

Sixth IDRC Conference – 1992

Chairman: Bob Taylor



Past Chairman's Statement – Robert A. TAYLOR

When I retired from the USDA in 1997, I started a very demanding profession. I play golf 5 days per week. I start promptly at 9:00 AM. I walk all 18 holes. I am usually finished by 1 to 2 PM Just in time for a snack and an afternoon nap and a swim before dinner. The next day it starts all over again.

But wait, I am getting ahead of my story. My experience with NIR started during 1964 –1974 when I worked in the space program as the chief project engineer on a program to measure the concentration of combustible gasses in the base region of the Saturn Booster used in the early manned space flight missions. When the Shuttle program started, I left the space program to join the Agricultural Research Service. From 1976 until I retired, I worked as the chief engineer on a project engineer responsible in developing instruments to measure the market quality of cotton. During 1991 the USDA changed the cotton grading system to use instruments to measure quality for premiums and discounts in the cotton market.

For four years following my retirement, I provided engineering consulting services to several companies developing cotton test instruments. My services are still available.

From this background you can see why I was interested in organize the golf outing at all of the early Chambersburg conferences. When Jerry Birth called me to solicit my help in organizing the first conference, I quickly volunteered to organize the Golf outing and help with the poster exhibits. I ran the golf outing and made the golf awards at the banquet at ALL IDRC conferences until 2000. During the 1990 conference, golf had become so popular that I was elected conference chairman for 1992. Thanks to every one who attended those conferences and took part in the golf outing. I again chaired the golf activities for the 1994, 1996, and 1998 IDRC conferences. For those who remember the awards banquets, I still have the near infrared jacket to award to the golf championship winner.

Others may remember me as the person who organized the IDRC T-shirt gift program. I purchased them at a discount price from a local screen print shop and trucked them to the conferences. If this conference committee is interested, we can do a 25th commemoration edition T-shirt. I still have the silk-screen art.

Robert A. Taylor, TAYLOR ENGINEERING

6th INTERNATIONAL DIFFUSE REFLECTANCE CONFERENCE

AUGUST 9-14, 1992

TECHNICAL PROGRAM

THEME

LINKING SPECTRAL REGIONS

WILSON COLLEGE

CHAMBERSBURG, PENNSYLVANIA, USA

WELCOME

AUGUST 9: SUNDAY EVENING (7:30 PM)

Chairman: *ROBERT TAYLOR, USD A, ARS,
CLEMSON, SC, USA*

GREETINGS FROM THE IDRC
FOUNDER Gerald Birth, USDA,
ARS, Russell Research Center
(Retired) Minneapolis, MN, USA

WELCOME TO WILSON
Kathy Lehman, Director of
Conferences Wilson College,
Chambersburg, PA, USA

WELCOME TO
CHAMBERSBURG Robert
Morris, Mayor,
Chambersburg, PA, USA

CONFERENCE
ORIENTATION Robert A.
Taylor, Chairman

INVITED LECTURE: *ISSAC LANDA
L. T. INDUSTRIES ROCKVILLE, MD, USA*

NEAR INFRARED

IN THE PROCESS ENVIRONMENT

SPECTRAL THEORY & CHEMOMETRICS

AUGUST 10: MONDAY MORNING (8 AM)

Chairman : *EMIL CIURCZAK, SETON HALL
UNIV., S. ORANGE, NJ, USA*

INTERPRETATION OF THE SCATTER
COEFFICIENT Gerald Birth,
Consultant, Minneapolis, MN, USA

PERTURBATION THEORETICAL
APPROACH TO THE GENERALIZED
KUBELKA-MUNK PROBLEM IN NON
HOMOGENEOUS OPTICAL MEDIA
Andreas Mandelis, Univ. of Toronto,
Toronto, Ontario, Canada

PROBING THE NIR REFLECTANCE
OPTICAL PATH OF COTTONS
Joseph Montalvo, Jr., USDA, ARS,
New Orleans, LA, USA

NEURAL NETWORK CALIBRATION
OF NIR DATA Avi Lorber, Nuclear
Research Center. Beer Sheva, Israel

NIR CALIBRATION WITH A SPARSE
WAVELENGTH AXIS David Honigs,
Katrina, Hagerstown, MD, USA

TEMPERATURE COMPENSATION
METHODS FOR NEAR-INFRARED
SPECTROSCOPIC CALIBRATION Jerry
Workman, PERSTORP ANALYTICAL, Silver
Springs, MD, USA

DEVELOPING A CHEMOMETRICS
COURSE FOR PHARMACEUTICAL
STUDENTS James K. Drennen,
Duquesne University, Pittsburgh, PA,
USA

FOOD AND AGRICULTURE QUALITY

August 10: MONDAY EVENING (7 PM)

Chairman: IAN MURRAY, SCOTTISH COLLEGE OF AGRICULTURE, ABERDEEN, SCOTLAND

NIR SPECTRA OF STRAW DURING RUMEN DEGRADATION Ian Murray, Scottish College of Agriculture, Aberdeen, Scotland, UK

QUALITATIVE ANALYSIS APPLYING NIR SPECTROSCOPY Karoly J. Kaffka, Univ. of Horticulture and Food Industry, Budapest, Hungary

SPECTRAL ANALYSIS OF FEED-FECES PAIRS FOR EVALUATING FORAGE DIGESTIBILITY Samuel Coleman, USDA, ARS, El Reno, OK, USA

VIS-NIR SPECTROSCOPY IN WHEAT

BREEDING: PIGMENTS, PROTEIN and

HARDNESS Tom N. McCaig, Ag. Canada

Research Station, Swift Current, SK, Canada

NEW INSTRUMENTATION FOR MEASURING QUALITY IN HIGH OPTICAL DENSITY AGRICULTURE PRODUCTS

Gerald G. Dull, USDA, ARS, Russell Research Ctr., Athens, GA, USA

DETERMINATION OF FIRMNESS OF INTACT APPLE FRUITS BY NEAR INFRARED REFLECTANCE

SPECTROSCOPY Rae Kwang Cho, Kyungpook Nat. Univ., Taegu, South Korea

INSTRUMENT DEMONSTRATIONS

August 11: TUESDAY AFTERNOON (1-2 PM)

TOUR OF INSTRUMENT EXHIBITS

Delegates wishing to investigate new and novel instruments or software described in the morning session should go to the Science Center between 1:00-2:00 PM. Depending on interest, the exhibits may close after 2:00 PM.

NEW AND NOVEL INSTRUMENTS

August 11: TUESDAY MORNING (8 AM)

Chairman: PHILLIP WILLIAMS, CANADIAN GRAIN COMM., WINNIPEG, CANADA

AN ACOUSTO - OPTIC TUNABLE FILTER (AOTF) - BASED OPTICAL SPECTROPHOTOMETER FOR FAST, REMOTE, ON-LINE APPLICATIONS

Xiaolu Wang, Brimrose Corporation of America

HIGH PERFORMANCE REFLECTION AND TRANSMISSION SPECTROSCOPIC ATTACHMENTS Joe Lucania, Harrick Scientific Corporation, Ossining, NY

ROBUST ON-LINE CALIBRATIONS: BEYOND BEER-LAMBERT Peter Hindle, Infrared Engineering Ltd., Maldon, Essex, UK

A HIGH-SPEED PARALLEL CHANNEL DIODE ARRAY SPECTROPHOTOMETER Ed Stark, KES Analysis, New York, NY, USA

DIFFUSE REFLECTANCE STANDARDS AND INSTRUMENTS FOR THE MEASUREMENT OF DIFFUSE REFLECTANCE IN THE VISIBLE/NIR/MID-NIR REGIONS

Arthur Springstein, Labsphere Inc., North Sutton, NH, USA

A MULTIPLEXED DIODE ARRAY PROCESS ANALYZER Isaac Landa, LT Industries, Inc., Rockville, MD, USA

EFFECTS OF SOURCE AND DETECTOR GEOMETRY ON NIR REFLECTANCE MEASUREMENTS OF COMPRESSED TABLETS John Carroll, NIRSystems, Inc., Silver Springs, MD, USA

RECENT DEVELOPMENTS IN NEAR-INFRARED TRANSMITTANCE INSTRUMENTATION AT PERSTORP

Jerry Workman, Perstorp Analytical, Silver Springs, MD, USA

HIGH-SPEED NEAR—INFRARED REFLECTANCE MEASUREMENT SYSTEM: SOMETHING OLD - SOMETHING NEW! James J. Psotka, Perten Instruments North America, Inc., Reno, NV, USA

SMALL BUT SOLID Robert D. Rosenthal, Trebor Industries Inc., Gaithersburg, MD, USA

DISCUSSION: ASTM LEVEL ZERO TEST FOR SCANNING SPECTROMETERS David Hopkins, Kellogg Co, Battle Creek, MI, USA

STANDARDIZATION AND CALIBRATION TRANSFER

August 11: TUESDAY EVENING (7 PM)

Chairman: JOHN SHENK, PENN STATE UNIV., UNIVERSITY PARK, PA, USA

NIR IN THE HANDS OF THE CANDYMAN
Jean Daly, Mars Confectionery, Slough, England, UK

NIR INSTRUMENT NETWORK EXPERIENCE IN BELGIUM Pierre Dardenne, Ministere de L'Agriculture, Libramont-Chevigny, Belgium

LARGE SCALE APPLICATION OF SCANNING SPECTROMETERS Michael Guandaev, Joint Venture Interagotech, Moscow, Russia

MULTIVARIATE CALIBRATION TRANSFER IN PRACTICE
Susan J. Foulk, Guided Wave Inc., El Dorado Hills, CA, USA

MAXIMIZING THE EFFECTIVENESS OF A NIR NETWORK
David J. Ryan, Central Soya Food Research, Fort Wayne, IN, USA

A DEVICE TO AID INSTRUMENT STANDARDIZATION AND CALIBRATION TRANSFER A.M.C. Davies, Norwich NIR Consultancy, Norwich, England, UK

BIO-MEDICAL APPLICATIONS

August 12: WEDNESDAY MORNING (8 AM)

Chairman: KARL H. NORRIS, CONSULTANT, BELTSVILLE, MD, USA

IN VIVO SPECTROSCOPY IN MEDICAL APPLICATIONS
David A. Wilson, Johns Hopkins Univ., Baltimore, MD, USA

EVALUATION OF A LOW-COST NIR METHOD FOR NON-INVASIVE BLOOD GLUCOSE MEASUREMENT Robert D. Rosenthal, Futrex, Inc., Gaithersburg, MD, USA

NEAR-IR SPECTROPHOTOMETRY IN THE CLINICAL LABORATORY Jeffrey W. Hall, Mount Sinai Hospital, Toronto, Ontario, Canada

NEAR-IR IMAGING IN STROKE RESEARCH Robert A. Lodder, Univ. of Kentucky, Lexington, KY, USA

RAPID VERIFICATION OF IDENTITY AND CONCENTRATION OF DRUG FORMULATIONS USING MID-IR SPECTROSCOPY David A. C. Compton, BIO-RAD, Digilab Div., Cambridge, MA, USA

POSTER SESSION

August 12: WEDNESDAY (1-2 PM)

Author should stand by their posters to answer personal questions.

BEST POSTER votes should be based on a combination of poster graphics and author's presentation.

SOFTWARE SHOOTOUT

August 12: WEDNESDAY WORKSHOP (2 PM)

Chairman: FRED McCLURE, N. C. STATE UNIV., RALEIGH, NC, USA

The objectives of this session are two fold: (1) To draw attention to the wide diversity of software available for analyzing spectral data, and (2) to impress on the NIR community the need to share data sets in order to advance NIR technology and be truly scientific in our technical publications.

Rules for this event are:

1. All participants must use the data set furnished on the single diskette along with this letter. You may use other data sets if you wish to illustrate a point or make comparisons; but, your results, both qualitatively and quantitatively must be based on the data set furnished herewith.
2. You are to make both qualitative (e.g., do all samples fit the data set) and quantitative analyses. Quantitative results should be based on the standard error of prediction (i.e., does your calibration perform well).
3. Use any software package you wish. Use more than one package if you wish.
4. You will have approximately 20-30 minutes to make your presentation. Decisions of the Judges will be final. Prizes will be given for the best in-depth analyses.
5. The data set itself will be described (number of samples, statistics of spectra and constituents, etc.) in detail when the session starts. You will be able to devote your time to a discussion of your analyses.

SPECTRAL EFFECTS OF WATER AND MOISTURE

August 12: WEDNESDAY EVENING (7 PM)

Chairman: *MUTSUO IWAMOTO, NATIONAL FOOD RESEARCH INST., TSUKUBA, JAPAN*

NIR SPECTROSCOPY AS A METHOD FOR DETERMINING THE STATE OF WATER Matsuo Iwamoto, National Food Research Institute, Tsukuba, Japan

NIR STUDY ON THE INTERACTION BETWEEN PROTEINS AND WATER Yukihiro Ozaki, Kwansei Gakuin University, Nishinomiya, Japan

INFLUENCE OF WATER ON THE NIR SPECTRA OF MODEL COMPOUNDS AND RELATIONSHIPS BETWEEN NIR & IR SPECTRAL CHANGES James B. Reeves, III, USDA, ARS, RNL, Beltsville, MD, USA

DECOMPOSITION ANALYSIS OF NIR SPECTRA OF WATER Hideyuki Abe, National Food Research Institute, Tsukuba, Japan

TEMPERATURE EFFECTS ON SPECTRA OF WATER IN FLOUR Phillip C. Williams Canadian Grain Comm., Winnipeg, Manitoba, Canada

LARGE CHANGES IN WAVELENGTH FOR SMALL CHANGES IN TEMPERATURE K. H. Norris, Consultant, Beltsville, MD, USA

BANQUET

AUGUST 13: THURSDAY EVENING (7 PM)

SPEAKER: *DAVE PETERSON*

NASA/AMES

MOFFETT FIELD, CA, USA

PLANETARY IMAGING SPECTROSCOPY:
MISSION TO PLANET EARTH
AND OTHERS

RECEPTION - 6:30 PM - DINING HALL

**MID-IR:
FUNDAMENTAL SPECTROSCOPY**

August 13: THURSDAY MORNING (8 AM)

Chairman: *DAVID WETZEL, KANSAS STATE UNIVERSITY, MANHATTAN, KS, USA*

PROGRESS IN NEAR-INFRARED FT-RAMAN SPECTROSCOPY Gabor Kemeny, Nicolet Analytical Instruments, Madison, WI, USA

FORENSIC APPLICATIONS OF DIFFUSE REFLECTANCE INFRARED FOURIER TRANSFORM SPECTROSCOPY (DRIFTS) USING DIRECT SAMPLING Edward Suzuki, State Patrol Crime Lab, Seattle, WA, USA

MID-INFRARED REFLECTION SPECTROMETRY AT THE METAL/LIQUID INTERFACE Peter Griffiths, Univ. of Idaho, Moscow, ID, USA

WAVELENGTH SELECTIVE IMAGING IN FT-IR MICROSPECTROSCOPY David Wetzel, Kansas State University, Manhattan, KS, USA

SAMPLING CHOICES AND QUANTITATIVE PRECISION IN MID-IR DRIFTS Forrest Weesner, Nicolet Analytical Instruments, Madison, WI, USA

IMAGING: UV, NIR, MID-IR & NMR August 14: FRIDAY MORNING (8 AM)

Chairman: *FRANKLIN E. BARTON, USDA, ARS, RUSSELL RESEARCH CENTER, ATHENS, GA, USA*

AN OVERVIEW OF MAGNETIC RESONANCE IMAGING AND APPLICATION TO WHEAT KERNEL STRUCTURE Dave Himmelsbach, USDA, ARS, Russell Research Center, Athens, GA, USA

ULTRAVIOLET ABSORPTION MICRO-SPECTROPHOTOMETRY OF PHENOLIC COMPOUNDS IN RELATION TO BIODEGRADATION OF PLANT CELL WALLS

Danny E. Akin, USDA, ARS, Russell Research Center, Athens, GA, USA

NEAR INFRARED IMAGING MICROSCOPY USING ACOUSTO-OPTIC TUNABLE FILTER (AOTF) AND FOCAL-PLANE ARRAY DETECTOR E. Neil Lewis, National Institutes of Health, Bethesda, MD, USA

NEAR INFRARED VIDEO IMAGING Dominique Bertrand, Institute National de La Recherche Agronomique, Nantes, Cedex, France

IMAGING SPECTROSCOPY ADVANCES TO THE FINALS W. Fred McClure, North Carolina State University, Raleigh, NC, USA

SOLUTIONS TO SOME BASIC PROBLEMS IN OPTICAL IMAGING SPECTROSCOPY

Stephen K. Taylor, Imaging Consultant/NCSU Graduate Student, Raleigh, NC, USA