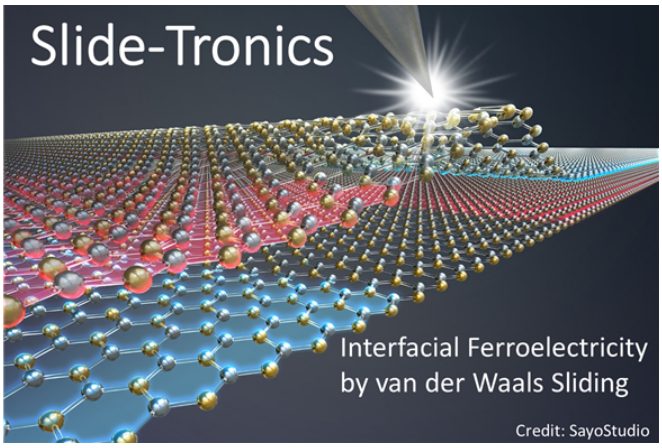
Tel Aviv University Center for Nanoscience and Nanotechnology

NEWSLETTER

Following a strategic decision of the TAU management, the Wolfson Applied Materials Research Center was recently merged into the Center for Nanoscience and Nanotechnology. This important move allows us to form one synergetic research and infrastructure facility for nano, quantum and bio-convergence technologies, equipped with state-of-the-art fabrication and characterization technologies and run by a dedicated team of professionals. The enhanced research capabilities resulting from the merger will propel us toward our ultimate goal: becoming an elite technology center with world-class capacities.

The construction of the iconic building – a home for elite technologies – is progressing, with completion of the exterior expected by the end of July. Earlier in June TAU issued a tender for the systems and interior construction. The tender will close at the end of July, and the new phase is expected to begin in August and take about 14 months.

Nanotechnology Research



Slide-Tronics - A novel polarization switching mechanism in an ultrathin ferroelectric material

Researchers from TAU's Schools of Physics and Chemistry, led by Dr. Moshe Ben Shalom, Prof. Eran Sela, Prof. Oded Hod and Prof. Michael Urbakh, have engineered a two-atoms-thick ferroelectric system, the thinnest observed to date, exhibiting a novel polarization switching mechanism: Two atomic sheets sliding relative to each other by one atomic spacing. The discovery may revolutionize data processing and storage technologies by allowing rapid quantum mechanical tunneling of electrons through the atomic-scale polar structure.

https://physicsworld.com/a/slidetronics-makes-its-debut/
https://science.sciencemag.org/content/372/6549/1462

Fred Chaoul - Fabrication

We are thrilled to announce the arrival, just last week, of the Helios 5 dual beam! We expect the system to be installed and ATP-approved within about two months.

The Helios 5 combines a focused ion beam (FIB) with a scanning electron beam - providing dual functionality in one machine. The ion column provides fast and precise milling, patterning and imaging of the sample's surface, while the superior low voltage performance of the ion column facilitates the production of a high-quality thin lamella for TEM. A Multi-Chem system provides accurate deposition/etching of different layers on the sample. By activating both columns simultaneously it is possible to slice the sample very gently and acquire an immediate SEM image of each slice. Repeating these steps enables the reconstruction of a 3D model of the specimen.

The Center recently enhanced the capabilities of its ZEISS GeminiSEM by adding a high-performance Energy Dispersive Spectroscopy (EDS) system by Bruker.

The heart of this system is the highly sensitive Silicon Drift Detector (SDD), exhibiting an extended dynamic range (signal saturation level) without compromising spectral resolution. The detector has improved sensitivity to low energy transitions from light chemical elements, excited by an HRSEM electron beam in low kV regime. The system uses the unique Bruker's Peak/Background-ZAF algorithms for reliable and self-calibrating data analysis and extraction. The algorithms are based on simultaneous analysis of continuum spectrum Bremsstrahlung radiation and discrete characteristic electron transitions. This approach minimizes the effects of electron scattering, absorption, surface roughness, and detector collection efficiency.

Wolfson - Characterization

We are currently in the process of purchasing 3 state-of-the-art microscopy and analysis systems:

An Analytical Scanning Transmission Electron Microscope; an Angular-Polarized-Time-Resolved Cathodoluminescence SEM; and an X-ray Photoelectron Spectroscopy. We aim to complete equipment selection and submit orders for the chosen systems by the end of this fiscal year.

Nano Community Events

Please join us at NANO.IL.2021 - the International Nanotechnology Conference in Israel. Early-bird registration ends on August 1, 2021.

Last Thursday we had a comeback of the "Nano Beer" gathering.
Looking forward for more to come...