satellite droplets during drop formation. As it turns out, this ability to create and handle single micro droplets is also important for applications in clinical diagnostics and genetics research. This includes being able to dose various liquids in precise amounts and to place them exactly where they are needed. Packard Instrument Company, a manufacturer of such drop dispensing instruments, has consulted with Professor Basaran to better understand and improve its drop production techniques.

Potential New Diagnosis Procedures for Alkaline Phosphatases (VA Commonwealth U.). Work by Professor Rutan at Virginia Commonwealth University on kinetic detection, subsequent to electrophoretic or thin-layer chromatographic separations, coupled to third-order data analysis methods has medical implications. It is anticipated that the research will lead to new diagnostic procedures for difficult to separate isoenzyme systems, such as alkaline phosphatases.

Secondary Ion Mass Spectrometry Imaging of Biological Tissues (ORNL/NWU/NIMH/NIAAA/ Johnson & Johnson). For years, researchers at Oak Ridge National Laboratory have been trying to apply secondary ion mass spectrometry (SIMS) to the analysis of biologic tissue--a very challenging application. There are plenty of barriers to overcome. However, these researchers have succeeded in part and are collaborating with researchers at Northwestern University and the National Institute of Mental Health, National Institute on Alcohol Abuse and Alcoholism, and have a exploratory project with Johnson & Johnson regarding contact lenses. These projects include mapping the distribution of gadolinium compounds in the vicinity of cardiac infarcts, the distribution of phospholipids during development and as a consequence of alcoholism, and the protein buildup on contact lenses. They also have a proposal pending to develop a monitor of calcium deposition in bone. BES supported the development of this critical technology of large field of view secondary ion imaging, cluster ion impact, and bromobenzene and fullerene primary ion beams.

Mass Spectrometry for Lipoproteins Studies (TX A&M U.). Mass spectrometry is central to research in areas such as protein chemistry, DNA chemistry, genomics, and proteomics. The implementation of mass spectrometry in virtually every biochemistry and molecular biology laboratory around the world can be traced to a few laboratories working in fundamental areas of instrumentation development and ion chemistry. Mass spectrometry methods such as electrospray ionization (ESI), matrix-assisted laser desorption ionization (MALDI), collision-induced dissociation (CID), and their subsequent instrumentation developments, are all outgrowths of research in experimental physical chemistry. Virtually all the medical related research that involves mass spectrometry is now based on ESI and MALDI and time-of-flight (TOF) mass spectrometers. Basic Energy Sciences supports research involving the development and use of ESI, MALDI, and TOF mass spectrometers. The research is aimed at understanding the basic processes involved in ESI and MALDI as well as the implementation and development of more sensitive, high performance TOF instrumentation and mass spectrometry based methods. Texas A&M University researchers have used the mass spectrometers provided by Basic Energy Sciences projects to study human lipoproteins, especially HDL. They have used high resolution TOF-MS combined with MALDI to profile HDL in the molecular weight range 6-30 kda in human subjects. Over 30 apo isoforms have been detected in the HDL fraction by the