XXII International Conference
on Raman Spectroscopy

FULL SCIENTIFIC PROGRAM
Sunday, August 8 - Friday, August 13, 2010
Boston Park Plaza Hotel, Boston, MA

SUNDAY, AUGUST 8

2:00 - 8:00 pm	Registration, *Mezzanine Foyer*
6:00 - 8:00 pm	Welcome Reception, *Plaza Ballroom (mezzanine)*

MONDAY, AUGUST 9

PLENARY SESSION (MOP), **MONDAY 8:30 - 10:00 AM,** *Imperial Ballroom (mezzanine)*
Presiding: Paul Champion, *Northeastern University* and Larry Ziegler, *Boston University*
SPONSORED BY COHERENT, INC.

MOP 8:30 - 9:15 am	**Keynote Speaker: Co-evolution of Lasers and Raman Spectroscopy: A Personal Account**; Thomas Spiro; *University of Washington, Seattle, WA*
MOP 9:15 - 10:00 am	**Femtosecond Stimulated Raman Spectroscopy**; Richard Mathies; *University of California, Berkeley, Berkeley, CA*

10:00 - 10:30 AM
Coffee Break, *Statler Room and Georgian-Arlington-Berkeley Room*

Parallel Session, MONDAY 10:30 AM - 12:30 PM
COHERENT RAMAN I (MOA), *Imperial Ballroom (mezzanine),* Sponsored by **Coherent Inc.**
Presiding: Richard Mathies, *University of California, Berkeley*

MOA 10:30 - 11:00 am	**Applications of Raman Scattering in Quantum Technologies**; K. F. Reim[1]; P. Bustard[1]; K. C. Lee[1]; J. Nunn[1]; V. O. Lorenz[2]; B. J. Sussman[3]; N. K. Langford[1]; D. K. Jaksch[1]; I. A. Walmsley[1]; *[1]University of Oxford, Oxford, UK; [2]University of Delaware, Newark, DE; [3]National Research Council, Ottawa, Canada*
MOA 11:00 - 11:30 am	**Photoinduced Structural Dynamics of 4-(Dimethylamino)benzonitrile (DMABN) Probed with Femtosecond Stimulated Raman Spectroscopy (FSRS)**; Justin Rhinehart; Randy Mehlenbacher; David McCamant; *University of Rochester, Rochester, NY*
MOA 11:30 - 11:50 am	**Femtosecond Stimulated Raman Spectroscopy: Theory and Experiments**; Soo-Ying Lee[1]; Kai Niu[1]; Bin Zhao[1]; Zhigang Sun[2]; *[1]School of Physical & Mathematical Sciences, Singapore, Singapore; [2]Department of Chemistry, Duke University, Durham, NC*
MOA 11:50 am - 12:10 pm	**Femtosecond Time-Resolved Observation of Hot Vibrational States in Carotenoides**; Vinu Namboodiri; Mahesh Namboodiri; Günter Flachenecker; Arnulf Materny; *Jacobs University Bremen, Bremen, Germany*
MOA 12:10 - 12:30 pm	**Spectral Interferences in Femtosecond Stimulated Raman Microscopy**; Benjamin Marx[1, 2]; Evelyn Ploetz[1, 2]; Peter Gilch[1, 2]; *[1]Ludwig-Maximilians-Universität München (LMU), München, Germany; [2]Heinrich-Heine-Universität Düsseldorf (HHU), Düsseldorf, Germany*

Parallel Session, MONDAY 10:30 AM - 12:30 PM
RESONANCE RAMAN OF BIOLOGICAL SYSTEMS I (MOB), *Plaza Ballroom (mezzanine)*
Presiding: Jim Kincaid, *Marquette University*

MOB 10:30 - 11:00 am **Modulation of the Conformation of Cytochrome c Oxidase from Paracoccus Denitrificans by Active-Site Mutations**; Denis Rousseau[1]; Hong Ji[1]; Tsuyoshi Egawa[1]; Tapan Das[1]; Anne Puustinen[2]; Marten Wikstrom[2]; Syun-Ru Yeh[1]; *[1]Albert Einstein College, Bronx, NY; [2]University of Helsinki, Helsinki, Finland*

MOB 11:00 - 11:30 am **High Protein Structural Flexibility of a Truncated Hemoglobin from an Antarctic Cold-Adapted Bacterium**; Barry D. Howes[1]; Daniela Giordano[3]; Leonardo Boechi[2]; Simona Mucciacciaro[1]; Maria Fittipaldi[1]; Darío A. Estrin[2]; Massimo Coletta[4]; Cinzia Verde[3]; Giulietta Smulevich[1]; *[1]Università di Firenze, Sesto F.No (Fi), Italy; [2]Universidad de Buenos Aires, Buenos Aires, Argentina; [3]CNR, Naples, Italy; [4]Università di Roma Tor Vergata, Rome, Italy*

MOB 11:30 - 11:50 am **Evaluation of Inter-Subunit Interactions in Half-Ligated Human Adult Hemoglobin Based on the Single Residue UVRR Spectra**; Teizo Kitagawa[1]; Shigenori Nagatomo[2]; Masako Nagai[3]; *[1]University of Hyogo, Ako, Japan; [2]University of Tsukuba, Tsukuba, Japan; [3]Hosei University, Koganei, Japan*

MOB 11:50 am-12:10 pm **Purines as Interrogators of Local Environment in Proteins and DNA**; Sayan Mondal; Spriha Gogia; Namrata Jayanth; Mrinalini Puranik; *National Centre for Biological Sciences, Bangalore, India*

MOB 12:10 - 12:30 pm **UV Resonance Raman-Derived Initial Excited-State Structural Dynamics of Nucleobases, Nucleosides and Dinucleotides**; Glen Loppnow; *University of Alberta, Edmonton, Canada*

Parallel Session, MONDAY 10:30 AM - 12:30 PM
SOLID STATE, SEMICONDUCTORS AND NANOPARTICLES I (MOC), *White Hill Room (4th floor)*
Presiding: A. K. Ramdas, *Purdue University*

MOC 10:30 - 11:00 am **Raman Spectroscopy and Translation Symmetry of Nanocrystalline Structures**; Shu-Lin Zhang; *Peking University, Beijing, China*

MOC 11:00 - 11:30 am **Raman Scattering from Industrially Prepared Nanometer Sized Particles of Monoclinic and Cubic Phases of Yttrium Europium Oxide Phosphors**; Robert Withnall[1]; Terry Ireland[1]; Jack Silver[1]; George Fern[1]; Alastair Godfrey[2]; Paul Reip[2]; *[1]Brunel University, Uxbridge, UK; [2]Intrinsiq Materials, Farnborough, UK*

MOC 11:30 - 11:50 am **Semiconductor Nanoparticles for Photovoltaics**; Justin Habinshuti[1, 2]; Sylvia Turrell[1]; Christophe Kinowski[3]; Didier Stievenard[2]; Tao Xu[2]; Bruno Grandidier[2]; Odile Cristini[3]; *[1]LASIR, Villeneuve D'ascq, France; [2]IEMN, Departement ISEN, 41 Bd Vauban, Lille, France; [3]PhLAM, Université de Lille 1, Villeneuve d'Ascq, France*

MOC 11:50 am-12:10 pm **Enhanced Raman Scattering of Silicon Nanowires by Ag Nanoparticles *in situ* Decoration**; Zeping Peng[1]; Hailong Hu[1]; Shijie Wang[2]; Zexiang Shen[1]; Qihua Xiong[1]; *[1]Nanyang Technological University, Singapore, Singapore; [2]Institute of Materials Research and Engineering, Singapore, Singapore*

MOC 12:10 - 12:30 pm **Raman Spectroscopy for Demonstrating the Sub-Wavelength Light Transmission**; Chang Chen[1]; Ronald Kox[1]; Francesca Clemente[1]; Liesbet Lagae[1]; Guido Maes[2]; Gustaaf Borghs[1]; Pol Van Dorpe[1]; *[1]Imec VZW, Leuven, Belgium; [2]Katholieke Universiteit Leuven, Leuven, Belgium*

12:30 - 2:00 PM
Lunch-on-your-own

MONDAY 2:00 - 4:00 PM, POSTER SESSION
Set up posters 8:00 - 8:30 am and remove by 8:00 pm. Refer to poster number in this program.
See page 60.

Georgian, Arlington, Berkeley, Clarendon Rooms, Posters 001-116

Carbon Based Materials (Nanotubes, Graphene, Carbon Nanostructures), 001 - 012
Coherent Raman (CARS, FSRS, Time-Domain Raman etc), 013 - 029
Inorganic/Organic/Organometallic Compounds, 030 -047
Molecular Biophysics and Photobiology, 048 - 063
Molecular Electronics and Polymers, 064 - 082
Resonance Raman in Biological and Chemical Systems, 083 - 110
SERS (Substrate Development, Single Molecule, Theory), 111 - 116

Statler Room, Posters 117-160

SERS (Substrate Development, Single Molecule, Theory) continued, 117 - 134
Solid State, Semiconductors and Nanoparticles, 135 - 152
Time Resolved Raman, 153 - 160

Parallel Session, MONDAY 4:00 - 6:10 PM
SERS (SUBSTRATES, SINGLE MOLECULE AND THEORY) I (MOE), *Imperial Ballroom (mezzanine)*
Presiding: Zhong-Qun Tian, *Xiamen University*

MOE 4:00 - 4:30 pm **Single Molecule and Single Particle SERS**; Richard Van Duyne; *Northwestern University, Evanston, IL*

MOE 4:30 - 5:00 pm **Single-Molecule Raman Spectroscopy: A Probe of Charge Transfer and Plasmonic Fields**; Gilad Haran; *Weizmann Insitute, Rehovot, Israel*

MOE 5:00 - 5:30 pm **Blinking SERS from Single Ag Nanoaggregates with Various LSPR Wavelengths**; Yukihiro Ozaki[1]; Yasutaka Kitahama[1]; Yuhei Tanaka[1]; Tamitake Itoh[2]; *[1]Kwansei Gakuin University, Japan; [2]Health Technology Research Center, AIST, Japan*

MOE 5:30 - 5:50 pm **A Unified Theory of Surface Enhanced Raman Scattering**; John Lombardi; *City College of New York, New York, NY*

MOE 5:50 - 6:10 pm **Nanoantenna Effect of SERS: Managing Light with Plasmons in the Nanometer Scale**; Hongxing Xu; *Institute of Physics, Chinese Academy of Science, Beijing, China*

Parallel Session, MONDAY 4:00 - 6:10 PM
CARBON-BASED MATERIALS I (MOF), *Plaza Ballroom (mezzanine)*
Presiding: Bennett Goldberg, *Boston University*

MOF 4:00 - 4:30 pm **Raman Spectroscopy of Carbon Nanotubes**; Federico Villalpando; Gene Dresselhaus; Mildred Dresselhaus; *Massachusetts Institute of Technology, Cambridge, MA*

MOF 4:30 - 5:00 pm **Resonance Raman Spectroscopy in Carbon Nanostructures**; Marcos Pimenta; *Federal University of Minas Gerais, Belo Horizonte/Mg, Brazil*

MOF 5:00 - 5:30 pm **Raman Spectroscopy of Carbon Nanostructures**; Janina Maultzsch; *Technische Universitaet Berlin, Berlin, Germany*

MOF 5:30 - 5:50 pm **Diameter Dependence of Dielectric Constant for the Excitonic Transition Energy of Single-Wall Carbon Nanotubes**; Paulo Araujo[1]; Ado Jorio[1]; Mildred Dresselhaus[4]; Kentaro Sato[2]; Richiiro Saito[3]; *[1]Universidade Federal de Minas Gerais - UFMG, Belo Horizonte, Brazil; [2]The University of Tokyo, Tokyo, Japan; [3]Tohoku University, Senday, Japan; [4]Massachusetts Institute of Technology - MIT, Boston, MA*

MOF 5:50 - 6:10 pm **Resonant Raman Spectroscopy of Chirality-Enriched Semiconducting Single Walled Carbon Nanotubes**; Juan G. Duque[1]; Hang Chen[2]; Svetlana Kilina[1]; Sergei Tretiak[1]; Andy Shreve[1]; Xiaomin Tu[3]; Ming Zheng[3]; Anna Swan[2]; Stephen K. Doorn[1]; *[1]Los Alamos National Laboratory, Los Alamos, NM; [2]Boston University, Boston, MA; [3]National Institute of Standards and Technology, Gaithersburg, MD*

Parallel Session, MONDAY 4:00 - 6:10 PM
TIME RESOLVED RAMAN (MOG), *White Hill Room (4th floor)*
Presiding: Tahei Tahara, *RIKEN*

MOG 4:00 - 4:30 pm	**Primary Protein Responses to Chromophore Isomerization of Photosensary Proteins**; Yasuhisa Mizutani; Misao Mizuno; *Osaka University, Toyonaka, Osaka, Japan*
MOG 4:30 - 5:00 pm	**New Attempts with Raman Spectroscopy for Examining Macromolecules and Lipid Bilayer Membranes**; Koichi Iwata; *Gakushuin University, Toshima, Tokyo, Japan*
MOG 5:00 - 5:30 pm	**The ULTRA Laser System - For Time-Resolved Spectroscopy**; Anthony Parker; *Central Laser Facility, Didcot, UK*
MOG 5:30 - 5:50 pm	**Singlet Fission and Triplet Dynamics in Carotenoid Aggregates Probed with Picosecond Resonance Raman Spectroscopy**; Michael Tauber; Chen Wang; *University of California, San Diego, La Jolla, CA*
MOG 5:50 - 6:10 pm	**The Vibrational Pumping Mechanism in Surface Enhanced Raman Scattering – A Sub Picosecond Time Resolved Study**; Wolfgang Werncke; Valeri Kozich; *Max-Born-Institut, Berlin, Germany*

MONDAY 6:30 - 10:30 PM
Fenway Park Tour and Barbeque Buffet (cash bar)
All registrants are welcome to join this event at the home of the Boston Red Sox!
Ticket required (included with all conference registrations).
Shuttle buses will begin at 6:15 pm from hotel's Valet parking entrance (Columbus St).
Walking and public transit instructions are available at conference registration desk.

PLENARY SESSION I (TOP1), **TUESDAY 8:30 - 10:00 AM,** *Imperial Ballroom (mezzanine)*
Presiding: Ian Walmsley, *University of Oxford*
SPONSORED BY JASCO, INC.

TOP1 8:30 - 9:15 am **Attosecond High Harmonic Spectroscopy to Observe Molecular Motion**; David Villeneuve; *National Research Council, Ottawa, Canada*

TOP1 9:15 - 10:00 am **Transforming SERS into a Dependable Platform for Ultra-Sensitive Molecular Sensing**; Martin Moskovits[1, 3]; Seungjoon Lee[2]; Brian Piorek[2]; Gary Braun[1, 3]; Xuegong Deng[3]; Carl Meinhart[1, 2]; Norbert Reich[1]; Thomas Tombler[3]; *[1]University of California, Santa Barbara, Santa Barbara, CA; [2]Spectra Fluidics, Inc., Goleta, CA; [3]API Technologies, Somerset, NJ*

10:00 - 10:30 AM
Coffee Break, *Statler Room and Georgian-Arlington-Berkeley Room*

Parallel Session, TUESDAY10:30 AM - 12:30 PM
SERS APPLICATIONS I (TOA), *Imperial Ballroom (mezzanine)*
Presiding: Richard Van Duyne, *Northwestern University*

TOA 10:30 - 11:00 am **Coherence-Based Nanoplasmonics for Chemical and Biomolecular Detection and Spectroscopy**; Britt Lassiter; Lisa Brown; Aoune Barhoumi; Heidar Sobhani Khaktesar; Peter Nordlander; Naomi J. Halas; *Rice University, Houston, TX*

TOA 11:00 - 11:30 am **DNA Sequence Detection Using Surface Enhanced Resonance Raman Spectroscopy (SERRS) in a Homogeneous Multiplexed Assay**; Karen Faulds; Douglas MacRae; Jennifer Dougan ; Duncan Graham; Alexandra MacAskill MacAskill; *University of Strathclyde, Glasgow, UK*

TOA 11:30 - 11:50 am **Surface Enhanced Non-Linear Spectroscopy: Wavelength Scanned Hyper-Raman**; Jon Camden; *University of Tennessee, Knoxville, TN*

TOA 11:50 am - 12:10 pm **Surface-Enhanced Raman Scattering of Microorganisms**; Mustafa Culha; *Yeditepe University, Istanbul, Turkey*

TOA 12:10 - 12:30 pm **Surface Enhancement in Femtosecond Stimulated Raman Scattering**; Evelyn Ploetz[1, 3]; Madalena Gellner[2]; Max Schütz[2]; Benjamin Marx[1, 3]; Sebastian Schlücker[2]; Peter Gilch[1, 3]; *[1]Ludwig-Maximilians-Universität München (LMU), München, Germany; [2]Universität Osnabrück, Osnabrück, Germany; [3]Heinrich-Heine-Universität Düsseldorf (HHU), Düsseldorf, Germany*

Parallel Session, TUESDAY 10:30 AM - 12:30 PM
RAMAN IMAGING I (TOB), *Plaza Ballroom (Mezzanine)*
Presiding: Sunney Xie, *Harvard University*
SPONSORED BY WITEC INSTRUMENTS CORP.

TOB 10:30 - 11:00 am **Vibrational Phase Contrast CARS Imaging**; Herman Offerhaus; *University of Twente, Enschede, Netherlands*

TOB 11:00 - 11:30 am **CARS Molecular Fingerprinting Using a White-Light Laser Source**; Hideaki Kano; Masanari Okuno; Hiro-o Hamaguchi; *The University of Tokyo, Tokyo, Japan*

TOB 11:30 am - 12:00 pm **Quantitative CARS for Chemistry in Confinement**; Katrin Domke[1]; Marianne H.F. Kox[2]; James Day[1]; Gianluca Rago[1]; Alex Riemer[1]; Eli Stavitski[2]; Bert M. Weckhuysen[2]; Mischa Bonn[1]; *[1]FOM-Institute AMOLF, Amsterdam, Netherlands; [2]Utrecht University, Debye Institute, Utrecht, Netherlands*

TOB 12:00 - 12:30 pm **Broadband Stimulated Raman Microscopy**; Evelyn Ploetz; Benjamin Marx; Peter Gilch; *Institut für Physikalische Chemie, HHU Düsseldorf, Düsseldorf, Germany*

Parallel Session, TUESDAY 10:30 AM - 12:30 PM
RAMAN OPTICAL ACTIVITY (TOC), *White Hill Room (4th floor)*
Presiding: Sandy Asher, *University of Pittsburgh*
SPONSORED BY BIOTOOLS, INC.

TOC 10:30 - 11:00 am **Resonance Raman Optical Activity: Past, Present and Future**; Laurence Nafie; *Syracuse University, Syracuse, NY*

TOC 11:00 - 11:30 am **Raman and ROA Studies of Glycosaminoglycan Structure**; Ewan Blanch; *University of Manchester, Manchester, UK*

TOC 11:30 - 11:50 am **Raman Optical Activity Study of Signatures Associated to $(TG)_N$ and $(GG)_N$ Conformations of Isotactic Polypropylene Chains Using Mode Localization Method**; Vincent Liegeois[1]; Christoph R. Jacob[2]; Benoit Champagne[1]; Markus Reiher[2]; *[1]FUNDP, Laboratoire de Chimie Théorique, Namur, Belgium; [2]ETH Zurich, Laboratorium fur Physikalische Chemie, Zurich, Switzerland*

TOC 11:50 am - 12:10 pm **Exploring the Active Site Structure of Photoreceptor Proteins by Raman Optical Activity**; Masashi Unno[1, 2]; Takahito Shingae[1]; Takashi Kikukawa[3]; Naoki Kamo[4]; *[1]Saga University, Saga, Japan; [2]JST, Kawaguchi, Japan; [3]Hokkaido University, Sapporo , Japan; [4]Matsuyama University, Matsuyama , Japan*

TOC 12:10 - 12:30 pm **Raman Optical Activity of Biomacromolecules: Structural Analysis of Sugar Moieties in Glycoproteins**; Christian Johannessen[1]; Robert Pendrill[2]; Lutz Hecht[1]; Göran Widmalm[2]; Laurence D. Barron[1]; *[1]University of Glasgow, Glasgow, UK; [2]Stockholm University, Stockholm, Sweden*

Parallel Session, TUESDAY 10:30 AM - 12:30 PM
ATTOSECOND / X-RAY AND RAMAN (TOD), *Terrace Room (lower lobby)*
Presiding: Tim Sage, *Northeastern University*

TOD 10:30 - 11:00 am **The Effective Fine Structure Constant of Graphene, Measured with Inelastic X-Ray Scattering**; Peter Abbamonte; *University of Illinois at Urbana-Champaign, Urbana, IL*

TOD 11:00 - 11:30 am **Molecular Dynamics Probed by Ultrafast Coherent X-Rays**; Margaret Murnane; Henry Kapteyn; *University of Colorado, Boulder, CO*

TOD 11:30 am - 12:00 pm **Stimulated Raman Spectroscopy with Femtosecond Optical or Attosecond X-Ray Pulses**; Shaul Mukamel; Saar Rahav; Haitao Wang; *UC Irvine, Irvine, CA*

TOD 12:00 - 12:30 pm **Raman Probes of Molecules at Extreme Pressures and Temperatures**; Russell Hemley; Timothy Strobel; Maddury Somayazulu; Alexander Goncharov; Natarajan Subramanian; Yue Meng; Ho-kwang Mao; *Geophysical Lab., Carnegie Inst. of Washington, Washington, DC*

12:30 - 2:00 PM
Lunch-on-your-own

PLENARY SESSION II (TOP2), **TUESDAY 2:00 - 3:30 PM,** *Imperial Ballroom (mezzanine)*
Presiding: Dana Dlott, *University of Illinois at Urbana-Champaign*

TOP2 2:00 - 2:45 pm **Oil on Water: Calming the Seas but Not the Science**; Geri Richmond; *University of Oregon, Eugene, OR*

TOP2 2:45 - 3:30 pm **Single Molecule Surface- and Tip-Enhanced Raman Spectroscopy**; Bruno Pettinger; Nicola R. Scott; Philip Schambach; *Fritz Haber Institute, Berlin, Germany*

3:30 - 4:00 PM
Coffee Break, *Statler Room and Georgian-Arlington-Berkeley Room*

Parallel Session, TUESDAY 4:00 - 6:00 PM
BIOMEDICAL APPLICATIONS (TOE), *Imperial Ballroom (mezzanine)*
In Tribute to Michael Feld
Presiding: Ramachandra Dasari, *MIT*

TOE 4:00 -4:30 pm **Non-Invasive and Minimally Invasive Raman Spectroscopic Diagnostics for Musculoskeletal Tissue Disorders**; Michael D. Morris; *University of Michigan, Ann Arbor, MI*

TOE 4:30 - 5:00 pm **Raman Spectroscopic Characterization of Single Cells**; Juergen Popp[1, 2]; Benjamin Dietzek[1, 2]; Michael Schmitt[1]; Christoph Krafft[2]; Robert Moeller[1, 2]; Petra Roesch[1]; *[1]Friedrich-Schiller University, Jena, Germany; [2]Institute of Photonic Technology, Jena, Germany*

TOE 5:00 - 5:20 pm **Noninvasive, *in-vivo*, Tissue Modulated Near Infrared Spectroscopy of Fingertips: Resonance Raman Spectrum of Human Hemoglobin**; Joseph Chaiken[1]; Jerry Goodisman[1]; Bin Deng[1]; Rebecca Bussjager[2]; George Shaheen[2]; *[1]Syracuse University, Syracuse, NY; [2]LighTouch Medical, Inc, Syracuse, NY*

TOE 5:20 - 5:40 pm **Raman Spectroscopy for Biomedical Diagnosis**; Pradeep Gupta; Shovan Majumder; Raktim Dasgupta; *Raja Ramanna Centre for Advanced Technology, Indore, India*

TOE 5:40 - 6:00 pm **Development of a Polarized Raman Spectroscopic Probe for Caries Assessment**; Lin-P'ing Choo-Smith[1]; Eric Marple[2]; Mark Hewko[1]; *[1]National Research Council Canada, Winnipeg, Canada; [2]Emvision LLC, Loxahatchee, FL*

Parallel Session, TUESDAY 4:00 - 6:10 PM
ART AND ARCHEOLOGY I (TOF), *Plaza Ballroom (Mezzanine)*
Presiding: Karen Trentelman, *Getty Conservation Institute*
SPONSORED BY BRUKER

TOF 4:00 - 4:30 pm **Microanalytical and Non-Destructive Approaches for the Investigation of Works of Art by Surface-Enhanced Raman Spectroscopy (SERS)**; Marco Leona[1]; John Lombardi[2]; *[1]Metropolitan Museum of Art, New York, NY; [2]City University of New York, New York, NY*

TOF 4:30 - 5:00 pm **Surface Enhanced Raman Spectroscopy: A Minimally Invasive Tool to Assist in Authentication and Interpretation of Works of Art on Paper**; Francesca Casadio[1]; Christa Brosseau[2]; Richard P. Van Duyne[3]; *[1]Art Institute of Chicago, Chicago, IL; [2]Saint Mary's University, Halifax, Nova Scotia, Canada; [3]Northwestern University, Evanston, IL*

TOF 5:00 - 5:30 pm **SERS of Insoluble Synthetic Organic Pigments Employing Calixarenes as Dispersive Cavitands: Application to Quinacridone Quinone**; Concepcion Domingo; Elena del Puerto; Santiago Sánchez-Cortés; José V. García-Ramos; *Instituto de Estructura de la Materia, CSIC, Madrid, Spain*

TOF 5:30 - 5:50 pm **Raman Microscopy and the Identification of Pigments in Archaeological Artefacts**; Robin Clark; *University College London, UK*

TOF 5:50 - 6:10 pm **Micro-Raman Mapping on Conservation Science: First Results in Critical Issues**; Claudia Conti[1]; Chiara Colombo[1]; Mauro Matteini[3]; Marco Realini[1]; Giuseppe Zerbi[2]; *[1]CNR, Ist. per la Conserv. e la Valoriz. Beni Cult., Milano, Italy; [2]Politecnico di Milano, Milano, Italy; [3]Alma Mater Studiorum - Università di Bologna, Bologna, Italy*

Parallel Session, TUESDAY 4:00 - 6:00 PM
SUM FREQUENCY / INTERFACES (TOG), *White Hill Room (4th floor)*
Presiding: Geri Richmond, *University of Oregon*

TOG 4:00 - 4:30 pm **Detection of Molecular Complexes and Direct Determination of Intermolecular Interaction Geometries by a Hybrid Raman-Infrared Multidimensional Coherent Spectroscopy**; David Klug[1]; Guo Rui[1]; Elizabeth Gardner[1]; Margherita Miele[1]; Gould Ian[1]; Fournier Frederic[1]; Keith Willison[2]; *[1]Imperial College, London, UK; [2]Institute of Cancer Research, London, UK*

TOG 4:30 - 5:00 pm **Vibrational Coupling and Hydrogen Bonding at the Air/Water Interface**; Alexander Benderskii; *University of Southern California, Los Angeles, CA*

TOG 5:00 - 5:20 pm **Interfacial Proteins and Peptides Studied Using Sum Frequency Generation Vibrational Spectroscopy**; Zhan Chen; *University of Michigan, Ann Arbor, MI*

TOG 5:20 - 5:40 pm **Creation and Relaxation of Phospholipid Compositional Asymmetry in Lipid Bilayers Examined by Sum-Frequency Vibrational Spectroscopy**; Timothy Anglin; Krystal Brown; John Conboy; *University of Utah, Salt Lake City, UT*

TOG 5:40 - 6:00 pm **AFM-Raman Imaging and Raman Spectral Fluctuation Analysis of Single-Molecule Interfacial Electron Transfer Dynamics**; H Peter Lu; *Bowling Green State University, Bowling Green, OH*

Parallel Session, TUESDAY 4:00 - 6:10 PM
TIP-ENHANCED AND NEAR-FIELD RAMAN I (TOH), *Terrace Room (lower lobby)*
Presiding: Mischa Bonn, *FOM-Institute AMOLF*
SPONSORED BY NANONICS IMAGING LTD.

TOH 4:00 - 4:30 pm **Probe and Instrument Development for Tip Enhanced Raman Scattering & Shadow Near-Field Scanning Optical Microscopy**; Aaron Lewis; *The Hebrew University of Jerusalem, Jerusalem, Israel*

TOH 4:30 - 5:00 pm **Near-Field Raman Microscopy and Spectroscopy of Carbon Nanotubes**; Lukas Novotny[1]; Gustavo Cancado[2]; Ado Jorio[2]; Achim Hartschuh[3]; *[1]University of Rochester, Rochester, NY; [2]Universidade Federal de Minas Gerais, Belo Horizonte, Brazil; [3]Ludwig-Maximilians-Universitat Muenchen, Muenchen, Germany*

TOH 5:00 - 5:30 pm **Tip-Pressurized Near-Field Raman Microscopy: A Breakthrough towards Molecular Resolution**; Satoshi Kawata; Prabhat Verma; Takaaki Yano; *Osaka University, Toyonaka, Osaka, Japan*

TOH 5:30 - 5:50 pm **Raman Spectroscopy of Single Semiconductor Nanowires: From Confocal Microscopy to TERS**; François Lagugné-Labarthet[1]; David Talaga[2]; *[1]University of Western Ontario, London, Canada; [2]Université Bordeaux 1, Talence, France*

TOH 5:50 - 6:10 pm **Near-Field CARS with Micro- and Nano-Particle;** Raymond Ooi; *University of Malaya, Kuala Lumpur, Malaysia*

TUESDAY 6:15 - 8:15 PM, POSTER SESSION
Set up posters 8:00 - 8:30 am and remove by 8:00 pm. Refer to poster number in this program.
See page 85.

Georgian, Arlington, Berkeley, Clarendon Rooms, Posters 001-116

Art, Archaeology and Astrobiology, 001 - 011
Biomedical Applications, 012 - 054
Industrial Applications, 055 -072
Pharmaceutical Applications, 073 - 081
Raman at Interfaces, 082 - 089
Raman Instrumentation, 090 - 114
Raman Optical Activity, 115 - 116

Statler Room, Posters 117-162

Raman Optical Activity, *continued*, 117 - 124
SERS Applications, 125 - 148
Sum Frequency Generation/Combined IR-Raman, 149 - 153
Tip-Enhanced and Near-Field Raman, 154 - 162

PLENARY SESSION (WOP), **WEDNESDAY 8:30 - 10:00 AM,** *Imperial Ballroom (mezzanine)*
Imperial Ballroom (mezzanine)
Presiding: Anthony Parker, *Central Laser Facility, Rutherford Appleton Laboratory*

WOP 8:30 - 9:15 am **Ultrafast Raman Spectroscopy of Vibrational Energy in Molecules with High Time and Space Resolution**; Jeffrey A. Carter; Christopher M. Berg; Brandt C. Pein; Nak-Hyun Seong; Dana D. Dlott; *University of Illinois at Urbana-Champaign, Urbana, IL, USA*

WOP 9:15 - 10:00 am **Spatially Offset Raman Spectroscopy - Emerging Concepts and Applications**; Pavel Matousek; *Rutherford Appleton Laboratory, Oxfordshire, UK*

10:00 - 10:30 AM
Coffee Break, *Statler Room and Georgian-Arlington-Berkeley Room*

Parallel Session, WEDNESDAY 10:30 AM - 12:40 PM
COHERENT RAMAN II (WOA), *Imperial Ballroom (mezzanine)*
Presiding: Wolfgang Kiefer

WOA 10:30 - 11:00 am **Real-Time Detection of Bacterial Spores and Food Contaminants Using Coherent Anti-Stokes Raman Spectroscopy**; Marlan Scully[2]; P. Cremer[1]; P. Hemmer[1]; R. Nevels[1]; T. Phillips[1]; S. Scully[1]; T. Siebert[1]; A. Sokolov[1]; A. Traverso[1]; G.R. Welch[1]; K. Wang[1]; X. Wang[1]; H. Xia[2]; W. Yang[1]; *[1]Texas A&M University, College Park, TX; [2]Princeton University, Princeton, NJ*

WOA 11:00 - 11:30 am **Nonlinear Raman Spectroscopy with Shaped Femtosecond Laser Pulses**; Marcus Motzkus; *Universität Heidelberg, Heidelberg, Germany*

WOA 11:30 am-12:00 pm **Pulse Shaping Strategies for Single-Beam CARS**; Paul Wrzesinski[1]; Vadim Lozovoy[1]; Dmitry Pestov[1]; Sukesh Roy[3]; Marcos Dantus[1]; James Gord[2]; *[1]Department of Chemistry, East Lansing, MI; [2]Propulsion Directorate, Air Force Research Labs, Wright Patterson AFB, OH; [3]Spectral Energies LLC, Dayton , OH*

WOA 12:00 - 12:20 pm **Interferometric Coherent Raman Micro-Spectroscopy with a Low Coherence Supercontinuum Source**; Bradley Littleton; *King's College London, London, UK*

WOA 12:20 - 12:40 pm **Adiabatic Optimal Control of CARS Coherence**; Vladimir Malinovsky; *Stevens Institute of Technology, Hoboken, NJ*

Parallel Session, WEDNESDAY 10:30 AM - 12:40 PM
RESONANCE RAMAN IN BIOLOGICAL SYSTEMS II (WOB), *Plaza Ballroom (mezzanine)*
Presiding: Thomas Spiro, *University of Washington*

WOB 10:30 - 11:00 am **UV Resonance Raman Investigations of Peptide/Protein Conformation and Folding**; Sandy Asher; Bhavya Sharma; Lu Ma; Sergei Bykov; Nataliya Myshakina; Zhenmin Hong; Kan Xiong; *University of Pittsburgh, Pittsburgh, PA*

WOB 11:00 - 11:30 am **Tryptophan Residues as Membrane Protein Anchors**; Judy Kim; Diana Schlamadingerd; Hannah Shafaat; Katie Sanchez; Jonathan Gable; *UC San Diego, La Jolla, CA*

WOB 11:30 am- 12:00 pm **Amyloid Fibrils are "Alive" as Evident from Deep UV Raman Spectroscopic Examination: An Instrumentation Driven Discovery**; Igor Lednev; William Lauro; Dmitry Kurouski; *SUNY at Albany, Albany, NY*

WOB 12:00 - 12:20 pm **Resonance Raman Spectroscopy of Helical Porphyrin Nanotubes: Hierarchal Structure and Exciton Coupling**; Benjamin Friesen; Christopher Rich; Ursula Mazur; Jeanne McHale; *Washington State University, Pullman, WA*

WOB 12:20 - 12:40 pm **Comparative Studies of Therapeutic Protein Secondary Structure Using Deep UV Resonance Raman Spectroscopy**; Sergey Arzhantsev; Connie Ruzicka; John Kauffman; *US Food and Drug Administration, Saint Louis, MO*

Parallel Session, WEDNESDAY 10:30 AM - 12:30 PM
RAMAN THEORY AND PES CALCULATIONS (WOC), *White Hill Room (4th floor)*
Presiding: Shaul Mukamel, *UC Irvine*

WOC 10:30 - 11:00 am **Theoretical Prediction of Raman and ROA Spectra**; Michael Frisch; *Gaussian, Inc., Wallingford, CT*

WOC 11:00 - 11:30 am **Tackling Non-Adiabatic Effects by Time-Dependent Density Functional Theory**; Filipp Furche[1]; Enrico Tapavicza[1]; Robert Send[2]; *[1]UC Irvine, Irvine, CA; [2]Karlsruher Institut für Technologie, Karlsruhe, Germany*

WOC 11:30 am - 12:00 pm **Vibronic Interactions in Semiconducting and Metallic Quantum Dots, Carbon Nanotubes, and Graphene Nanoribbons: Time-Domain *ab initio* Studies**; Oleg Prezhdo; *University of Washington, Seattle, WA*

WOC 12:00 - 12:30 pm **Modeling of Non-Adiabatic Photoinduced Dynamics and Energy Transfer in Conjugated Molecules**; Sergei Tretiak[1]; Sebastian Fernandez-Alberti[2]; Adrian Roitberg[3]; *[1]Los Alamos National Laboratory, Los Alamos, NM; [2]Universidad Nacional de Quilmes, Bernal, Argentina; [3]Department of Chemistry, University of Florida, Gainesville, FL*

Parallel Session, WEDNESDAY 10:30 AM - 12:40 PM
INDUSTRIAL APPLICATIONS AND RAMAN INSTRUMENTATION (WOD), *Terrace Room (lower lobby)*
Presiding: Pavel Matousek, *Rutherford Appleton Laboratory*
SPONSORED BY KAISER OPTICAL SYSTEMS, INC.

WOD 10:30 - 11:00 am **The Application of Raman Spectroscopy for Pharmaceutical Secondary Manufacturing**; Ian Lewis[1]; Kevin Davis[1]; Sean Gilliam[1]; Herve Lucas[2]; Carsten Uerpmann[2]; *[1]Kaiser Optical Systems, Inc., Ann Arbor, MI; [2]Kaiser Optical Systems, SARL, Ecully, France*

WOD 11:00 - 11:20 am **Simultaneous Acquisition of all Four Forms of Circular Polarization ROA Using a Modified Scattered Circular Polarization ROA Spectrometer**; Honggang Li[1]; Rina Dukor[1]; Laurence Nafie[2]; *[1]Biotools Inc., Jupiter, FL; [2]bDepartment of Chemistry, Syracuse University, NY*

WOD 11:20 - 11:40 am **Quantitative Analysis of Solid Pharmaceutical Formulations Using Transmission Raman Spectroscopy**; Magnus Fransson; Jonas Johansson; Anders Sparén; Olof Svensson; *AstraZeneca R&D Mölndal, Mölndal, Sweden*

WOD 11:40 am-12:00 pm **Gas-Phase Raman Spectroscopy – A New Tool in the Process Analysis Toolbox**; Peter Van Vuuren[1]; Joseph Slater[2]; James Tedesco[2]; Ronald Fairchild[2]; Ian Lewis[2]; Phillip Human[3]; *[1]Process Analytics Consultant, Kingwood, TX; [2]Kaiser Optical Systems Inc., Ann Arbor, MI; [3]Sasol Synfuels, Secunda, South Africa*

WOD 12:00 - 12:20 pm **Measurement of Absolute Raman Scattering Cross Section and Standoff Raman Detection**; Roshan Aggarwal[1]; Lewis Farrar[1]; Dennis Polla[2]; *[1]MIT Lincoln Laboratory, Lexington, MA; [2]Defense Advanced Research Projects Agency, Arlington, VA*

WOD 12:20 - 12:40 pm **Improving and Understanding Three Dimensional Spatial Resolution in a Confocal Raman Microscopy and Raman Hyperspectral Imaging I**; Eunah Lee[1]; Bernard Roussel[2]; Emmanuel Froigneux[2]; Fran Adar[1]; Sergey Mamedov[1]; Andrew Whitley[1]; *[1]HORIBA Jobin Yvon Inc., Edison, NJ; [2]HORIBA Jobin Yvon S.A.S., Villeneuve d'Ascq, France*

EXCURSIONS
WEDNESDAY 1:15 - 5:30 PM

Times vary depending upon excursion. Please see your ticket for details.
Tickets are required. One excursion per person (activities overlap). A limited number of tickets are available for purchase at conference registration until noon on Monday.

Freedom Trail Walking Tour

JFK Library and Museum

Duckboat Tour of Boston

WEDNESDAY 5:30 PM
Odyssey Dinner Cruise on Boston Harbor

Spectacular views of historic Boston Harbor and live entertainment enhance the three-course dinner with wine. Cocktails and other drinks may be purchased separately. Shuttle buses to the Odyssey dock begin at 5:30 pm from hotel's Valet parking entrance (Columbus St). All passengers must be aboard the boat by 7 pm sharp!

Ticket required. A limited number of tickets may be purchased at conference registration until noon on Monday.

PLENARY SESSION (ThOP), **THURSDAY 8:30 - 10:00 AM,** *Imperial Ballroom (mezzanine)*
Imperial Ballroom (mezzanine)
Presiding: Albert Stolow, *National Research Council Canada*
SPONSORED BY BRUKER

ThOP 8:30 - 9:15 am **Vibrational Spectroscopy Using Short Optical Pulses: Coherence, Transients and Interfaces**; Tahei Tahara; *RIKEN, Wako, Japan*

ThOP 9:15 - 10:00 am **Raman Spectroscopy of Graphene: State of the Art**; Andrea C. Ferrari; *University of Cambridge, Cambridge, UK*

10:00 - 10:30 AM
Coffee Break, *Statler Room and Georgian-Arlington-Berkeley Room*

Parallel Session, THURSDAY 10:30 AM - 12:30 PM
SERS APPLICATIONS II (ThOA), *Imperial Ballroom (mezzanine)*
Presiding: John Lombardi, *City College of New York*

ThOA 10:30 - 10:50 am **Controlled SERRS Using Biologically Driven Nanoparticle Assembly**; Duncan Graham; Karen Faulds; David Thompson; Fiona McKenzie; Ross Stevenson; *University of Strathclyde, Glasgow, UK*

ThOA 10:50 - 11:10 am **Quantifying Resonant Raman Cross Sections With SERS**; Stefan Andreas Meyer; Eric C. Le Ru; Pablo G. Etchegoin; *Victoria University of Wellington, Wellington, New Zealand*

ThOA 11:10 - 11:30 am **Immuno-SERS Microscopy: Nanoparticle Probes and Tissue Diagnostics**; Mohammad Salehi; Max Schütz; Sebastian Schlücker; *University of Osnabrueck, Osnabrueck, Germany*

ThOA 11:30 - 11:50 am **Towards an Analytical Tool Based on Lab-on-a-Chip-SERS (LOC-SERS) for Detection of Drugs in Complex Matrices**; Anne März[1]; Thomas Bocklitz[1]; Thomas Henkel[3]; Petra Rösch[1]; Michael Kiehntopf[2]; Jürgen Popp[1]; *[1]FSU Jena, Institute of Physical Chemistry, Jena, Germany; [2]Dept.of Clinical Chemistry & Laboratory Diagnostics, Jena, Germany; [3]Institute of Photonic Technology (IPHT) Jena, Jena, Germany*

ThOA 11:50am - 12:10pm **Vibrational Characterization and Surface-Enhanced Raman Scattering Detection of Beta-Agonists used in Sport Doping**; Santiago Sanchez-Cortes; Irene Izquierdo-Lorenzo; Jose Vicente Garcia-Ramos; Concepción Domingo; *Instituto de Estructura de la Materia (CSIC), Madrid, Spain*

ThOA 12:10 - 12:30 pm **Fingerprints….. Fingerprinted by SERS!**; Richard Spragg[1]; Leesa Ferguson[2]; Rosalind Wolstenholme[2]; Louis Tisinger[1]; Enrique Lozano Diz[1]; *[1]PerkinElmer, Seer Green, UK; [2]Sheffield Hallam University, City Campus, Sheffield*

Parallel Session, THURSDAY 10:30 AM - 12:30 PM
RAMAN IMAGING II (ThOB), *Plaza Ballroom (mezzanine)*
Presiding: Eric Potma, *UC Irvine*

ThOB 10:30 - 11:00 am **Multi-Modal CARS Microscopy Using a Simple Femtosecond Source**; Albert Stolow; *National Research Council, Ottawa, Canada*

ThOB 11:00 - 11:30 am **Coherent Raman Spectroscopy with a Fiber-Format Femtosecond Oscillator**; Giulio Cerullo; Marco Marangoni; *Politecnico di Milano, Italy, Milano, Italy*

ThOB 11:30 - 11:50 am **Broadband CARS Microscopy: Noninvasive Chemical and Time-Resolved Imaging for Biology and Materials**; Marcus Cicerone; Sapun Parekh; Khaled Aamer; Young Jong Lee; *NIST, Gaithersburg, MD*

ThOB 11:50am - 12:10pm ***In vivo* Coherent Raman Imaging for Neuroscience Applications**; Daniel Cote; *Universite Laval - CRULRG, Quebec, Canada*

ThOB 12:10 - 12:30 pm **Stimulated Raman Photoacoustic Imaging**; Vladislav Yakovlev; *University of Wisconsin - Milwaukee, Milwaukee, WI*

Parallel Session, THURSDAY 10:30 AM - 12:40 PM
FORENSICS / GEOSCIENCE / ENVIRONMENTAL / ASTROBIOLOGY (ThOC), *White Hill Room (4th floor)*
Presiding: Robert Withnall, *Brunel University*
SPONSORED BY DELTANU, INC.

ThOC 10:30 - 11:00 am **On the Contribution of Raman Spectroscopy to Forensic Science**; Patrick Buzzini[1]; Genevieve Massonnet[2]; *[1]West Virginia University, Morgantown, WV; [2]University of Lausanne, Lausanne, Switzerland*

ThOC 11:00 - 11:30 am **Excited- and Ground-State Reaction Dynamics of Nitrosyl Chloride in Solution**; Phil Reid; *University of Washington, Seattle, WA*

ThOC 11:30am - 12:00pm **Discriminant Analysis of Raman Spectra for Body Fluid Identification for Forensic Purposes**; Vitali Sikirzhytski; Kelly Virkler; Igor Lednev; *Department of Chemistry, University at Albany, SUN, Albany, NY*

ThOC 12:00 - 12:20 pm **Time-Resolved Remote Raman Spectroscopy for Characterizing Surface Mineralogy on Planetary Surfaces**; Shiv Sharma; Anupam Misra; *University of Hawaii, Honolulu, HI*

ThOC 12:20 - 12:40 pm **Detection of High Energy Materials at Safe Distances**; Rick Cox; Brad Williams; Matt Russell; Bryan Ray; *DeltaNu, Laramie, WY*

Parallel Session, THURSDAY 10:30 AM - 12:30 PM
CARBON-BASED MATERIALS II (ThOD), *Terrace Room (lower lobby)*
Presiding: Mildred Dresselhaus, *MIT*

ThOD 10:30 -11:00 am **Raman Spectroscopy to Study Disorder and Perturbations in sp^2 Nano-Carbons**; Ado Jorio[1]; Luiz Gustavo Cancado[1]; Erlon H. Martins Ferreira[2]; Fernando Stavale[2]; Carlos A. Achete[2]; Marcus V. O. Moutinho[3]; Rodrigo B. Capaz[3]; *[1]Federal University of Minas Gerais, Belo Horizonte/Mg, Brazil; [2]Inmetro, Rio de Janeiro, Brazil; [3]UFRJ, Rio de Janeiro, Brazil*

ThOD 11:00 - 11:30 am **Unique One- and Two-Dimensional Phenomena Observed in Carbon Nanotubes and Graphene**; Stephen Cronin; Adam Bushmaker; *University of Southern California, Los Angeles, CA*

ThOD 11:30 - 11:50 am **Barometrically and Electrostatically Induced Strain in Suspended Graphene**; Sebastian Remi[1]; Alexander Kitt[1]; Anna Swan[1, 4]; Bennett B. Goldberg[1, 4]; Ben Feldman[3]; Jens Martin[3]; Amir Yacoby[3]; Ji Won Suk[2]; Rodney S. Ruoff[2]; *[1]Boston University, Physics Department, Boston, MA; [2]The University of Texas, Austin, TX; [3]Harvard University, Cambridge, MA; [4]Boston University, ECE, Boston, MA*

ThOD 11:50am - 12:10pm **Modifying Properties of Graphene – A Raman Microscopic Study**; Ze Xiang Shen; *Nanyang Technological University, Singapore, Singapore*

ThOD 12:10 - 12:30 pm **Curved Nanocarbons: Probing the Curvature and Topology Effects Using Phonon Spectra**; Sanju Gupta[1]; Avadh Saxena[2]; *[1]University of Pennsylvania, Philadelphia, PA; [2]Los Alamos National Laboratory, Los Alamos, NM*

12:30 - 2:00 PM
Lunch-on-your-own

Parallel Session, THURSDAY 2:00 - 4:10 PM
BIOMOLECULES AND LIVING SYSTEMS I (ThOE), *Imperial Ballroom (mezzanine)*
Presiding: Paul Carey, *Case Western Reserve University*
SPONSORED BY RENISHAW INC.

ThOE 2:00 - 2:30 pm — **Elucidating Viral Protein Structures and Assembly Mechanisms by Raman Spectroscopy**; George J. Thomas; *University of Missouri - Kansas City, Kansas City, MO*

ThOE 2:30 - 3:00 pm — **Deca-Second Mitochondria Dynamics of Living Yeast Cells as Revealed by *in vivo* Time- and Space-Resolved Raman Spectroscopy**; Mana Kato[1]; Chikao Onogi[1]; Hiro-o Hamaguchi[1, 2]; *[1]University of Tokyo, Tokyo, Japan; [2]National Chiao Tung University, Hsinchu, Taiwan*

ThOE 3:00 - 3:30 pm — **Laser Tweezers Raman Spectroscopic Analysis of Single Cells and Their Dynamics**; James Chan[1, 2]; Tobias Moritz[2, 3]; Douglas Taylor[2, 4]; Christopher Polage[2, 5]; Denise Krol[2, 6]; Stephen Lane[2]; *[1]Lawrence Livermore National Laboratory, Livermore, CA; [2]NSF Center for Biophotonics Science and Technology, Sacramento, CA; [3]Biophysics Graduate Group, UC Davis, Davis, CA; [4]Dept of Pediatrics, UC Davis Medical Center, Sacramento, CA; [5]Dept of Pathology, UC Davis Medical Center, Sacramento, CA; [6]Dept of Applied Science, UC Davis, Davis, CA*

ThOE 3:30 - 3:50 pm — **Fluorescence-Free Biochemical Characterization of Cells Using Modulated Raman Spectroscopy**; Anna Chiara De Luca[1]; Michael Mazilu[1]; Andrew Riches[2]; Simon Herrington[2]; Kishan Dholakia[1]; *[1]SUPA, Univeristy of St Andrews, St Andrews, UK; [2]Bute Medical School, Univeristy of St Andrews, St Andrews, UK*

ThOE 3:50 - 4:10 pm — **Surface-Enhanced Raman Spectroscopic Detection of Human CaSki Cells Using Clean and Uniform Substrates of Assembled Au Nanoparticles**; Jiayi Huang; Yanhui Xu; Bin Ren; Zhongqun Tian; *Xiamen University, Xiamen, China*

Parallel Session, THURSDAY 2:00 - 4:10 PM
ART AND ARCHEOLOGY II (ThOF), *Plaza Ballroom (mezzanine)*
Presiding: Robin Clark, *University College London*

ThOF 2:00 - 2:30 pm — **Raman Spectroscopy in Collections Research: Beyond Pigment Identification**; Karen Trentelman; Catherine Patterson; *Getty Conservation Institute, Los Angeles, CA*

ThOF 2:30 - 3:00 pm — **Raman Spectroscopy Applied to Cultural Heritage and Works of Art**; Jens Stenger; Narayan Khandekar; Katherine Eremin; *Harvard Art Museum, Cambridge, MA*

ThOF 3:00 - 3:30 pm — **On-Site Raman Analysis of Cultural Heritage Sites: Stained Glass Windows of the Sainte-Chapelle (Paris) and San Rock Art (South Africa)**; Philippe Colomban[1]; Linda Prinsloo[2]; Aurélie Tournié[1, 2]; *[1]Laboratoire de Dynamique Interaction et Réactivité, Paris, France; [2]University of Pretoria, Pretoria, South Africa*

ThOF 3:30 - 3:50 pm — **Investigation of Artists' Working Practice, Surface Texture, And Pigment Color Changes in Traditional Oil Paintings by Raman Spectroscopy**; Silvia Centeno; Julie Arslanoglu; Dorothy Mahon; Charlotte Hale; *The Metropolitan Museum of Art, New York, NY*

ThOF 3:50 - 4:10 pm — **Spectroscopic Studies of Atypically Illuminated Medieval Hebrew Bible in Comparison to a XV Century Western Manuscript**; Agnieszka Gruchalska; Anna Rogulska; Grzegorz Rusek; Barbara Lydzba-Kopczynska; *Wroclaw University, Wroclaw, Poland*

Parallel Session, THURSDAY 2:00 - 4:00 PM
SOLID-STATE, SEMICONDUCTORS AND NANOPARTICLES II (ThOG), *White Hill Room (4th floor)*
Presiding: Shu-Lin Zhang, *Peking University*

ThOG 2:00 - 2:20 pm — **Doubly Resonant Raman-EPR Spectrum of Ruby(Al_2O_3:Cr^{3+})**; X. Lu[1]; S. Venugopalan[2]; Hyunjung Kim[3]; M. Grimsditch[4]; S. Rodriguez[1]; A. K. Ramdas[1]; *[1]Purdue University, West Lafayette, IN; [2]SUNY-Binghamton, Binghamton, NY; [3]Sogang University, Seoul, Korea; [4]Argonne National Laboratory, Argonne, IL*

ThOG 2:20 - 2:40 pm — **Determination of Raman Efficiency in SiGe Alloys**; Andrea Picco[1]; Emiliano Bonera[1]; Emanuele Grilli[1]; Marco Giarola[2]; Gino Mariotto[2]; Danny Chrastina[3]; Mario Guzzi[1]; *[1]Università degli Studi di Milano - Bicocca, Milano, Italy; [2]Università di Verona, Verona, Italy; [3]LNESS - Politecnico di Milano, Como, Italy*

ThOG 2:40 - 3:00 pm — **A High-Pressure Raman Spectroscopic Study of the Negative Thermal Expansion (NTE) Behaviour of Some Cadmium(II) Cyanide Materials**; Carl Romao; Mirela M. Barsan; Denis F. R. Gilson; Ian S. Butler; *McGill University, Montreal, Canada*

ThOG 3:00 - 3:20 pm — **2-Magnon Raman Behavior of NiO Nanoparticles**; Farrakh Shazad; Peter Knoll; *Inst. of Physics University of Graz, Graz, Austria*

ThOG 3:20 - 3:40 pm — **Low-Frequency Excitations in $20Nb_2O_5$-$80NaPO_3$ Glass for Raman Gain Applications**; Alfons Schulte[1]; Yu Guo[1]; Walter Schirmacher[3]; Bernhard Schmid[4]; Thierry Cardinal[2]; Tobias Unruh[3]; *[1]University of Central Florida, Orlando, FL; [2]ICMCB, CNRS, University of Bordeaux, Bordeaux, France; [3]TU Munich, Garching, Germany; [4]U Mainz, Mainz, Germany*

ThOG 3:40 - 4:00 pm — **Low-Frequency Raman Scattering by Acoustic Vibrations of Anisotropic Nanoparticles**; Lucien Saviot[1]; Daniel B. Murray[2]; *[1]Laboratoire Interdisciplinaire Carnot de Bourgogne, Dijon, France; [2]University of British Columbia, Okanagan, British Columbia, Canada*

Parallel Session, THURSDAY 2:00 - 4:10 PM
TIP-ENHANCED AND NEAR-FIELD RAMAN II (ThOH), *Terrace Room (lower lobby)*
Presiding: Satoshi Kawata, *Osaka University*
SPONSORED BY PRINCETON INSTRUMENTS

ThOH 2:00 - 2:30 pm — **Tip-Enhanced Raman Scattering Sensitive, Label-**Free**, Nanoscale**; Volker Deckert[1, 2]; *[1]Friedrich Schiller University Jena, Jena, Germany; [2]IPHT - Institute of Photonic Technology, Jena, Germany*

ThOH 2:30 - 3:00 pm — **Higher-Order Optical Modes and Nanostructures for Detection and Imaging Applications**; Zachary Schultz[1]; Ira Levin[2]; *[1]Notre Dame, Notre Dame, IN; [2]National Institutes of Health, Bethesda, MD*

ThOH 3:00 - 3:30 pm — **Optical Nanocrystallography with Tip-Enhanced Phonon Raman Spectroscopy**; Markus B. Raschke; *University of Washington, Seattle, WA*

ThOH 3:30 - 3:50 pm — **Synthesis and Nanosoldering of Nanowires for Tip-Enhanced Raman Spectroscopy**; Pierre Brodard; Mikhael Bechelany; Laetitia Philippe; Johann Michler; *EMPA, Swiss Federal Laboratories for Materials Tes, Thun, Switzerland*

ThOH 3:50 - 4:10 pm — **Imaging and Characterization of Caveolae with TERS during Stimulated Wound Healing**; Tanja Deckert-Gaudig[1]; Melissa Mariani[2]; Volker Deckert[1]; *[1]IPHT - Institute of Photonic Technology, Jena, Germany; [2]Mount Sinai School of Medicine, New York City, New York*

THURSDAY 4:10 - 6:10 PM, POSTER SESSION
Set up posters 8:00 - 8:30 am and remove by 8:00 pm. Refer to poster number in this program.
See page 111.

Georgian, Arlington, Berkeley, Clarendon Rooms, Posters 001-116

Biological Cells and Tissues, 001 - 022
Forensics/Geoscience/Environmental Applications, 023 - 036
Higher-Order Raman (Fifth-Order Raman/hyper Raman), 037 - 040
Molecular Biophysics and Photobiology, 041 - 057
Raman Imaging, 058 - 070
Raman Theory, 071 - 075
SERS (Substrate Development, Single Molecule, Theory), 076 - 098
SERS Applications, 099 - 120

Statler Room, Posters 117-163

Solid State, Semiconductors and Nanoparticles, 121 - 147
Theoretical Advances in PES, 148 - 153
Tip-Enhanced and Near-Field Raman, 154 - 163

THURSDAY 6:30 PM
Conference Banquet
Live jazz from 6:30 - 7:30 pm (cash bar available) in the Plaza Ballroom.
Dinner will begin at 7:30 pm in the Imperial Ballroom (four course meal and wine).

Join your colleagues for an evening of conviviality and entertainment.
After Dinner: Professor Charles Townes, Nobel Laureate
"The Laser, and How New Things Happen"
Tickets required. *$75 each. A limited number of tickets may be purchased until noon on Monday.*

Parallel Session, FRIDAY 8:30 - 10:30 AM
RAMAN IMAGING III (FOA), *Imperial Ballroom (mezzanine)*
Presiding: Hiro-o Hamaguchi, *The University of Tokyo*

FOA 8:30 - 9:00 am	**Nonlinear Vibrational Imaging of Tissues**; Eric Potma; *UC Irvine, Irvine, CA*
FOA 9:00 - 9:30 am	**Raman Imaging of Differentiating Cells**; Cees Otto; Vishnu VardhanPully; Aufried Lenferink; *University of Twente, Enschede, Netherlands*
FOA 9:30 - 9:50 am	**Non-Invasive Imaging of Modified Liposomal Pharmaceutical Nanocarrier by Raman Microscopy**; Tatyana Chernenko; Rupa Sawant; Vladimir Torchilin; Max Diem; *Northeastern University, Boston, MA*
FOA 9:50 - 10:10 am	**Vibrational Microspectroscopic Imaging: Applications to Skin Science and Wound Healing**; Richard Mendelsohn; Carol Flach; *Department of Chemistry, Rutgers University, Newark, NJ*
FOA 10:10 - 10:30 am	**Advancing Raman Molecular Imaging for Disease Diagnosis**; Shona Stewart; Amy Drauch; John Maier; *ChemImage Corporation, Pittsburgh, PA*

Parallel Session, FRIDAY 8:30 - 10:40 AM
SERS (SUBSTRATES, SINGLE MOLECULE, THEORY) II (FOB), *Plaza Ballroom (mezzanine)*
Presiding: Peer Fischer, Fraunhofer, IPM

FOB 8:30 - 9:00 am	**New Operation Mode for SERS Using Ultrathin-Silica-Shelled Gold Nanoparticles**; Jian-Feng Li[1]; Zhi-Lin Yang[1]; Yi-Fan Huang[1]; Yong Ding[2]; De-Yin Wu[1]; Bin Ren[1]; Zhong Lin Wang[2]; Zhong-Qun Tian[1]; *[1]State Key Lab. of Phys. Chem. of Solid Surfaces, Xiamen, China; [2]Sch. of Mater. Sci. and Eng., Georgia Inst. of Tech, Atlanta, GA*
FOB 9:00 - 9:20 am	**Nanofabrication of Disc on Pillar Substrates for Surface Enhanced Raman Spectroscopy**; Michael Sepaniak[1]; Deepak Bhandari[1]; Sabrina Wells[1]; Nickolay Lavrik[2]; *[1]University of Tennessee, Knoxville, TN; [2]Oak Ridge National Labroatory, Oak Ridge, TN*
FOB 9:20 - 9:40 am	**Single Molecule SERS with Nanogap-Engineered Gold-Silver Core-Shell Nanodumbbells (GSND)**; Yung Doug Suh; *Laboratory for Advanced Molecular Probing (LAMP), Daejeon, South Korea*
FOB 9:40 - 10:00 am	**The Silver Nanorod Array SERS Substrates**; Yiping Zhao; Yongjun Liu; *The University of Georgia, Athens, GA*
FOB 10:00 - 10:20 am	**Engineered SERS Substrates with Multiscale Signal Enhancement: Nanoparticle Cluster Arrays**; Bjoern Reinhard; *Boston University, Boston, MA*
FOB 10:20 - 10:40 am	**SERRS through Hybridized Exciton-Plasmon Polaritons in Nanostructured Silver Films**; Nicholas Cade; Tom Ritman-Meer; David Richards; *King's College London, UK*

Parallel Session, FRIDAY 8:30 - 10:30 AM
PHOTOPHYSICS AND CHEMICAL DYNAMICS (FOC), *White Hill Room (4th floor)*
Presiding: Dongho Kim, *Yonsei University*

FOC 8:30 - 8:50 am **Ultrafast Vibrational Spectroscopy of Perylene Diimide Complexes**; Lynetta Mier[1]; Yong Min[2]; Evgeny O. Danilov[1]; Arthur J. Epstein[1, 2]; Terry L. Gustafson[1]; *[1]Department of Chemistry, The Ohio State University, Columbus, OH; [2]Department of Physics, The Ohio State University, Columbus, OH*

FOC 8:50 - 9:10 am **Water Assisted and Acid Catalyzed Decarboxylation Reactions of Ketoprofen in Aqueous Solutions**; David Lee Phillips[1]; Ming-De Li[1]; Yong Du[3]; Jiadan Xue[2]; *[1]University of Hong Kong, Hong Kong; [2]Ohio State University, Columbus, OH; [3]University of Rochester, Rochester, NY*

FOC 9:10 - 9:30 am **Photophysics of Protochlorophyllide**; Benjamin Dietzek[1, 2]; Robert Hanf[1]; Michael Schmitt[1]; Sonja Seidel[1]; Gudrun Hermann[1]; Jürgen Popp[1, 2]; *[1]Friedrich-Schiller-University Jena, Jena, Germany; [2]Institute of Photonic Technology, Jena, Germany*

FOC 9:30 - 9:50 am **Photodissociation Dynamics of Acetone in the Gas Phase and in Solution Studied by Transient Absorption and Femtosecond Stimulated Raman Spectroscopy**; Seung Min Jin; Hye Ran Koh; Ilseung Yang; Junhee Kang; Hyung Min Kim; Seong Keun Kim; *Seoul National University, Seoul, South Korea*

FOC 9:50 - 10:10 am **Molecular Near-Field Effect in Resonance Hyper-Raman Scattering: Excitation Profile of All-Trans-Beta-Carotene in Cyclohexane**; Rintaro Shimada[1]; Hiro-o Hamaguchi[1, 2]; *[1]School of Science, The University of Tokyo, Tokyo, Japan; [2]National Chiao Tung University, Hsinchu, Taiwan*

FOC 10:10 - 10:30 am **Understanding the Ground- and Excited-State Photophysics of Oxadiazole and Triarylamine Substituents in Copper and Rhenium Metal Complexes**; Raphael Horvath[1]; Michael Fraser[1]; Pawel Wagner[2]; David Officer[2]; Keith Gordon[1]; *[1]University of Otago, Dunedin, New Zealand; [2]University of Wollongong, Wollongong, Australia*

Parallel Session, FRIDAY 8:30 - 10:40 AM
BIOMOLECULES AND LIVING SYSTEMS II (FOD), *Terrace Room (lower lobby)*
Presiding: Koichi Iwata, *Gakushuin University*

FOD 8:30 - 9:00 am **The Raman Revolution in Structural Biology**; Paul Carey; *Case Western Reserve University, Cleveland, OH*

FOD 9:00 - 9:30 am **Raman (and IR) Studies of Protein Structure and Dynamics**; Hua Deng; Robert Callender; *Albert Einstein College of Medicine, Bronx, NY*

FOD 9:30 - 10:00 am **Comparative Studies of Human Indoleamine 2,3-dioxygenase and Tryptophan Dioxygenase**; Syun-Ru Yeh[1]; Ariel Lewis-Ballester[1]; Dipanwita Batabyal[1]; Changyuan Lu[1]; Tsuyoshi Egawa[1]; Yu Lin[1]; Marcelo Marti[2]; Luciana Capece[2]; Dario Estrin[2]; *[1]Albert Einstein College of Medicine, Bronx, NY; [2]Universidad de Buenos Aires, Buenos Aires, Argentina*

FOD 10:00 - 10:20 am **Resonance Raman Characterization of the Flavin Radical in Cryptochrome DASH**; Johannes Schelvis[1]; Carlos Lucero[1]; Azaria Eisenberg[2]; Yvonne Gindt[3]; *[1]Montclair State University, Montclair, NJ; [2]New York University, New York, NY; [3]Lafayette College, Easton, PA*

FOD 10:20 - 10:40 am **Structure-Function Relationships in Spider Silk**; Michel Pézolet; Thierry Lefèvre; Marie-Eve Rousseau; Simon Boudreault; Conrad Cloutier; *Université Laval, Quebec City, Canada*

10:30 - 11:00 AM
Coffee Break

PLENARY SESSION (FOP), **FRIDAY 11:00 AM - 12:30 PM,** *Imperial Ballroom (mezzanine)*
Imperial Ballroom (mezzanine)
Presiding: Paul Champion, *Northeastern University* and Larry Ziegler, *Boston University*

FOP 11:00 - 11:45 am **Stimulated Raman Scattering Microscopy**; Sunney Xie; *Harvard University, Cambridge, MA*

FOP 11:45 am - 12:30 pm **Ultrafast Raman Loss Spectroscopy: Differences from FSRS and Origin of Line Shapes on Resonant Excitation**; Siva Umapathy; *Indian Institute of Science, Bangalore, India*

ADJOURN