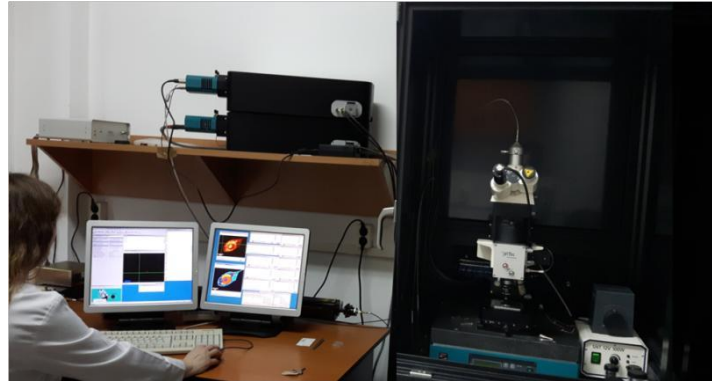


## Confocal Raman microscope system coupled with Atomic Force Microscopy module (Alpha300A, Witec)



### ► Specific components:

**(a) Confocal Raman Microscope:** optical microscope equipped with different types of objectives (E Plan, LMP Plan, EC Plan, achromatized plan) of different magnifications (10X, 20X, 50X, 100X, 63X) dry/immersion operation; piezoelectric scanner on x-y, scanning area 100 x 100  $\mu\text{m}$  on x-y and 20  $\mu\text{m}$  in depth; excitation sources: NdYag laser at 532 nm, He-Ne laser at 632.8 nm and laser diode at 785 nm; holographic filters (532, 633 and 785 nm); 1 UHTS300 spectrometer equipped with CCD detector with Peltier cooling up to  $-60\text{ }^{\circ}\text{C}$  (DV401-BV, Andor - 1024 X 128 pixels) for the visible spectral range; 1 spectrometer UHTS300 equipped with a CCD detector with Peltier cooling up to  $-60\text{ }^{\circ}\text{C}$ , DU401-BR-DD, Andor- 1024 X 128 pixels) for the NIR near-infrared spectral range); optical fiber coupling (unimode and multimode); color video camera for viewing samples in bright field; LED with white light; Witec Project Four data acquisition and processing software and Witec Project Four Plus advanced data processing software;

**(b) Atomic Force Microscope:** coupled on the same platform as the Raman microscope; active vibration isolation system; AFM operating modes: in contact/lateral force, pulsed, phase imaging; special objective for AFM analyzes in liquids; - electronic control unit; enclosure for sound insulation, vibration and anti-dust; UPS voltage stabilizer; computer for data acquisition and processing;

► **Performances:** High complexity system, used in a wide range of applications from priority fields at local/national/international level; confocal detection with lateral resolution of 250-300 nm; ultrasensitive detection, up to unimolecular level by means of surface-enhanced Raman spectroscopy (SERS); flexible design, accessible optical unit, 3 excitation wavelengths, two of which are visible and one in NIR, data acquisition and processing software adapted for different types of measurements / data analysis modes: collection of individual Raman/SERS spectra , Raman/SERS time series collection, line scan, surface; Raman/SERS imaging; AFM; software for advanced data processing through multivariate analysis (K-means cluster analysis, PCA, etc.).

► **Total value:** 1.413.461,15 Lei ( aprox 320.000 Euro)

► **Aquisition year:** 2006 - 2007 + annexes and licenses (2011-2014)

► **Applicability:** Characterization of the chemical composition and structure of materials by confocal Raman spectroscopy; Raman imaging consists in the creation of maps regarding the distribution of some (bio)chemical components in heterogeneous materials used in the field of nanotechnology, life sciences, geology, pharmaceuticals and the food industry; characterization of biological structures (living cells, tissue) incubated with different nanoagents used in therapy, diagnosis and imaging (medicines, nanoparticles labeled with SERS reporters, nanovectors, etc.); Monitoring the therapeutic activity of different drugs / nanoparticles; Nanotoxicity evaluations; the development of plasmonic substrates for SERS biosensors and biodetection, etc. ; Surface topography analysis and phase analysis by atomic force microscopy.

► **Availability for Access and Use**

Contact persons:

**Monica Potara**, CS II (email: monica.potara@ubbcluj.ro, 0264454554/int 116)

**Cosmin Farcau**, CS I (email: cosmin.farcau@ubbcluj.ro, 0264454554/int 116)

Available for a pre-evaluation of the complexity of the samples and estimation of the working time, in the **9:30 - 17:30 interval**, based on a preliminary email or phone appointment.

**Usage conditions:** exclusively by the personnel responsible for the mentioned specialty

**Analysis price - extern UBB:** Preliminary evaluation – free of charge; Raman image measurement and analysis: 350 lei/sample; Measurement of Raman spectrum: 200 lei/sample

**Analysis price - intern UBB:** free of charge