

GENERAL INFORMATION

The workshops will be held at Bowdoin College, which is located in the center of Brunswick, Maine about 25 miles northeast of Portland, just off Interstate 295. Brunswick is on the shore of Casco Bay and about an hour's drive from Penobscot Bay, both outstanding sailing areas. In addition, the beach, lake, mountain, and wilderness regions which give Maine its reputation as a superb summer vacationland are within a few minutes to an hour of Brunswick. The Bowdoin campus hosts a professional Summer Theater and a professional chamber music series.

The individual course fee of \$1950 covers tuition, materials, room, and board from Sunday evening, July 11 or July 18 through Friday noon, July 16 or July 23.

Single participants will be housed in a student residence hall. Three meals a day (including a lobster bake on the Monday evening) will be served, commencing Sunday night, July 11 or July 18 through Friday noon, July 16 or July 23. All participants should plan to arrive in Brunswick by Sunday evening. Participants who wish to bring their families are most welcome to do so. Families may be housed in quad-apartments which are a part of the new student residential hall. A package meal plan is available for registrants who choose to reside off-campus or who reside in the quad-apartment housing. (Note that there are no cooking facilities in the quad apartments). For further details you are urged to consult the web site (<http://www.ircourses.org>), or email us at ircourses@ircourses.org.

Individuals who wish to enroll in one or both of the Infrared Spectroscopy Courses can register and submit payment directly on the web site. Those unable to do so should contact Jim de Haseth promptly. The deadline for receipt of the formal registration form and fee is June 25. Registrants are urged, however, to register well in advance of this date to be assured that accommodations can be reserved. This is of particular importance to those wishing quad apartment accommodations as these facilities are very limited. All correspondence should be directed to:

James A. de Haseth
IR Course, Inc.
165 Sunnybrook Drive
Athens, Georgia 30605-3347
Tel : 706.248.6386
Email : dehaseth@ircourses.org
Web site : www.ircourses.org

IR Courses, Inc. accepts registrations irrespective of race, creed, sex, color, physical handicap, and national or ethnic origin.

Bowdoin College has limited handicapped accessibility to facilities on campus. Notification of special needs must be received at *least thirty* (30) days prior to arrival in order to determine if we can accommodate these needs. If there is a need to rent special equipment or employ additional trained personnel, the cost must be met by the participant.

2010
IR

James A. de Haseth,
IR Courses, Inc.
165 Sunnybrook Drive
Athens, Georgia 30605-3347

REGISTER ON-LINE AT OUR WEB SITE:

www.ircourses.org

Dr. Edward Suzuki
Washington State Crime
Laboratory will join
us for Infrared Spectroscopy II

2010
IR

July 12–July 16, 2010
INFRARED SPECTROSCOPY I.
Interpretation of Infrared and Raman Spectra

July 19–July 23, 2010
INFRARED SPECTROSCOPY II.
Infrared and Raman Spectroscopy
Applied to Forensic Analysis

Bowdoin College • Brunswick, Maine

HISTORY OF THE PROGRAM

Infrared and Raman spectroscopy are two of the most important tools of modern chemists. Regardless of title, if their work touches any aspect of organic chemistry or related materials, the scientists of today must have an up-to-date, working knowledge of the principles and applications of vibrational spectroscopy. The first course was given at MIT in 1950. In 1972 the location of the course was moved to Bowdoin (pronounced Boh-dun) College. Over 6,000 chemists (and others) have attended these workshops since their inception.

Over this period, the course has been continually updated and a number of internationally renowned spectroscopists has joined the staff, including James de Haseth, Peter Griffiths, and Robert Hannah. This year, the second week of the course will concentrate on applications of IR and Raman spectroscopy to forensic chemistry and Jim, Peter and Bob will be joined by Dr. Ed Suzuki of the Washington State Crime Lab whose work in forensic applications of infrared and Raman spectroscopy enjoys a high reputation.

IR COURSES, INC.

IR Courses, Inc. is a not-for-profit 501(c)(3) corporation, registered in the State of Georgia, which exists solely to provide continuing education resources for vibrational spectroscopy. The corporation provides the financial resources to promote future courses, in the form of advertising and the dissemination of materials pertinent to the courses. In effect, the corporation is an endowment to the scientific community to ensure that continuing educational resources exist to provide instruction in vibrational spectroscopy.

The corporation was established in 2001. For fifty years the Bowdoin Infrared Courses were administered by educational institutions. From 1950 through 1971 the courses were administered by the Massachusetts Institute of Technology, and from 1972 through 2000 administration was conducted by Bowdoin College. As competition for funds in educational institutions has increased in recent years there arose the need to become independent of educational institutions. Hence IR Courses was incorporated. A not-for-profit organization means costs for the courses can be kept to a minimum. The corporation has no paid employees although the staff does receive an honorarium, and all administration is done on a volunteer basis.

Any specific enquiries about IR Courses, Inc. should be addressed to:

IR Courses, Inc.
165 Sunnybrook Drive
Athens, Georgia 30605-3347

Email: ircourses@ircourses.org

INFRARED SPECTROSCOPY I.

Week I: Interpretation of Infrared and Raman Spectra

Infrared spectroscopy is the most popular and cost effective technique for the structural elucidation of relatively simple organic molecules as well as many polymers and inorganic materials. With the advent of hand-held Raman spectrometers, Raman spectroscopy has now become almost as important as infrared. While comparison of the spectrum of an unknown sample with spectral libraries may sometimes identify the material correctly, this is frequently not the case. For example, the sample may often be a mixture or the authentic reference spectrum of the material is not contained in the available libraries. Even then the infrared or Raman spectrum of a material gives important information about the molecular structure of the compounds that are present in the sample. The ability to interpret IR and Raman spectra and hence to identify the presence or absence of organic functional groups and their surrounding environment is vital to anyone using infrared or Raman spectrometers. It is this need that this course addresses.

Following an introductory discussion of the theory of infrared and Raman spectroscopy, a set of four lectures focuses on spectral data associated with the hydrocarbon platform supporting the various functional groups. Next follows a set of three lectures centered on a variety of functional groups including OH, NH, C=O, C-N and other polar groups. Special emphasis is placed on C=O systems because the infrared spectrum is particularly sensitive to the molecular structure supporting the frequently encountered carbonyl group.

The complete set of lectures is designed to introduce the participant to the strategies involved in the efficient interpretation of the spectrum of an unknown compound. Coupled to the lecture program are three evening workshops in which participants work on a set of exercises that has proven particularly successful in the development of the necessary skills to handle routine investigations. A separate lecture at the end of the week concerns purely inorganic materials. The week closes with two lectures that cover a variety of standard sample handling procedures. One of these lectures is devoted to methods that deal with samples that contain mixtures of materials.

In this first course, no previous experience with infrared theory or technology is required, but some background in organic chemistry and its associated terminology is *assumed*.

The lecture staff will include:

Dr. James A. de Haseth (Weeks I & II)
The University of Georgia and Light Light Solutions, LLC

Dr. Peter R. Griffiths (Weeks I & II)
The University of Idaho

Dr. Robert W. Hannah (Weeks I & II)
[formerly Director of Research, Perkin-Elmer]

Dr. Edward Suzuki (Week II)
Washington State Police

INFRARED SPECTROSCOPY II.

Week II: Infrared and Raman Spectroscopy Applied to Forensic Analysis

A second course on infrared and Raman spectroscopy will be of general interest to chemists and other scientists who work in the fields of problem solving, and especially forensic science. The interpretation of infrared and Raman spectra of polymers is described and a general background on how to measure spectra of the highest quality is given. The format of the course largely follows that of the first week. This course will consist of two sets of lectures.

In the first set, the staff will discuss the theory, instrumentation and optimization of FT-IR and Raman spectroscopy, quantitative and sampling techniques, computer methods (including the retrieval of data), quantitative techniques, and integration of IR data with other spectroscopic information. The second set of lectures will center on the application of infrared and Raman spectroscopy to forensic analysis. Participants will first be introduced to the interpretation of the infrared spectra of organic molecules and polymers. The application of infrared and Raman spectroscopy to a series of problems in forensic chemistry will then be discussed. While of direct relevance to scientists working in forensic laboratories, these examples will also help any scientist who works in a problem-solving laboratory understand how to use vibrational spectroscopy to obtain answers to real-world problems. We are happy to announce that Dr. Edward Suzuki of the Washington State Police, Crime Laboratory Division, will be joining the team and presenting three lectures on the practical aspects of forensic science.

In the first two evening workshops the participants will be given a series of spectra to interpret. Some of the spectra will be polymers of frequently encountered materials. The third evening session will include a lecture on search strategies as well as advantages and limitations of computer search systems. In the second half of the session participants will use computerized search systems to determine the structures and identifications of a number of unknown compounds.

NOTE: All the above programs will be conducted at a relatively advanced level, and participants are expected to have a bachelor's degree or the equivalent. Participants may register for one or more courses. The fee for each of the five-day programs is \$1950, which includes room and board, due and payable upon notification of admission to the particular program.

We hope to provide a limited number of quad suites for families each week. These suites do not have any cooking facilities nor does suite registration include the meal plan. The cost of a quad suite and course registration is \$1920. Full meal plans are available at additional cost. Off-campus registration, without a meal plan, is \$1650.