Abstract: Crude oils and source rocks are complex mixtures of organic compounds. The preferred technique for the analysis of these complex mixtures has in the past been gas chromatography-mass spectrometry with associated ancillary techniques such as single ion monitoring (SIM) or multiple ion detection. The compounds which are frequently used in geochemistry form homologous series and are readily detected by single ion monitoring of characteristic fragment ions. However, in many cases particular families of compounds consist of many overlapping homologues and stereoisomers which are virtually impossible to resolve. The development of triple state quadrupole (TSQ) and other hybrid mass spectrometers have provided a means to solve this problem. A number of parent/daughter ion relationships specific for each sterane, or any other biomarker, is monitored during the course of the analysis. By using the approach it is possible to resolve the homologues and greatly simplify the mixtures. In addition, it is possible to enter into a much higher molecular weight range by direct probe analysis than was previously possible GC-MS. A large proportion of the organic material in source rocks is insoluble in organic solvents. Hence this cannot be characterized simply by using GC-MS. Instead it is necessary to use a degradation step such as pyrolysis prior to, but in conjunction with, the GC-MS analysis. In the second half of this presentation it is proposed to discuss the application of pyrolysis techniques to characterization of kerogen and the production of hydrocarbons and sulphur containing compounds. The significance of these distributions and their use in geochemical problems will be discussed using a number of case histories.

Bio Sketch: I received my Ph.D. in organic chemistry from the University of Sydney (Australia) in 1972 and more recently my D.Sc. degree from the same University in 1998. I then spent one and a half years as a post-doctoral fellow with Professor G. Eglinton at the University of Bristol (England) undertaking research in various aspects of organic geochemistry and the application of analytical techniques such as gas chromatography-mass spectrometry to this area of research. Following this, I spent four years at the University of California, Berkeley, as a research associate, directing the organic geochemistry research group of Professor Melvin Calvin. I returned to Sydney in 1977 to join the CSIRO, Fuel Geoscience Unit, now part of the Division of Fossil Fuels, where I was a principal research scientist studying various aspects of petroleum geochemistry. In June 1984, I joined the faculty at the University of Oklahoma. The major theme of my research during the past 15 years has been directed at the application of organic chemistry to fossil fuel research. The second major area of research has been the characterization of source rocks, coals, and oil shales using microscale pyrolysis techniques combined directly with gas chromatography-mass spectrometry. More recently a large amount of my work has been concerned with environmental studies and particularly investigating the use of stable carbon isotopes as a means of monitoring and tracking pollutants in the environment.

The meeting will be at Sweetwaters Restaurant, 1104 W. Clairemont Ave, Eau Claire (near the intersection of Clairemont (US 12) and State Highway 37). Dinner reservations should be made by contacting Dave Lewis at 715-836-4744 or email lewisd@uwec.edu before noon on Monday, May 3.

Dinner: Choice of Entrée (Prime Rib of Beef; Chicken a la Oscar: Roast Pork Rib Forestier), salad, rolls, potato, coffee/tea/milk ($16.95 + tip + tax)