Fourier Transform Spectroscopy Topical Meeting and Tabletop Exhibit

Collocated With

Hyperspectral Imaging and Sounding of the Environment (HISE)

February 11-15, 2007

Eldorado Hotel
Santa Fe, New Mexico

PDP Submission Deadline: January 22, 12:00 noon EST (17.00 GMT)
Hotel Reservation Deadline: January 21, 2007
Pre-Registration Deadline: January 18, 2007

FTS Program and General Chairs

Donald Jennings, NASA Goddard Space Flight Ctr., USA, General Chair
Pierre Tremblay, Univ. Laval, Canada, Program Chair
Fourier Transform Spectroscopy (FTS) Program Committee

Donald Jennings, NASA Goddard Space Flight Ctr., USA, General Chair
Pierre Tremblay, Univ. Laval, Canada, Program Chair

Mark Abrams, FastMetrix, Inc., USA
Peter Bernath, Univ. of Waterloo, Canada
Claude Camy-Peyret, LPMA/CNRS, France
Bruno Carli, IROE, Italy
Guy Guelachvili, Univ. of Paris, France
Dieter Hausamann, German Aerospace Ctr., DLR, Germany
Akihiko Kuze, JAXA, Japan
Jean-Pierre Maillard, Observatoire de Paris, France
Chris Manning, Manning Applied Technology, USA
David Naylor, Univ. of Lethbridge, Canada
Juliet Pickering, Imperial College, UK
Jean-Marc Thériault, Defense R&D Canada, Canada

Hyperspectral Imaging and Sounding of the Environment (HISE) Program Committee

Mitch Goldberg, National Oceanic and Atmosphere Administration, USA, General Chair
Hung-Lung Allen Huang, Univ. of Wisconsin-Madison, USA, General Chair
Bryan A. Baum, Univ. of Wisconsin-Madison, USA, Program Chair
Ping Yang, Texas A&M Univ., USA, Program Chair

James E. Davies, Remote Sensing and Satellite Res. Group, Curtin Univ. of Technology, Australia
Oleg V. Dubovik, NASA Goddard Space Flight Ctr., USA
Li Guan, Nanjing Univ. of Information Science and Technology, China
Hajime Okamoto, Tohoku Univ., Japan
Tim Schmit, NOAA/NESDIS, USA
William L. Smith, Hampton Univ., USA
B. J. Sohn, Seoul Natl. Univ., Republic of Korea
Manfred Wendisch, Leibniz Inst. Tropospharenforschung eV, Germany
About FTS

This meeting will welcome all researchers who use Fourier transform spectrometry in their work or who have developed competing technologies within the historic application areas of FTS. The wide scope will include innovative techniques and instrumentation, laboratory research, imaging spectroscopy, remote sensing, space from the air and in space. The meeting will focus particularly on new instruments, new applications and new techniques.

Fourier transform spectrometry has been the central method in many research areas that require high accuracy, sensitivity, and resolution and continues grow in usage. Increasingly, Fourier transform spectrometry is becoming the technique of choice in new research areas, such as meteorology and chemical microscopy, where such attributes are needed. The breadth of applicability of FTS provides a common bond between researchers in otherwise disparate fields.
Meeting Topics to Be Considered

1. Instrument Technology:
   1. Novel FTS concepts and designs
   2. FTS in the sub-millimeter, infrared, visible, and ultraviolet
   3. Time resolved Fourier transform spectroscopy
   4. Imaging Fourier transform spectroscopy
   5. New technologies for FTS
   6. Laboratory instruments
   7. Space-based instruments
   8. Astronomical instruments

2. Analysis:
   1. New methods for radiometric accuracy
   2. New methods for line shape determination
   3. New methods for improving frequency accuracy
   4. Improvements in atmospheric retrievals
   5. New approaches used for spectral calibration
   6. Simultaneous observations of particulate and gaseous absorption

3. Applications:
   1. Atomic and molecular spectroscopy
   2. Raman FT spectroscopy
   3. Medical and biological in-situ spectroscopy
   4. Earth remote sensing from the ground, air and space
   5. Planetary spectroscopy from the ground, air and space
   6. Astronomy: the sun, stars, the interstellar medium, and the cosmic background
Invited Speakers

FTS Invited Speakers

JMA2, The Atmospheric Chemistry Experiment (ACE): Latest Results, Peter Bernath¹,²; ¹Univ. of Waterloo, Canada, ²Univ. of York, United Kingdom.

JMA4, The Tropospheric Emission Spectrometer: 2 1/2 Years of Tropospheric Composition Measurements from Space, David M. Rider; JPL, USA.

FMA1, First Results from the Far-Infrared Beamline at the Canadian Light Source, Robert R. McKellar; Natl. Res. Council of Canada, Canada.

FMB1, Coherent Fourier-Transform Spectroscopy Based on Infrared Frequency Combs, Daniel van der Weide; Univ. of Wisconsin, USA.

FMB4, FT-IR Hyperspectral Imaging: Applications and Data Analysis, Boiana Budevska; DuPont Crop Protection, USA.

FMC1, IASI Onboard MetOp and its Validation with IASI-Balloon, Claude Camy-Peyret; LPMA/CNRS, France.

FMC4, Far-Infrared Sounding of the Troposphere: Rational and the FIRST Instrument, Kenneth W. Jucks¹, Marty Mlynczak², David Johnson², Harri Latvakowski³, Mike Watson⁴, Gail Bingham⁵, Stan Wellard³, Wes Traub¹; ¹Harvard-Smithsonian Ctr. for Astrophysics, USA, ²NASA Langley Res. Ctr., USA, ³Space Dynamics Lab, USA.


FTuA2, First Wideband Measurement (100-1400 cm⁻¹) of the Atmospheric Emission Spectrum with an Uncooled FT Instrument (including the Detector Unit) Operating at Stratospheric Balloon Altitude, Luca Palchetti; IFAC-CNR, Italy.

FTuB1, Performance of a Field-Portable Imaging FTS, Martin Chamberland, Vincent Farley, Alexandre Vallières, André Villemaire; Telops Inc., Canada.

FTuC1, An Overview of the SHS Technique and Applications, Frederick L. Roesler; Univ. of Wisconsin-Madison, USA.

FTuC4, 10 Years of Solar FTIR Spectrometry at the Zugspitze: Atmospheric Studies and Satellite Validation, Ralf Sussmann; IMK-IFU, Inst. für Meteorologie und Klimaforschung, Forschungszentrum Karlsruhe, Germany.

FTuD1, Frequency Modulation FTS: A Broadband Method for Measuring Weak Absorptions and Dispersions, Nathalie Picqué, Guy Guelachvili; LPPM/CNRS, France.

FTuD4, Cavity Enhanced Laser Induced Fluorescence Spectroscopy of Small Gas-Phase Molecules, Amanda J. Ross, Raphaël Vallon, Patrick Crozet; LASIM, Univ. Lyon 1 and CNRS, France.

FWA1, FTS-2: A Submillimetre Astronomical Imaging Fourier Transform Spectrometer, David Naylor, B. G. Gom; Univ. of Lethbridge, Canada.
FWA2, Imaging FTS in Astronomy: SPIRE and Beyond, Kjetil Dohlen; Lab d' Astrophysique de Marseille (LAM), France.

FWB1, Greenhouse Gases Observation from Space with TANSO-FTS on GOSAT, Takashi Hamazaki¹, Yutaka Kaneko², Akihiko Kuze², Hiroshi Suto²; ¹JAXA - GOSAT Project Team, Japan, ²Japan Aerospace Exploration Agency, Japan.

FWC1, Externally Dispersed Interferometry for the Mt. Palomar Doppler Planet Search, David J. Erskine; Lawrence Livermore Natl. Lab, USA.

FWC4, SpiOMM: A Ground-Based Wide-Field Imaging FTS, Frédéric Grandmont¹, Anne-Pier Bernier², Maxime Charlebois², Laurent Drissen²; ¹ABB Bomem, Inc., Canada, ²Univ. Laval, Canada.

FThA1, Flight Performance and Scientific Results of the Fourier Transform Spectrometer Onboard the ASTRO-F (AKARI) Satellite, Mitsunobu Kawada; Nagoya Univ., Japan.

FThA2, Double Pendulum Interferometers in Planetary Missions, Sergio Fonti; Univ. degli Studi di Lecce, Italy.

FThB1, Far-IR Cirrus Cloud Radiative Properties from the Tropospheric Airborne Fourier Transform Spectrometer (TAFTS) Instrument, Paul D. Green, Neil Humpage, Caroline Cox, Jon E. Murray, John E. Harries, Juliet C. Pickering; Imperial College London, United Kingdom.

FThB4, AIRIS--The Canadian Airborne Infrared Hyperspectral Imager: Current Status and Future Developments, Tracy Smithson; DRDC-RDDC Valcartier, Canada.
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<th>Time</th>
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<tr>
<td>3:00 p.m.–5:00 p.m.</td>
<td>Registration</td>
<td>North Concourse</td>
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<tr>
<td><strong>Monday, February 12</strong></td>
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<tr>
<td>7:00 a.m.–5:00 p.m.</td>
<td>Registration</td>
<td>North Concourse</td>
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<tr>
<td>8:15 a.m.–8:30 a.m.</td>
<td>FTS/HISE Opening Remarks</td>
<td>Anasazi South</td>
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<tr>
<td>8:30 a.m.–10:30 a.m.</td>
<td>JMA • FTS/HISE Joint Session</td>
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<tr>
<td>10:30 a.m.–11:00 a.m.</td>
<td>Coffee Break</td>
<td>Anasazi North</td>
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<tr>
<td>10:30 a.m.–4:00 p.m.</td>
<td>Exhibits Open</td>
<td>Anasazi North</td>
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<tr>
<td>11:00 a.m.–12:30 p.m.</td>
<td>FMA • Newton Session</td>
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<tr>
<td>11:00 a.m.–12:30 p.m.</td>
<td>HMA • Full Spectral Hyperspectral Data and Particle Scattering Models</td>
<td>Zia</td>
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<tr>
<td>12:30 p.m.–2:00 p.m.</td>
<td>Lunch (on your own)</td>
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<tr>
<td>2:00 p.m.–3:30 p.m.</td>
<td>FMB • Huygens Session</td>
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<td>2:00 p.m.–5:30 p.m.</td>
<td>HMB • Aerosols</td>
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<td>3:30 p.m.–4:00 p.m.</td>
<td>Coffee Break</td>
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<td>4:00 p.m.–5:30 p.m.</td>
<td>FMC • Young-Fresnel Session</td>
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<td>4:00 p.m.–5:30 p.m.</td>
<td>HMC • Hyperspectral Data Analysis</td>
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<td>Registration</td>
<td>North Concourse</td>
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<td>8:15 a.m.–10:15 a.m.</td>
<td>FTuA • Fourier Session</td>
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<td>8:15 a.m.–10:15 a.m.</td>
<td>HTuA • A-Train Cloud Analysis</td>
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<tr>
<td>10:15 a.m.–11:00 a.m.</td>
<td>Coffee Break</td>
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<td>10:15 a.m.–4:00 p.m.</td>
<td>Exhibits Open</td>
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<tr>
<td>11:00 a.m.–12:30 p.m.</td>
<td>FTuB • Michelson Session</td>
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<td>HTuB • Ice Clouds</td>
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<td>12:30 p.m.–2:00 p.m.</td>
<td>Lunch (on your own)</td>
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<td>FTuC • Peck Session</td>
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<tr>
<td>2:00 p.m.–3:30 p.m.</td>
<td>HTuC • Polar-Orbiting Platform Data and Analysis</td>
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<td>3:30 p.m.–4:00 p.m.</td>
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<td>4:00 p.m.–5:30 p.m.</td>
<td>FTuD • Fellgett Session</td>
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<td>4:00 p.m.–5:30 p.m.</td>
<td>HTuD • Combination of Active and Passive Sensors</td>
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<td>5:30 p.m.–7:00 p.m.</td>
<td>FTS/HISE Reception</td>
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<td>8:15 a.m.–10:15 a.m.</td>
<td>FWA • Jacquintot Session</td>
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<td>8:15 a.m.–10:15 a.m.</td>
<td>HWA • Air Quality and Trace Gases</td>
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<td>10:15 a.m.–11:00 a.m.</td>
<td>Coffee Break</td>
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<tr>
<td>10:15 a.m.–5:00 p.m.</td>
<td>Exhibits Open</td>
<td>Anasazi North</td>
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<td>FWB • Connes Session</td>
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<td>11:00 a.m.–12:30 p.m.</td>
<td>HWB • Hyperspectral IR Data</td>
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<td>12:30 p.m.–2:00 p.m.</td>
<td>Lunch Break (on your own)</td>
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<td>2:00 p.m.–3:30 p.m.</td>
<td>FWC • Cooley-Tukey Session</td>
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<tr>
<td>2:00 p.m.–3:30 p.m.</td>
<td>HWC • Geostationary Satellite Data</td>
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<td>3:30 p.m.–5:00 p.m.</td>
<td>JWA • FTS/HISE Joint Poster Session</td>
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<td>5:00 p.m.–7:30 p.m.</td>
<td>Dinner Break (on your own)</td>
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<td>7:30 p.m.–9:00 p.m.</td>
<td>FWD • FTS Postdeadline Session</td>
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<td>7:30 p.m.–9:00 p.m.</td>
<td>HWD • HISE Postdeadline Session</td>
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<td><strong>Thursday, February 15</strong></td>
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<td>8:30 a.m.–10:30 a.m.</td>
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<td>8:30 a.m.–10:30 a.m.</td>
<td>HThA • Radiative Transfer</td>
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<td>11:00 a.m.–12:30 p.m.</td>
<td>HThB • Sounding Retrievals</td>
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<tr>
<td>12:30 p.m.–12:45 p.m.</td>
<td>FTS Closing Remarks</td>
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<td>12:30 p.m.–12:45 p.m.</td>
<td>HISE Closing Remarks</td>
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Explanation of Session Codes

The first part of the code designates the conference (F=FTS, H=HISE, J=Joint).

The next part designates the day of the week (Monday=M, Tuesday=Tu, Wednesday=W, Thursday=Th).

The next part indicates the session within the particular day the talk is being given. Each day begins with the letter A and continues alphabetically.

The number on the end of the code signals the position of the talk within the session (first, second, third, etc.).

For example, a presentation numbered FThL4 indicates that this FTS paper is being presented on Thursday during the 1st session (A) and that it is the fourth paper presented in session FThA.

● Sunday, February 11, 2007 ●

North Concourse
3:00 p.m.–5:00 p.m.
Registration Open

● Monday, February 12, 2007 ●

North Concourse
7:00 a.m.–5:00 p.m.
Registration Open

Anasazi South
Opening Remarks
8:15 a.m.–8:30 a.m.

JMA • FTS/HISE Joint Session

Anasazi South
8:30 a.m.–10:30 a.m.
JMA • FTS/HISE Joint Session
Bryan A. Baum; Univ. of Wisconsin-Madison, USA, Presider
Claude Camy-Peyret; LPMA/CNRS, France, Presider
JMA1 • 8:30 a.m.  **Invited**
Hyperspectral Infrared Imaging and Sounding—Measurement Concept, Technology, and Processing Approach, William L. Smith¹,², H. Revercomb; F. Best¹, A. Huang¹, R. Kreuter¹, A. Lara¹, X. Liu¹, S. Manger¹, D. Zhou¹; ¹Hampton Univ., USA, ²Univ. of Wisconsin/SSEC-CIMSS, USA, ³NASA Langley Res. Ctr., USA, ⁴NPOESS Integrated Program Office, USA. Infrared hyperspectral spectrometers have brought on a new era in remote sensing measurement capabilities. The measurement concepts, technology, and processing approaches are reviewed.

JMA2 • 9:00 a.m.  **Invited**
The Atmospheric Chemistry Experiment (ACE): Latest Results, Peter Bernath¹,²; ¹Univ. of Waterloo, Canada, ²Univ. of York, UK. ACE is a Canadian-led satellite mission that is measuring the concentrations of more than thirty atmospheric constituents by solar occultation. A selected overview of ACE results to date will be presented.

JMA3 • 9:30 a.m.  **Invited**
Overview of GOES-R Risk Reduction and Algorithm Working Group Activities, Mitchell D. Goldberg; NOAA, USA. Abstract not available.

JMA4 • 10:00 a.m.  **Invited**
The Tropospheric Emission Spectrometer: 2 1/2 Years of Tropospheric Composition Measurements from Space, David M. Rider; JPL, USA. The Tropospheric Emission Spectrometer (TES), launched on the AURA spacecraft in July 2004, covers the 3.2-15.4 micron spectral range with imaging arrays. TES generates global profiles of infrared-active constituents from the surface to the lower stratosphere.

Anasazi North
10:30 a.m.—11:00 a.m.
Coffee Break

Anasazi North
10:30 a.m.—4:00 p.m.
Exhibits Open

FMA • Newton Session

Anasazi South
11:00 a.m.—12:30 p.m.
FMA • Newton Session
Guy Guelachvili; CNRS, France, Presider

FMA1 • 11:00 a.m.  **Invited**
First Results from the Far-Infrared Beamline at the Canadian Light Source, Robert R. McKellar; Natl. Res. Council of Canada, Canada. A beamline for high resolution far infrared spectroscopy is being commissioned at the CLS in Saskatoon. Significant increases in brightness are observed compared to conventional sources, but noise remains an issue for the synchrotron beam.

FMA2 • 11:30 a.m.
Mid Infrared Spectromicroscopy Beamline at the Canadian Light Source, Tim May¹, Thomas Ellis¹, Ruben Reininger; ¹Canadian Light

HMA • Full Spectral Hyperspectral Data and Particle Scattering Models

Zia
11:00 a.m.—12:30 p.m.
HMA • Full Spectral Hyperspectral Data and Particle Scattering Models
Manfred Wendisch; Leibniz Inst Tropospharenforschung eV, Germany, Presider

HMA1 • 11:00 a.m.  **Invited**
The Far-Infrared Spectrum: Exploring a New Frontier in the Remote Sensing of the Earth’s Climate, Martin Mlynczak, David G. Johnson, David P. Kratz; NASA Langley Res. Ctr., USA. The far-infrared portion of Earth’s emission spectrum is relatively unobserved despite its importance in regulating climate. New sensors enable exploration of the far-IR, opening a new window to half of the energy radiated by Earth.

HMA2 • 11:30 a.m.  **Invited**
Hyperspectral Solar Spectral Measurements and Applications, Peter Pilewskie¹, Sebastian Schmidt¹, Steven Platnick², Ping Yang³,
FMA • Newton Session (continued)

Source, Canada, 1Scientific Answers & Solutions LLC, USA. The Canadian Light Source (CLS) is commissioning a beamline for mid infrared spectromicroscopy spanning from 2.5 to 25 micrometer wavelengths. The optics and features of this beamline and current status of the facility are presented.

FMA3 • 11:45 a.m.
Generation of Quantitative Vapor Samples for FTIR Spectroscopy, Timothy J. Johnson, Robert L. Sams, Steven W. Sharpe; Pacific NW Natl. Lab, USA. To help construct a database of 0.1 cm⁻¹ resolution quantitative vapor-phase infrared spectra, PNNL had devised methods of improved reliability and accuracy for the delivery of liquid- and solid- phase compounds to the vapor phase.

FMA4 • 12:00 p.m.
Miniature Thermal Emission Spectrometer on the Mars Exploration Rovers, Greg L. Mehall, Philip R. Christensen; Arizona State Univ., USA. An overview of the Miniature Thermal Emission Spectrometer (Mini-TES) experiments on the Mars Exploration Rovers. The Mini-TES is a Fourier Transform Spectrometer (FTS) with a spectral range of 5-29 microns at 10 cm⁻¹ spectral resolution.

FMA5 • 12:15 p.m.
Infrared Observations of Saturn and Titan from Cassini, Donald E. Jennings1, R. K. Achterberg2, B. Bézard3, G. L. Bjoraker1, J. C. Brasunas4, R. Carlson1, A. Coustenis1, F. M. Flasar5, P. G. J. Irwin1, V. G. Kunde1, A. A. Mamoutkine3, C. A. Nixon1, G. S. Orton1, J. C. Pearl4, P. N. Romani5, M. E. Segura1, A. A. Simon-Miller1, E. H. Wishnow1, S. Ytineter3; NASA Goddard Space Flight Ctr., USA, 1Science Systems and Applications, Inc., USA, 2Observatoire de Meudon, France, 3Clarendon Lab, Univ. of Oxford, UK, 4Dept. of Astronomy, Univ. of Maryland at College Park, USA, 5JPL, USA, 6QSS Group, Inc., USA, 7Univ. of California at Berkeley, USA. The Composite Infrared Spectrometer (CIRS) aboard the Cassini spacecraft has been orbiting Saturn for 2.5 years, yielding discoveries about the atmospheres and surfaces of the planet and its moons.

Lunch Break (on your own)
12:30 p.m.–2:00 p.m.

FMB • Huygens Session

Anasazi South
2:00 p.m.–3:30 p.m.
FMB • Huygens Session
Jérôme Genest; Univ. Laval, Canada, Presider

FMB1 • 2:00 p.m. • Invited*
Coherent Fourier-Transform Spectroscopy Based on Infrared Frequency Combs, Daniel van der Weide; Univ. of Wisconsin, USA. We demonstrate real-time recording of chemical vapor fluctuations from 22 m away with a fast Fourier-transform infrared (FTIR) spectrometer that uses a laser-like infrared probing beam generated from two 10-fs Ti:Sapphire lasers.

FMB2 • 2:30 p.m.
Continuous-Wave Fourier Transform Laser Sources, Thilo Kraetschmer, Scott T. Sanders; Univ. of Wisconsin-Madison, USA.

HMA • Full Spectral Hyperspectral Data and Particle Scattering Models (continued)

Manfred Wendisch1, Jerry Harder1, Jens Redemann2; 1Univ. of Colorado, Lab for Atmospheric and Space Physics, USA, 2NASA Goddard Space Flight Ctr., USA, 3Texas A&M Univ., USA, 4Inst. für Physik der Atmosphäre, Univ. Mainz, Germany, 5BAERI, USA. Measurements of hyperspectral solar irradiances from aircraft and satellite are applied to a variety of cloud and aerosol remote sensing, and radiative energy budget applications.

HMA3 • 12:00 p.m. • Invited*
Hyperspectral Cloud and Aerosol Optical and Radiative Properties Modeling and Applications, Ping Yang1, Gang Hong1, Jianguo Niu1, Zhibo Zhang1, Hung-Lung (Allen) Huang2, Bryan A. Baum3, Jun Li; 1Texas A&M Univ., USA, 2Univ. of Wisconsin-Madison, USA. This paper reports on the simulations of the hyperspectral radiative signatures of ice clouds and aerosols. Additionally, the numerical accuracy of a newly developed fast cloudy radiative transfer model is assessed.

Lunch Break (on your own)
12:30 p.m.–2:00 p.m.

HMB • Aerosols

Zia
2:00 p.m.–3:30 p.m.
HMB • Aerosols
Patrick Minnis; NASA, USA, Presider

HMB1 • 2:00 p.m. • Invited*
Discrimination of Aerosol and Clouds Using Hyperspectral and Multispectral Measurements, Steven Ackerman; Univ. of Wisconsin-Madison, USA. This paper explores the advantages and disadvantages of using high-spectral resolution infrared observations coupled with imager data to detect cloud and aerosol and, where feasible, retrieve their microphysical properties.

HMB2 • 2:30 p.m. • Invited*
How 3D Science Can Help to Correctly Interpret Satellite Data on Aerosol-Cloud Interaction, Alexander Marshak; NASA, USA. In operational retrievals of cloud and aerosol properties, cloudy pixels are treated independent of their neighbors. We will quantify the 3D
Continuous-wave frequency comb Fourier transform sources utilize interference of frequency combs to measure spectra. Spectra obtained with this approach are in agreement with results from traditional spectrometers. The sources contain no moving parts.

FMB3 • 2:45 p.m.
Distribution of Background Measurements Using a Double-Beam FTIR Spectrometer, François Bouffard¹, Jean-Marc Thériault²; ¹Univ. Laval, Canada; ²DRDC Valcartier, Canada. Background measurements were acquired using a double-beam FTIR spectrometer in order to characterize their distribution. This distribution appears more favorable than the distribution of single-beam backgrounds for the passive detection of atmospheric contaminants.

FMC1 • 4:00 p.m.
IASI Onboard MetOp and its Validation with IASI-Balloon, Claude Camy-Peyret; LPM/CRNS, France. First results of the Infrared Atmospheric Sounding Interferometer (IASI) in orbit onboard the MetOp meteorological operational satellite since 19 October 2006 will be presented together with calibration and validation activities using IASI-balloon.

HMB3 • 3:00 p.m. • Invited
Improved Characterization of Aerosol Properties Using Combined Information from Remote Sensing, Laboratory Measurements and Global Modeling, Oleg V. Dubovik; Lab d’Optique Atmosphérique, CNRS Univ. de Lille, France. Several efforts on improving characterization of tropospheric aerosol by combining complementary information from laboratory measurements of scattering by aerosol particles, aerosol remote sensing from satellite and ground and global modeling of aerosol transport are discussed.

Anasazi North
3:30 p.m.–4:00 p.m.
Coffee Break

HMC1 • 4:00 p.m.
International MODIS/AIRS Processing Package (IMAPP): AIRS Retrieval Updates and Efforts, Elisabeth Weisz, Hung-Lung Huang, Jun Li; Cooperative Inst. for Meteorological Satellite Studies, USA. Updates on the previous version of the IMAPP AIRS retrieval software, which provides international researchers with single field-of-view (FOV) temperature, humidity, ozone profiles and surface parameters, will be presented. Future release will include cloudy retrievals.

FMC4 • 3:00 p.m. • Invited
FT-IR Hyperspectral Imaging: Applications and Data Analysis, Boiana Budevska; DuPont Crop Protection, USA. This paper briefly introduces applications of FT-IR hyperspectral imaging to laboratory analyses and focuses on application of FT-IR/ATR imaging to crop protection products on test and plant surfaces. Results from univariate and multivariate analyses of the hyperspectral images are shown and advantages of the multivariate approach demonstrated.

Anasazi North
3:00 p.m.–4:00 p.m.
Coffee Break

HMC2 • 4:15 p.m. • Invited
Radiative Transfer Modeling and Retrievals for Advanced Hyperspectral Sensors, Xu Liu¹, D. K. Zhou¹, A. M. Larar¹, W. L. Smith², Stephen A. Mango³; ¹NASA Langley Res. Ctr., USA; ²Hampton Univ., USA; ³NOPESS Integrated Program Office, USA. A novel radiative transfer model and a physical inversion algorithm based on principal component analysis will be presented. Instead of dealing with channel radiances, the new approach fits principal component scores of these quantities.
### FMC • Young-Fresnel Session (continued)

**FMC2 • 4:30 p.m.**  
Atmospheric Chemistry Experiment (ACE) Measurements of Tropospheric and Stratospheric Chemistry and Long-Term Trends, Curtis Rinsland\(^1\), Peter Bernath\(^2\), Chris Boone\(^3\), Ray Nassar\(^4\); \(^1\)NASA Langley Res. Ctr., USA, \(^2\)Univ. of Waterloo, Canada, \(^3\)Harvard Univ., USA. We highlight chemistry and trend measurement results from the Atmospheric Chemistry Experiment (ACE) which is providing precise middle troposphere to the lower thermosphere measurements with a 0.02 cm\(^{-1}\) resolution Fourier transform spectrometer covering 750-4400 cm\(^{-1}\).

**FMC3 • 4:45 p.m.**  
Static Infrared Fourier Transform Interferometer (SIFTI): Benefits of Phase Modulation Processing, Elodie Cansot, Philippe Hébert, Alain Rosak, Christian Bui, Frédéric Bernard; CNES, France. SIFTI (Static Infrared Fourier Transform Interferometer) is a high resolution spectrometer, part of the TRAQ payload. This paper presents a description of this instrument and gives a preliminary radiometric performance in presence of phase modulation.

**FMC4 • 5:00 p.m.**  
*Invited*  
Far-Infrared Sounding of the Troposphere: Rational and the FIRST Instrument, Kenneth W. Jucks\(^1\), Marty Mlynczak\(^2\), David Johnson\(^1\), Harri Latvakowski\(^1\), Mike Watson\(^1\), Gail Bingham\(^1\), Stan Wellard\(^1\), Wes Traub\(^2\); Harvard-Smithsonian Ctr. for Astrophysics, USA, \(^1\)NASA Langley Res. Ctr., USA, \(^2\)Space Dynamics Lab, USA. The FIRST project shows the capabilities of an imaging FTS that covers the important long wavelength portion of the OLR. Here we describe the motivation behind the project, the prototype initial instrument, and results.

### HMC • Hyperspectral Data Analysis (continued)

**HMC3 • 4:45 p.m.**  
A Fast Moderate-Spectral-Resolution Atmospheric Transmittance Model, Heli Wei, Xiuhong Chen\(^1\), Ruizhong Rao, Yingjian Wang\(^1\), Ping Yang\(^2\); \(^1\)Anhui Inst. of Optics and Fine Mechanics, Chinese Acad. of Sciences, China, \(^2\)Dept. of Atmospheric Sciences, Texas A&M Univ., USA. A new moderate-spectral-resolution (1 cm\(^{-1}\)) atmospheric transmittance model based on the LBLRTM covering wavenumber from 1 to 25000 cm\(^{-1}\) is reported. The model can be used to accurately and efficiently compute atmospheric spectral transmittance.

**HMC4 • 5:00 p.m.**  
Characterization of a Harmful Algal Bloom in Monterey Bay, CA Using Airborne Hyperspectral Imagery, Curtiss O. Davis\(^1\), Paul Bissett\(^2\); \(^1\)Oregon State Univ., USA, \(^2\)Florida Environmental Res. Inst., USA. The Coastal Ocean Applications and Science Team (COAST) conducted its first experiment imaging a Harmful Algal Bloom (HAB) in Monterey Bay, CA. We describe the hyperspectral imagery and the detection of the HAB.

**HMC5 • 5:15 p.m.**  
Improved AIRS/AMSU Surface and Atmospheric Soundings under Partial Cloud Cover Using an AIRS Only Cloud Clearing Approach, Joel Suskind; NASA GSFC, USA. The AIRS Version-5 cloud clearing and sounding methodology will be described briefly and results will be shown. These results demonstrate the importance of having sounding channels with very low noise extending to 2400 cm\(^{-1}\).
The subsystem.

Luca Oelhaf;

FTuA • A-Train Cloud Analysis

8:15 a.m.–10:15 a.m.

Update on the MODIS Collection 5 Processing Cloud Optical and Microphysical Algorithm and Product Validation, Steven Platnick, Michael D. King; NASA Goddard Space Flight Ctr., USA. Over the last year, extensive improvements and enhancements to the operational global MODIS cloud optical products have been implemented. Key elements of this new Collection 5 processing algorithm will be discussed along with examples.

HTuA • A-Train Cloud Analysis

Peter Pilewski; NASA Ames Res. Ctr., USA, Presider

Zia

8:15 a.m.–10:15 a.m.

First Wideband Measurement (100-1400 cm⁻¹) of the Atmospheric Emission Spectrum with an Uncooled FT Instrument (Including the Detector Unit) Operating at Stratospheric Balloon Altitude, Luca Palchetti; IFAC-CNR, Italy. In Earth radiation budget experiments, one missing measurement is the spectrally resolved OLR below 400cm⁻¹. The first spectral measurement down to 100cm⁻¹, performed with an uncooled FTS on-board a stratospheric balloon, is here described.

HTuA • A-Train Cloud Analysis

8:45 a.m.

Invited

Inference and Validation of Cloud Phase from MODIS, AIRS and CALIPSO Data, Bryan A. Baum1, Robert E. Holz2, Hung-Lung Huang1, Yong-Keun Lee1, Ping Yang2, Shaima L. Nasiri1, Michael D. King1, Steve Platnick1;1Univ. of Wisconsin-Madison, USA, 2Texas A&M Univ., USA, 3NASA Goddard Space Flight Ctr., USA. We discuss how cloud phase is inferred from MODIS and AIRS data and compare global results with those obtained from analysis of CALIPSO depolarization measurements.

HTuA • A-Train Cloud Analysis

8:45 a.m.

Invited

Improvement of Cloud Thermodynamic Phase Assessment Using Hyperspectral Measurements, Shaima L. Nasiri1, Brian H. Kahn2, Bryan Baum1;1Texas A&M Univ., USA, 2JPL, USA, 3Univ. of Wisconsin-Madison, USA. We discuss the difficulties inherent in the bispectral infrared thermodynamic phase retrieval of potentially mixed-phase clouds and how the phase retrievals of these clouds may be improved by including hyperspectral infrared measurements.

HTuA • A-Train Cloud Analysis

9:15 a.m.

Invited

Geosynchronous Imaging Fourier Transform Spectrometer (GIFTS) Performance Assessment, Fred A. Best, Henry E. Revercomb1, Robert O. Knuteson1, David C. Tobin1, Joe K. Taylor1, Doug P. Adler1, William L. Smith1, Daniel K. Zhou1, Robert A. Reisse1, John D. Elswe1, Gregory W. Cantwell1, Gail E. Bingham1, 1Univ. of Wisconsin-Madison, USA, 2NASA Langley Res. Ctr., USA, 3Utah State Univ., Space Dynamics Lab, USA. The Geosynchronous Imaging Fourier Transform Spectrometer (GIFTS) on-orbit radiometric calibration requirement of 1K is predicted to be met, based on the delivered performance of the engineering design unit on-board blackbody calibration subsystem.

HTuA • A-Train Cloud Analysis

9:15 a.m.

Invited

The Geosynchronous Imaging Fourier Transform Spectrometer (GIFTS): Engineering Development Unit (EDU) Noise Performance, Joe K. Taylor1, Henry E. Revercomb1, Robert O. Knuteson1, Fred A. Best1, 1Univ. of Wisconsin-Madison, USA, 2NASA Langley Res. Ctr., USA, 3Utah State Univ., Space Dynamics Lab, USA, 4Hampton Univ., USA, 5NASA Langley Res. Ctr., USA. The GIFTS EDU noise performance measured during thermal vacuum testing indicates that the required noise performance has been realized, and that goal performance has been achieved over much of both the Infrared detector bands.
FTuA • Fourier Session (continued)

FTuA5 • 9:45 a.m.
GIFTS Radiance Validation from Ground-Based Sky-Viewing Comparisons to AERI, Henry E. Revercomb, William L. Smith, David C. Tobin, Robert O. Knuteson, Fred Best, Joe K. Taylor, David D. Turner, Daniel K. Zhou, Robert A. Reisse, Gregory W. Cantwell, Joe Tansock, Univ. of Wisconsin-Madison, USA, NASA Langley Res. Ctr., USA, Utah State Univ., Space Dynamics Lab, USA. Spectral validation of the Geosynchronous Imaging Fourier Transform Spectrometer (GIFTS) engineering design unit has been performed using zenith sky viewing comparisons with an Atmospheric Emitted Radiance Interferometer (AERI). Good agreement is demonstrated.

FTuA6 • 10:00 a.m.
Geosynchronous Imaging Fourier Transform Spectrometer (GIFTS) Thermal Vacuum Testing: Aspects of Spectral Characterization, David C. Tobin, Henry E. Revercomb, Joe K. Taylor, Fred A. Best, Robert O. Knuteson, William L. Smith, John Eliewell, Gregory W. Cantwell, Gail Bingham, Joe Tansock, Robert A. Reisse, Daniel K. Zhou, Univ. of Wisconsin-Madison, USA, Utah State Univ., Space Dynamics Lab, USA. Thermal vacuum testing of GIFTS was performed at the Space Dynamics Laboratory and completed in September 2006. With a focus on spectral characterization of the sensor, analyses of selected thermal vacuum tests will be presented.

HTuA • A-Train Cloud Analysis (continued)

HTuA4 • 9:45 a.m. • Invited •
Remote Sensing of Clouds and Aerosols from POLDER: Recent Development in the A-Train Framework and Perspectives for New Mission Concept, Jérôme Riedi, Frédéric Parel, Didier Tanré, Jean-Luc Deuzé, Lab d’Optique Atmosphérique, Univ. des Sciences et Technologies de Lille, France. We present here recent development in clouds and aerosols remote sensing from the PARASOL mission and focus on the new insights provided by additional information available from synergy with other instruments of the A-Train.

Anasazi North
10:15 a.m.–11:00 a.m.
Coffee Break

Anasazi North
10:15 a.m.–11:00 a.m.
Exhibits Open

Anasazi South
11:00 a.m.–12:30 p.m.
FTuB • Michelson Session
Christopher Manning, Manning Applied Technology, USA, Presider

FTuB • Michelson Session

FTuB1 • 11:00 a.m. • Invited •
Performance of a Field-Portable Imaging FTS, Martin Chamberland, Vincent Farley, Alexandre Vallières, André Villemaire, Telops Inc., Canada. This paper presents the performance of a commercial LWIR imaging FTS designed for field use. The imaging size is 320x256 in the 8-12 µm region with a user selectable spectral resolution reaching 0.25 cm⁻¹.

FTuB2 • 11:30 a.m.
Recent Developments in Instrumentation for Fourier-Transform Spectrometry, Jérôme Genest, Pierre Tremblay, Simon Roy, Philippe Saucier, Maxime Cadotte, Patrick Dubois, Simon Potvin, Geneviève Taurand, Frédéric Talbot, Ctr. d’Optique, Photonique et Laser, Canada. This presentation will discuss several recent developments that will impact the way we do Fourier-transform spectrometry. Real-time instrument line shape correction, new interferogram sampling techniques, frequency combs and super-continuum MID-IR sources will all be discussed.

HTuB • Ice Clouds

Zia
11:00 a.m.–12:30 p.m.
HTuB • Ice Clouds
Steven Platnick; NASA, USA, Presider

HTuB1 • 11:00 a.m. • Invited •
The Retrieval of Cirrus Quantities from AIRS Observations: Some Challenges and Opportunities, Brian Kahn; JPL, USA. Abstract not available.

HTuB2 • 11:30 a.m. • Invited •
Ice Cloud Microphysical Properties and their Application to Satellite Remote Sensing, David Mitchell, Robert P. d’Entremont, R. Paul Lawson; Desert Res. Inst., USA, Atmospheric and Environmental Res., Inc., USA, SPEC, Inc., USA. A retrieval methodology has been developed for retrieving Deff and ice water path for ice clouds. Unique aspects include temperature-dependent diagnosis of ice crystal and size distribution shape and their coupling with cloud optical properties.

Anasazi North
10:15 a.m.–11:00 a.m.
Coffee Break

Anasazi North
10:15 a.m.–11:00 a.m.
Exhibits Open

FTuB • Michelson Session

Anasazi South
11:00 a.m.–12:30 p.m.
FTuB • Michelson Session
Christopher Manning, Manning Applied Technology, USA, Presider

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FTuB2 • 11:30 a.m.
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HTuB • Ice Clouds

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11:00 a.m.–12:30 p.m.
HTuB • Ice Clouds
Steven Platnick; NASA, USA, Presider

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HTuB2 • 11:30 a.m. • Invited •
Ice Cloud Microphysical Properties and their Application to Satellite Remote Sensing, David Mitchell, Robert P. d’Entremont, R. Paul Lawson; Desert Res. Inst., USA, Atmospheric and Environmental Res., Inc., USA, SPEC, Inc., USA. A retrieval methodology has been developed for retrieving Deff and ice water path for ice clouds. Unique aspects include temperature-dependent diagnosis of ice crystal and size distribution shape and their coupling with cloud optical properties.
A High Sensitivity Interferometer-Based Spectrometer without a Fourier Transform, Ricardo C. Coutinho1, David R. Selviah1, Hugh D. Griffiths1; 1Brazilian Navy Weapon Systems Directorate, Brazil, 2Dept. of Electronic and Electrical Engineering, Univ. College London, UK, 3Defence College of Management and Technology, Cranfield Univ., UK. A novel interferometric technique which senses a change in spectrum without Fourier transformation is presented. It relies on measuring a feature of a short coherence interferogram, and compares favorably with FTS in complexity and sensitivity.

A Novel Technique for the Metrology Calibration of a Fourier Transform Spectrometer, Locke D. Spencer, David A. Naylor; Dept. of Physics, Univ. of Lethbridge, Canada. A method is presented for using a Fourier transform spectrometer (FTS) to calibrate the metrology of a second FTS. This technique is particularly useful when the second FTS is inaccessible such as inside a cryostat.

Detailed Characterization of Photoconductive HgCdTe Photodetectors: Gain and Noise Performances, Pierre Tremblay1, Erik Kretschmer1, Vincent Farley1, Martin Chamberland1; 1Univ. Laval, Canada. 2Telops Inc., Canada. We report a novel approach to characterize photoconductive detectors. A measurement procedure is set up in order to deduce blackbody responsivity and photoconductive gain, while clearly separating source and background contributions to the shot noise.

An Overview of the SHS Technique and Applications, Frederick L. Roessler; Univ. of Wisconsin-Madison, USA. The concepts of Spatial Heterodyne Spectroscopy (SHS) are described, and trade-offs to be considered in applications are reviewed. SHS instruments in use and in development for ground- and space-based applications will be highlighted.

SHIMCAD Breadboard: Design and Characterization Overview, David D. Bahcock1, Chris R. Engler1, John M. Harlander1; 1NRL, USA, 2St. Cloud State Univ., USA. We describe the design and characterization of a breadboard longwave infrared spatial heterodyne spectroscopy (SHS) interferometer. By measuring key instrument parameters, we show that machining tolerances are sufficient for LWIR interferometers without post-integration alignment options.

Impact of Crystal Habit on Cirrus Radiative Properties, Manfred Wendisch1, Ping Yang2, Peter Pilewskie2; 1Leibniz Inst Tropospharenforschung eV, Germany, 2Texas A&M Univ., USA, 3Univ. of Colorado, USA. The impact of crystal morphology on solar and thermal infrared radiative properties of subtropical cirrus is quantified. For this purpose airborne measurements and simulated optical properties of nonspherical ice crystal are implemented into radiative simulations.

Cloud Microphysics from Cloud Radar and Lidar Onboard R/V Mirai and Comparison with CloudSat/CALIPSO Data, Hajime Okamoto; Tohoku Univ., Japan. This paper presents the results of cloud microphysical properties retrieved from 95-GHz radar and lidar onboard R/V Mirai. Particle size in mid-latitude cirrus is larger than in Tropics. Comparison with CloudSat/CALIPSO data is presented.

Overview of CERES, Norman G. Loeb, Bruce A. Wielicki; NASA Langley Res. Ctr., USA. This paper presents an overview of the CERES project. It demonstrates how algorithm improvements have lead to improved top-of-atmosphere (TOA) radiative flux accuracy. CERES shortwave flux anomalies are compared with those from Earthshine and ISCCP-FD.
An Imaging Heterodyne Spectrometer for Planetary Exploration, Cilia Damian$^1$, Pierre Dressant$^1$, Alain Sémery$^1$, Jean-Michel Roess$^1$, Jean-Pierre Mailhard$^2$; $^1$LESIA, France; $^2$IAP, France. We present a new design for an imaging heterodyne FT spectrometer and the first test results. The use of SHS combined with cylindrical optics records an interferogram for each point of the slit height.

10 Years of Solar FTIR Spectrometry at the Zugspitze: Atmospheric Studies and Satellite Validation, Ralf Sussmann; IMK-IFU, Inst. für Meteorologie und Klimaforschung, Forschungszentrum Karlsruhe, Germany. The high-resolution solar FTIR operated since 1995 at the Zugspitze (47°N, 11°E, 2964 m asl.) is presented together with highlights from its utilization for long-term sounding of atmospheric trace gases and satellite validation.

Frequency Modulation FTS: A Broadband Method for Measuring Weak Absorptions and Dispersions, Nathalie Piqué$^1$, Guy Guelachvili; LPPM/CNRS, France. High-frequency modulation of the interferogram enables to achieve high sensitivity.

High Resolution UV Fourier Transform Spectroscopy: SO2 Photabsorption Cross Sections for Planetary Atmosphere Studies, Richard J. Blackwell-Whitehead$^1$, Douglas S. Blackie$^1$, Juliet C. Pickering$^1$, Anne P. Thorne$^1$, James Rufus$^1$, Glenn Stark$^1$, Peter L. Smith$^1$; $^1$Imperial College London, UK; $^2$Wellesley College, USA; $^3$Harvard-Smithsonian Ctr. for Astrophysics, USA. Accurate laboratory SO2 photosorption cross sections are essential for the meaningful interpretation of planetary atmospheres. New laboratory measurements of SO2 spectra at low temperatures using high resolution VUV Fourier Transform spectroscopy are described.

Line Mixing and Speed Dependence in CO2 at 1.6 μm, Malathy Devi$^1$, Chris Benner$^1$, Linda R. Brown$^2$, Charles E. Miller$^2$, Robert A. Toth$^2$; $^1$College of William and Mary, USA; $^2$JPL, USA. To enable column CO2 measurements from space by OCO, ~0.3% precisions for intensities and air-broadening parameters are required for near-IR CO2 bands. Preliminary FTS laboratory measurements at 6350 cm⁻¹ using non-Voigt line profiles are described.

Assimilation of Microwave Observations in Cloudy Conditions, Fuchang Weng; NOAA/NESDIS/ORA, USA. Several experiments are conducted to prove the impacts of direct assimilation of cloudy radiances on hurricane analysis fields. Such tests include the WRF-GSI analysis and Hybrid Variational (HVAR) Scheme. Analysis results are rather promising.

The CALIPSO Mission and Initial Observations of Clouds and Aerosols from CALIOP, David Winker; NASA Langley Res. Ctr., USA. Launched in April 2006, the CALIPSO satellite provides unique global measurements of aerosols and clouds using a two-wavelength polarization lidar. This talk will discuss mission status, instrument performance, and initial results.

Comparing Actively Remote Sensed Lidar Cloud Properties with Passive AIRS and MODIS Retrievals, Robert E. Holz$^1$, Tiziano Maestri$^2$, Steven A. Ackerman$^3$, Liam E. Gumley$^4$; $^1$Univ. of Wisconsin at Madison, CIMSS, USA, $^2$Università degli Studi “Alma Mater Studiorum”, Italy. A new technique is presented that utilizes the vertically resolved lidar cloud extinction profile to estimate uncertainties in the passive retrievals of geometrically thick but tenuous cirrus.

Aircraft Multi-Spectral Remote Sensing and In-Situ Measurements of UK Frontal Cirrus, Clare Lee$^1$, Anthony J. Baran$^1$, Martin D. Glew$^2$, Hazel Jones$^2$, Stuart M. Newman$^1$, Jonathan P. Taylor$^2$; $^1$Met Office, UK, $^2$Univ. of Manchester, UK. Ice clouds have a significant impact on the Earth’s water and radiation budgets. Here we present multi-spectral remote sensing and in-situ measurements of frontal cirrus, using the FAAM aircraft coincident with an A-train overpass.
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<th>FTuD * Fellgett Session (continued)</th>
<th>HTuD * Combination of Active and Passive Sensors (continued)</th>
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<td><strong>FTuD4 • 5:00 p.m.</strong>&lt;br&gt;Invited&lt;br&gt;Cavity Enhanced Laser Induced Fluorescence Spectroscopy of Small Gas-Phase Molecules, Amanda J. Ross, Raphaël Vallon, Patrick Crozet; LASIM, Univ. Lyon 1 and CNRS, France. Active and passive optical cavities have been incorporated in laser induced fluorescence experiments, allowing resolved fluorescence spectra of weak systems to be recorded in the visible and near infrared on a Bomem DA3 FT spectrometer.</td>
<td><strong>HTuD4 • 5:00 p.m.</strong>&lt;br&gt;Invited&lt;br&gt;Validation of Satellite-Based Retrievals Using Ground-Based Measurements, Gerald Mace; Univ. of Utah, USA. Abstract not available.</td>
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*Sunset Room*<br>5:30 p.m.–7:00 p.m.<br>FTS/HISE Conference Reception
● Wednesday, February 14, 2007 ●

**North Concourse**

7:30 a.m.–5:00 p.m.

Registration Open

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**Anasazi South**

8:15 a.m.–10:15 a.m.

**FWA • Jacquinot Session**

Bruce M. Swinyard; Rutherford Appleton Lab, UK, Presider

**FWA1 • 8:15 a.m.**

FTS-2: A Submillimetre Astronomical Imaging Fourier Transform Spectrometer, David Naylor, B. G. Gom; Univ. of Lethbridge, Canada.

We present the design of FTS-2, a dual-port imaging Fourier transform spectrometer for use with SCUBA-2 at the James Clerk Maxwell Telescope. The challenging mechanical and optical constraints imposed by the telescope interfaces are discussed.

**FWA2 • 8:45 a.m.**

*Invited*

Imaging FTS in Astronomy: SPIRE and Beyond, Kjetil Dohler; Lab d’Astrophysique de Marseille (LAM), France. I describe the SPIRE far infra-red imaging Fourier spectrometer in terms of optical concept, error budgeting, and ground alignment. The instrument is part of the Herschel Space Observatory, to be launched in 2008.

**FWA3 • 9:15 a.m.**

A High Resolution Broad Spectral Range Spatial Heterodyne Spectrometer for UV Laboratory Astrophysics, John T. Harland1, James E. Lawler2, Fred L. Roessler3, Zach Labby3; 1St. Cloud State Univ., USA, 2Univ. of Wisconsin-Madison, USA. A high resolving power (>500,000) Spatial Heterodyne Spectrometer with spectral coverage across the VUV - UV region is being built for laboratory spectroscopy including emission branching fractions, improved level energies, and hyperfine/isotopic parameters.

**FWA4 • 9:30 a.m.**

The USNO Dispersed Fourier Transform Spectrograph, Arsen R. Hajian1, Bradford B. Behr1, Andrew T. Cenko1, Douglas G. Currie2; 1US Naval Observatory, USA, 2Univ. of Maryland, USA. The “dispersed FTS” at USNO combines a FTS with a grating spectrometer, multiplexing the interferometer output and thus boosting the instrument sensitivity. We present initial astronomical results and discuss the wide variety of future applications.

**FWA5 • 9:45 a.m.**

Signal-to-Noise Ratio Tradeoffs Associated with Coarsely Sampled Fourier Transform Spectroscopy, Samuel T. Thurman, James R. Fienup; Inst. of Optics, Univ. of Rochester, USA. Signal-to-noise ratio (SNR) tradeoffs associated with coarsely sampled step-and-integrate Fourier transform spectroscopy are derived. We show that there is no SNR penalty in the shot-noise limit for a fixed total detector integration time.

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**HWA • Air Quality and Trace Gases**

**HWA1 • 8:15 a.m.**

*Invited*

Monitoring Air Quality from Space, Shobha Kondragunta; NOAA/NESDIS, USA. Abstract not available.

**HWA2 • 8:45 a.m.**

*Invited*

Global Monitoring of Tropospheric Pollution from Geostationary Orbit, Kelly Chance; Harvard-Smithsonian Ctr for Astrophysics, USA. Satellite measurements of major tropospheric pollutants have been demonstrated and are now routinely made. Geostationary measurements are the logical next step in pollution monitoring from space. Requirements and constraints for geostationary measurements are presented.

**HWA3 • 9:15 a.m.**

*Invited*

Observing Trace Gases from Spectrally Resolved Infrared Radiances, Christopher D. Barnett1, Mitch Goldberg1, Eric Maddy1, Xiaozhen Xiong1; 1NOAA/NESDIS/STAR, USA, 2QSS Group, Inc., USA. We present measurements of mid-tropospheric atmospheric carbon derived from the Aqua Atmospheric Infrared Sounder and inter-comparisons with NOAA Earth System Research Laboratory/Global Monitoring Division in-situ measurements.

**HWA4 • 9:45 a.m.**

*Invited*

Towards Operational Monitoring of the Chemical Composition of the Atmosphere Using Solar Backscatter Imaging Techniques, Heinrich Boeversmann, Andreas Richter, M. Buchawitz, John P. Burrows; Inst. of Environmental Physics, Univ. of Bremen, Germany. As demonstrated by GOME/ERS-2 and SCIAMACHY/ENVISAT and partly to be continued until 2020 by GOME-2/METOP, solar backscatter spectroscopy is well suited to probe atmospheric chemical composition relevant for Ozone, Air Quality and Greenhouse Gas monitoring.
FWA • Jacquinot Session (continued)

FWA6 • 10:00 a.m.
Enhanced Step-Mode FTIR Position Control, Brandon Inberg, Carl Fahlstrom, Laura Dobeck, Lee H. Spangler, Steven R. Shaw; Montana State Univ., USA. A step-scan interferometer has been modified to allow mirror locking a 1/6 He Ne wavelength intervals by generating quadrature synthetic reference signals representing a 3x multiple of the actual signal. Sample TRS data is presented.

Anasazi North
10:15 a.m.–11:00 a.m.
Coffee Break

Anasazi North
10:15 a.m.–4:00 p.m.
Exhibits Open

FWB • Connes Session

Anasazi South
11:00 a.m.–12:30 p.m.
FWB • Connes Session
Peter Bernath; Univ. of Waterloo, Canada, Presider

FWB1 • 11:00 a.m. Invited
Greenhouse Gases Observation from Space with TANSO-FTS on GOSAT, Takashi Hamazaki1, Yutaka Kaneko2, Akihiko Kuze3, Hiroshi Suto4; 1JAXA - GOSAT Project Team, Japan, 2Japan Aerospace Exploration Agency, Japan. Thermal And Near infrared Sensor for carbon Observation Fourier-Transform Spectrometer on GOSAT monitors CO2 and CH4 globally from space. It has three narrow bands (0.76, 1.6, and 2 micron) and a wide band (5.5-14.3 micron).

FWB2 • 11:30 a.m.
Design and Qualification of the TANSO Interferometer, François Châteauneuf1, Marc-André Soucy1, Gaétan Perron1, Luc Lévesque1, Jun Tani1; 1ABB, Canada, 2NEC Toshiba Space System, Japan. The Greenhouse gases observing SATellite will monitor global distributions of CO2. This paper presents the interferometer designed for the Thermal And Near infrared Sensor for carbon Observation FTS along with qualification and performance verification activities.

FWB3 • 11:45 a.m.
Noise Modeling for the TANSO-FTS Sensor aboard GOSAT, Mitsushiro Tomosada1, Akihiko Kuze2, Hiroshi Suto3, Tsutsya Yokota4; 1Inst. of Statistical Mathematics, Japan, 2Japan Aerospace Exploration Agency, Japan, 3Tsukuba Univ., Japan, 4Natl. Inst. for Environmental Studies, Japan. Noise characteristics in the spectrum data obtained by a FTS sensor TANSO-FTS, which will be onboard GOSAT (Greenhouse gases Observing SATellite), were analyzed and modeled by numerical simulation.

FWB • Hyperspectral IR Data

FWB4 • 12:00 p.m.
Calibration Plan of GOSAT TANSO, Kci Shiomi1, Hiroshi Suto2, Shuji Kawakami3, Tomoko Kina1, Mayumi Yoshida3, Yasushi Mitoimi2, Nami Seki1, Fumie Kataoka1; 1Japan Aerospace Exploration Agency, Japan, 2Remote Sensing Technology Ctr. of Japan, Japan, GOSAT will be launched in 2008 for observing greenhouse gases by space-borne FTS named TANSO-FTS. Sensor characterization test and

Anasazi North
10:15 a.m.–11:00 a.m.
Coffee Break

Anasazi North
10:15 a.m.–4:00 p.m.
Exhibits Open

Akihiko Kuzé, Tsukuba Univ., Japan

FWB2 • 11:30 a.m. Invited
Retrieval Lesson Learned from NAST-I Hyperspectral Data, Daniel K. Zhou1, William L. Smith2, Xu Liu1, Allen M. Larar1, Stephen A. Mango1; 1NASA Langley Res. Ctr., USA, 2Hampton Univ., USA, 3Univ. of Wisconsin-Madison, USA. Advanced satellite sensors are tasked with improving measurements of the Earth’s atmosphere. Measurement system validation is critical to achieving this goal and maximizing research and operational utility of resultant data.

FWB3 • 12:00 p.m. Invited
Hyerspectral Remote Sensing of the Ningaloo Reef: Data Collection, Processing, Validation and Applications in Monitoring One of the World’s Largest, Most Diverse and Pristine Tropical Coral Reef Ecosystems, James E. Davies, Wojciech M. Klonowski, Leon J. Majesek, Mark A. Gray, Mervyn J. Lynch; Curtin Univ. of Technology, Australia. Underway physical and radiometric
FDB • Connes Session (continued)

preparation of post-launch calibration are implemented under Phase-C/D currently.

FDB5 • 12:15 p.m.
Limb Sounding with Imaging FTS: The Status of the GLORIA and IMIPAS Projects, Felix Friedli-Vallon1; Hermann Oeluf1; Peter Preusse1; Martin Riese1; Forschungszentrum Karlsruhe, Germany, 
2Forschungszentrum Juelich, Germany. First characterisation results of the breadboard for the airborne Global limb Radiance Imager of the Atmosphere (GLORIA) instrument are presented. The further development path for this imaging Fourier transform spectrometer is outlined.

12:30 p.m.–2:00 p.m.
Lunch Break (on your own)

FWC • Cooley-Tukey Session

Anasazi South
2:00 p.m.–3:30 p.m.
FWC • Cooley-Tukey Session
Jean-Pierre Maillard; Inst. d’Astrophysique de Paris, France, Presider

FWC1 • 2:00 p.m. •Invited•
Externally Dispersed Interferometry for the Mt. Palomar Doppler Planet Search, David J. Erskine; Laurence Livermore Natl. Lab., USA. A fixed-delay interferometer placed in series with Cornell’s planned TripleSpec near-infrared spectrograph at Mt. Palomar’s 200 inch telescope will greatly improve its Doppler velocity precision and effective spectral resolution.

FWC2 • 2:30 p.m.
The FIR Imaging Fourier Transform Spectrometer Concept for the SPICA Mission, Bruce M. Swingard, Marc Ferlet; Rutherford Appleton Lab, UK. We present the results of the design study for an Imaging FTS instrument working in the 30-200 micron waveband. The instrument is intended for use on the Japanese SPICA mission for astronomy.

FWC3 • 2:45 p.m.
The FROID Algorithm for Spectral Reconstruction, Arsen R. Hajian1; Bradford B. Behr1; Andrew T. Cerko1; Kevin H. Knuth1; Douglas G. Currie1; US Naval Observatory, USA, 2Univ. of Albany, USA, 3Univ. of Maryland, USA. We present a Bayesian algorithm for spectral reconstruction (FROID: Fourier Reconstruction of Optical Interferometer Data). The FROID method incorporates a priori information allowing honest treatment of non-Poisson noise, bandlimited data, and other real-world effects.

FWC4 • 3:00 p.m. •Invited•
SpiOMM: A Ground-Based Wide-Field Imaging FTS, Frédéric Grandmont1; Anne-Pier Bernier1; Maxine Charlebois1; Laurent Drissen1; 1ABB Bomem, Inc., Canada, 2Univ. Laval, Canada. SpiOMM is an Imaging FTS operating at the Mégantic telescope. It produces astronomical cubes of data in the visible using a CCD. Its 1.5 millions field elements makes it the largest IFTS used in astronomy.

HDB • Hyperspectral IR Data (continued)
data were captured within the Ningaloo Marine Park. Three underway transects were conducted coincident with HyMap overpasses. Local mode MISR data and ancillary aerosol and meteorological observations complete the validation set.

12:30 p.m.–2:00 p.m.
Lunch Break (on your own)

HWC • Geostationary Satellite Data

Zia
2:00 p.m.–3:30 p.m.
HWC • Geostationary Satellite Data
Martin Mlynczak; NASA Langley Res. Ctr., USA, Presider

HWC1 • 2:00 p.m. •Invited•
Overview of Chinese Second Generation Polar Orbiting Satellite FY-3 Imaging and Sounding Capabilities and Applications, Chaohua Dong,Jun Yang, Naimeng Lu, Yujie Liu, Zhongdong Yang, Bin Cai; Natl. Satellite Meteorological Ctr. (NSMC) of China Meteorological Administration (CMA), China. FY-3, the new series of Chinese polar-orbiting meteorological satellites is planned for 2007 launch. Eleven instruments covering violet, visible, near-infrared, infrared, and microwave observations to study weather, climate and other environmental features will be discussed.

HWC2 • 2:30 p.m. •Invited•
Development of a Multispectral and Hyperspectral Proxy Data System for GOES-R, Hung Lung A. Huang; Univ. of Wisconsin-Madison, USA. This paper describes an ongoing effort to develop the state-of-the-art proxy data sets, models, software tools, and their associated documents in support of broad area of GOES-R Algorithm Working Group (AWG) application and development activities.

HWC3 • 3:00 p.m. •Invited•
Retrieval of Cloud Properties from GOES-R, Patrick Minnis; NASA Langley Res. Ctr., USA. The next generation of USA geostationary satellites will have an enhanced imager, the Advanced Baseline Imager, that will enable improved detection and retrieval of cloud properties. Use of new channel combinations for retrievals is discussed.
JWA1
A Near-UV Spatial Heterodyne Spectrometer for Interstellar [OI] Emission Line Studies, Edwin J. Mierkiewicz1, Fred L. Roessler1, John M. Harlander2, Ronald J. Reynolds3, Kurt P. Jaech4; 1Univ. of Wisconsin-Madison, USA, 2’St. Cloud State Univ., USA. Using a newly developed spatial heterodyne spectrometer, we have obtained the first radial velocity resolved observations of interstellar 3727Å emission and confirmed the superb performance of the technique for observing spatially extended faint sources.

JWA2
UV and VUV High Resolution Fourier Transform Spectroscopy: Laboratory Atomic Spectroscopy for Astrophysics Applications, Juliet C. Pickering1, Richard Blackwell-Whitehead1, Darren Smillie1, Anne P. Thorne2, Peter L. Smith3, Gillian Nace4; 1Harvard-Smithsonian Ctr. for Astrophysics, USA, 2NIST, USA. High resolution spectrographs on astronomical telescopes create demands for accurate high resolution UV/VUV atomic data for interpretation of astrophysical spectra. Atomic spectroscopy combining high resolution VUV Fourier Transform and grating spectroscopy is described.

JWA3
FTIR Analysis of Pristine and Ion Irradiated Polymers, Jitendra K. Quamara, Anu Sharma, Geetika Goyal, Randhir Singh, P. Raj, Maneesha Garg; Physics Dept., Natl. Inst. of Technology-Kurukshetra, India. FTIR Spectroscopy has been applied for the analysis of swift heavy ion irradiated polyimides and PLCs. The FTIR spectra reveal the demerization of carbonyl groups, enhancement in the absorbed water and formation of new radicals.

JWA4
Reference Wavelengths of Thorium and Argon for the Calibration of Infrared Astronomical Spectrographs, Gillian Nace1, Craig J. Sansonetti1, Florian Kerber2; 1NIST, USA, 2European Southern Observatory, Germany. We report new reference wavelengths emitted by a Th/Ar hollow cathode lamp in the range 900 nm to 4500 nm.

JWA5
Kilometric Path Lengths in Infrared Absorption with Time-Resolved Fourier Transform Spectroscopy, Nathalie Picqué, Véronique Girard, Mathieu Jacquemet, Robert Farrenq, Guy Gueldhelli; LPPM / CNRS, France. Time-resolved Fourier transform spectroscopy associated to intracavity laser absorption allows to record highly sensitive high resolution spectra, in the infrared up to 2.5 μm, of both stable and unstable molecules.

JWA6
NIR All-Fiber Supercontinuum Frequency Comb Spectrometer, Philippe Saucier, Frédéric Talbot, Jérôme Genest, Pierre Tremblay; Univ. Laval, Canada. We discuss the realisation of an all-fiber spectrometer working on the principle of heterodyne measurement using two high brightness frequency combs exhibiting supercontinua in the NIR (1.2 μm - 1.9 μm).

JWA7
New Spectral Calibration Approach Suitable for Imaging Fourier Transform Spectrometers, Simon A. Roy1, Simon Potvin1, Jérôme Genest1, Raphael Desbiens2; 1Univ. Laval, Canada, 2ABB Bomem Inc., Canada. A new approach to line shape correction is presented. The method uses line shape integration to calibrate the spectral grids of pixels and is thus convenient for spectrometers equipped a CCD camera.

JWA8
New Sampling Approach Suitable for Imaging Fourier Transform Spectrometers with Integrating Detector, Simon A. Roy1, Jérôme Genest1, Martin Chamberland2; 1Univ. Laval, Canada, 2Telops Inc., Canada. A new approach to interferogram sampling is presented. The method reduces data load and processing overhead while allowing post-correction of sampling errors. It is particularly well suited for continuous-scan spectrometers equipped a CCD camera.

JWA9
FPGA SoC Architecture for Imaging FTS Real-Time Data Processing, Patrick Dubois1,2, Martin Chamberland3, Jerome Genest4, Sebastien Roy5; 1Univ. Laval, Canada, 2Telops Inc., Canada. A FPGA SoC architecture is presented which can perform real-time data processing of imaging FTS data. Datacubes co-adding, FFTs, spectral cropping and radiometric calibration can be performed at a datarate in excess of 30 Mpixels/s.

JWA10
An OSSE for Aerosols, Reneske Timmermans1, Martijn Schaap1, Stephen Tjemkes2; 1Netherlands, 2EUMETSAT, Germany. The study aims to quantify the impact of satellite derived aerosol information as observed by future instruments on the forecasting and analysis of PM2.5 levels over Europe using an observing system simulation experiment.

JWA11
Plume Identification and Tracking Using Satellite Imaging, Moncef B. Taqjali1, Ilham Sadri2, Michael Meinhold3; 1Advanced Photonics Res. Lab, Univ. of Nevada, USA, 2SAIC, USA. The aim of this work is to combine visible, near infrared, and thermal optical infrared channels in order to produce a two-dimensional spectral map in which plumes can be identified and tracked in real time.

JWA12
Aerosol and Surface Properties Characterization from Joint Inversion of Ground-Based and Satellite Observations, Alexander Sinyuk1, Oleg Dubovik2, Brent Holben1, Tom F. Eck3, Francois-Marie Breon4, John Martinchik5, Ralph Kahn6, David J. Diner7, Eric F. Vermote2, Jean-Claude Roger8, Tatjana Lapuponok9, Ilya Slutsker10; 1Science Systems and Applications, Inc., USA, 2Lab d’Optique Atmospherique, CNRS Universite de Lille, France, 3Lab for Terrestrial Physics, NASA Goddard Space Flight Ctr., USA, 4GEST Ctr., Univ. of Maryland Baltimore County, USA, 5Lab des Sciences du Climat et de l’Environnement, France, 6JPL, Caltech, USA, 7Univ. of Maryland at College Park, USA, 8OPG/LAMP Univ. Blaise Pascale, France. A method for simultaneously retrieving aerosol and surface parameters from ground based and satellite observations collocated in space and time is presented. The improvements in aerosol and surface reflectance characterization are discussed.
JWA13
Capabilities of the MTG-IRS Candidate Candidate Mission to Depict Horizontal Moisture Structures, Stephen Tjemkes, Jochen Grandell, Regis Borde, Rolf Stuthmann; EUMETSAT, Germany. The MTG-IRS candidate mission has primary objective to monitor atmospheric dynamics using water vapour tracers. Using different analysis, capabilities of MTG to meet mission objectives will be shown.

JWA14
Level 0 to 1 Algorithm Theoretical Basis for the On-Orbit Calibration of the Geostationary Imaging Fourier Transform Spectrometer, Robert Knuteson, Henry E. Revercomb, David C. Tobin; Univ. of Wisconsin-Madison, USA. The UW-Madison Space Science and Engineering Center has applied its extensive experience to the development of Level 0 to 1 ground data processing algorithms for the on-orbit calibration of the Geostationary Imaging FTS (GIFTS) sensor.

JWA15
Multilayer Cloud Detection in the MODIS Collection 5 Cloud Product, Stephen Platnick1, Michael King2, Gala Wind3, G. Thomas Arnold4, M. McGill5, Steven Ackerman6, Robert Holz7, Bryan Baum8, Ping Yang9; NASA Goddard Space Flight Ctr., USA, 2SSAI, USA, 3Univ. of Wisconsin-Madison, USA, 4Texas A&M Univ., USA. Multilayer cloud detection using, in part, a water vapor absorption band at 0.94 µm has been implemented in the recent MODIS Collection 5 processing stream. Evaluation with active sensor(s) will be discussed.

JWA16
SIRAS-G, the Spaceborne Infrared Atmospheric Sounder for Geosynchronous Earth Orbit, Thomas Kampe; Ball Aerospace and Technologies Corp., USA. SIRAS-G, developed under NASA's 2002 IIIP is enabling technology for future spaceborne IR sounders. A major aspect of this program was a laboratory demonstration dispersive spectrometer. Results from the demo instrument development program are described.

JWA17
GIFTS EDU Ground-Based Measurement Experiment, D. K. Zhou1, W. L. Smith2, L. J. Zollinger3, R. J. Huapi4, R. A. Reisse5, A. M. Larar6, X. Liu7, J. J. Tansock8, S. M. Jensen9, H. E. Revercomb10, W. F. Felzt11, G. E. Bingham12; NASA Langley Res. Ctr., USA, 2Univ. of Wisconsin, USA, 3Space Dynamics Lab, Utah State Univ., USA; ZelTech, USA. GIFTS EDU is an imaging infrared spectrometer designed for atmospheric soundings. The EDU ground-based measurement experiment was held in Logan, Utah during September 2006 to demonstrate its extensive capabilities for geosynchronous and other applications.

JWA18
Diurnal and Seasonal Contrasts in Cloud Properties from AIRS Data, Yong-Keun Lee1, Ping Yang2, Hung-Lung Huang2, Bryan A. Baum3; 1Space Science and Engineering Ctr., USA, 2Dept. of Atmospheric Sciences, Texas A&M Univ., USA. We discuss diurnal and seasonal contrasts of cloud properties over a tropical region based on analysis of Atmospheric Infrared Sounder (AIRS) data.

JWA19
Hyperspectral Remote Sensing of the Coastal Environment, David D. R. Kohler, W. Paul Bissett, Robert G. Steward, Mubin Kadiwala, Robert Banfield; FERI, USA. Paper details the construction of a new hyperspectral sensor focused on the coastal environment. This sensor follows the same basic design strategy as its predecessor, the NRL developed PHILLS sensor.

JWA20
An Automated Nonrigid Registration for a Tunable Hyperspectral Imaging System, Hector Erives1, Scott Teare1, Glenn J. Fitzgerald; 2New Mexico Tech, USA, 3Dept. of Primary Industries, Horsham, Australia. A method that uses the Phase Correlation and a geometric transformation is proposed to estimate nonrigid registration errors for a hyperspectral imaging system. It computes multiple correlations to find and correct for local registration errors.

JWA21
Spectral Errors and Their Affect on Retrieval of Temperature and Water Vapor Profiles in the Presence of Clouds, Brian R. Johnson, Grzegorz Miezcznik, Thomas U. Kampe; Ball Aerospace and Technologies Corp., USA. The impact of spectral channel registration errors in an imaging grating spectrometer on the retrieval of temperature and water vapor profiles in the presence of opaque, low-level (~700 mb) clouds is investigated.

JWA22
Effects of Jitter Motion on Atmospheric Temperature and Humidity Retrievals from FTS IR Measurements, Grzegorz Miezcznik, Brian R. Johnson; Ball Aerospace and Technologies Corp., USA. Co-registration errors caused by a line of sight jitter across a cloud boundary introduce spectral artifacts into hyperspectral FTS radiances. Analytical derivation and examples of atmospheric temperature and moisture retrieval sensitivity to jitter is presented.

JWA23
Study of High Temporal Ozone Product from Imagers Onboard Geostationary Satellites, Xin Jin1, Jun Li1, Christopher C. Schmidt2, Timothy J. Schmidt3, Jinlong Li4; Cooperative Inst. for Meteorological Satellite Studies (CIMSS), USA, 2Advanced Satellite Product Branch, Ctr. for Satellite Applications and Res., NESDIS/NOAA, USA. The capability of total column ozone (TCO) measurements was demonstrated by the SEVIRI data as a proxy for ABI. The retrieved TCO has good agreement (R=0.92, RMSE=4%) with that from OMI onboard the EOS/Aura platform.

JWA24
The Hyperspectral Infrared Sounding Simulation Study Using WRF Data, Chian-Yi Liu1, Jun Li1, Timothy J. Schmidt2, Elisabeth Weisz1, Erik Olson3, Jason Otkin1; 1CIMSS, USA, 2NOAA/NESDIS/Ctr. for Satellite Applications and Res., USA. The geostationary hyperspectral infrared sounder studied for the next generation GOES. An atmospheric sounding retrieval algorithm has been developed for processing the GFS under clear and cloudy skies through eigenvector regression with all IR channels.

5:00 p.m.–7:30 p.m.
Dinner Break (on your own)
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<tr>
<th>FWD • FTS Postdeadline Session</th>
<th>HWD • HISE Postdeadline Session</th>
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<td><strong>Anasazi South</strong></td>
<td><strong>Zia</strong></td>
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<td>7:30 p.m.–9:00 p.m.</td>
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<td><strong>FWD • FTS Postdeadline Session</strong></td>
<td><strong>HWD • HISE Postdeadline Session</strong></td>
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<td><em>Donald E. Jennings; NASA Goddard Space Flight Ctr., USA, Presider</em></td>
<td><em>Jerome Riedi; Lab d’Optique Atmosphérique, Univ. des Sciences et Technologies de Lille, France, Presider</em></td>
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Anasazi South
8:30 a.m.– 10:30 a.m.
FThA • Mertz Session
David Naylor; Univ. of Lethbridge, Canada, Presider

FThA1 • 8:30 a.m.  •Invited•
Flight Performance and Scientific Results of the Fourier Transform Spectrometer Onboard the ASTRO-F (AKARI) Satellite, Mitsuo Kubo; Nagoya Univ., Japan. We developed the imaging Fourier transform spectrometer (iFTS) of the infrared astronomical satellite AKARI, which was launched on February 21, 2006. The iFTS works very well and takes many far-infrared spectra of the sky.

FThA2 • 9:00 a.m.  •Invited•
Double Pendulum Interferometers in Planetary Missions, Sergio Fonti; Univ. degli Studi di Lecce, Italy. The discussion is focused on the advantages of using double pendulum interferometers in planetary missions, but also on the problems connected with their characteristics. Examples of existing and future instruments of this kind are given.

FThA3 • 9:30 a.m.
Basic Principle of Doppler Asymmetric Spatial Heterodyne Spectroscopy (DASH): An Innovative Concept for Measuring Winds in Planetary Atmospheres, Christoph R. Englert1, Michael H. Stevens1, David E. Siskind1, David D. Babcock1, John M. Harlander2; 1NRL, USA, 2St. Cloud State Univ., USA. We introduce an innovative concept for inferring altitude profiles of horizontal atmospheric wind by measuring the Doppler shift of multiple emission lines versus altitude. Instruments using this approach will be well suited for planetary missions.

FThA4 • 9:45 a.m.
Wide-field Imaging FTSs at High Spectral Resolution for Astronomy, Jean-Pierre Maillard; Inst. d’Astrophysique de Paris, France. An imaging FTS as a direct imager can combine a wide-field coverage with a high spectral resolution. This unique property is exploited in several instrumental projects which are presented.

Zia
8:30 a.m.– 10:30 a.m.
HThA • Radiative Transfer
Allen M. Larar; NASA Langley Res. Ctr., USA, Presider

HThA1 • 8:30 a.m.  •Invited•
Infrared Radiative Transfer in Cloudy Atmospheres and Retrieval Applications, Jean-Luc Menczel1, Robert d’Entremont1, David Mitchell2, Gennady Ulymin1, Ryan Aschbrenner1, Alan Lipton1; Atmospheric and Environmental Res., Inc., USA, 2Desert Res. Inst., USA. The Optimum Spectral Sampling method for fast and accurate radiative transfer has been enhanced for speed in clear atmospheres and extended to cloudy atmospheres. Applications to retrieval of cloud properties from infrared measurements are described.

HThA2 • 9:00 a.m.
A New Model for Domain-Average Solar Radiative Transfer in the Cloudy Atmosphere with Validation from Recent Ground-Based O: A-band Spectroscopy, Anthony B. Davis1, Klaus Pfeilsticker2; ‘Los Alamos Natl. Lab, USA, 2Heidelberg Univ., Inst. für Umweltphysik, Germany. We present a new forward radiation transport model targeting large-scale shortwave fluxes and radiances in the presence of arbitrary cloudiness. Excellent agreement with recent pathlength observations is achieved with just one spatial variability parameter.

HThA3 • 9:15 a.m.
Improvements to the Taftkaa Atmospheric Correction Algorithm for Hyperspectral Ocean-Color Data, Marcos J. Montes, Bo-Cai Gao; NRL, USA. The Taftkaa atmospheric correction algorithm, used primarily for atmospheric correction of ocean color data, has been improved to include the ability to use the full view-geometry and solar geometry for each pixel of data.

HThA4 • 9:30 a.m.
Forward Modelling of Aircraft and Satellite Radiances from the EQUATE Campaign, Stuart M. Neuman; Met Office, UK. The European AQUA Thermodynamic Experiment (EQUATE) produced a comprehensive set of radiometric and in-situ profiles. These data are valuable for investigations into atmospheric radiative transfer and validation of temperature and humidity retrievals from hyperspectral sounders.

HThA5 • 9:45 a.m.
Modeling Aerosol Radiance for NCEP Data Assimilation, Quanhua Liu1, Yong Han2,1, Paul van Delst1, Fuzhong Weng2; 1CSDA, USA, 2NOAA/NESDIS/ora, USA. CRTM can quantitatively simulate the aerosol effect on satellite radiances. Sensitivity studies show that the dust aerosol may reduce modeling brightness temperature by 1 Kelvin at 11 μm and 4 Kelvin at 3.7 μm.
FThA • Mertz Session (continued)

FThA5 • 10:00 a.m.
A New Static Fourier-Transform Spectrometer: The First Spectra from Synthesis Temporal Aperture Reconstruction Spectrometer, Stéphane Santran, Patrice Naqtegale, Bruno Bousquet, Laurent Sarger, Lionel Canioni; CPMOH, France. In the framework of spatial aperture synthesis, we developed a temporal aperture synthesis allowing the concatenation of several interferograms. We succeed to enhance the resolving power of static Fourier-transform spectrometers by a factor of 40.

FThA6 • 10:15 a.m.
A Broadband Spatial Heterodyne Spectrometer for High Resolution Studies of Faint Extended Emission Sources, Walter Harris, Olivia Dawson; Univ. of Washington, USA. Spatial heterodyne spectrometers (SHS) provide high étendue and spectral resolution in a compact instrument well suited for observing extended emissions over a narrow bandpass. Here we describe progress toward development of a tunable broadband SHS.

Anasazi North
10:30 a.m.–11:00 a.m.
Coffee Break

Anasazi South
11:00 a.m.–12:30 p.m.
FThB • Brault Session
Mark Abrams; FastMetrix, Inc., USA, Presider

FThB1 • 11:00 a.m. • Invited •
Far-IR Cirrus Cloud Radiative Properties from the Tropospheric Airborne Fourier Transform Spectrometer (TAFTS) Instrument, Paul D. Green, Neil Humphage, Caroline Cox, Jon E. Murray, John E. Harries, Juliet C. Pickering; Imperial College London, UK. We present the results from on-going work on cirrus cloud radiative emission in the far-IR from datasets collected in a number of recent campaigns involving the TAFTS instrument.

FThB2 • 11:30 a.m.
Airborne Forward-Looking Interferometer Turbulence Investigation, William Smith1, Stanislav Kireev1, Gary Gimmstead2, Leanne West1, Xu Liu3, Philip Schaffner1, John J. Murray1; 1Hampton Univ., USA, 2Georgia Tech Res. Inst., USA, 3NASA Langley Res. Ctr., USA. The NASA Langley Research Center is conducting a feasibility study of a Forward-Looking Interferometer to detect and measure hazards to aircraft, including turbulence, low visibility, volcanic ash, icing conditions, wind shear, and wake vortices.

FThB3 • 11:45 a.m.
Design of a Fourier-Transform Spectral Imager for Airborne Measurements, Yann Ferret1, Jean Taboury1, P. Fournet1, H. Sauer1, F. Goudault1, P. Chate1, Nicolas Guirriacau1, C. Coudraine1, S. Thêtras2, P. Cymbalisti3, J. Primot1, J. Deschamps3; 1IOTA, France, 2ONERA, France. We present an experimental spectral imager based on a Michelson interferometer with dihedrons. This design allows a high geometrical étendue and a simplicity for fringes tuning.

HThA • Radiative Transfer (continued)

HThA6 • 10:00 a.m.
Retrieval of Aerosol Properties from SAGE III Limb Scattering Measurements: Future Applications for OMPS, Robert P. Loughman1, Didier F. Rault1, Terry Deshler2; 1Hampton Univ., USA, 2NASA Langley Res. Ctr., USA, 3Univ. of Wyoming, USA. SAGE III limb scattering (LS) radiances are inverted, producing stratospheric aerosol extinction profiles. Initial agreement with coincident solar occultation measurements is 25 ± 75%, and adding aerosol size distribution retrievals should increase extinction retrieval quality.

HThA7 • 10:15 a.m.
Applications of Synthetic GOES-R Data, Louie Grassi1, Mark DeMaria1, Reneu Brunner1; 1CIRA/CSU, USA, 2NOAA/NESDIS/ORA/RAIMMB, USA. A method has been developed to create synthetic GOES-R data from high-resolution mesoscale model and radiative transfer calculations. This synthetic data is being used to evaluate the capabilities of GOES-R for severe weather analysis.

Anasazi North
10:30 a.m.–11:00 a.m.
Coffee Break

Anasazi South
11:00 a.m.–12:30 p.m.
FThB • Sounding Retrievals
Fuochong Weng; NOAA/NESDIS/ORA, USA, Presider

HThB1 • 11:00 a.m. • Invited •
Development and Demonstration of Hyperspectral Infrared Only Sounding Retrieval, Jun Li1, Jinlong Li1, Elisabeth Weiss1, Chian-Yi Liu1, Timothy J. Schmidt1, Allen Huang1, Mitchell D. Goldberg1, W. Paul Merz1; 1Univ. of Wisconsin-Madison, USA, 2Ctr. for Satellite Applications and Res., NOAA/NESDIS, USA. Algorithm has been developed for retrieving temperature and moisture profiles from hyperspectral infrared sounder radiances under both clear and cloudy skies. Focus has been on handling surface emissivity and clouds in infrared only sounding retrieval.

HThB2 • 11:30 a.m. • Invited •
Capability of High Spectral Resolution Observations in the Infrared to Detect Water Vapor Structures, Carmine Serio, Giuseppe Greco, Guido Masiello; Univ. degli Studi della Basilicata, Italy. The problem of physically-based inversion of high spectral resolution infrared observations for the retrieval of fine-scale vertical structures of water vapor in the lower atmosphere has been addressed in this study.
### FThB • Brault Session (continued)

**FThB4 • 12:00 p.m. • Invited**

**AIRIS—The Canadian Airborne Infrared Hyperspectral Imager: Current Status and Future Developments,** Tracy Smithson; DRDC-RDDC Valcartier, Canada. The AIRIS instrument, developed for the Defense Research and Development Canada, is described. Example measurements are presented and progress towards future real-time processing capabilities, discussed.

### HThB • Sounding Retrievals (continued)

**HThB3 • 12:00 p.m. • Invited**


### Anasazi South

12:30 p.m.–12:45 p.m.

FTS Closing Remarks

### Zia

12:30 p.m.–12:45 p.m.

HISE Closing Remarks
Key to Authors and Presiders

A
Abrams, Mark — FThB
Achterberg, R. K. — FMA5
Ackerman, Steven A. — HMB1, HTuD2, HWB, JWA15
Adler, Doug P. — FTuA3
Arnold, G. Thomas — JWA15
Aschbrenner, Ryan — HThA1

B
Babcock, David D. — FTuC2, FThA3
Banfield, Robert — JWA19
Baran, Anthony J. — HTuD3
Barnet, Christopher D. — HWA3
Baum, Bryan A. — HMA3, JMA HTuA2, HTuA3 JWA18, JWA15
Behr, Bradford B. — FWA4, FWC3
Benner, Chris — FTuD3
Bernard, Frédéric — FMC3
Bernath, Peter — JMA2, FMC2, FWB
Bernier, Anne-Pier — FWC4
Best, Fred A. — JMA1, FTuA3, FTuA4, FTuA6, FTuA5
Bézard, B — FMA5
Bingham, Gail E. — FMC4, FTuA3, FTuA4, FTuA6, JWA17
Bissett, W. Paul — HMC4, JWA19
Bjoraker, G. L. — FMA5
Blackman, Douglas S. — FTuD2
Blackwell-Whitehead, Richard J. — FTuD2, JWA2
Boone, Chris — FMC2
Borde, Regis — JWA13
Bouffard, François — FMB3
Bousquet, Bruno — FThA5
Bovensmann, Heinrich — HWA4
Brasunas, J. C. — FMA5
Breon, Francois-Marie — JWA12
Brown, Linda R. — FTuD3
Brunner, Renate — HThA7
Buchwitz, M. — HWA4
Budevska, Boiana — FMB4
Buil, Christian — FMC3
Builjtes, Peter — JWA10
Burrows, John P. — HWA4

C
Cadotte, Maxime — FTuB2
Cai, Bin — HWC1
Camy-Peyret, Claude — FMC1, JMA
Canioni, Lionel — FThA5
Cansot, Elodie — FMC3
Cantwell, Gregory W. — FTuA3, FTuA4, FTuA5, FTuA6
Carlson, R. — FMA5
Cenko, Andrew T. — FWA4, FWC3
Chamberland, Martin — FTuB1, FTuB5, JWA8, JWA9
Chance, Kelly — HWA2
Charlebois, Maxime — FWC4
Châteauneuf, François — FWB2
Chavel, P. — FThB3
Chen, Xiaohong — HMC3
Christensen, Philip R. — FMA4
Coudrain, C. — FThB3
Coustenis, A. — FMA5

Coutinho, Ricardo C. — FTuB3
Cox, Caroline — FThB1
Crozet, Patrick — FTuD4
Currie, Douglas G. — FWA4, FWC3
Cymbalista, P. — FThB3

D
Damiani, Cilia — FTuC3
Davies, James E. — HWA3
Davis, Anthony B. — HThA2
Davis, Curtis O. — HMC4
Dawson, Olivia — FThA6
DeMaria, Mark — HThA7
d'Entremont, Robert P. — HTuB2, HThA1
Desbiens, Raphaël — JWA7
Deschamps, J. — FThB3
Deshler, Terry — HThA6
Deuzé, Jean-Luc — HTuA4
Devi, Malathy — FTuD3
Diner, David J. — JWA12
Dobek, Laura — FWA6
Dohlen, Kjetil — FWA2
Dong, Chaohua — HWC1
Drissen, Laurent — FWC4
Drossart, Pierre — FTuC3
Dubois, Patrick — FTuB2, JWA9
Dubovik, Oleg V. — HMB3, HWA, JWA12

E
Eck, Tom F. — JWA12
Ellis, Thomas — FMA2
Elwell, John — FTuA4
Elwell, John D. — FTuA3, FTuA4
Englert, Christoph R. — FTuC2, FThA3
Erives, Hector — JWA20
Erskine, David J. — FWC1

F
Fahlstrom, Carl — FWA6
Farley, Vincent — FTuB1, FTuB5
Farrens, Robert — JWA5
Feltz, W. F. — JWA17
Ferlet, Marc — FWC2
Ferrec, Yann — FThB3
Fienup, James R. — FWA5
Fitzgerald, Glenn J. — JWA20
Flasar, F. M. — FMA5
Fonti, Sergio — FThA2
Fournet, P. — FThB3
Friedl-Vallon, Felix — FTuA, FWB5

G
Gao, Bo-Cai — HThA3
Garg, Maneesha — JWA3
Genest, Jérôme — FMB, FTuB2, JWA6, JWA7, JWA8, JWA9
Gimmedast, Gary — FThB2
Girard, Véronique — JWA5
Glew, Martin D. — HTuD3
Goldberg, Mitchell D. — JMA3, HWA3, HThB1
Gom, B. G.—FWA1
Goudail, F.—FThB3
Goyal, Geetika—JWA3
Grandell, Jochen—JWA13
Grandmont, Frédéric—FWC4
Grasso, Louie—HThA7
Gray, Mark A.—HThB3
Green, Paul D.—FThB1
Greico, Giuseppe—HThB2
Griffiths, Hugh D.—FTuB3
Guelachvili, Guy—FMA, FTuD1, JWA5
Guérineau, Nicolas—FThB3
Gumley, Liam E.—HTuD2

H
Hajian, Arsen R.—FWA4, FWC3
Hamazaki, Takashi—FWB1
Han, Yong—HThA5
Harder, Jerry—HMA2
Harlander, John M.—FTuC2, FWA3, JWA1, FThA3
Harries, John E.—FTuB1
Harris, Walter—FThA6
Hausamann, Dieter—FTuD
Hébert, Philippe—FMC3
Holben, Brent—JWA12
Holz, Robert E.—HTuA2, HTuD2, JWA15
Hong, Gang—HMA3
Huang, Hung-Lung (Allen)—HMA3, JMA1, HMC1, HTuA2, JWA18, HWC2, HThB1
Humpage, Neil—FThB1
Huppi, R.J.—JWA17

I
Inberg, Brandon—FWA6
Irwin, P. J.—FMA5

J
Jacquemet, Mathieu—JWA5
Jaehnig, Kurt P.—JWA1
Jennings, Donald E.—FMA5
Jensen, S. M.—JWA17
Jin, Xin—JWA23
Johnson, Brian R.—JWA21, JWA22
Johnson, David G.—HMA1, FMC4
Johnson, Timothy J.—FMA3
Jones, Hazel—HTuD3
Jucks, Kenneth W.—FMC4

K
Kadiwala, Mubin—JWA19
Kahn, Brian H.—HTuA3, HTuB1
Kahn, Ralph—JWA12
Kampe, Thomas U.—JWA21, JWA16
Kaneko, Yutaka—FWB1
Kataoka, Fumie—FWB4
Kawada, Mitsunobu—FThA1
Kawakami, Shuji—FWB4
Kerber, Florian—JWA4
Kina, Tomoko—FWB4

King, Michael D.—HTuA1, HTuA2, JWA15
Kireev, Stanislav—FThB2
Klonowski, Wojciech M.—HThB3
Knuteson, Robert O.—JMA1, FTuA3, FTuA4, FTuA5, FTuA6, JWA14
Knuth, Kevin H.—FWC3
Kohler, David D. R.—JWA19
Kondragunta, Shobha—HWA1
Kraetschmer, Thilo—FMB2
Kratz, David P.—HMA1
Kretscher, Erik—FTuB5
Kunde, V. G.—FMA5
Kuze, Akihiko—FMC, FWB1, FWB3

L
Labby, Zach—FWA3
Lapyonok, Tatyana—JWA12
Larar, Allen M.—JMA1, HMC2, JWA17, HWB1, HWB2, HThA
Latvakowski, Harri—FMC4
Lawler, James E.—FWA3
Lawson, R. Paul—HTuB2
Lee, Clare—HTuD3
Lee, Yong-Keun—HTuA2, JWA18
Lévesque, Luc—FWB2
Li, Jinlong—JWA23, HThB1
Li, Jun—HMA3, HMC1, JWA23, JWA24, HThB1
Lipton, Alan—HThA1
Liu, Chian-Yi—JWA24, HThB1
Liu, Quanhua—HThA5
Liu, Xu—JMA1, HMC2, JWA17, HWB1, HWB2, FThB2
Liu, Yujie—HWC1
Loeb, Norman G.—HTuC2, HTuD
Loughman, Robert P.—FThA6
Lu, Naimeng—HWC1
Lynch, Mervyn J.—HWB3

M
Mace, Gerald—HTuD4
Maddy, Eric—HWA3
Maestri, Tiziano—HTuD2
Maillard, Jean-Pierre—FTuC3, FWC, FThA4
Majewski, Leon J.—HThB3
Mamoutkine, A. A.—FMA5
Mango, Stephen A.—HMC2, JMA1, HWB2, Manning, Christopher—FTuB
Marshak, Alexander—HMB2
Martonchik, John—JWA12
Masiello, Guido—HThB2
May, Tim—FMA2
McGill, M.—JWA15
McKellar, Robert R.—FMA1
Mehall, Greg L.—FMA4
Meinhold, Michael—JWA11
Menzel, W. Paul—HThB1
Miecznik, Grzegorz—JWA21, JWA22
Mierkiewicz, Edwin J.—JWA1
Miller, Charles E.—FTuD3
Minnis, Patrick—HMB, HWC3
Mitchell, David—HTuB2, HThA1
Mitomi, Yasushi—FWB4
Mlynczak, Martin—FMC4, HMA1, HWC
Moncet, Jean-Luc—HThA1
Montes, Marcos J.—HThA3
Murray, John J.—FThB2
Murray, Jon E.—FThB1

N
Nagtegaele, Patrice—FThA5
Nasiri, Shaima L.—HTuA2, HTuA3
Nassar, Ray—FMC2
Nave, Gillian—JWA2, JWA4
Naylor, David A.—FTuB4, FWA1, FThA
Newman, Stuart M.—HTuD3, HThA4
Niu, Jianguo—HMA3
Nixon, C. A.—FMA5

O
Oelhaf, Hermann—FTuA1, FWB5
Okamoto, Hajime—HTuC1
Olson, Erik—JWA24
Orton, G. S.—FMA5
Otkin, Jason—JWA24

P
Palchetti, Luca—FTuA2
Parol, Frédéric—HTuA4
Pearl, J. C.—FMA5
Perron, Gaétan—FWB2
Pfeilsticker, Klaus—HThA2
Pickering, Juliet C.—FTuD2, JWA2, FTuC, FThB1
Picqué, Nathalie—FTuD1, JWA5
Pilewskie, Peter—HMA2, HTuA, HTuB3
Platnick, Steven—HMA2, HTuA1, HTuA2, HTuB, JWA15
Potvin, Simon—FTuB2, JWA7
Preusse, Peter—FWB5
Primit, J.—FThB3

Q
Quamara, Jitendra K.—JWA3

R
Raj, P.—JWA3
Rao, Ruizhong—HMC3
Rault, Didier F.—HThA6
Redemann, Jens—HMA2
Réess, Jean-Michel—FTuC3
Reininger, Ruben—FMA2
Reisse, Robert A.—FTuA3, FTuA4, FTuA5, FTuA6, JWA17
Revercomb, Henry E.—JMA1, FTuA3, FTuA4, FTuA5, FTuA6, JWA14, JWA17
Reynolds, Ronald J.—JWA1
Richter, Andreas—HWA4
Rider, David M.—JMA4
Riedi, Jérôme—HTuA4
Riese, Martin—FWB5
Rinsland, Curtis—FMC2
Roesler, Frederick L.—FTuC1, FWA3, JWA1
Roger, Jean-Claude—JWA12
Romani, P. N.—FMA5
Rosak, Alain—FMC3
Ross, Amanda J.—FTuD4
Roy, Sebastien—JWA9
Roy, Simon A.—FTuB2, JWA7, JWA8
Rufus, James—FTuD2

S
Sadri, Ilham—JWA11
Sams, Robert L.—FMA3
Sanders, Scott T.—FMB2
Sansonetti, Craig J.—JWA4
Santran, Stéphane—FThA5
Sarger, Laurent—FThA5
Saucier, Philippe—FTuB2, JWA6
Sauer, H.—FThB3
Schapa, Martijn—JWA10
Schaffner, Philip—FThB2
Schmidt, Christopher C.—JWA23
Schmidt, Sebastian—HMA2
Schmit, Timothy J.—JWA23, JWA24, HThB1
Scott, Deron K.—FTuA4
Segura, M. E.—FMA5
Sekio, Nami—FWB4
Selviah, David R.—FTuB3
Sémery, Alain—FTuC3
Serio, Carmine—HThB2
Sharma, Anu—JWA3
Sharpe, Steven W.—FMA3
Shaw, Steven R.—FWA6
Shiomi, Kei—FWB4
Simon-Miller, A. A.—FMA5
Singh, Randhir—JWA3
Sinyuk, Alexander—JWA12
Siskind, David E.—FThA3
Slutsker, Ilya—JWA12
Smillie, Darren—JWA2
Smith, Peter L.—FTuD2, JWA2
Smith, William L.—JMA1, HMC2, FTuA3, FTuA4, FTuA5, FTuA6, HWB1, JWA17, FThB2, HWB2
Smithson, Tracy—FThB4
Sohn, B. J.—HThB3
Soucy, Marc-André—FWB2
Spangler, Lee H.—FWA6
Spencer, Locke D.—FTuB4
Stark, Glenn—FTuD2
Stevens, Michael H.—FThA3
Steward, Robert G.—JWA19
Stuhlmann, Rolf—JWA13
Susskind, Joel—HMC5
Sussmann, Ralf—FTuC4
Suto, Hiroshi—FWB1, FWB4
Swinyard, Bruce M.—FWA, FWB2

T
Taboury, Jean—FThB3
Talbot, Frédéric—FTuB2, JWA6
Tanii, Jun—FWB2
Tanré, Didier—HTuA4
Tansock, Joe—FTuA4, FTuA5, FTuA6, JWA17
Taurand, Geneviève—FTuB2
Tayahi, Moncef B.—JWA11
Taylor, Joe K.—FTuA3, FTuA4, FTuA5, FTuA6
Taylor, Jonathan P.—HTuD3
Teare, Scott—JWA20
Thériault, Jean-Marc—FMB3
Thètis, S.—FThB3
Thorne, Anne P.—FTuD2, JWA2
Thurman, Samuel T.—FWA5
Timmermans, Renske—JWA10
Tjemkes, Stephen—JWA10, JWA13
Tobin, David C.—FTuA3, FTuA4, FTuA5, FTuA6, JWA14
Tomosada, Mitsuhiro—FWB3
Toth, Robert A.—FTuD3
Traub, Wes—FMC4
Tremblay, Pierre—FTuB2, FTuB5, JWA6
Tsubaki, Hiroe—FWB3
Turner, David D.—FTuA5

**U**
Uymin, Gennady—HThA1

**V**
Vallières, Alexandre—FTuB1
Vallon, Raphaël—FTuD4
van Delst, Paul—HThA5
van der Weide, Daniel—FMB1
Vermote, Eric F.—JWA12
Villemaire, André—FTuB1
Vinatier, S.—FMA5

**W**
Wang, Yingjian—HMC3
Watson, Mike—FMC4
Wei, Heli—HMC3
Weisz, Elisabeth—HMC1, JWA24, HThB1
Wellard, Stan—FMC4
Wendisch, Manfred—HMA, HMA2, HTuB3
Weng, Fuzhong—HTuC3, HThA5, HThB
West, Leanne—FThB2
Wielicki, Bruce A.—HTuC2
Wind, Gala—JWA15
Winker, David—HTuC, HTuD1
Wishnow, E. H.—FMA5

**X**
Xiong, Xiaozhen—HWA3

**Y**
Yang, Jun—HWC1
Yang, Ping—HMA2, HMA3, HMC3, HTuA2, HTuB3,
JWA15, JWA18
Yang, Zhongdong—HWC1
Yokota, Tatsuya—FWB3
Yoshida, Mayumi—FWB4

**Z**
Zhang, Zhibo—HMA3
Zhou, Daniel K.—HMC, HMC2, JMA1, FTuA3, FTuA4, FTuA5,
FTuA6, HWB1, HWB2, JWA17
Zollinger, L. J.—JWA17