



Inter-American Photochemical Society Newsletter

Volume 26 Number 1, Fall 2003

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I-APS Internet Address:

<http://www.chemistry.mcmaster.ca/~iaps>

This newsletter is available in PDF format from the website.

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September 5, 2003

Dear Colleagues:

Dan Falvey and Jerry Meyer co-chaired the 14th Inter-American Photochemical Society Winter Conference held in Clearwater Beach, Florida in January, 2003. Their efforts along with those of the Organizing Committee are greatly appreciated. The speakers, poster presenters, and participants actively interacted to make this another successful meeting of the Society. Thank you to all.

Plans for the 15th I-APS Winter Conference that will take place January 1-4, 2004 on the campus of Arizona State University in Tempe, Arizona are progressing very well. Co-chairs Devens Gust and Cornelia Bohne have arranged an outstanding slate of speakers. Please check the Society's web site for updating information. We anticipate another stimulating meeting in which participants ranging from well established investigators to early developing researchers will have an opportunity to exchange their latest results that span the current breadth of photochemistry and photophysics. The broadly multidisciplinary nature of the interests of those attending these conferences has made for rich discussions and for the start of productive collaborations.

The I-APS Conference, with the participation of consistently returning photoscientists and of relatively newly signed I-APS members – especially the students, postdocs, and those beginning their independent careers, is a highlight of what the Society has to offer. The Society continues to promote the attendance of students through the awarding of travel grants and the keeping of their conference registration fees low. I encourage you, your students, and your postdoctoral researchers to plan to be in Tempe in January. If you have new colleagues using light in research, please tell them about the conference and talk to them about becoming an I-APS member. The contributions of annual membership dues are important for the continued success of the Society.

I am very much looking forward to the 15th I-APS Winter Conference. I hope to see you and your co-workers in Tempe.

Sincerely,

Ed



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Dario Bassani, First Recipient of the I-APS Young Investigator Award

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It is a special pleasure to write these words about **Dr. Dario Bassani**, who was recognized as the first recipient of the I-APS Young Investigator Award at the XIVth I-APS Meeting that was held January 2–5, 2003 in Clearwater Beach, Florida.

I have followed Dario's impressive research career since he was a graduate student at Northwestern. His work with Fred Lewis on the inter- and intramolecular reactions of phenylethenes and amines was extremely thorough and his studies of the mechanism of cis-trans photoisomerization of 1-arylpropenes for the first time clearly delineated singlet and triplet contributions for the styrene chromophore. Common interests in the photochemistry of olefins had led to a crossing of our paths on numerous occasions. Dario exhibited curiosity, depth of knowledge, and a genuine interest in improving his science. It was obvious from the first of these encounters that Dario had a great future in photochemistry.

From Northwestern Dario went first to Basel, where he worked nearly two years with Jakob Wirz and then, further broadened his interests and knowledge by carrying out research in Jean-Marie Lehn's laboratory at the Laboratoire de Chimie Supramoléculaire, Université de Strasbourg.

The rich scientific background that Dario brought to the University of Bordeaux has served him very well in his independent research. Dario's presentations at the Gordon Research Conference on Organic Photochemistry (2001) and at the XVIIIth IUPAC Symposium on Photochemistry (2000) were impressive because of their clarity, and the originality and quality of the research. His award presentation at the XIVth I-APS meeting proved no exception. Dario's presentation "*Supramolecular Photochemistry: from Molecular Electronics to Self-Assembled Photoactive Architectures*" began with a description of the design and investigation of triarylmethane dyes as switching elements in conjugated polymers. In contrast to current approaches to the mediation of the electrical properties of conducting polymers by varying either the conjugation length or the density of charge carriers, these systems use the generation of an sp² orbital upon ionization to both extend the

conjugation and to introduce a positive charge carrier. Attainment of a high degree of sensitivity towards a single ionization event was sought. The initial results show that although the macroscopic charge carrier mobility is limited by inter-chain hopping, the degree of charge delocalization is greatly enhanced upon

ionization. In addition, these materials present some very unusual spectroscopic properties such as near-IR transition with very large extinction coefficients. The talk included the presentation of some perspectives on the use of self-assembly for the construction of photo- and electro-active supramolecular architectures, research currently in progress.

In the second part of his talk Dario gave an overview of his group's recent efforts in bringing supramolecular catalysis to excited-state reactions. This task often begins with a good dose of molecular modeling in order to understand which molecular recognition elements could be coupled to photoactive chromophores so as to influence the photoreactivity. Bond-forming processes, such as photoinduced cyclizations, were shown to present the advantage of increasing molecular complexity, and are also particularly prone to benefit from pre-organization of the reactants. The examples given were based on the formation of self-assembled hydrogen-bonded tape like architectures, formed between melamine and barbituric acid derivatives. Appending a photodimerizable cinnamate or stilbene sub-unit to the melamine unit allows the later to be used as a molecular recognition handle with which to bind and orient the photoreactive units. By binding two such melamine units on each of its hydrogen-bonding sites, barbituric acid was shown to play the role of a supramolecular template or scaffold, holding together two cinnamates or stilbenes in a face-to-face geometry favorable to photodimerization. The fact that



the photoproducts thus formed exhibit different regio- and diastereoselectivity than is observed under conventional bimolecular reaction conditions demonstrates that the photoreaction occurring inside the supramolecular architecture retains the topology of the reactants. This observation opens up the possibility of using photoinduced reactions as a photochemical alternative to olefin metathesis for the covalent capture of supramolecular assemblies and the construction of molecular receptors.

Dario finished his talk by introducing applications in the field of substrate-induced receptor synthesis by considering photoproduct binding properties. In addition to strongly binding barbituric acid, the template used to accelerate their formation, the photodimers efficiently discriminate structurally between the similar nucleic acid bases uracil and thymine. The generality and power of this supramolecular approach, beyond the dimerization of photochemically-friendly cinnamates and stilbenes, was demonstrated by its use to promote the intermolecular dimerization of a fullerene C_{60} derivative in solution. Normally, the low solubility of C_{60} restricts its photoinduced dimerization to solid C_{60} samples and microheterogeneous environments.

The future of Photochemistry as a science will remain bright as long as it continues to attract talented scientists like Dario Bassani.

Biographical Sketch — Fred Lewis

My colleague Fred Lewis spent his earliest years on the East coast, ranging from Florida to Connecticut. He received his undergraduate education at Amherst College, which then as well as now is an excellent liberal arts institution. Despite a decided lack of emphasis on the sciences at Amherst at that time, Fred compensated by engaging in two years of independent research on organic reaction mechanisms with Marc Silver. Fred relates that Marc was at the same time demanding and forgiving, allowing him to make numerous mistakes but insisting that he learn from them. The one photochemical reaction that Fred conducted at Amherst was the synthesis of benzpinacol from benzophenone following the directions in Louis Fieser's lab manual.



Fred's first real exposure to photochemistry came the summer after he graduated from Amherst College. He spent that summer working for American Cyanamid in Stamford, CT in a group led by the late Arnold Zweig studying applications for photochromic fulgides. Fred began graduate studies at the University of Rochester in the Fall of 1965 and joined the group of W. H. Saunders, Jr. While most of the Saunders group was working on elimination reactions, Fred elected to study the photochemistry of triarylazides. With Bill's guidance and encouragement, Fred's work on the direct and sensitized reactions of organic azides progressed rapidly. As his interest in photochemistry developed, he decided to seek a postdoc with one of the leaders in this rapidly growing field. One of the young Kodak photochemists suggested that Fred consider Nick Turro's lab, even though Nick had arrived at Columbia only a few years earlier. This turned out to be excellent advice. Nick's group provided a stimulating environment in which to learn the fundamentals of photochemistry and to think critically.

Fred joined the Northwestern faculty in 1969 and began his studies of the Norrish type I and II reactions (α -cleavage and γ -hydrogen abstraction, respectively) of alkyl and cycloalkyl phenyl ketones, which helped mold the way chemists think about excited state reactivity. Prior to his work, it was generally assumed that excited state processes were too rapid to be governed by the basic concepts of transition state theory. Fred showed that this

was not the case, demonstrating that intramolecular γ -hydrogen abstraction reactions are subject to entropic control and that competitive photochemical processes are subject to ground state conformational control. These studies have become textbook examples of photochemical structure-reactivity relationships.

Beginning in the mid-1970's, Fred investigated excited state complexes (excimers and exciplexes) and radical ions as intermediates in photochemical reactions. The possibility that excited complexes might be intermediates in photochemical reactions was first suggested by E. J. Corey in 1964. However, physical chemists studying fluorescent exciplexes failed to recognize the connection between photophysical and photochemical behavior. Fred was among the first to make this connection in his studies of the addition reactions of singlet stilbenes with alkenes and amines, in which a fluorescent exciplex was shown to be an intermediate. A fruitful collaboration with the group of Siegfried Schneider (T.U. Munich) permitted an integrated study of the spectroscopic characterization and chemical behavior of exciplexes and radical ion pairs. This collaboration culminated during the early 90's in a study of intramolecular addition reactions of aminoalkylstyrenes and stilbenes. During this period, Fred also conducted the first systematic studies of the use of Lewis acid complexation, metal ion coordination, and intramolecular hydrogen bonding to control the photochemical behavior of conjugated esters, amides, and ketones and related heterocyclic molecules. And, with Eric Weitz (Northwestern), he explored the use of multiphoton infrared excitation to effect selective thermal isomerization reactions.

Beginning in the mid-90's, Fred turned his attention to potential energy surfaces for unimolecular isomerization reactions. Starting with a classical Arrhenius approach, Fred determined the barriers for singlet state C=C torsion of the 1-phenylpropenes from measurements of singlet lifetimes and isomerization quantum yields over a wide temperature range. Classical methods proved inadequate for the analysis of the more complex behavior of the 1,3-diphenylpropenes, which undergo both C=C torsion and di- π -methane rearrangements from the singlet state. The development of kinetic modeling of quantum yield and lifetime data allowed for a detailed analysis of the singlet state potential surface. This methodology has recently been extended to determine C=C torsional barriers for styrenes that do not possess geometric isomers and for the electrocyclic ring closure of 2-vinylbiphenyls. This work constitutes one of the most important contributions to the study of excited state reactivity during the past decade.

The most visible of Fred's recent contributions are studies of electron transfer processes in DNA. This work grew out of a collaborative study with Robert Letsinger (Northwestern) of excimer fluorescence probes of DNA duplex formation. The observation of selective quenching of the fluorescence of a stilbenedicarboxamide by guanine led to the design of stilbene-linked hairpins possessing a single G:C base pair separated from the stilbene by a variable number of A:T base pairs. In collaboration with my research group, femtosecond time-resolved spectroscopy was used to determine the distance dependence of the charge separation and charge recombination processes. Our 1997 paper in *Science* established that DNA is a better medium for electron transfer than are proteins, but that DNA is certainly not a molecular wire — a conclusion now generally excepted by the electron transfer community. The same methodology has been employed to determine the driving force dependence and tunneling energy gap dependence of photoinduced electron transfer, information of central importance to the theory of electron transfer processes. Beginning with a 2000 paper in *Nature*, Fred and I have determined the dynamics and equilibria for hole transport processes in DNA, thus providing a quantitative basis for the understanding of strand cleavage studies of DNA. My collaboration with Fred over the past seven years on this problem has been both intellectually and personally one of the most satisfying that I've had.

Fred's contributions to the understanding of photochemical reactivity are notable both for their scope and for their adaptation of diverse methodologies to solving complex problems. Rather than concentrate on a single reaction or technique, he continues to explore new ideas and methodologies. Effective collaboration with spectroscopists and theoreticians has permitted him to tackle highly complex problems. I am confident that Fred will continue to produce cutting edge work in the photochemical sciences for many years to come. His receipt of the I-APS Award is well-deserved recognition for his many accomplishments in photochemistry.

— Michael R. Wasielewski

14th I-APS Winter Conference, Clearwater Beach, Florida, January 2–5, 2003

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After traveling to Tempe, Arizona last year, the conference came back to the white sandy beaches of the Gulf of Mexico. This highly stimulating meeting was organized by **Dan Falvey** (University of Maryland) and **Jerry Meyer** (Johns Hopkins University). The scientific program consisted of 26 invited and contributed talks, including presentations from 2003 Closs Award winner **Jayaraman Sivaguru** (Tulane University), 2003 I-APS Young Investigator Award winner **Dario Bassani** (Université Bordeaux), and 2003 I-APS Award in Photochemistry winner **Fred Lewis** (Northwestern University). This program was complemented by two poster sessions, numerous discussions during the coffee breaks, and again, by the ocean breeze and the white beaches. The conference started during the evening of Thursday, January 2 with welcoming remarks and announcements from the organizers.

The scientific part of the conference began with a lecture by **Devens Gust** (Arizona State University) titled “*Molecular Photovoltaics, Switches, and Photonic Wires Based on Photosynthesis.*” Devens told the audience how ideas inspired by photosynthesis and multiplied by imagination and synthetic skills can be used for a variety of applications including construction of molecular logic gates, efficient transfer and utilization of excitation energy, and design of photochromic molecular photovoltaics.

The next talk was by **Russ Schmehl** (Tulane University) on “*Charge Transfer Excited States in Metal Complexes of Terpyridyl Substituted Phenylene Vinylene Oligomers.*” The photophysical properties of these compounds are interesting and suggest the involvement of several states. For example, significant solvatochromism in luminescence suggests emission from a presumably intraligand charge-transfer state which can be solvated preferentially in mixed solvents such as CHCl₃/CH₃CN). Effects of aggregation (thin films vs. solutions) and the nature of metal (shifting of the excitation to the triplet manifold for the heavier metals) on the photophysics of these oligomers were also discussed.

In the final lecture of the first day, **Kirk Schanze** (University of Florida) discussed “*Amplified Excited State Quenching in Conjugated Polyelectrolytes.*” The amplified

quenching effect is an extremely efficient quenching of fluorescence of π -conjugated polymers which contain ionic side groups (conjugated polyelectrolytes [CPEs]) that is observed in the presence of charged quenchers such as bipyridinium salts or anthraquinonesulfonate salts. This effect is believed to result from formation of ion pairs between the quencher and the CPE, coupled with the ability of the exciton to diffuse rapidly along the polymer chain. Kirk discussed the mechanism of quenching, compared the dynamics and efficiency of singlet and triplet exciton quenching, and showed that singlet exciton quenching is much more efficient.

The conference continued with the Mixer and the first Poster session which went on almost to midnight. There was much lively conversation, reunions of long-time friends, and introductions of first-timers. All this was intermingled with a steady exchange of complimentary coupons for beverages and with the enjoyment of snacks.

The first speaker of the second day was **Malcolm Forbes** (University of North Carolina, Chapel Hill) who provided insights derived from EPR spectroscopy on the intriguing topic of “*Photooxidation of Amino Acids: Radicals, Cations, or Beer.*” The nature of paramagnetic products formed during photooxidation of nonaromatic amino acids was studied by time-resolved EPR spectroscopy. At low pH, the methionine radical-cation forms a dimer with methionine molecule through formation of a S-S two-center, three-electron bond. At higher pH, the lone pair on nitrogen participates in the formation of an intramolecular S-N 2c,3e bond. Even though no beer was served so early in the day, the lecture was appreciated by the audience.

The second morning lecture was given by **Andrei Kutateladze** (University of Denver) who discussed fundamental chemistry and practical applications of “*Molecular Assembly and Disassembly...*” based upon “*...Dithiane and Trithiane-Based Photolabile Scaffolds for Molecular Recognition.*” In the first part of the talk, Andrei outlined a new modular approach to photolabile molecular objects, and thoroughly discussed the mechanistic aspects of photoinduced fragmentation in

dithiane-carbonyl adducts. In the second part of the talk, he described an impressive array of molecular host/guest complexes assembled with dithiane-based photochemical latches as well as photolabile liposomes that can unload their contents upon irradiation and thus can be potentially used for the photorelease of biological effecters in a variety of applications.

After a short coffee break, the conference continued with the talk of **Dirk Guldi**, (University of Notre Dame — Radiation Laboratory) on “*Carbon Nanostructures: From Fullerenes to Nanotubes. Their Implementation into Donor-Acceptor Ensembles.*” Dirk discussed the fundamental advantages of carbon nanostructures for the control over charge separation and charge recombination in artificial light harvesting antenna and reaction center mimics. They compared for the first time reorganization energies for intramolecular and intermolecular electron transfer involving three-dimensional acceptors — spherical C₆₀ — and a two-dimensional acceptor — planar naphthalenediimide. Smaller reorganization energies for C₆₀-based systems assist in pushing charge recombination events deeply into the inverted region and led to a conceptual breakthrough — a 24% efficient charge-separation within a molecular tetrad. The lifetime of the spatially-separated (~49 Å) radical pair, product of a sequence of energy and electron transfer reactions, reaches well beyond milliseconds (0.38 s), into a time domain which has never been accomplished so far in an artificial photosynthetic reaction center. In addition, Dirk described the fabrication of robust and photoactive ITO electrodes. Electrostatic and van-der-Waals interactions have been used for the step-by-step deposition of layers containing a fullerene-porphyrin dyad as the active layer.

This was followed by a lecture by **Cornelia Bohne** (University of Victoria) on “*Supramolecular Photochemistry: From Measurements to the Design of Function.*” Cornelia addressed several important aspects of supramolecular dynamics such as what methodology is appropriate for different time scales, the importance of structure/dynamics correlations, and the possibility of manipulation of dynamics to gain function. In particular, real time measurements of complexation dynamics with cyclodextrins or bile salts provided direct information on how structural changes in guests and hosts affect the dynamics of these systems.

Political, economical, and scientific aspects of the energy crisis facing our society in the near future were discussed in an eye-opening lecture by **Dan Nocera** (MIT) who called on photochemists to meet the challenge of “*Energy Conversion at the Molecular Level.*” Dan started with the global energy inventory, described the looming energy crisis, outlined possible ways of overcoming this crisis, and challenged the scientific community to address

this important problem. After dispelling many misconceptions of “what energy sources will fuel our future,” Dan presented recent advances from his laboratory about multielectron photochemical processes involving mixed-valence bimetallic (Rh⁰Rh^{II}) complexes stabilized by bis(trifluorophosphino)methylamine ligands. These complexes readily undergo oxidation and reduction to afford their symmetric (Rh⁰Rh⁰ and Rh^{II}Rh^{II}) congeners. Photochemical interconversion among these complexes provides an example of a system capable of “supporting four-electron photochemistry among discrete molecular species.” The unusual properties and reactivity of “Pacman” porphyrins were discussed in the final part of his talk.

In the next presentation, **Andrew Lyon** (Georgia Institute of Technology) presented “*FRET as a Probe of Core/Shell Microgel Structure.*” After an introduction to the properties of core-shell microgels (microgels which have chemically differentiated core and shell layers produced by a two-stage precipitation polymerization), Andrew explained how fluorescence resonance energy transfer (FRET) allows analysis of fundamental structural properties of these systems such as the nature of cross-linking and the compression of the core by subsequent addition of shells. During the early stages of microgel synthesis, a more densely cross-linked network is formed, followed by formation of a more open network at the later stages. As the result, the microgel structure is dendritic in nature.

After another short break, the conference continued with a presentation by **Mazdak Khajepour** (University of Pennsylvania) on “*Oxygen Accessibility to the Heme Pocket in Horseradish Peroxidase.*” Mazdak discussed the role of dynamics in the penetration of small molecules into a protein, in particular the penetration of oxygen into horseradish peroxidase. A phosphorescent Pd-mesoporphyrin was incorporated in the protein in order to study phosphorescence quenching by oxygen in the free protein and the protein bound to a competitive substrate. Mazdak reported a 10-fold decrease in the quenching constant for the bound protein which was taken to suggest that an oxygen-transport channel in the protein structure is partially blocked by the bound substrate.

The scientific program of the second day of the conference ended with a lecture by **Phil Castellano** (Bowling Green State University) who reported his newest findings on “*Room Temperature Phosphorescence from Platinum (II) Diimine Bis(arylacetylde) Complexes.*” Although Phil described this research as “a work in progress” (it was only four months old at the time of the conference), he had impressive results on “excited state lifetime engineering” and reported remarkably long-lived,

structured phosphorescence at room temperature from platinum(II) diimine complexes with 1-ethynylpyrene ligands.

After a long day full of stimulating scientific discussion, the conference participants boarded the *Starlight Majesty* for a luxurious banquet cruise along the intracoastal waterway. This year's excursion was limited to the more sheltered waters because of the greater than usual chopiness. Despite the gusty winds, the hearty still enjoyed the views from the exterior decks.

Saturday morning started with a lecture by **Joe Dinnocenzo** (University of Rochester) on "*Ion Radical Reactions in Polymeric Media*." Joe discussed the preparation, photophysical, photochemical, and optical properties of a new class of photoresponsive polymers capable of undergoing photoinduced electron transfer-initiated ion radical chain isomerization (Quantum Amplified Isomerization [QAI]). These materials have a potential to overcome many drawbacks of existing photoresponsive polymers. For example, they are designed to produce multiple reactions per each absorbed photon without any dimensional changes but with significant changes in optical properties such as refractive index, absorption, and fluorescence.

"The youth of this society is what we want to nurture" was the message of I-APS President **Ed Hilinski** (Florida State University) in his introduction of the 2003 Closs Awardee **Jayaraman Sivaguru** (Tulane University) who presented his research on "*Asymmetric Induction During Photoisomerization of Diphenylcyclopropane Derivatives: A Study in Isotropic and Confined Media*." The main theme of this lecture was asymmetric induction in the photoisomerization of 1-substituted-2,3-diphenylcyclopropanes in zeolites. Relative advantages of chiral inductors and chiral auxiliaries were discussed. Several factors were found to be important for chiral induction; these included water content, nature and number of cations controlled by Si/Al ratio in the zeolite, and cation- π -interactions. The mechanism of action of a cation dependent "diastereomer switch" from N,O-coordination (Li-zeolites) to O,O-coordination (K-zeolites) provides a nice illustration of how even complex systems can succumb to a mechanistic study, and the nature of underlying factors controlling reactivity can be thoroughly understood.

The 2003 I-APS Young Investigator Award Lecture was given by **Dario Bassani** (Université Bordeaux) who shared his adventures in "*Supramolecular Photochemistry: from Molecular Electronics to Self-Assembled Photoactive Architectures*." Dario reported his progress on several lines of research combining supramolecular and photochemical methods in the development of nanoscale molecular devices. For example, spectroscopic and conductivity

studies on a series of oligo(thienyl-vinylene) containing leucodyes illustrate that these materials have significant potential as molecular switches capable of conjugation and charge injection in a single event. At the end of the lecture, Dario briefly discussed his progress in other directions such as supramolecular photocatalysis and polymerization of fullerenes with possible applications as templates for the assembly of polymeric systems and the construction of photonic devices in which active centers are juxtaposed in a linear arrangement.

The 2003 I-APS Award in Photochemistry was presented to Fred Lewis (Northwestern University) who shared with the audience his "*Reflections on Excited State Reactivity: Entropy, Enthalpy and Conformation*." Fred started his talk with a historical perspective outlining the development of photochemistry from its early stage to its current status as a science capable of detailed understanding of photochemical processes at the molecular level using transition state theory — a notion which is taken for granted now but was considered to be "misguided and risky" when Fred started his research career. During his talk, Fred skillfully combined several research vignettes including conformational control of photochemical behavior, stilbene exciplex formation, exciplex conformational control of regioselectivity of intramolecular photoaddition, as well many other fundamental aspects of photochemistry and photophysics of arylalkenes along with detailed kinetic studies of photochemical rearrangements into a highly engaging potpourri well-accepted by the audience.

Fred's lecture was followed by the I-APS Business Meeting during which it was decided to hold the next conference in January, 2004 in Tempe, Arizona. It will be co-chaired by **Devens Gust** and **Cornelia Bohne**. **Laren Tolbert** (Georgia Institute of Technology) invited all conference participants to attend the Gordon Research Conference on Photochemistry, July 20–25, 2003, to be held at Mount Holyoke College in South Hadley, Massachusetts. Explore the conference web site at <http://www.grc.uri.edu/programs/2003/photochem.htm> for more information.

After a very short break for lunch, the conference continued with a lecture by **Linda Peteanu** (Carnegie Mellon University) who presented her latest results on "*Effects of Aggregation on the Excited States and Emission Properties of Materials Used to Make Organic LEDs*." Linda convinced the audience that LED research is a lot of fun not only because "one can see fluorescent images reflected in the eyes of students" but also because of the number of important photophysical issues one has to address in designing materials for practical applications. She described the effects of structure, morphology, and degree of aggregation on properties of phenylene vinylene

oligomers, shared her excitement about finding extraordinary photostable materials, and outlined future directions in designing of new, even better, organic LEDs.

In the next lecture "*Luminescence and Electroluminescence of Metal Complexes*," **Luisa DeCola** (University of Amsterdam) described the discovery of an unusual electroluminescent device based on poly(phenylenevinylene) blended with a phosphorescent complex consisting of two ruthenium centers linked by a tetraphenylene bridge. The unique feature of this complex is that its emission color can be switched from red to green by simply reversing the sign of the bias voltage.

After a short, but warm and personal, perspective on the history of photochemistry and a brief overview of the many research topics which are under active development in his research group, **Howard Zimmerman** (University of Wisconsin-Madison) continued his lecture with a story of discovery of Type C Cyclohexenone Rearrangement. The title of the talk was "*An Experimental and Theoretical Study of the Type C Enone Rearrangement. Mechanistic and Exploratory Photochemistry*." In contrast to most classic cyclohexenone rearrangements, the Type C rearrangement proceeds through a twisted π, π^* excited triplet state rather than the more usual n, π^* state. The electronic nature of intermediates and a possible mechanism were evaluated experimentally through substituents effects on the regioselectivity of migration and studied theoretically through the use of state-of-the-art combined multiconfigurational CASSCF/NBO approach. In this theoretical study, the use of Natural Bond Orbitals (NBOs) allowed the selection of a CASSCF active space with only those orbitals being included which are of utmost importance for the species under consideration. This made it possible to solve a challenging task — an efficient but still accurate CASSCF treatment of these relatively large systems.

Peter de Lijser (Cal State, Fullerton) presented a detailed and thorough mechanistic study of "*Photosensitized Reactions of Oximes and Oxime Ethers*." While oximes typically afford the corresponding carbonyl compounds under chloranil sensitization conditions, the chemistry of oxime ethers is more diverse, and a variety of products can be obtained depending on the structure of the oxime and the solvent used.

In a break before the evening lectures some of the conference participants ventured out to explore seafood restaurants in the Clearwater Beach area and the nearby islands. Nevertheless, everybody was back at 7 pm for a lecture by **Steffen Jockusch** (Columbia University) who gave a talk on "*Triplet Fluorescence Energy Transfer in Covalently Trichromophore-Labeled DNA for Multiplex Genetic Analysis*." Multiplex fluorescent tags are important tools in studies of many biological targets, but

the number of dyes with distinguishable fluorescent signatures is limited. Steffen described how energy transfer in mono-, di-, and trichromophore-labeled DNA can be used for tuning fluorescence. The combination of this approach with efficient solid-state synthesis of the substrates leads to the development of a number of new tags with distinguishable fluorescent signatures.

The final lecture of Saturday "*Spatial, Photochemical, and Spectroscopic Studies of Melanins*" was given by **John Simon** (Duke University). Although the history of melanin research goes back to the 17th century and melanins are among the most ubiquitous natural pigments, their structure and biological function are still actively debated. Careful spectroscopic and imaging experiments on eumelanin and pheomelanin provided significant insight into the dynamics of formation, the optical properties, and the photoreactivity of different melanin aggregates.

The last evening of the conference had another poster session that was also well attended despite fierce competition from the Packers-Falcons game that could be viewed in the hospitality suite funded by *Ultrafast Spectrometers LLC*.

The last day started with remarks by 15th I-APS Winter Conference co-chair **Devens Gust** (Arizona State University) who invited all present to Tempe. Devens encouraged everyone to contact Cornelia or him to give suggestions for speakers. As additional conference information becomes available, it can be accessed via the I-APS web site at < <http://www.chemistry.mcmaster.ca/~iaps/>>.

Vladimir Popik (Bowling Green State University) presented a talk on "*Remarkable Wavelength-Dependent Photochemistry of Diazo Meldrum's Acid and Its Spirocyclic Isomer, Diazirino Meldrum's Acid*." The direction of photochemical transformation taken by diazo Meldrum's acid can be conveniently controlled through adjustment of the irradiation wavelength. The use of 350 nm light results in clean isomerization to a spirocyclic diazirine while photolysis with a low-pressure mercury lamp (254 nm) yields an α -carbonylketene, the product of a Wolff rearrangement. Interestingly, a triplet-sensitized photoreaction followed a third pathway to produce cleanly the parent dicarbonyl compound, Meldrum's acid. Insight into the nature of these processes and the related wavelength-dependent photochemistry of the spirocyclic diazirine was achieved through a combination of photophysical and computational studies.

In the first part of her talk, **Jaime Stearns** (Purdue University) discussed differences in the "*UV and IR Spectroscopy of ortho-, meta- and para-Diethynylbenzene*." The lower energy of the S_2 state in the case of *ortho*-diethynylbenzene was suggested to have interesting

implications for the photochemical reactivity of these compounds. In the second part of her talk, Jaime also discussed interesting aspects of the excited state dynamics of indole and its derivatives.

Anna Gudmundsdottir (University of Cincinnati) presented a detailed mechanistic study on “*Triplet Sensitization of Alkyl Azides*.” This photochemical reaction provides a straightforward access to triplet nitrenes, reactive intermediates that have received considerable recent attention due to their interesting spin properties and their potential as candidates for magnetic materials. Triplet nitrenes formed in triplet-sensitized decomposition of azides were trapped via a variety of bimolecular reactions and detected directly in laser flash photolysis studies and in IR studies in argon matrices. Unambiguous assignments of the C-N stretch of the nitrene intermediate was achieved through ¹³C and ¹⁵N isotope labeling studies. In the last part of the talk, Anna also presented a number of interesting photochemical transformations of organic azides in the solid state that were different from their solution reactivity. Anna then invited all to attend the International Symposium on Reactive Intermediates and Unusual Molecules (ISRIUM 2003) to be held in Reykjavik, Iceland from August 17 to 23, 2003; see <<http://www.che.uc.edu/ISRIUM2003>>.

Jack Saltiel (Florida State University) spoke about studies on “*Conformer Specific Photoconversion of 25-Hydroxytachysterol to 25-Hydroxyprevitamin D₃*,” which brought to Jack memories of both his former advisors, George Hammond and Bill Dauben. Surprisingly, although Jack’s research has revolved around the idea of conformer specific photochemistry for a long time, this was his first study of vitamin D photochemistry, the subject of Havinga’s original paper on the NEER (nonequilibration of excited rotamers) principle. Despite

all the trials and tribulations of doing fundamental science in the framework of an industrial collaboration, this research led to significant mechanistic and practical developments in vitamin D photochemistry. Examination of hydroxytachysterol absorption spectra revealed features consistent with at least two conformers that were shown to differ dramatically in their reactivity. Selective irradiation of one of these conformers led to a nearly four-fold increase in the efficiency of previtamin D formation from tachysterol. A high yield of previtamin was achieved starting from the provitamin by using sequential 254/313 nm excitation.

Ian Gould (Arizona State University) concluded the conference with a talk on “*Reductive Bond Fragmentation, Experiment and Theory*” which provided a detailed analysis of this deceptively simple but important process using N-O bond fragmentation in *N*-methoxypyridinium salts as a case study. Judicious choice of substituents allowed control over the relative energies of the crossing point between two electronic configurations corresponding to the reactant and the product while the electronic coupling between the configurations (leading to an avoided crossing) can be increased by the bending of the N-O bond out of molecular plane. With a proper combination of the above factors, the reaction barrier disappears!

In closing remarks, **Ed Hilinski** thanked everyone including the co-chairs, the other members of the organizing committee, the award winners, the speakers, the poster presenters, the discussion leaders, and those participating in discussions — for making this another excellent meeting in the series of I-APS Winter Conferences, hoped to see everyone in Tempe, Arizona in January 2004 for the 15th I-APS Winter Conference, and wished all safe trips home.

Observations from the XXIst International Conference on Photochemistry (ICP21), Nara, Japan, July 26–31, 2002

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The XXIst International Conference on Photochemistry (ICP21) was held in the city of Nara, Japan, from July 26th to 31st, 2002. Scientific activities took place at Nara Public Hall in the middle of historic City Park, where modern facilities are tastefully integrated into a beautiful landscape full of *Shinto* shrines, *Buddhist* temples and traditional Japanese gardens. For a short time, 710–784 AD, Nara was Japan's capital, so stone and wood literally breathe history here (for more information see a website maintained by the prefecture: http://www.pref.nara.jp/nara_e/area01). The city park is also inhabited by thousands of domesticated yet vicious deer, known to beg unsuspecting tourists to death. Of the conferees, there was only one accident reported — a gang of deer ate half a copy of the scientific program (paperback) carelessly waved around by Bob Dunn of University of Kansas on his way to the lecture hall.

Further fatalities were prevented by the fact that the organizers (Mikhail V. Alfimov, Honorary Chairman of the International Organizing Committee and local organizers, Hiroshi Masuhara and Kinichi Obi, co-chairs; full list of organizers is below) did a superb job of putting together a diverse scientific program, which kept the conferees indoors and out of harms way from 9 am to 8:30 pm with short breaks for lunch and dinner. Except for the first three plenary lectures, the talks were held in four concurrent sessions, which made my task of reviewing them for this report a tad difficult. I, nevertheless, have a hope that my writeup will convey the spirit of this scientific gathering, which brought together 814 scientists from 31 countries and covered a wide variety of topics. According to the distributed participant list, the largest group of participants was, naturally, from Japan. The US followed with 33 conferees, then Korea (21), Russia (21), Germany (20), UK (12), Taiwan (9), Poland (8), France (7), Canada (6), India (6), Netherlands (6), Switzerland (6), Australia (5), Belgium (5), Ukraine (5), China (4), Finland (3), Spain (3), Sweden (3), Tailand (3), Belarus (2), Algeria (1), Denmark (1), Egypt (1), Hong Kong (1), Israel (1), Italy (1), Jordan (1), Nigeria (1), Turkey (1). There was also one participant from a country named *Other*, who actually came from University of Puerto Rico.

The conference kicked off with a special “Student Symposium” and a welcome party on Saturday, July 26th. The group photo from the party is posted at the conference website (<http://www.pac.ne.jp/icp21>). At the opening ceremony next day Hiroshi Masuhara proudly declared the conference the largest ICP meeting of them all. Kiyoshi Kurokawa, the chairman of the Science Council of Japan gave an inspiring speech and read a greeting telegram from the Prime Minister of Japan. Mikhail Alfimov, the honorary chairman and the host of the previous ICP meeting, found it symbolic that the conference on photochemistry is held in a country whose flag carries the image of world's largest UV/VIS source.

The opening ceremony was followed by three plenary lectures: by the 1986 Nobelist Yuan T. Lee, *Academia Sinica*, Toshio Yanagida, *Osaka U*, and Graham R. Fleming, *UC-Berkeley*. Lee briefly reviewed his method of crossed molecular beams, developed in his Berkeley days and then talked about two recent projects, one having to do with photochemistry of a *good guy* (-YTL), ClO₂, and the other — with photoinduced scrambling of alkyl benzenes, which they proved involves cycloheptatrienes as intermediates. Toshio Yanagida had presented a spectacular lecture chock full of movies on molecular machines, manipulation of DNA with optical tweezers, single molecule fluorescence with evanescent wave excitation etc. He finished with his controversial stochastic model of myosin locomotion based on the premise that it is the Brownian motion and not the ATP, which is the energy source for myosin marching down the actin filaments. The ATP, he argues, is needed only to modulate the myosin-actin binding. The actual motion is Brownian, with the directionality biased by the asymmetric nature of myosin-actin binding (i.e., a thermal ratchet). On a lighter and somewhat philosophical note, Yanagida outlined the differences between the Western (*deterministic*) and Eastern (*ambiguity, stochastic*) understanding of various phenomena. Granted, he was not serious at all, but his comments underscored dramatic and irreconcilable differences between the “Western” and “Eastern” traditions, especially in the matters such as “to wear or not to wear” slippers, when presenting a lecture.

The podium in the Room “A” was a part of a traditional pagoda-like internal structure with a sort of tatami mat covering the stage. In addition to the usual “No food, No drinks, No smoking,” there was another message displayed between the talks: “Please take off your shoes on stage. Please change to slippers.” Apparently, this caught not only my attention — several people gave it some thought. The next plenary speaker, Graham Fleming, while climbing on stage, made a passing comment that this is the only talk you give, having to wonder if you have holes in your socks. Actually, after changing into traditional red slippers the speakers looked very homey and down to earth, in spite of all the formal attire, black suits, white shirts, ties and what not. In any event, Fleming’s talk was on mechanisms and optimization of photosynthetic light harvesting. He summarized his seminal studies on energy transport in natural light harvesting systems and talked about studying ultrafast processes with the three-pulse photon echo peak shift technique. What also strikes me is that for systems as large and as complex as clusters of porphyrins outfitted with protein fragments or carotenoids, the Fleming group was able to run high level *ab initio* computations, both using Gaussian and in house programs, and some in collaboration with Martin Head-Gordon’s group. The computed coupling matrix elements and the *transition density cube* made for a very realistic model of energy-transfer pathways in the photosystems.

After a brief lunch break the conference resumed in four concurrent sessions: (A) special session dedicated to late Professor George Porter “Elementary Processes in Photochemistry” at which among other things Frank Wilkinson of *Loughborough Univ.* covered George Porter’s research at Cambridge and Sheffield; and David Phillips (*Imperial College London*) talked about Sir Porter’s days at the Royal Institution and Imperial College; (B) “Laser Processing towards Nano-Technology”; (C) “Photofunction of Heterogeneous System”; (D) “Organic Photochemistry and Reactive Intermediate.” The latter was organized jointly by Hideo Tomioka (*Mio U*) and Kazuhiko Mizuno (*Osaka Pref. U*). Invited lectures at this two-day mini-symposium included a talk by Daniel Falvey, *U Maryland*, on chemical and spectroscopic studies of photochemically generated nitrenium ions; Akihiko Ouchi (pronounced oh-^{oo}-chee, not ouchey!), *Natl Inst of Adv Industrial Science and Technology*, on photoinduced rearrangements of 1,6-(N-phenyl)aza[60]fulleroids; my lecture on photolabile scaffolds for molecular recognition; Takumi Oshima, *Osaka U*, on photosensitized E/Z isomerization of 1,2-dichloroethene with cation-recognized triplet sensitizers; UngChan Yoon, *Pusan Natl. U*, on synthetic strategy for the preparation of cyclic peptide mimetics based on SET-promoted photocyclizations; Teruo Shinmyozu, *Kyushu U*, on

photochemical study of [3n]cyclophanes (with the objective of synthesizing hexaprismane derivatives); and Miguel A. Miranda, *U. Politecnica de Valencia*, on mechanistic studies in dyads containing benzoylthiophene and indoles or phenols. Diastereomeric dyads were synthesized and separated to investigate possible chiral discrimination in intramolecular hydrogen transfer from the indole or phenol fragment to benzoylthiophene. The day was concluded with poster session 1.

In addition to the second half of “Organic Photochemistry and Reactive Intermediates,” several sessions were held on Monday, July 28th, including “Gas Phase Photodynamics,” “Solar Light Energy Conversion: from Artificial photosynthesis to Solar Cell,” “Anisotropic Control in Supramolecular Photochemistry,” “Supramolecular Photochemistry,” “Photochemistry of Biomolecules,” “Photochemistry and Microscopy,” “Atmospheric Chemistry” and “Reaction Dynamics and Spin Chemistry.” As usual Michael Grätzel of *Swiss Federal Inst. of Technology* had delivered a stimulating lecture on molecular photovoltaics that mimic natural photosynthesis under “Solar energy conversion.” Haruo Inoue of *Tokyo Metropolitan U.* opened the “Anisotropic Control...” session with a talk on anisotropic molecular interactions in supramolecular system and selective energy flow. This was followed by talks by Anthony Harriman, *U Newcastle* on conformational control of electronic coupling in molecular dyads and Robert Liu’s (*U Hawaii*) photoisomerization by hula-twist (since Jack Saltiel decided not to go to Japan after the Gordon Research Conference, Bob’s mechanism went largely uncontested). There were several talks in this session on semiconducting polymers and assemblies, including lectures by Sarah Tolbert, *UCLA*, on control of optical properties in semiconducting polymers through host/guest chemistry and inorganic/surfactant co-organization; Prashant Kamat, *U Notre Dame*, on photoinduced charging events in semiconductor-metal and metal-fluorophore hybrid nanoassemblies; Benjamin Schwartz, *UCLA*, on spatial distribution of interchain species in films of semiconducting conjugated polymers. Invited lectures in the “Supramolecular Photochemistry” session included a talk by Russell Schmechl, *U Tulane*, on photophysical behavior of Ru(II), Os(II) and Pt(II) complexes having multiple photoactive excited states; Seigo Yamauchi, *Tohoku U*, on controlling the lifetimes of excited states “by an electron spin”; and Kirk Schanze, *U Florida*, on triplet excited state in platinum-acetylide oligomers and polymers. Albert Brouwer, *U Amsterdam*, talked about photoinduced sub-molecular motion in rotaxanes.

In the “Photochemistry of Biomolecules” session Silvia Braslavsky, *MPI*, gave an invited lecture on

utilization of optoacoustic measurements to assess time-resolved thermodynamic parameters of biological photoreceptors.

On Monday afternoon a rather large audience was attracted to workshop on “Photochemistry and Microscopy” organized by M. Ishikawa, H. Fukumura, N. Tamai. Under scrutiny were singular quantities of molecules or, at most, nanocrystals. David Vanden Bout, *UT-Austin*, talked about single molecule studies of rotational dynamics in materials near their glass transition; Frans De Schryver, *KULeuven*, gave a talk on ensemble and single molecule photophysics of multichromophoric systems; Markus Sauer, *U Heidelberg*, discussed using electron transfer reactions to probe single-molecule conformational dynamics. After a short 25 min “coffee break with a snack,” designed to substitute dinner, the talks continued into the evening, starting with a lecture by Stefan Hell of *Max Planck Inst for Biophys. Chemistry*. Using stimulated emission depletion (STED) microscopy in combination with 4Pi microscopy, Hell’s group was able to overcome the Abbe’s diffraction resolution barrier and achieve the order of 30 nm spatial resolution along the optic axis. If proved practical, the method may be the next BIG thing in far-field optical microscopy. Robert Dunn, *U Kansas*, gave a talk on utilization of a hybrid AFM/NSOM microscopy in single molecule studies of biological function. This session was concluded with a lecture by Paul Barbara, *UT-Austin*, who covered some selected issues related to single molecule spectroscopy of conjugated polymer and DNA isolated chains. Actually, there was a lot of new material on conjugated polymers to cover, so Paul only touched on the DNA issues at the end of his talk.

There were sessions on “Photochromism,” “Organic Photochemistry,” “Photochemistry and Photophysics of Porphyrin-Related Compounds” and “Synchrotron Radiation Chemistry” on Tuesday morning. The “Photochromism” session was held in Room A and the first few talks were chaired by Mr. Photochromism himself Masahiro Irie of *Kyushi U*. The first lecture was by Mikhail Krayushkin, *Russian Acad. Sci.*, who discussed several novel synthetic approaches to photochromic dihetarylethens. As was required of all the speakers in Room A, the renowned Russian scientist did change into red slippers. However, his drinking water during the stimulating talk did not come unnoticed by the presiding officer, who eventually sent his apprentice up the podium to seize the generic bottle of *Aqua*-something. As it turned out, the warning “No drinks” was strictly enforced in Room A (luckily, rooms B, C & D stayed less prohibitive). Yasushi Yokoyama, *Yokohama Natl. U*, who attended GRC on Photochemistry at Mount Holyoke and also managed to get to Nara on time, gave a lecture on novel

photochromic systems based on 1,3-bisarylbutadienes. Several other lectures on various aspects of photochromism and optical switching were delivered by Kindo Uchida, *Ryukoku U*, Takahiro Seki, *Nagoya U*, Keitaro Nakatani, *Ecole Normale Supérieure de Cachan*, Toshihiko Nagamura, *Shizuoka U*, and Valery Barachevsky, *Russian Acad. Sci.*

Tuesday afternoon was allocated for Noh performance, a half-day sightseeing tour and the Banquet, which was opened with a traditional ceremony of smashing the lid of a sake barrel with hatchets (performed by high ranking ICP officers dressed in traditional Japanese clothes) and also drinking sake from *petite* wooden boxes accompanied by shouting “Kanpai!” This certainly broke ice around many tables, so the banquet was a success. Countless variations of exquisite fish dishes were offered in addition to “first come first serve” sushi bar in the banquet hall. I personally enjoyed fish very much, although I should admit, in Nara I completely exhausted my annual quota of seafood intake. Our Japanese colleagues were extremely hospitable hosts. Masami Sakamoto of *Chiba U*, sharing table with us, patiently explained the customs and traditions of Japanese dining. A day before, the organizer of “Organic Photochemistry and Reactive Intermediates” Hideo Tomioka took several of us to a traditional restaurant, where we all enjoyed informal interaction with our Japanese colleagues. The organizers did a good job providing opportunities for such informal “mixing.” Twice they organized Japanese-style-late-evening-bar mixers for the speakers, where we all were able to chat about scientific and not-so-scientific issues, consuming munchedibles by the low tables and washing it down with ever-slightly-alcoholic beverages. Kanpai!

Wednesday, July 30th, Room A (slippers!), “Asymmetric Photochemistry.” The session was organized by Yoshihisa Inoue of *Osaka U*. Invited lectures included a talk by Kenso Soai, *Tokyo U Sci.*, on enantioselective synthesis with ee’s exceeding 99.5% achieved by a combination of circularly polarized light and asymmetric autocatalysis; Richard Pagni, *UTennessee*, on multiphoton chemistry with linear and circularly polarized light. Axel Griesbeck, *U Cologne*, summarized his work on spin effects in organic stereochemistry (“spin-mapping”) and also talked about magnetic isotope effects in the absence of external magnetic fields — a new dimension in controlling the stereochemical outcome of photocyclizations by modulating SOC/HFC ratios. Norbert Hoffmann, *CNRS & U de Reims*, gave a talk on asymmetric photocycloadditions to furanones; Yasushi Yokoyama, *Yokohama Natl. U*, gave another lecture on chirality control in photocyclizations of diarylethenes and the morning session was concluded with an invited talk

by Thorsten Bach, *Tech. U Muenchen*, who reviewed his research efforts in achieving high enantioselectivity of intra- and intermolecular photocyclizations via H-bond templating with enantiomerically pure host molecules.

After lunch this session was continued with talks given by the organizer Yoshi Inoue, *Osaka U*, on photo-generation and properties of optically active (*E*)-diazacyclooctene, which racemizes much faster than its all-carbon counterpart, *trans*-cyclooctene; V. Ramamurphy, *Tulane U*, on the role of confinement and alkali metal ions in asymmetric photoreactions within zeolites. After coffee break Murphy took up the reins of session's chairman and the last two invited lectures in this workshop were delivered by John Scheffer, *U British Columbia*, on pre-organization of achiral molecules of photochirogenesis through crystallization-induced immobilization in homochiral conformations and Masami Sakamoto, *Chiba U*, on memory of chirality generated by spontaneous crystallization and asymmetric synthesis using the frozen chirality — a neat approach whereby achiral molecules trapped in chiral conformations (in chiral crystals) can be dissolved in cold solutions without racemization and then subjected to stereoselective transformations via all kinds of solution chemistries.

Other sessions this day included a workshop on "Photochemical and Photocatalytic Reactions within Zeolites," a special session "Photo-Catalytic Chemistry in Asia," and workshops "Molecules in Intense Laser Fields," "Electron Transfer and Energy Relaxation Dynamics I," and "Photochemistry of DNA." The latter drew a rather large crowd of participants and was opened with Fred Lewis' (*Northwestern U*) talk on dynamics and energetics of single step hole transport in DNA. Other invited talks at this session included a lecture by Tetsuro Majima, *Osaka U*, on hole transfer in DNA by adenine hopping mechanism; Kazuhiko Nakatani, *Kyoto U*, on charge transport in duplex DNA containing hole-trapping nucleotide bases; Hiroshi Sugiyama, *Kyoto U*, on photoreaction of 5-halouracil-containing Z-form DNA; and Masatsuga Shimomura, *Hokkaido U*, on aggregation behavior and photoisomerization of azobenzene DNA-mimetics formed at the air-water interface. Invited speakers at the "Electron transfer..." session included Monique Martin, *Ecole Normale Supérieure*, speaking on ultrafast spectroscopy of p-coumaric acid in a quest to understand the primary photochemistry of the photoactive yellow protein; Klaas Zachariasse, *MPI for Biophys. Chem.*, with a lecture on intramolecular charge transfer with donor/acceptor molecules in solution, in crystals and with planarized systems; and Nobuhiro Ohta, *Hokkaido U*, speaking on electric field effects on excimer fluorescence of pyrene and generation of electroluminescence in a polymer film. The day ended

with Poster Session II followed by a late night "bar mixer" for invited speakers.

Thursday, July 31st: in addition to the second section of "Asymmetric Photochemistry" chaired by John Scheffer, the last day of ICP saw the following sessions: "Photochemical Electron Transfer," "Electron Transfer and Energy Relaxation Dynamics II," "Nano-Scale New Technology," "Time- and Space-Resolved Vibrational Spectroscopy: State-of-the-Art and Photochemical Applications," "Spin photochemistry" and "Photochemistry and Function of Coordination Compounds." The latter was chaired by Kirk Schanze, Seigo Yamauchi, Russ Schmehl and Etsuko Fujita and covered a wide variety of topics, from bacteriochlorophyll, to optically switchable molecular solids, to light-to-electrical energy conversion. Gerald Meyer, *Johns Hopkins U*, gave a lecture on molecular control of photo-induced interfacial electron transfer. In his talk Jerry covered very fundamental issues related to electron injection at the TiO₂ interfaces. Joseph Hupp, *Northwestern U*, talked about supramolecular assemblies for photoelectrochemical light-to-electrical energy conversion. At the "Photochemical Electron Transfer" session Hiroshi Imahori, *Kyoto U*, talked about porphyrin and fullerene as a novel donor-acceptor couple in photoinduced electron transfer; Mikhail Kuzmin, *Moscow State U*, gave a talk on the nature of alternative mechanisms of excited-state electron transfer, elaborating the nature of medium reorganization. Also, a talk on femtosecond study of the photoinduced electron transfer in porphyrin-fullerene dyad was presented by Helge Lemmetyinen, *Tampere U Technology*. There were several interesting talks at the "Electron Transfer and Energy Relaxation Dynamics II," including a talk by Jacek Waluk entitled "In Search of cis Tautomeric Forms in Porphycene."

The Closing Ceremony was held shortly after 5 pm, after which it was time to say goodbye to Nara.

Well, what's left for me is to thank the organizers again for their hard work and congratulate them with all this success. I am particularly pleased with the fact that the program included more "organic" photochemistry than any previous ICP conference (granted I am biased!), making it a more diverse (and balanced) mix of mechanisms, photophysics, spectroscopy and practical applications.

Finally, a somewhat important note on raising public awareness and lobbying for fundamental science. Hiroshi Masuhara mentioned that Japanese government allocates special funds for no more than two chemistry conferences annually, but in spite of tough competition our local organizers were able to secure such support for ICP, underscoring the importance of photochemical sciences

in public view. In his tribute to Sir George Porter, Graham Fleming commended him on being not just a great scientist, but also a great showman, who was willing to talk about science with anyone (including Queen Elizabeth). That comment resonated with our conversation with Silvia Braslavsky, who suggested that every scientific conference should incorporate a popular science session open for general public for the same practical reason — to raise awareness and to (re)instill the idea that science is cool; — something for the future organizers to think about.

The next ICP meeting will take place in Australia in 2005.

Sayonara! (pronounced SA_YO-U_NA_RA). See you in Australia, mate! (pronounced m-EYE-t)

International Organizing Committee:

M. V. Alfimov (Russia): Honorary Chairman; A. K. Chibisov (Russia); G. R. Fleming (USA); M. Martin (France); H. Masuhara (Japan); D. Phillips (United Kingdom); J. C. Scaiano (Canada); J. D. Simon (USA); J. Waluk (Poland); K. Zachariasse (Germany)

Local Organizing Committee:

Chairpersons: H. Masuhara (Osaka); K. Obi (Tokyo)
Secretary-General: N. Nakashima (Osaka)
Secretary-Treasurer: K. Mizuno (Osaka)
Members: T. Asahi (Osaka); K. Nakamura (Nara); A. Fujishima (Tokyo); K. Shibuya (Tokyo); H. Fukumura (Tohoku); S. Suruga (Tokyo); T. Ichimura (Tokyo); K. Yoshihara (Ishikawa)

Conference Report International Symposium on Reactive Intermediates and Unusual Molecules Reykjavik, Iceland, August 17–23, 2003

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The first International Symposium on Reactive Intermediates and Unusual Molecules (ISRIUM) was held in Geneva in 1978 and since then the meeting has been held regularly in various locations in Europe, Asia, Australia, and North America. Organized by **Anna Gudmundsdottir** (University of Cincinnati, USA), the 18th version of ISRIUM was recently held in the uniquely spectacular country of Iceland. The stimulating nature of our surroundings was well-matched by the interesting scientific program expertly put together by Anna.

Following a reception Sunday evening, August 17, the conference began Monday morning with **Matt Platz** (Ohio State University, USA) describing recent kinetic and spectroscopic evidence for carbene-solvent complexes. **John Toscano** (Johns Hopkins University, USA) followed with a presentation on the chemistry and spectroscopy of oxynitrenes and **Barry Carpenter** (Cornell University, USA) concluded the first morning session with an overview of the challenging mechanism of the cyclization of (Z)-1.2.4-heptatrien-6-yne.

Ned Jackson (Michigan State University, USA) opened the second morning session with a discussion of hydridic to protonic hydrogen bonds. **Bob Moss** (Rutgers University, USA) described the generation of several classic carbocations of physical organic chemistry via oxychlorocarbene fragmentation reactions. Concluding the session, **Tatiana Nekipelova** (Emanuel Institute of Biochemical Physics, Russia) presented results on the reactivity carbocations generated upon photolysis of dihydroquinolines.

Bob McMahon (University of Wisconsin, USA) began the first afternoon session describing microwave spectroscopic detection of organic intermediates important in the chemistry of the interstellar medium and **Bob Sheridan** (University of Nevada, USA) presented results on several singlet carbene rearrangements that occur at temperatures at or below 10 K and the role that tunneling plays in these processes. **Thomas Bally** (University of Fribourg, Switzerland) concluded the session with a discussion of detailed low-temperature matrix experiments on the fragmentation reactions of oxychlorocarbenes.

In the second afternoon session **JoAnn DeLuca** (Central Washington University, USA) presented results on the thermal and photochemical decomposition of phenyliodonium ylides and their potential as precursors for dicarbonylcarbenes. **Malcolm Forbes** (University of North Carolina, USA), sporting a shiny gold medal from a personal best finish in the Reykjavik Half-Marathon, described recent time-resolved EPR experiments on the photooxidation of dipeptides and the always entertaining topic of beer photochemistry. **Bob McClelland** (University of Toronto, Canada) followed with a discussion of recent laser flash photolysis studies of 2-fluorenylnitrenium ion and the allylic carbocation derived from tamoxifen. Monday concluded with a lively and well-attended Poster Session.

Tuesday morning began with **Wolfram Sander** (Ruhr-Universität Bochum, Germany) describing recent work on the mechanisms of carboxylic acid dimerization in low-temperature matrices. **Hilkka Kenttämä** (Purdue University, USA) followed with a discussion of the reactivity of aromatic biradicals including didehydroquinoliniums as revealed by Fourier-transform ion cyclotron resonance mass spectrometry and **Athanossios Nicolaides** (University of Cyprus, Cyprus) concluded the session with computational predictions for stable purely hydrocarbon carbenes with singlet ground states.

Christopher Hadad (Ohio State University, USA) started the second morning with a comprehensive discussion of substituent effects on stability and rearrangement processes for a variety of carbenes. **Robin Walsh** (University of Reading, United Kingdom) reported on the kinetics and mechanisms of Group 14 heavy carbene reactions in the gas phase and **Hamish McNab** (University of Edinburgh, United Kingdom) presented flash vacuum pyrolysis studies of nitrene and carbene precursors to access heteroindoxyl and benzimidazo[1,2-a]pyrimidine derivatives, respectively.

Josef Michl (University of Colorado, USA) opened the Tuesday afternoon sessions with an interesting description of the fabrication and spectroscopic, dielectric, Langmuir isotherm, scanning microscopy, and

computational characterization of fused quartz and metal surface-mounted altitudinal molecular rotors. **Mitsua Kira** (Tohoku University, Japan) described recent studies of the reactivity of a stable silylene including the synthesis of a stable trisilaallene. **Wes Borden** (University of Washington, USA) concluded the first afternoon session with a presentation on the use of B3LYP calculations to design semibullvalenes with bishomoaromatic equilibrium geometries, to predict their spectroscopic signatures, and to investigate whether these semibullvalenes are actually stabilized by bishomoaromaticity.

Wolfgang Schoeller (University of Bielefeld, Germany) presented a qualitative theoretical model for predicting the stability of biradicals of four-membered ring heterocycles and **Peter Ogilby** (University of Aarhus, Denmark) described several approaches for the development of new microscopes to monitor singlet oxygen directly with both time and spatial resolution and the potential application of these singlet oxygen microscopes in biological and polymeric systems. Tuesday's sessions concluded with **Rainer Herges** (Universität Kiel, Germany) describing the synthesis of the first Möbius-type twisted annulenes and investigations probing the aromatic character of these novel and topologically interesting compounds.

Cornelia Bohne (University of Victoria, Canada) began Wednesday with a presentation on mechanistic studies of the photoswitching between dimethyldihydropyrenes and metacyclophanedienes. **Peter Gaspar** (Washington University, USA) described gas phase studies using a quadrupole ion trap GC/MS instrument to study the chemistry of novel reactive intermediates with four or six valence electrons including phosphonium, oxenium, and sulfonium ions and monovalent methanetriyl and silanetriyl cations. **Dan Falvey** (University of Maryland, USA) finished the first morning session with an update on the chemical and spectroscopic properties of photochemically generated arylnitrenium ions, including their reactions with a variety of aromatic compounds such as 1,3,5-trimethoxybenzene, guanosine, and tryptophan.

The second morning session began with **William Jenks** (Iowa State University, USA) providing an account of the photochemistry of dibenzothiophene-S-oxides, which produce sulfides and O-atoms upon photolysis, and the analogous sulfilimines, which may be alternate nitrene precursors. **John Warkentin** (McMaster University, Canada) described reactions of dialkoxycarbenes with tethered carbonyl groups, produced by thermolysis of oxadiazoline derivatives. **Ralf Warmuth** (Rutgers University, USA) concluded the morning sessions with an interesting presentation on the ring-expansion

reactions of 1-bicyclo[2.2.1]heptylcarbene in the inner phase of a hemisarcander.

Nikolaus Ernsting (Humboldt-University, Germany) began the afternoon sessions with an overview of broadband techniques and applications of femtosecond optical spectroscopy in condensed phases. **Chris Reed** (University of California, Riverside, USA) presented recent results demonstrating $\text{H}(\text{CB}_{11}\text{H}_6\text{Cl}_6)$ is the strongest pure acid isolated to date and that it can be used to generate highly reactive cations that are stabilized by the inert, non-coordinating icosahedral carborane anion. **Roger Alder** (University of Bristol, United Kingdom) finished the first afternoon session with a thorough discussion of dimerization reactions of diaminocarbenes.

Miguel Garcia-Garibay (University of California, Los Angeles, USA) discussed recent experiments on the photoenolization of ortho-methyl-arylketones in crystals near zero Kelvin that were aimed at establishing structure-reactivity correlations for quantum-mechanical tunneling reactions. **Henning Hopf** (Technical University of Braunschweig, Germany) concluded Wednesday's sessions with a presentation on the thermal cyclization reactions of conjugated 1,3-hexadien-5-yne derivatives in the gas phase.

The conference banquet was held Wednesday evening on Videy, a picturesque small island off the coast of Reykjavik. After a short boat ride, we were greeted by the local delicacy, hákarl (fermented shark!), washed down with Icelandic schnapps — brennivín, which translates as Black Death, but is crystal clear and very enjoyable! The fine dinner that followed was enjoyed by all.

Koop Lammertsma (Vrije Universiteit, The Netherlands) began Thursday's sessions with a discussion about the generation and synthetic applications of low-valent organophosphorus reagents including complexed phosphinidenes. **Phil Shevlin** (Auburn University, USA) continued with a description of the diverse and fascinating reactions of atomic carbon including the competition between double bond addition and C-H insertion in their reaction with alkenes and **Udo Brinker** (Universität Wien, Austria) finished the session with a discussion of the diastereoselectivity preferences in intra- and intermolecular reactions of 2-adamantanylidene.

Heinz Roth (Rutgers University, USA) provided a discussion of the acidity of C-H bonds in radical cations and **Petr Klan** (Masaryk University, Czech Republic) presented an overview of the 2,5-dimethylphenacyl photoremovable protecting group and its applications. **Dave Modarelli** (University of Akron, USA) concluded the scientific portion of the day with a talk on electron transfer reactions in rigid polyphenylene and flexible polyamide porphyrin-containing dendrimers.

The conference excursion to the Blue Lagoon, a unique pool of natural mineral-rich geothermal seawater in the middle of a lava field, was held Thursday afternoon. After bathing in the Lagoon and exploring around its surrounding lava field, we continued our excursion (stopping to observe the interesting hot springs in Krísuvík) to the small seaside town of Stokkseyri where we enjoyed a wonderful feast of Icelandic lobsters.

Anita Maguire (University College Cork, Ireland) began Friday with a presentation on a new synthetic route to α -oxo sulfines from α -diazo sulfoxides. **David Birney** (Texas Tech University, USA) discussed the multiphoton IR initiation of pericyclic and pseudopericyclic reactions and **Manabu Abe** (Osaka University, Japan) talked about alkoxy group effects on the reactivity and singlet-triplet energy gap of 2,2-dialkoxycyclopentane-1,3-diyls.

The last session of the conference was begun by **Hideo Tomioka** (Mie University, Japan) who discussed experiments using stable triplet carbenes as building blocks for high-spin magnetic materials. **Peter Chen** (ETH Zürich, Switzerland) presented electrospray ionization tandem mass spectrometric studies of organometallic reactions including the chemistry high valent oxo complexes. The conference concluded with **Jakob Wirz** (Universität Basel, Switzerland) describing comprehensive mechanistic studies of the primary photoproducts generated by irradiation of Vitamin K₁ and plastoquinone-1.

Brief Report

Division of Organic and Biomolecular Chemistry-IUPAC, Ottawa, August 10–11, 2003

Sub-Committee on Photochemistry

As it should be known by now, IUPAC has reorganized itself into a project-driven structure, this meaning that any person (including all chemists) can propose a project to IUPAC, following the instructions published in http://www.iupac.org/projects/faqs_projects.html.

The Division of Organic and Biomolecular Chemistry of IUPAC and the photochemical community, represented by the photochemical societies, have decided to have a Sub-Committee on Photochemistry housed in this Division with the purpose of proposing projects, updating older documents of the former Commission of Photochemistry, evaluating new proposals as well as finalized documents, and proposing reviewers for projects related to photochemical sciences. Contrary to the case in the previous Committee-driven structure, no funds are now allocated for regular meetings of the Sub-Committees.

I have the honour and responsibility of presently chairing the Sub-Committee as a Titular Member of the Division from 1999 to 2003 (two 2-years terms, no further renewal is possible). Now I still chair the Sub-Committee as German National representative in the Division.

During the Division meetings in Ottawa, in August 2003, on the occasion of the IUPAC General Assembly, several points of interest for the photochemical community were discussed. One was the fact that there is money in IUPAC for the realization of projects. The money may be used, e.g., for the financing of one day meeting, regarding a particular project, during one of the general photochemical meetings. So, if you have concerns about standards, glossaries, recommendations, **please propose a project. The best is that you channel your concerns through the Sub-Committee on Photochemistry.**

Another aspect discussed was a IUPAC photochemistry prize for a young investigator. Conversations are very advanced with the Royal Soc. of Chemistry (UK) in order to transform an international prize that RSC already awards into a IUPAC prize that should then be awarded on the occasion of the IUPAC-sponsored Symposia on Photochemistry.

Still another aspect was the improvement of the readership of *Pure and Applied Chemistry*, the Journal of IUPAC. It was proposed to include in the issue devoted to the respective IUPAC Symposium, not only the plenary and invited lectures, but also the best oral presentations and posters (publication could be the prize for the best one, two, or three posters).

The present constitution of the Sub-Committee on Photochemistry is as follows:

Ulises Acuña, Spain <roculises@iqfr.csic.es>
Teresa Atvars, Brasil <tatvars@iqm.unicamp.br>
Cornelia Bohne, Canada, <bohne@uvic.ca>
Roland Bonneau, France <bonneau@cribx1.u-bordeaux.fr>
Andre Braun, Germany <Andre.Braun@ciw.uni-karlsruhe.de>
Alexander Chibisov, Russia <Chibisov@photonics.ru>
Ken Ghiggino, Australia <ghiggino@unimelb.edu.au>
Andrei Kutateladze, USA, akutatel@du.edu
Helge Lemmetyinen, Finland <lemme@cc.tut.fi> (new member)
Marta Litter, Argentina, litter@cnea.gov.ar
Hiroshi Miyasaka, Japan <miyasaka@chem.es.osaka-u.ac.jp>
Massimo Olivucci, Italy <olivucci@unisi.it>
David Phillips, UK <d.phillips@ic.ac.uk>
Ronald Rahn, USA <rrahn@uab.edu>
Enrique San Román, Argentina, esr@qi.fcen.uba.ar
Nick Serpone, Canada <serpone@vax2.concordia.ca>
Masashide Terazima, Japan <mterazima@kuchem.kyoto-u.ac.jp>

I include a list of the projects currently handled by the Sub-Committee on Photochemistry. In each case the name and e-mail address of the working party chairman is included. Please contact the chairman in case you want to contribute to the particular project.

Approved by IUPAC and in preparation by the working party: 2001-018-1-300: Time and Space Resolved Fluorescence Spectroscopy and Photochemistry

Chairman: Hiroshi Masuhara, Osaka, Japan
masuhara@ap.eng.osaka-u.ac.jp

2000-012-1-300: Single Molecule Spectroscopy

Chairman: Frans De Schryver, Leuven, Belgium,
frans.deschryver@chem.kuleuven.ac.be

2001-020-1-300: Glossary of Terms and Basic protocols in Photodynamic Therapy (PDT)

Chairman: David Phillips, London, UK
d.phillips@ic.ac.uk

2002-024-1-300: Glossary of Terms used in Photochemistry (3rd Version)

Chairwoman: S. E. Braslavsky, Mülheim an der Ruhr, Germany,
braslavskys@mpi-muelheim.mpg.de

2001-036-1-300 (previous 330/21/98): Glossary of Terms in Photocatalysis and Radiation Catalysis. Joint project with Division I.

Chairmen: V.N. Parmon (Div. I) and J. Bolton (Div. III).
Compatibilization of conflicting proposals: Marta Litter
<litter@cnea.gov.ar>

New projects:

Computational Methods for Excited States

Chairman: Massimo Olivucci, Siena, Italy,
olivucci@unisi.it

Update of the Documents on **Fluorescence Standards**, with emphasis on microheterogeneous systems and solid state samples

Chairman: Enrique San Román, Buenos Aires, Argentina,
<esr@qi.fcen.uba.ar>

I am now preparing a web page of the Sub-Committee, within the pages of IUPAC and of course linked to the pages of the photochemical Societies.

We would very much like to have many colleagues involved in the work of the Sub-Committee. Please, get involved.

Silvia E. Braslavsky

Max-Planck-Institut für Bioanorganische Chemie
(formerly Strahlenchemie)

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Upcoming Photochemistry Conferences

14th International Congress on Photobiology

June 10–15, 2004, Jeju, Korea

<http://www.icp2004.or.kr>

IPS-15. 15th International Conference on Photochemistry and Storage of Solar Energy

July 4–9, 2004, Paris, France

Scope: The IPS conferences are held every two years, with the aim of covering the latest developments in the field of photochemical conversion and storage of solar energy. The IPS-15 Conference will include the following topics:

- Photo-induced electron transfer
- Photochemical conversion
- Photo-electrochemistry
- Photo-catalysis and environmental chemistry
- Photosynthesis (artificial, biological)
- Bio-mimetic Systems
- Fundamental aspects of quantum solar energy conversion
- Dye sensitized nano-structured solar cells
- Materials for photon conversion
- Practical applications

The web site of IPS-15 Conference is:
<http://www.congres-scientifiques.com/IPS15/>

The International Conference on the Photochemistry and Photophysics of Coordination Compounds

July 4–9, 2004, Hong Kong

Web site:
<http://web.hku.hk/~isppcchk/main/main.htm>

Electron Donor-Acceptor Gordon Conference

August 9–14, 2004, Newport, RI

Organized by Mark Ratner and Guilford Jones
The web site of this conference is:
<http://www.grc.org/programs/2004/elecdon.htm>

VIII Encuentro Latinoamericano de Fotoquímica y Fotobiología" (VIII Latinamerican Meeting on Photochemistry and Photobiology)

November 8–12, 2004, La Plata, Argentina

The meeting will be attended by Latin-American experts, as well as scientists from other countries, who will give lectures. Posters will also be exhibited during the conference.

These meetings are an excellent opportunity to discuss the most recent scientific and technological advances in several areas of Photochemistry and Photobiology.

More details can be found in the web page of the conference:

<http://www.viii-elafot.netfirms.com/>

The E-mail of the conference is:
viiielafor@inifta.unlp.edu.ar

15th I-APS WINTER CONFERENCE
Arizona State University, Tempe, AZ
January 1 - 4, 2004

SUBMIT YOUR ABSTRACT NOW!!

***The program looks exciting (see below).
Some of the submitted abstracts will be selected for oral
presentations.***

Check the Conference Website at : <http://web.uvic.ca/~bohne/IAPS2004/>

Conference Chairs and Contact Information

Devens Gust
Department of Chemistry and
Biochemistry
Arizona State University
Tempe, AZ 85287-1604 USA
TEL: (480) 965-4547
FAX: (480) 965-2747
E-mail: gust@asu.edu

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Department of Chemistry
University of Victoria
Victoria, BC Canada V8W 3V6
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bohne@uvic.ca

Organizing Commitee, 2004 IAPS Meeting

Claudio D. Borsarelli
Anna Gudmundsdottir
Edwin Hilinski
Clifford Kubiak
Glen Loppnow
Gerald Meyer
Michael Rodgers
Claudia Turro

Universidad Nacional de Santiago del Estero
University of Cincinnati
Florida State University
University of California, San Diego
University of Alberta
Johns Hopkins University
Bowling Green State University
Ohio State University

Invited Speakers Include

Bridgett A. Barry	University of Minnesota
Neil Branda	Simon Fraser University
William B. Connick	University of Cincinnati
Paolo di Mascio	Universidade de São Paulo
Daniel E. Falvey	University of Maryland
Nathaniel S. Finney	University of California, San Diego
John T. Fourkas	Boston College
Martin Gruebele	University of Illinois, Urbana-Champaign
William S. Jenks	Iowa State University
Shana O. Kelley	Boston College
Leonard R. MacGillivray	University of Iowa
Dwayne Miller	University of Toronto
Arthur Nozik	National Renewable Energy Laboratory
Lucia Flamigni	ISOF-CNR, Bologna
Jeffery J. Rack	Ohio University
Enrique San Roman	Universidad de Buenos Aires
Frank C.J.M. van Veggel	University of Victoria

General Information

The conference will be held on the campus of Arizona State University, in Tempe, AZ. The program will include both invited and a limited number of contributed talks that span membership interests in the photosciences including organic, physical, inorganic, biological and materials photochemistry. Contributions for both oral presentations and posters will be accepted. The meeting will begin with registration on the afternoon of Thursday, January 1, 2004. The first scientific session will begin in the evening of Thursday, January 1. The last scientific session will finish at 12:30 PM on Sunday, January 4.

Call for papers

The conference will include invited and contributed papers. A limited number of contributed papers will be presented orally, and the others will be presented in poster sessions. To submit a paper, send a one page abstract to conference co-chair **Cornelia Bohne** (see contact info above) before **October 15, 2003**. Please indicate whether your paper should be considered for oral presentation.

Contributors will be notified by November 30, 2003 whether or not their paper has been selected for oral presentation.

Abstract Preparation: Type each abstract on 8.5 x 11 inch paper with 1-inch margins all around. Use "Times" or "Times New Roman" 12-point or 10-point font. Place the title in bold centered horizontally at the top followed by followed by the author's(s') name(s) and address(es) also centered horizontally. Underline the presenting author's name. Full-justify and single-space the body of the abstract. The complete abstract including any schemes, figures, and references cannot be longer than one page. Submit your abstract as a pdf file (Adobe Acrobat) via e-mail to bohne@uvic.ca. Alternatively mail two copies and make sure they do not fold during mailing. Faxed abstracts or attachments NOT in pdf format cannot be accepted.

MEETING REGISTRATION FORM
INTER-AMERICAN PHOTOCHEMICAL SOCIETY
15th WINTER CONFERENCE
Arizona State University, Tempe, AZ, January 1 - 4, 2004

Mail this completed form with a **check made payable to I-APS** to:

Prof. Cornelia Bohne
Department of Chemistry, University of Victoria
P.O. Box 3065 STN CSC
Victoria, BC, Canada V8W 3V6

To avoid late fees, please ensure the form is received no later than **November 15, 2003**.

Name: _____
Affiliation: _____
Address: _____
Telephone: _____ Fax: _____
email: _____
Name of Accompanying Person(s): _____

Registration Fees

I-APS Member @ \$ 175 each _____
I-APS Non-member @ \$ 205 each _____
Student or Postdoc @ \$ 60 each _____
Accompanying person @ \$ 80 each _____
Late Fee @ \$ 25 per person after
November 15, 2003 _____
TOTAL _____

The registration fee includes charges for the banquet, abstract book, coffee breaks, etc. In case one wants to include accompanying persons for only the banquet, please report this to the Conference Registrar at the time of on-site registration. The cost of the banquet alone (unknown presently) will be charged.

Revised June, 2003

HOTEL REGISTRATION FORM
INTER-AMERICAN PHOTOCHEMICAL SOCIETY -- 15th WINTER CONFERENCE
Arizona State University, Tempe, AZ, January 1 - 4, 2004

Hotel Reservation deadline is **December 1, 2003**. After this date, reservations may be made subject to availability at the prevailing rate.

<p style="text-align: center;"><i>Mail or FAX completed form to:</i></p> <p style="text-align: center;">Tempe Twin Palms Hotel</p> <p style="text-align: center;">225 East Apache Blvd. Tempe, AZ 85281</p> <p style="text-align: center;">FAX: 480-303-6602</p>	<p style="text-align: center;"><i>OR telephone toll-free</i></p> <p style="text-align: center;">800-367-0835 (M - F, 8 AM - 5 PM, mtn. time)</p> <p style="text-align: center;">or</p> <p style="text-align: center;">480-967-9431 (other times)</p> <p style="text-align: center;">Indicate the reservation is for the Inter-American Photochemical Society conference.</p>
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Please reserve the following room(s) (enter the number of rooms requested):

_____ room(s) with one queen-size bed @ \$ 95.00 per night single or double occupancy

_____ room(s) with two queen-size beds @ \$ 95.00 per night 1-4 persons

The following type of room is preferred: nonsmoking smoking

Arrival Date: _____ Time: _____

Departure Date: _____

The above rates are guaranteed for the dates of January 1 - 3, 2002. Contact the hotel for availability and rates on other days. Please guarantee reservation by sending the first night's room deposit in the form of a check or major credit card information.

Payment by: Check MasterCard Visa American Express Discover Diner's Club

Card holder's name (printed): _____

Card holder's signature: _____

Credit Card Number: _____ Exp. Date: _____

Please Send Reservation Confirmation to:

Name: _____

Company: _____

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City/ State or Province/ Zip Code / Country: _____

Telephone: _____ FAX: _____

INTER-AMERICAN PHOTOCHEMICAL SOCIETY

MEMBERSHIP FORM

New Member



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First Initial Last

Address

Position Telephone:

FAX: email

Membership Fees:

	1 Year	2 Years	3 Years	Amount
Full membership	US\$ 22.00	US\$ 40.00	US\$ 56.00	<input type="text"/>
Postdoctoral Fellow*	US\$ 15.00	US\$ 27.00	---	<input type="text"/>
Student*	US\$ 8.00	US\$ 14.00	---	<input type="text"/>
Voluntary Contribution to support student travel				<input type="text"/>
				TOTAL <input type="text"/> \$0

* Name of current advisor

For our information: Are you presently a member of the American Society for Photobiology? Yes No

Signature _____ Date _____

Return this form with check payable in US\$ to the **Inter-American Photochemical Society** to:

Professor Steven A. Fleming
Department of Chemistry
Brigham Young University
Provo, UT 84602-4672

Please indicate your general area of Photochemistry interest below:

Physical
Organic
Theoretical

Inorganic
Analytical
Photobiology

Physical Organic
Photophysics

Please check specific Photochemistry interests:

- | | |
|---|--|
| <input type="checkbox"/> Air Pollution (AP) | <input type="checkbox"/> Photochemical Kinetics (PK) |
| <input type="checkbox"/> Atmospheric (AT) | <input type="checkbox"/> Spectroscopy (SP) |
| <input type="checkbox"/> Chemiluminescence (CL) | <input type="checkbox"/> Photoemission (PE) |
| <input type="checkbox"/> Dyes (CD) | <input type="checkbox"/> Isotope Separation (IS) |
| <input type="checkbox"/> Environmental (CE) | <input type="checkbox"/> Photobiochemistry (BC) |
| <input type="checkbox"/> Extraterrestrial (ET) | <input type="checkbox"/> Photobiophysics (BP) |
| <input type="checkbox"/> Far UV (UV) | <input type="checkbox"/> Photochromism (PC) |
| <input type="checkbox"/> Imaging Systems (Silver) (PG) | <input type="checkbox"/> Photoconductivity (PN) |
| <input type="checkbox"/> Imaging Systems (Nonsilver) (RG) | <input type="checkbox"/> Photoelectrochemistry (PL) |
| <input type="checkbox"/> Lasers (LS) | <input type="checkbox"/> Photoionization (PI) |
| <input type="checkbox"/> Macromolecular (CC) | <input type="checkbox"/> Photolithography (PT) |
| <input type="checkbox"/> Mechanistic (MP) | <input type="checkbox"/> Photomedicine (PM) |
| <input type="checkbox"/> Ordered Media (OM) | <input type="checkbox"/> Photosynthesis (PS) |
| <input type="checkbox"/> Organometallic (CM) | <input type="checkbox"/> Radiation Chemistry (RC) |
| <input type="checkbox"/> Preparative/Synthetic (CR) | <input type="checkbox"/> Solar Energy Utilization (SE) |
| <input type="checkbox"/> Polymer (CY) | <input type="checkbox"/> Vision (VS) |