Focus on semiconductors and software

The descriptions of the new products listed in this section are based on information supplied to us by the manufacturers. PHYSICS TODAY can assume no responsibility for their accuracy. For more information about a particular product, visit the website at the end of the product description.

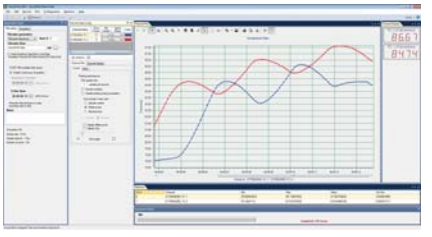
Andreas Mandelis

AFM semiconductor characterization system

Bruker has introduced a new atomic force microscope configuration called the Dimension Icon SSRM-HR (scanning spreading resistance microscopy–high-resolution). It integrates the large-stage, low-drift, and fine force control of the Dimension Icon platform with the SSRM application module and is designed for HR semiconductor characterization, SSRM-DIA (diamond) probes, and environmental control. Incorporating the AFM platform with an environmental control system capable of 1-ppm gas purity and high-vacuum control provides repeatability and high spatial resolution in semiconductor carrier profiling. The system can detect buried gate oxide layers as thin as 5 Å. After samples are seamlessly transferred from a high-vacuum sample preparation chamber, their oxygen and water content are controlled at the 1-ppm level during AFM imaging. *Bruker Nano Surfaces Division, 112 Robin Hill Road, Santa Barbara, CA 93117, http://www.bruker.com*

Data acquisition application software

Data Translation has announced that its new software application, QuickDAQ 2013, is available free of charge and supports all the company's data acquisition modules. Single-channel and advanced two-channel FFT analysis add-ons are offered to build onto the capabilities of the base package. QuickDAQ 2013 features out-of-the-box measurement data support; the ready-to-measure application software allows users to configure, acquire, log, display, and analyze data from any of Data Translation's more than 150 data acquisition modules. Many customizable features are included to meet individual needs. Engineers and scientists can apply FFT algorithms embedded in the signal analysis software to the measured data in order to view performance characteristics. *Data Translation Inc, 100 Locke Drive, Marlboro, MA 01752-1192, http://www.datatranslation.com*

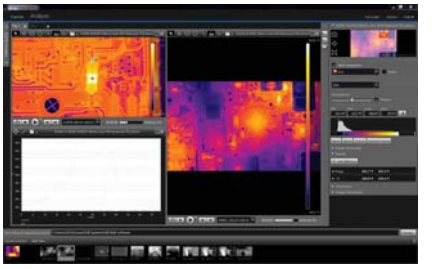


Laboratory automation control platform

Aerotech's new Ensemble LAB control platform can automate laboratory and light industrial manufacturing applications. The full-color, touch-screen display enables quick access to core functionality, and an intuitive tabbed interface provides single-press access to setup and operation screens. A front-panel USB port allows for connection of a keyboard and other peripherals to help in the creation of complex program sequences. Ensemble LAB is designed for applications for which ease of operation is desired without sacrificing overall system capability. The front-panel interface allows operators to quickly execute simple operations such as jogging, homing, and moving to fixed positions. For more complex operations, onboard memory stores programs that can be accessed from the front panel or through remote control. *Aerotech Inc, 101 Zeta Drive, Pittsburgh, PA 15238, http://www.aerotech.com*

IR camera control for high-speed imaging

The new ResearchIR thermal measurement, recording, and analysis software from FLIR Systems has been designed for R&D and advanced science applications. The software provides acquisition, diagnostic, and data-sharing tools that include customizable, savable workspaces. Users can arrange how imagery, data, charts, and plots are displayed. ResearchIR connects directly to FLIR cameras via USB, Firewire, Gigabit Ethernet, and Camera Link for fast viewing of thermal snapshots and movie files. It supports such options as pre- and post-trigger recording based on user-configured start and stop times, scene temperature thresholds, and frame rates. ResearchIR performs real-time image analysis with an extensive set of measurement modes and features zoom and pan for closer examinations. Preset sequencing and superframing let users analyze scenes with large temperature differences or targets with rapid thermal dynamics. *FLIR Systems Inc, 27700A Southwest Parkway Avenue, Wilsonville, OR 97070, http://www.flir.com*



Catalyst quantification

The Hiden Catlab integrated microreactor and mass spectrometer (MS) system now features LABview-based control. The user-definable software can establish MS data acquisition parameters; input gas or vapor flow through up to eight mass flow controllers; record

furnace temperature and ramp rates; and provide valve switching functions, including pulse gas injection for chemisorption measurements. The temperature profile defines the trigger points to change gas composition, inject gas pulses, and stop or start data acquisition. The Catlab system is engineered for combined reactor and MS system operation, but it can easily be decoupled to enable operation of the mass spectrometer as a standalone laboratory and process gas analyzer. Reaction products are monitored directly from the sample position via the primary sampling interface embedded within the 1000 °C fast-response furnace. A secondary interface then provides a decoupling point for offline MS operation. *Hiden Analytical Inc, 37699 Schoolcraft Road, Livonia, MI 48150, http://www.hidenanalytical.com*

Temperature controller card

Lake Shore now offers a four-channel option card for models 336 and 350 temperature controllers used for low-temperature physics research in university and commercial laboratories. The new card increases the controllers' utility by doubling the number of inputs.

The model 3062 card adds four additional input channels for cryogenic temperature sensors that can be used for monitoring or control. The scanner option channels can be configured for diode, negative temperature coefficient resistor, or positive temperature coefficient resistor sensors. The model 3062 scanner card can easily be installed in the field, with no need to send the controller back for upgrade. The scanner card is supported by model 336 firmware version 2.3 and later and model 350 firmware version 1.1 and later. To update models 336 or 350, users can visit http://www.lakeshore.com/products/pages/firmwareupdater.aspx to download the free Lake Shore firmware updater software and the most up-to-date instrument firmware. *Lake Shore Cryotronics Inc, 575 McCorkle Boulevard, Westerville, OH 43082, http://www.lakeshore.com*

Mathematics software

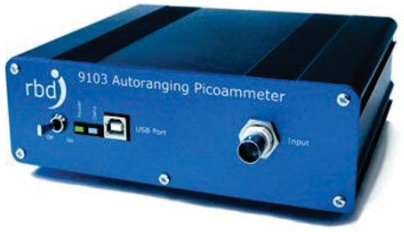
Maplesoft has announced a new release of its Maple mathematical computing software for education and research in mathematics, engineering, and the sciences. Maple 17 introduces more powerful mathematics and a large collection of enhancements that support the creation of interactive Maple math apps for teaching and learning. The apps can be used not only in Maple 17 but through Maplesoft's recently announced Möbius Project initiative, which provides new ways to bring the power of Maple to more people. Maple 17's functionality includes solutions to a new class of differential equations, advancements in solving systems of equations, an extensive package for working with algebraic groups, new signal processing tools, expanded support for differential geometry, and new tools for physics. *Maplesoft, 615 Kumpf Drive, Waterloo, Ontario N2V 1K8, Canada, http://www.maplesoft.com*

Software for creating Origin Project files

OriginLab has released a 64-bit version of its Orglab DLL (dynamic-link library) for creating Origin Project (OPJ) files. Tailored to the needs of scientists and engineers, the data analysis and graphing capabilities of Origin and OriginPro have the flexibility and functionality to manage complex data analysis and graphing tasks. Hardware and software vendors and instrument manufacturers can work with large volumes of data, export them as OPJ files, and save data and associated metadata using Origin's flexible and hierarchical project structure. Metadata can be saved into Origin workbooks, worksheets, and columns and used for graph annotation and analysis. *OriginLab Corporation, One Roundhouse Plaza, Suite 303, Northampton, MA 01060, http://www.originlab.com*

Low DC current measurements

A new feature that RBD Instruments has added to its Actuel data logging software enables multiple 9103 USB picoammeters to be synced and may open up new applications for low DC current



measurement. The 9103 USB picoammeter is designed to provide bipolar DC current measurements in the range of picoamps to milliamps. An ASCII-based command structure enables users to quickly incorporate the 9103 into their custom software application. The 9103—named for the working current range from 10^{-9} amp to 10^{-3} amp—is a tool for engineers and researchers who need to measure low DC currents economically and plot the current versus an applied voltage. The Actuel software included with the 9103 displays the measured current in a virtual panel meter on the PC monitor. Users can change all functions, such as current range, sample time, bias, and grounding. Data can be logged and graphed in a variety of output options. *RBD Instruments Inc, 2437 Northeast Twin Knolls Drive, Suite 2, Bend, OR 97701, http://www.rbdinstruments.com*

Integrated spectroscopy and imaging software

Craic Technologies designed its Lambdafire microspectroscopy and imaging software package to collect, analyze, and process both microspectra and images from Craic microspectrophotometers

that run Windows 8. Lambdafire is simple to use but contains advanced spectroscopic, imaging, and data analysis features. The complete Lambdafire combines 64-bit software that takes advantage of the company's latest generation of microspectrophotometers, such as the 20/30 PV, and the latest versions of Windows. Users can control Craic microspectrophotometers and acquire high-quality UV, color, and near-IR spectra and images of microscopic samples by absorbance, reflectance, Raman, and various types of luminescence and fluorescence. Additional modules may be incorporated to add such capabilities as small-spot film thickness measurements and micro-colorimetry. *Craic Technologies Inc, 948 North Amelia Avenue, San Dimas, CA 91773, http://www.microspectra.com*

Software for studying molecular interactions

The new release of Cresset's XedTools package features the next generation of the XED force field and includes command-line utilities for studying molecular interactions by using the XED molecular mechanics force field. The most recent version offers improved performance, enhanced capabilities, and an expanded library to improve the conformations of molecules with flexible rings. The free XedMin tool has been updated, so ligands can now be minimized within a protein context to allow more accurate modeling of protein ligand interactions. The XED force field incorporates enhanced description of aromatic–halogen interactions; a completely analog system for dealing with nitrogen atoms, thus providing a smooth transition from pyramidal to planar geometries; and an extension of the supported elements to facilitate the modeling of compounds, such as boronates, by means of new mechanisms of action. In studies, the force field performs well at reproducing bioactive conformations for molecules with less than eight rotatable bonds. *Cresset BioMolecular Discovery Limited, BioPark Hertfordshire, Broadwater Road, Welwyn Garden City, Hertfordshire AL7 3AX, UK, http://www.cresset-group.com*

Microanalysis system

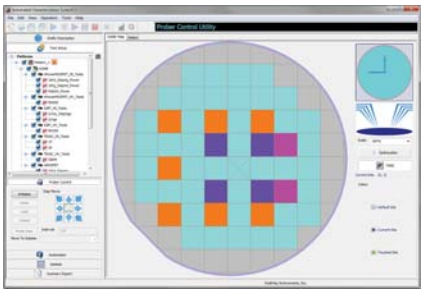
With the release of its new TEAM WDS analysis system, Edax has merged its wavelength dispersive spectrometry product line into the TEAM platform. That improves workflow and streamlines all three microanalysis techniques—energy dispersive spectroscopy (EDS), electron backscatter diffraction, and WDS—into one common user interface. The system also introduces Smart Focus, a fully automated focusing routine that provides complete microscope optimization for WDS analysis. That feature optimizes the stage position based on the WDS optic to guarantee the highest intensity for each element. The Edax spectrometer design can be mounted on most EDS ports on a scanning electron microscope to allow users greater freedom in system configuration compared with alternative WDS systems. According to the company, the Edax spectrometer excels in a wide range of operating conditions, from low currents for beam-sensitive materials to high currents typical of WDS analysis. *Edax Inc, 91 McKee Drive, Mahwah, NJ 07430, http://www.edax.com*

Software package for geoscientists

Golden Software has released Strater 4, a well log, borehole, and cross-section plotting software package for geoscientists. Strater 4 enables users to quickly create professional well logs, cross sections, and location maps from interval, depth, and other borehole data. Among the software's new features are the abilities to display deviated logs in a cross section and deviation paths on a map and to create cross sections using line logs. Showing deviated logs and deviation paths is potentially helpful, since many boreholes are currently deviated and horizontal. Strater can now create a more accurate representation of the data. Creating cross sections from line logs opens up possibilities for geoscientists who only have geophysical data such as Log ASCII Standard files and top- or bottom-layer picks. A full coordinate system library has also been added. *Golden Software Inc, 809 14th Street, Golden, CO 80401-1866, http://www.goldensoftware.com*

Wafer-level testing software

Keithley Instruments has enhanced the automated characterization suite (ACS) software that supports its family of high-power semiconductor characterization solutions. Optimized for automated wafer-level parameter test applications, the ACS package includes automated characterization, reliability analysis, and known good die testing. The ACS V5.0 update leverages the capabilities of Keithley's models 2651A (high current) and 2657A (high voltage) System SourceMeter SMU instruments to enable automated wafer-level testing of high-power semiconductor devices such as power metal oxide semiconductor FETs, insulated-gate bipolar transistors, bipolar junction transistors, and diodes. The ACS intuitive graphical user interface makes it simple for users to configure test instrumentation, set measurement parameters, measure current–voltage, and display results. *Keithley Instruments Inc, 28775 Aurora Road, Cleveland, OH 44139, http://www.keithley.com*



Spectroscopy software

OceanView spectroscopy software from Ocean Optics combines data processing capabilities with a clear graphical user interface and is designed for use with the company's miniature spectrometers. Highly customizable, OceanView includes a schematic view that provides a visual roadmap of data flow from spectral inputs to processed results. It displays and utilizes spectral data from Ocean Optics spectrometers and has the added flexibility of integrating temperature, voltage, and other input data, so users can capture and visualize data from multiple sources. OceanView saves and reloads previous experiments and has a convenient "persistence of settings" feature that recalls acquisition parameters and file locations. Users can customize the OceanView interface and later access those settings without having to rebuild them with each new session. The software delivers results in the form of an answer rather than a simple waveform. *Ocean Optics Inc, 830 Douglas Avenue, Dunedin, FL 34698, http://www.oceanoptics.com* ■