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Dear Colleagues:

I returned to UCSB earlier this month after attending the 16th I-APS Winter Conference in Clearwater Beach, FL really enthused about the Society's role in promoting the photochemical sciences. Phil Castellano and Dirk Guldi organized this meeting and they are to be congratulated on both the content and the organization. It was an excellent conference with about 120 in attendance and it again demonstrated the vitality of photochemical research and of the Inter-American Photochemical Society. There were a number of students and first-time attendees as well as quite a few regulars. A wonderful range of speakers participated, from Lakshmi Kaanumalle (the Closs Student Awardee) and Alvaro Delgadoillo (the Cienfuegos Awardee) to Michael Kasha, who chided some of us on our relative youth. I was especially pleased to talk to several people who had attended a recent I-APS Conference for the first time and returned because they had found these conferences to be so rewarding. The mixture of talks illustrated the highly interdisciplinary character of photochemistry as it is practiced today.

During 2005 conference, the I-APS Award in Photochemistry was presented to Devens Gust and the Young Investigator Award to Igor Alabugin, and David Schuster and Kerry Thomas were inducted as new I-APS Fellows. A report on the Conference appears in this Newsletter. Other I-APS news is that officers for 2004-2006 were elected last Fall, and the new I-APS Vice President (President-Elect) is Cornelia Bohne (U. Victoria). Newly elected Advisory Board members are Claudia Turro (Ohio State U.), Lisa Kelly (U. MD, Baltimore County) and Teresa Atvars (U. Campinas, Brazil).

The next I-APS Conference is planned to be in Salvador, Bahia, BRAZIL, in late May or early June 2006, and you should keep this in mind when scheduling meetings for next year. A preliminary announcement for this conference will appear on the I-APS website, http://www.chemistry.mcmaster.ca/~iaps/, once more details are available. Past I-APS conferences in South America have been very rewarding and I am looking forward to the 2006 meeting.

The continuing vitality of the I-APS is dependent on an active and participatory membership. If you have colleagues and students who are doing research related to photochemistry and photophysics, please encourage them to join the society and/or attend future conferences. A membership form is attached to this newsletter, so that you can pass it on to an interested party. Membership dues help support the publication of the newsletter, conferences, and student travel awards.

Best wishes to one and all.

Sincerely,

Peter C. Ford
I-APS President (2004-06)
Biographical Sketch — Mike Wasielewski

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My colleague Mike Wasielewski is a native of Chicago and spent his earliest years in the neighborhood of the University of Chicago campus before growing up in the Chicago suburbs. These early years must have been influential because Mike received his undergraduate education in the College of the University of Chicago. As an undergraduate Mike began his research career in the laboratory of Leon Stock, who is well known for his work on the mechanism of electrophilic aromatic substitution reactions. At that time Lee’s research was transitioning to a focus on free radicals and how spin delocalization occurs in organic structures. Mike took up the project and as a consequence developed a lifelong interest in spin chemistry. Mike’s interests in that direction were also helped by frequent discussions with Gerhard Closs, who at the time was developing the concepts behind chemically-induced dynamic nuclear polarization. Mike’s first involvement with photochemistry was using light as a means to generate radicals for study by electron paramagnetic resonance spectroscopy.

Mike graduated a quarter early from Chicago in March of 1971 in order to serve his active duty obligation in the U.S. Army Reserve before starting graduate school. Due to a variety of circumstances involving this obligation, Mike chose to remain at Chicago for graduate school. During that time, working again with Lee Stock, Mike developed an extensive picture of how electron spin delocalization occurs in cyclic organic structures. Mike combined a great deal of synthetic work on rigid, well-defined structures with both NMR and EPR spectroscopy to probe spin delocalization in a variety of bicyclic and tricyclic molecules. This approach to understanding complex physical phenomena in organic molecules was to prove important in Mike’s future work.

Mike finished his Ph.D. work in November of 1974 and moved immediately to the laboratory of Ronald Breslow at Columbia. There Mike embarked on a project designed to study the degree of anti-aromaticity in the cyclopropenyl anion using what at the time could be called “ultrafast electrochemistry”. This highly unstable anion was generated from the stable cyclopropenium cation using electrochemical reduction. A thermodynamic cycle was then used to obtain the acidity of cyclopropene. Mike enjoyed his time in New York, and still has fond memories of the Breslow group.

The start of 1976 found Mike beginning his career at the Argonne National Laboratory back in Illinois. Mike was inspired by his exposure to biomimetic chemistry in the Breslow lab, and decided to tackle the problem of understanding the primary charge separation events in photosynthetic proteins using synthetic, biomimetic model systems. At that time the Argonne photosynthesis group, headed by Joseph J. Katz, was in the forefront of the worldwide drive to understand this important biological process. Mike found Joe to be an excellent mentor who encouraged a research style that always focused on tackling the hard problems with a no-holds-barred approach.

While at Argonne, Mike pioneered the use of ultrafast laser techniques to measure the kinetics of photoinduced charge separation and radical ion pair recombination for porphyrin-quinone systems that provided the first unequivocal confirmation of Marcus theory for photoinduced charge separation and recombination. He also made significant contributions to understanding the influence of solvation on electron transfer reactions. He solved a long-standing enigma regarding the fact that photoinduced charge separation within photosynthetic reaction center proteins occurs in a few picoseconds even at cryogenic temperatures, while electron transfer turns off in most model systems at low temperatures in glassy or frozen media. Using a large series of exquisitely tailored porphyrin-acceptor molecules, Mike demonstrated for the first time that efficient, non-adiabatic electron transfer, such as that which occurs in photosynthetic reaction centers, frequently requires a significantly larger driving force in a glassy solvent at low temperatures than it does in the photosynthetic protein. Mike also succeeded in...
on photochemically robust aryleneimide and diimide chromophores, whose size and shape control their self-assembly into large photofunctional arrays that serve as hybrid photoconversion materials. This new class of photoactive materials will have a significant impact on the development of organic solar cells.

Based on these accomplishments and others, Mike rose through the ranks at Argonne and in 1991 he was promoted to the rank of Senior Chemist, the youngest person to hold that rank, and in 1993 was appointed group leader of the new Molecular Photonics Group. Mike’s desire to expand his research horizons and work with students led him to Northwestern University, where in 1994 he was appointed Professor of Chemistry. He maintained a joint appointment at both Argonne and Northwestern for five years, running two research groups with an expanding portfolio of research activities.

In 1999 Mike moved all of his activities to Northwestern, where he continues to investigate fundamental issues of electron transfer as well as explore the complexities of organic electronic and photonic materials. For example, the small electronic couplings characteristic of non-adiabatic electron transfer reactions are important determinants of electron transfer rates, yet are very difficult to measure and are nearly impossible to calculate accurately. To obtain these couplings Mike was able to directly measure spin-spin exchange interactions in photogenerated radical ion pairs using a combination of magnetic field effects on the triplet yield following charge recombination and direct time-resolved EPR measurements of radical ion pair dynamics within structurally well-defined molecules. The molecular systems that Mike has developed give us a microscope with unprecedented energy resolution to examine how significant changes in electronic coupling depend on subtle changes in molecular structure.

Mike’s research in the field of organic molecular electronics is distinguished by his mechanistic approach to understanding the fundamental chemical and physical problems that are encountered in designing organic molecules for use as potential electronics components such as wires and switches. His work yielded the first demonstration of the energetic and electronic coupling criteria necessary to make organic molecules function as molecular wires, a long sought after goal in this field. He has also demonstrated several new approaches to organic molecular switches involving the control of electron transport through arrays of organic donor-acceptor molecules by the application of multiple ultrafast laser pulses. This behavior provides the basis for logical operations based solely on ultrafast photonic control of electron movement within these arrays. Mike has also developed covalent building blocks based
My colleague Devens Gust was born and grew up in Phoenix, Arizona, when it was a small city, just entering the post-World War II growth spurt that continues to this day. Encouraged by an inspiring high school chemistry teacher, he chose chemistry as a major after enrolling in Stanford. He got a taste of chemistry research by isolating natural products in the laboratory of Eugene van Tamelen. Devens was surprised to learn that as an undergraduate, he would have an entire laboratory to himself — until he discovered that his starting material was an odoriferous plant gum used as an animal repellant. Later, he worked under the direction of Harry Mosher on reagents for resolution of chiral amino acid derivatives.

At Harry’s suggestion, Devens entered graduate school at Princeton in order to work in organic stereochemistry with Kurt Mislow. He began research in sulfur and tellurium stereochemistry, but his work was interrupted by the draft board. The Vietnam war was at its height, and all student deferments were eliminated, leading to a two-year stint for Devens in the U. S. Army as a Military Policeman. This put an end to the tellurium research.

After being discharged from the military, Devens returned to Princeton, where he embarked upon a project that initiated a new field of stereochemistry — isomerism and isomerization resulting from correlated rotation about single bonds. In a series of 16 papers in the early 1970s, Devens, Mislow and Paolo Finocchiaro, a visiting professor from the University of Catania, reported an in-depth study of molecular “gearing” that generated not only a wealth of experimental data, but also a group-theoretical approach to understanding and correlating their findings. None of this work involved photochemistry, but Devens did have his first exposure to photochemistry at Princeton through a course taught by a former student of George Hammond, Don Valentine.

Devens used nuclear magnetic resonance spectroscopy extensively during his work at Princeton, and decided to do his postdoctoral work with J. D. Roberts at Caltech. Soon after his arrival in 1974, a new high-field spectrometer with a very large bore magnet arrived in the laboratory. Devens used this instrument to carry out the first natural-abundance $^{15}$N studies of various biological molecules, including proteins and nucleic acids. In 1975 he was offered and accepted an assistant professorship at Arizona State University.

At ASU, Devens became acquainted with Gary Samuelson, an assistant professor and former student of Howard Zimmerman, shortly before Gary’s illness and untimely death. Devens initiated studies that combined his experience in organic stereochemistry and NMR expertise. He synthesized hexaphenylbenzene molecules bearing substituents, studied the stereoisomerism resulting from slow rotation about the bonds joining the aryl rings, and used group theory to analyze the possibilities for isomerism and isomerization. He also became interested in rotational isomerism in tetraarylporphyrins.

My wife Ana and I arrived at ASU in 1976. I came as an assistant professor of biochemistry, and Ana had just completed postdoctoral work at the University of Washington. Ana and I began a study on carotenoid-based photosynthetic antennas isolated from various organisms. Devens, Ana and I got into the habit of eating lunch together, and over these lunches, we decided to combine Devens’ expertise in porphyrins with our expertise in carotenes, and make model systems in which to study the transfer of singlet and triplet excitation energy between these chromophores. This led to the synthesis and photochemical study of the first covalently-linked systems that modeled photosynthetic antenna and photoprotective functions by carotenes.

We were all initiated into the wonders of laser spectroscopy by René Bensasson, at the Muséum National d’Histoire Naturelle, Paris. Because ASU had no laser equipment, Devens, Ana and I spent numerous summers...
in France doing time-resolved studies. These visits led to sabbatical stays for Devens and me in 1982, where we worked with Bensasson in Paris and Paul Mathis, Jean-Claude Mialocq, and Claude Chachaty in Saclay and Ted Land in Manchester to do spectroscopic studies on the molecules we were synthesizing. This experience led to our first experiments in photoinduced electron transfer, and, in 1983–1984, our report of a carotene-porphyrin-quinone molecular “triad.” This molecule caused quite a stir in the photosynthesis and photochemical communities as it was able to not only undergo photoinduced electron transfer, but also to stabilize the resulting energetic charge-separated state for relatively long periods. Previously, only photosynthetic reaction centers were able to perform in this way. The key to long-lived charge separation was the use of a two-step electron transfer sequence to rapidly move the two radical ions far apart within the molecule, thus reducing electronic coupling. This approach was elaborated by our group in following years, with the preparation of tetrads and pentads that did an even better job of generating energetic, long-lived charge separated states in high quantum yield.

Having in hand the ability to produce “photovoltaic” molecules, the laboratory has since been exploring methods for using the energy stored as charge separation. With the initial collaboration of Patrick Seta and Elisabeth Bienvenue in Montpellier, and later in our own laboratories, we devised ways to carry out charge separation across lipid bilayers. In 1997 we were able to use photoexcitation of the triads to pump protons across the membranes of liposomes and create a proton gradient that stored some of the light energy as electrochemical potential, thus mimicking additional aspects of photosynthetic energy storage. A year later, we reported the use of this energy to make ATP via the enzyme ATP synthase. Another research direction that began in the mid 1990s was the investigation of fullerenes as electron acceptors. In 1994, we reported the first example of photoinduced electron transfer in a covalently-linked porphyrin-fullerene dyad. The unique properties of fullerenes as acceptors spurred us on to investigate a number of photochemically active dyads and triads. During this period, Hiroshi Imahori, of the University of Osaka, spent time as a visiting scientist in Devens’ laboratory, where he became interested in porphyrin-fullerene systems. Hiroshi and his colleagues have since worked very productively in this research area.

In addition to exploring biologically-related aspects of the photochemistry of our synthetic systems, we have been looking at more materials-oriented “applications.” In collaboration with physicists Stuart Lindsay and Otto Sankey of ASU, we have developed a technique for studying the conductivity of single molecules of carotene, porphyrin, etc., bound chemically between gold electrodes. Along these same lines, in work spearheaded by Devens, the group has also been investigating methods for modulating photoinduced electron transfer in dyads, triads, etc. using photochromism. We have succeeded in the preparation of various molecule switches and logic gates that are controlled by light via photochromes. In other collaborations, Devens has used photochromes to change the properties of surfaces using light. Recently this approach has been used to move water droplets around on a superhydrophobic surface using only a light gradient.

Devens has always enjoyed collaboration with others, and this in part explains our long-term and productive relationship. Recently, he has become involved in a wide range of collaborations involving biologists, physicists, and electrical, materials and bioengineers as well as chemists. I fully expect to see a continuation of his innovative work in the photochemical sciences for a long time to come, and look forward to continuing our very enjoyable collaboration.
I-APS 2005 Fellow —
John Kerry Thomas

J. Kerry Thomas is the Julius A. Nieuwland, C.S.C. Professor Emeritus of Chemistry at the University of Notre Dame. He was born in 1934 in Llanelli, South Wales, an area of Wales between the mountains and sea, which is full of historic cites. In 1951, he obtained a State Scholarship to the University of Manchester in England and attended there from 1951 to 1957, obtaining a B.Sc. degree in 1954 and a Ph.D. in 1957. His graduate work on the photo- and X-ray degradation of polymers was supervised by Dr. J. H. Baxendale, a notable kineticist. From 1957 to 1958 he was a postdoctoral fellow at the National Research Council in Ottawa, Canada. He returned to Harwell, England, as a Scientific Officer in 1958 where he carried out work on radiation induced surface graft-polymerization. In 1960 Kerry joined the Argonne National Laboratory in Illinois, where he remained until 1970. It was here that he developed the short-pulsed nanosecond laser and pulse radiolysis techniques, which are so popular in physical chemistry today. With these techniques he studied the fundamental chemical processes induced by radiation. In 1970 he went to the University of Notre Dame as a Professor of Chemistry and he was appointed Julius A. Nieuwland C.S.C. Professor of Chemistry in 1984.

Kerry's research has included applications of pulsed photochemical methods to investigate reactions at interfaces, and to describe the nature of the interfaces themselves. He has established many of the original concepts used in this fast growing field of Reactions in organized or contained medias with its many applications to storage of energy, biokinetics and catalysis. He is a member of I-APS, the American Chemical Society, the Royal Chemical Society, the Photobiology Society, and the Society for Radiation Research, where he has been a member of the council. He has served on the Editorial Board of the Journal for Radiation Research, and presently serves on the Editorial Board of Chemical Physics Letters, The Journal of Colloid and Interface Science and the Journal of Physical Chemistry. He has been a past Chairman of the Gordon Conference in Radiation Chemistry and of the Gordon Conference on Micelles and Macromolecular Catalysis. In 1969 he was awarded an honorary Doctor of Science by the University of Manchester; in 1974 he was given the research award of the Radiation Research Society; and he was a Gäst Professor at the Hahn Meitner Institute in Berlin in 1975. In 1993, he was the recipient of the ACS Award in Colloid or Surface Chemistry sponsored by Procter and Gamble Company. He has given many invited lectures both in the U.S.A. and abroad and is the author of over 350 research papers and review articles and an ACS monograph entitled "Chemistry of Excitation at Interfaces."

Besides chemistry, Kerry enjoys music and has sung in numerous church choirs, oratorio societies, and now in Indiana Opera North. He has returned to his love of boats and now has a sloop on Lake Michigan.

In addition to a number of awards for his work in radiation chemistry and colloid chemistry, in 1999, a Festschrift issue of the Journal of Physical Chemistry was dedicated to Kerry and his research. The I-APS Fellowship is a fitting recognition of his contributions in photochemistry and photophysics.

– Tony Trozzolo

I-APS 2005 Fellow —
David I. Schuster

The purpose of this letter is to recommend Dr. David I. Schuster for I-APS Fellowship, recognizing outstanding lifetime scientific achievements in photochemistry. Since April 2004 I am a chaired full professor at the University of Erlangen (Germany), after being a faculty member of the Radiation Laboratory at the University of Notre Dame for nearly 10 years. I am an experienced physical-organic chemist with an interdisciplinary expertise in physicochemistry and surface characterization. As the remainder of this letter will demonstrate, I wholeheartedly support Dr. David I. Schuster's application for the I-APS Fellowship, since I am convinced that Dr. David I. Schuster is, indeed, an outstanding and exceptional candidate. There is no question that he is a brilliant scientist with outstanding abilities, whose work has received world-wide recognition and who is fully accepted as a leader in his research field and among his peers.

I first became acquainted with Dr. David I. Schuster's skills, high level of native intelligence, remarkably innovative nature and keen interest in research, when I started my professional career as a faculty member of the Radiation Laboratory at the University of Notre Dame. Based on my interactions with him – which have been intensive and extended over a number of years – I am
convinced that Dr. David I. Schuster possesses outstanding abilities distinguishing him and his scholarship from the overwhelming majority of people in his field of expertise, photochemistry and charge separation of reactive intermediates. Finally, the track record of Dr. David I. Schuster's over the past decades – publishing in highly ranked journals – as well as Dr. David I. Schuster's prominent place in these research units, leads me to conclude that he is an outstanding researcher in the area of photochemistry. Not surprisingly, he also enjoys a large number of invitations as – by the way, excellent – speaker at conferences and individual seminars. In any case, they clearly reflect his highly valued standing and recognition in the scientific community of Chemists, in general.

David Schuster has been one of the pioneers in the field of mechanistic organic photochemistry for over four decades, starting with his seminal postdoctoral work with Howard Zimmerman in 1960-61 on the mechanism of photorearrangements of cross-conjugated cyclohexadienones. During the early stage of his career at New York University starting in 1961, Schuster did critically renowned research on photorearrangements of cyclohexadienones, cyclohexenones and unsaturated ketones. These included complex stereochemical studies that were critical in verifying predictions of the (then) new Woodward-Hoffmann orbital symmetry theory for photochemical reactions. During a sabbatical year with George Porter at the Royal Institution in London in 1968-69, he did the first studies on dynamics of short-lived triplet excited states using the new nanosecond flash photolysis techniques.

In subsequent years, he did pioneering studies applying both microsecond and nanosecond flash techniques to ketone photochemistry, and was among the first to use time-resolved single photon counting and photoacoustic calorimetry to work out the dynamics of many types of photochemical processes. He was also among the first to determine the lifetimes and energies of triplet 1,4-biradicals using time-resolved photoacoustic calorimetry. His many reviews in these areas are still regarded as the most comprehensive and insightful in the photochemistry literature. For the last decade, he has devoted himself to studies of the photochemistry and photophysics of fullerenes, beginning with photoinduced [2+2] additions of cyclic enones to pristine C60 and C70. For several years, he and his group at NYU have focused on the synthesis and photophysics of donor-acceptor systems in which C60 acts as the acceptor, in the process of which they have made many important discoveries. Among these was providing experimental evidence that back electron transfer in porphyrin-fullerene hybrids occurs in the Marcus inverted region, leading to relatively long-lived charge-separated states, which has implications for the construction of nanoscale energy-storage devices. His most recent studies involve elaborate construction of rotaxanes and catenanes in which the donor (porphyrin, ferrocene) and acceptor (C60) moieties are mechanically rather than covalently linked, which have lent insight into the importance of through-bond vs. through-space electron transfer and energy transfer processes. His work is characterized throughout by design and synthesis of specific substrates to probe one or more specific aspects of key photochemical and photophysical processes, followed by careful and multifaceted study of such processes. He and his group at NYU continue to be active and productive and show no sign of slowing down.

I am pleased to provide this review of Dr. David I. Schuster's lifetime scientific achievements in photochemistry. Compared to others with similar backgrounds, Dr. David I. Schuster impresses me as an individual who has made, and will surely continue to make, important contributions to his field of specialization. He is certainly an extraordinary talent.

– Dirk M. Guldi

2004 Young Investigator Award — Leonard R. MacGillivray

Leonard Richard MacGillivray was born in Sydney, Nova Scotia, Canada on January 10th, 1972. Dr. MacGillivray obtained a Bachelor's Degree in Science with Honors in Chemistry in 1994 at Saint Mary's University in Halifax, Nova Scotia. During his time at Saint Mary's University, Dr. MacGillivray conducted research in the laboratory of Michael J. Zaworotko. Following his undergraduate degree, Dr. MacGillivray was awarded a Natural Sciences and Engineering Research Council of Canada (NSERC) 1997 Fellowship, which he used to obtained a Ph.D. degree in the field of Supramolecular Chemistry at the University of Missouri-Columbia under the supervision of Jerry L. Atwood.

Following his Ph.D. in 1998, Dr. MacGillivray joined the Functional Materials Program at the Steacie Institute for Molecular Sciences, National Research Council of Canada (NRCC), Ottawa as a Research Associate. While at the NRCC, Dr. MacGillivray initiated a program of study to control chemical reactivity in the organic solid state based on principles of molecular recognition and self-assembly.
In 2000, Dr. MacGillivray was appointed Assistant Professor of Chemistry at the University of Iowa. His research program at the University of Iowa currently focuses on developing a method to control chemical reactivity in the organic solid state that provides synthetic freedoms of the liquid phase. A central focus is to control the solid-state [2+2] photodimerization. In 2002, Dr. MacGillivray was awarded a National Science Foundation Faculty Early Career Development Award (CAREER) by the Division of Materials Research and a Research Innovation award by Research Corporation for his work. In 2003, Dr. MacGillivray published a paper in Angewandte Chemie that demonstrated the construction of molecular ladders in the organic solid state. The work was featured as the cover article and was described in the popular press, including Chemical & Engineering News. In 2004, Dr. MacGillivray was awarded the 2004 Inter-American Photochemical Society Young Investigator Award and the 2004 Margaret C. Etter Early Career Award of the American Crystallographic Association.

– Peter C. Ford

2005 Young Investigator Award — Igor Alabugin

The Inter-American Photochemical Society Young Investigator Award was established in 2002 to recognize outstanding photoscientific contributions by Society members who have held an independent research position for no more than five years. The 2005 Award was presented to Igor Alabugin of Florida State University during the annual I-APS conference in Clearwater Beach this last January. Igor carried out his graduate studies at Moscow State University where he earned his Ph.D. in Organic Synthesis in 1995. He then was a postdoctoral fellow at the University of Wisconsin with Howard Zimmerman (1996-2000) before joining the Florida State Faculty in 2000 as an Assistant Professor.

Igor's research program takes advantage of theoretical methods to guide their experimental studies and includes such diverse topics as stereoelectronic effects, blue-shifted hydrogen bonding, pericyclic reactions, chemistry of 1,2-dications, the development of new photochemically induced and thermal cycloaromatization reactions, chemistry of acetylenes triplets states, and selectivity and stereochemistry of radical cyclizations. He has authored/coauthored about 30 papers, fourteen of which stem from his studies at Florida State.

Igor has also become an active participant in the Inter-American Photochemical Society having authored a detailed account of the proceedings of the 2003 I-APS that was published in the 2003 I-APS Newsletter. He was nominated for the YI award by I-APS past President Fred Lewis who commented: “I find him to be the most impressive of the young photochemical scientist to come upon the US academic scene in recent years. He is precisely the type of person that the I-APS board had in mind when the Young Investigator Award was created several years ago.”

– Peter C. Ford

2005 Cilento Award — Alvaro Delgadillo

Alvaro Delgadillo, born in 1975 in Oruro (Bolivia). He obtained the degree of “Licenciado en Química” (B.Sc.) from the Pontifical Catholic University of Chile in 1999 and started the same year his doctorate studies under the direction of Dr. Barbara Loeb. After completion of his doctorate in 2004 he joined the Johns Hopkins University to work with Dr. Gerald Meyer as a postdoctoral fellow. His current research interests are focused in the synthesis of ruthenium complexes and mechanistic studies of interfacial electron transfer.

– Peter Ford

2005 Closs Student Award — Lakshmi Sireesha Kaanumalle

Lakshmi Sireesha Kaanumalle, upon receipt of B.Sc. (University of Madras, 1997) and M.Sc. (I.I. T. Madras, 1999) degrees came to United States to continue her graduate studies in Photochemistry. She obtained her Ph.D. from Tulane University in December, 2004. Her Ph. D. thesis entitled “Controlling Photochemical Reactions With Cations and Confined Spaces” dealt with photochemical studies in confined media. Currently she is a Research Associate at University of Miami, Coral Gables, Florida in the research group of Prof. V. Ramamurthy.

– Peter Ford
16th I-APS Winter Conference, Clearwater Beach, Florida, January 6–9, 2005

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Following a treacherous hurricane season, Clearwater Beach played host to the 16th I-APS Winter Conference. Felix N. Castellano (Bowling Green State University) and Dirk M. Guldi (Friedrich-Alexander Universität Erlangen-Nürnberg) served as co-chairs of the meeting. The scientific program consisted of 33 invited and contributed talks including presentations from Cilento Award winner Alvaro Delgadillo (Johns Hopkins University), Closs Award winner Lakshmi S. Kaanumalle (Tulane University), Young Investigator Award winner Igor V. Alabugin (Florida State University), I-APS Award winner Devens Gust (Arizona State University), and I-APS Fellows J. Kerry Thomas (University of Notre Dame) and David I. Schuster (New York University). The scientific program was complemented by two well-attended poster sessions on Thursday and Friday evening.

Vaidhyanathan Ramamurthy (Tulane University) opened the scientific program on Thursday evening with a discussion of asymmetric photoreactions within zeolites. His results demonstrated the ability of zeolites to induce diastereomeric and enantiomeric photoproduct excesses in systems where no excess is obtained in solution. The extent of asymmetric induction as well as the isomer being enhanced was controllable by the alkali ions in the zeolite host.

The second talk of the evening was given by Christoph Weder (Case Western Reserve University) on the development of deformation and temperature sensors based on dye-polymer blends. The cyano-substituted oligo(p-phenylene vinylene) dyes used in these systems display shifts in monomer-eximer emissions in response to external perturbations. The deformation and temperature sensing abilities of these materials originate from the effects of shear-induced mixing and phase separation, respectively.

Next, Paul F. Barbara (University of Texas, Austin) described the application of a new technique, fluorescence-voltage single molecule spectroscopy (F-V/SMS), for the study of semiconducting nanoparticles. Using this method, the charge transfer dynamics of the MEH-PPV conjugated polymer were investigated in situ. It was shown that the charge transfer process is controlled by the filling of hole traps in the transporting layer, the redox state of MEH-PPV, and the heterogeneity of the device on the molecular scale.

Michael Kasha (Florida State University) gave the final talk of the evening on the energetics of double proton-transfer in a hydrogen-bonded N-heterocyclic base pair. Professor Kasha described computational and experimental studies of the 7-azaindole dimer, a model base pair with important implications for DNA structure. Double proton-transfer is nearly barrierless in this system whereas double deuteron-transfer has a 1.4 kcal/mol barrier and is suppressed at low temperatures.

The second day of the conference began with the Cilento Award lecture by Alvaro Delgadillo (Johns Hopkins University) titled “Photophysics of Condensed Heterocyclic Ruthenium Complexes in Solution and Anchored to Nanocrystalline TiO$_2$.” He showed that excitation of ruthenium complexes with fused heterocyclic ligands can result in direct electron injection into TiO$_2$ or trapping of the electron on the ligand. The interfacial electron transfer properties of a unique trans-ligand Ru(II) complex were also described.

Next, Villy Sundström (Lund University) described studies of the photophysical dynamics of carotenoids. Ultrafast spectroscopic techniques were used to probe the dark S$_2$ state in order to elucidate the role of carotenoids in photoprotection and light-harvesting in photosynthetic systems through characterization of electron transfer and energy transfer pathways.

Rolf Dessauer, formerly of DuPont, followed with a perspective on the role of photochemistry in the development of industrial materials. He described how hexaarylbiimidazoles were originally pursued by DuPont for photochromic applications and exploited later as photooxidants and photoinitiators. This class of molecule has since become an important component in over one-thousand U.S. patents.

Josef Michl (University of Colorado) reported an investigation of localized and delocalized excited states of peralkylated oligosilanes. Depending on the length of the silane chain, fluorescence from localized or delocalized states was observed and cyclic constrained systems were
opportunities for the development of efficient photovoltaic advances in combining light-harvesting units with regime is the result of the excited state absorption of nanosecond regime relative to that in the femtosecond the enhanced two-photon absorption cross section in the hydrogen bond, and functional, self-assembled multi-porphyrin systems. Functional, self-assembled multi-porphyrin strategies for the development of artificial photosynthetic photochemistry. His presentation described several of a series of three talks on the subject of supramolecular properties as a result of their unique structures.

The next presentation was given by Russell H. Schmehl (Tulane University) on the photophysics of bridged bimetallic Rhodium and mixed Ruthenium/Rhodium complexes. The photophysics of these systems is dependent on the identity of the transition metal as well as the bridging ligand. Excited state lifetimes ranged from 10 ns to 4 ms for the complexes studied and isomerization pathways were identified in select cases.

The morning session was concluded by Joy E. Rogers (Air Force Research Laboratory) who presented a detailed description of the photophysics of bichromophores consisting of a two-photon absorbing antennae and an energy accepting C60 fullerene. She demonstrated that the enhanced two-photon absorption cross section in the nanosecond regime relative to that in the femtosecond regime is the result of the excited state absorption of C60. The efficient energy transfer process to C60 was characterized using multiple time-resolved spectroscopic methods.

Shunichi Fukuzumi (Osaka University) gave the first of a series of three talks on the subject of supramolecular photochemistry. His presentation described several strategies for the development of artificial photosynthetic systems. Functional, self-assembled multi-porphyrin systems were developed by controlling coordination, hydrogen bond, and π-π interactions. Demonstrated advances in combining light-harvesting units with molecular recognition sites provide new and exciting opportunities for the development of efficient photovoltaic devices.

Next, Michael J. Therien (University of Pennsylvania) presented work on the development of efficient near-infrared emitting fluorophores for imaging applications. These materials are formed by the self assembly of conjugated porphyrins with amphiphilic diblock copolymers and their emission can be modulated from 600 to 950 nm. Dr. Therien views these materials as a complement to in vivo quantum dot imaging with the potential to facilitate drug delivery.

Finally, Michael R. Wasielewski (Northwestern University) presented recent work on self-assembled charge transport materials. The systems described include liquid crystalline perylenedimide-based materials that undergo rapid charge separation, an artificial light-harvesting antenna that induces the formation of a functional special pair, and self-assembled columns and helical nanotubes that display remarkable photophysical properties as a result of their unique structures.

Photochemistry in confined spaces was the subject of the next three talks, beginning with Richard G. Weiss (Georgetown University) who described a region and enantioselective photochemical system for probing radical pair motion in solvent cages. Irradiations of 1-naphthyl (R)-2-phenylpropanoate and 1-naphthyl (R)-1-phenylethyl ether give two types of radical pairs confined within a solvent cage. Rate constants describing the dynamics of the radical pairs were extracted from photoproduct yields. This photoprobe system could be applicable to other types of confined spaces as well.

Ralf Warmuth (Rutgers University) demonstrated the use of hemicarcerands for the stabilization of highly strained reactive intermediates. The ability of the host to suppress bimolecular decay pathways allowed observation of the strained cyclic ketenimine formed after excitation of phenylazide. The reactive fluorophenoxy carbene was also stabilized in the hemicarcerand environment, allowing interrogation of its spectroscopic and photochemical properties.

The Friday afternoon session concluded with the Closs Award lecture by Lakshmi S. Kaanumalle (Tulane University) titled “Photochemistry in Water-Soluble Synthetic Capsules and Dendritic Reaction Cavities.” Octa acid and a third generation phenolic dendrimer were employed as hosts for the photochemical reactions of aromatic hydrocarbons, dibenzyl ketones, benzoin alkylethers, and naphthyl esters. Particularly remarkable cage effects were presented for the irradiation of p-methyl dibenzylketone in octa acid, demonstrating the enormous influence of confinement on photochemical reactivity.

The Saturday session began with Young Investigator Award winner Igor V. Alabugin (Florida State University) whose presentation “Photochemistry of Acetylenes and Enediyne: From MO Crossings to DNA Cleavage” explored the potential of cycloaromatization and radical cyclization reactions in biochemical and materials science applications. Photoinduced enediyne-inedene transformations were shown to be effective for the design of double-stranded DNA cleaving agents. The photophysical factors that influence the addition of excited acetylenes to dienes were explored with the goal of producing polycycles with interesting metal coordination properties.

John P. Toscano (Johns Hopkins University) followed with time-resolved infrared studies of acyl nitroso compounds. These species are of interest because they can react with nucleophiles to produce NO-/HNO, the one-electron reduced congener of nitric oxide. Production of acyl nitroso species from derivatives of 1,2,4-oxadiazole-4-oxide and Diels-Alder adducts and the reactivity of these species with nucleophiles was characterized by infrared absorption on the ns-ms time scale.

Next, William J. Leigh (McMaster University) described time-resolved studies of alkyl- and aryl-
substituted germlyenes and digermyenes. Excitation of a 1,1-disubstituted germcyclopent-3-ene leads to the formation of a diene and a germlylene species. Kinetic and mechanistic studies were presented for diphenylgermylene and its dimer tetraphenylgermylene. These species had received little previous attention due to a lack of simple, versatile precursors.

Joseph T. Hupp (Northwestern University) led the audience out of coffee break with a presentation on “inverse” Gratzel cells and their potential for solar energy conversion. These systems consist of microporous dye scaffolds on top of a semiconductor layer. This architecture is designed to minimize the photocurrent losses due to electron trapping on the semiconductor surface and losses from the iodo/triiodide redox shuttle. Fundamental studies of how these inverse cells solve these problems, in terms of their electron and energy transfer dynamics, were described.

The next talk was given by Pavel Anzenbacher, Jr. (Bowling Green State University) on the problem of developing classes of small molecules that have emissions spanning the visible spectrum, yet have similar physical properties. Emission tuning from the blue-green to the red was demonstrated by the tris(8-quinolinate) Al(III) complex by attachment of electron donating or withdrawing groups to the quinolinate ligand. HAMMET correlations were used to provide insight into the observed photophysics in these systems.

Howard E. Zimmerman (University of Wisconsin) closed the morning session with a description of recent advances in mechanistic photochemistry. These included his recent work on the tri-π-methane rearrangement and its resulting closure to three-membered and five-membered rings and the Type C enone rearrangement from twisted π-π* excited states. Mechanistic, kinetic, and computational approaches to solid-state photochemistry were also described.

The afternoon session was begun by R. Bruce Weisman (Rice University) who presented fluorescence studies of single-walled carbon nanotubes. His results revealed the absorption and emission transitions of more than thirty structural species of SWNTs. These transitions can be used as an analytical method for the determining the composition of nanotube mixtures. Since the emissions of these species occur in the near-IR region, they hold potential for in vivo imaging of biological materials.

Next, Lisa A. Kelly (University of Maryland, Baltimore County) described recent work regarding the photophysics of temperature-sensitive polymers. The systems described were styrene-based polymer incorporated with perylene. The influence of temperature on the perylene monomer-excimer equilibrium within the polymer matrix was described using steady-state and time-resolved fluorescence data. The sensitivity of this equilibrium is such that these polymeric materials can serve as temperature-sensitive coatings for a variety of applications.

The following presentation was given by Pedro F. Aramendia (Universidad de Buenos Aires) on photochromism in liquid crystals. The photochromic behavior of azobenzenes, spirocompounds, and fulgides in this environment was investigated by polarized absorption, birefringence, and polarized microscopy. Each system was shown to exert unique photoinduced effects on the molecular order of the surrounding liquid crystal environment.

Benjamin J. Schwartz (University of California, Los Angeles) gave a detailed description of the dynamics of charge transfer-to-solvent reactions. Charge transfer from sodium anion to solvent was presented as a simple electron transfer scheme. Using ultrafast pump-probe techniques and molecular dynamics simulations a molecular-level description of how solvent motions control CTTS dynamics was proposed.

I-APS Award winner Devens Gust (Arizona State University) concluded the Saturday session with his talk titled “Molecule-Based Switches and Logic Gates: Using Photochromic Molecules to Control Photoinduced Electron Transfer.” Multichromophoric systems, inspired by natural photosynthetic reaction centers, were used to develop single- and double-throw switches and molecular logic gates that use light as an input and output optical or electrical signals. The combination of two such systems in the development a half-adder capable of binary addition was demonstrated.

On Saturday evening, the annual I-APS banquet was held at the Salvador Dali Museum in St. Petersburg. Attendees were treated to a guided tour of the gallery, although the roasted pig served at dinner seemed to steal the show.

A presentation from the first of two 2005 I-APS Fellows, J. Kerry Thomas (University of Notre Dame), led off the final day of the conference. His talk “Alumina and Photo-Radiation Chemistry” described the influence of three forms of alumina (boehmite, gamma alumina, and corundum) on photophysical, photochemical, and radiolytic processes. Each type of alumina provides a unique environment for adsorbed materials and, in particular, gamma alumina can participate in photoinduced electron transfer processes.

I-APS Fellow David I. Schuster (New York University) followed with his lecture titled “Long-Range Photoinduced Electron Transfer in Porphyrin-Fullerene Donor-Acceptor Systems: Rotaxanes, Catenanes and Molecular Wires.” This work demonstrated the ability to form long-lived charge separated states in rotaxanes and catenanes.
where the photoactive moieties are mechanically-linked. Alkyne-linked porphyrin-fullerene dyads also display rapid charge separation, yet slow return electron transfer in the Marcus inverted region.

The next talk was given by Claudia Turro (Ohio State University) on the photophysics of dirhodium complexes and their reactivity with DNA. Several types of complexes were prepared with various ligands designed for intercalation into DNA. The extent of DNA photocleavage was correlated with the lifetime of the reactive charge separated state of these complexes and the driving force for return electron transfer.

Jeffrey M. Zaleski (Indiana University) described the development of diradical generators as photoactive chemical agents for biological applications. The systems under investigation were porphyrin complexes with enediyynes and diazo compounds. Radical species produced thermally or photochemically from these precursors can be used to perform hydrogen-atom abstraction from DNA.

Next, Cornelia Bohne (University of Victoria) presented work on the binding dynamics of small molecules to DNA. Although binding of xanthone derivatives to DNA can be demonstrated, the triplet state energies of these guests do not allow measurement of association and dissociation rates by quenching methods. Laser temperature jump with fluorescence monitoring was proposed as an alternative method for studying the dynamics of DNA intercalation.

Elizabeth J. Harbron (College of William and Mary) concluded the meeting with a presentation on the photophysics of azobenzene-functionalized phenylenevinylene polymers. The fluorescence of these polymers is partially quenched by energy transfer from the PPV backbone and this quenching is more efficient towards the cis azobenzene isomer. The differential quenching of cis and trans isomers allows reversible modulation of the fluorescence intensity by controlling the isomer population with light.

On behalf of all the attendees, I thank the organizers, Felix Castellano and Dirk Guldi, and all those who contributed to the success of this conference. We look forward to gathering again next January.
8th International Conference on Solar Energy and Applied Photochemistry, SOLAR ’05 and Enpho’05
20–25 February 2005, Luxor, Egypt

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The conference SOLAR ’05 is the eighth in this very successful series organized by the Chairman Professor Sabry Abdel-Mottaleb, accompanied now for the fifth time by the international workshop on environmental photochemistry Enpho’05. The large and continuing interest of the scientific community for this conference is documented by the attendance of 203 participants (69 from Egypt) from 32 countries. The program contained 63 lectures and 90 posters.

The opening ceremony of the Conference was attended by Prof. Dr. Ali Al-Abd, the Vice President for research and higher studies of Ain Shams University (Cairo) and the president of the steering committee of the Photoenergy Center, an Institute founded by Prof. Abdel-Mottaleb.

The Conference then started with four plenary lectures (40 minutes), in a joint session with the 1st Conference on Nanotechnology, which was held simultaneously at the same location, the Pyramisa Hotel. The lectures and their titles were: K. Müllen (Mainz, Germany): Putting the Molecules into Molecular Electronics. G.Q. Max Lu (Brisbane, Australia): Novel Method of Synthesis of Mesoporous and Nanocrystalline TiO2 for Dye-Sensitized Solar Cells. P.K. Hansma (Santa Barbara, USA): Lessons for New Nanotechnology from Nature’s Nanotechnology. C. Levy-Clément (Paris-Thiais, France): A NewEta-Solar Cell Based on Free-Standing ZnO/CdSe Nanowires.

The topics discussed at the SOLAR’05 and Enpho’05 were largely grouped into two main categories: (a) (solar) photocatalysis and atmospheric photochemistry and (b) photochemistry, photophysics and photobiology, including electron and energy transfer.

The titles of the following 12 Plenary Lectures (40 minutes) show the wide scope of the topics treated at the Conference: R. E. Bauer (Buffalo, USA), Solar-Activated Photocatalytic Purification of the Clinical Air Circulating in a Dental Hospital. I.R. Bellabono (Milan, Italy), Photocatalytic Membrane Processes and Plants for Purification of Water and Air; State of the Art and Industrial Issues. G. Kaup (Oldenburg, Germany), SNOM: a New Photophysical Tool for Chemistry and Life Sciences. S. Lis (Poznan, Poland), Photophysical Characterization of Chosen Ln(III) Macromolecular Complexes with Inorganic and Organic Ligands in Solution and Solid. K.A. Zachariasse (Göttingen, Germany), Intramolecular Charge Transfer in the Excited State. V. Vaida (Boulder, USA), Sunlight Initiated Reactions in Atmospheric Chemistry. H. Hashimoto (Tokyo, Japan), Environmental Preservation Technologies with TiO2 Using Solar Light. D. Bahnemann (Hannover, Germany), Solar Photocatalysis: Cleaning Polluted Water, Air and Surfaces with Sunlight. M.A. Aegerter (Saarbrücken, Germany), Electrochromic Devices Made by the Sol-Gel Process: State of the Art and Issues. A. Vlček (London, UK/Prague, Czech Republic), Ultrarapid Photochemical Electron and Energy Transfer in Complexes fac-[Re(I)(L)(CO)3(2,2’-bipyridine)]n+. R. Loutfy (Tucson, USA), Fullerene Nanoparticles and Applications. N. Russo (Calabria, Italy), Time-Dependent Density Functional Theory and Photodynamic Therapy.

Besides the plenary lectures, 15 Keynote Contributions (30 minutes) were presented, about evenly divided over the two main Conference topics: (a) water treatment (J.-M. Herrmann (France), M. Mehrvar (Canada), V. Loddo (Italy), O. Zahraa, (France)), photodegradation (A. Zarkadis (Greece), P. Mazellier (France)), and photocatalysis (J. Blanco (Spain), C. Guillard (France)) and (b) intramolecular charge transfer (W. Rettig, Germany), long-lived charge transfer states (J.W. Verhoeven, Netherlands), chemical sensors (G. Orellana, Spain), artificial light-harvesting (S. Balaban, Germany), luminescent materials (A.M. Klonkowski, Poland) and a photorechargeable cell (T. Miyasaka, Japan).

An important part of the oral contributions consisted of 32 short lectures (20 minutes) on water treatment, photodegradation, ultrastable fluorescent dyes, photocatalysis, photochemistry, photobiology, nanoparticles, solar energy conversion, long range electron transfer, excited state relaxation and luminescent microcrystals. These lectures were delivered by B. Legube (France), J. Correia de Oliveira (Portugal), C. Pulgarin (Switzerland), L. Österlund (Sweden), S.Y. AlQaradawi (Qatar), W.M. Nau (Germany), B. Sánchez (Spain), P. Kurz (Switzerland), K. Akutari (Switzerland),
J.P. Da Silva (Portugal), B.S. Lukyanov (Russia), S. Szarska (Poland), D. Bahnemann (Germany), J. Dussaud (France), J. Yu (Hong Kong), J.S. Lee (Korea), I. Pastoriza (Spain), E. Sellis (Italy), J.C.S. Wu (Taiwan), S. Zaliz (Czech Republic), S. Ali (USA), N. Sakai (Japan), C.-S. Kim (Korea), K.-J. Kim (Korea), V. Jovanovski (Slovenia), L. Brohan (France), M.A. Rampi (Italy), B.M. Uzhinov (Russia), S. Fery-Forgues (France) and T.D. Karapantsios (Greece).

Besides the lectures, 90 Posters were presented in two evening sessions. The lively discussions that often arose in front of the posters underline the important contribution made by the poster authors to the scientific success of the Conference.

During the closing session of SOLAR ‘05/Enpho’05, the speakers R.E. Baier, J. Blanco, J.-M. Herrmann, S. Lis, B. Uzhinov, J.W. Verhoeven, V. Vaida and K.A. Zachariasse expressed their compliments and gratitude to the Chairman M.S.A. Abdel-Mottaleb and his team for the excellent organization of the Conference and made it clear that this Conference plays a very important role in the development of solar energy and applied photochemistry. The fact that the new Nano-Tech Conference was being held simultaneously in the same location, can offer for the attendees of both meetings the unparalleled opportunity to ‘look over the fence’ and extend their scientific interest with new vistas, even further than was already offered by the joint starting session of both Conferences. For a full list of the speakers at the Conference on Nanotechnology, www.nanoinsight.net may be visited.

The social program of the SOLAR ‘05/Enpho’05 consisted of two excursions for all participants and the Conference Banquet. On the Monday afternoon, a visit was organized to Karnak, the Temple of Amun. Even for those who had visited Karnak before, the vast size and artistic excellence of the ancient temples, constructed mainly during the New Kingdom (1550–1075 BC), exerted an unforgettable impression. The last day of the meeting (Friday) was reserved for a full-day excursion to the west bank: the Memnon Colossi, the famous mortuary temple Deir el-Bahri of the female pharaoh Hatsheput (1503–1482 BC), of a surprisingly modern architecture, and the Valley of the Kings, where the pharaohs of the New Kingdom, such as Tutankhamun (1333–1323 BC), Seti I (1289–1279 BC) and Ramses II (1279–1212 BC) have been entombed. The excursion was concluded with a visit to the huge temple Medinet Habu, constructed for Ramses III (1184–1153 BC). Besides the impact of the historic importance and architectonic excellence of the temples and tombs, the scenery on the west bank of the Nile, opposite to Luxor, is of impressing beauty. In addition to the excursions for all participants, an extensive program was organized for the accompanying persons, with visits to the museum and bazaars in Luxor and the temple of Dendera.

The Conference Banquet, an Oriental Evening, was held on the Wednesday in the Khan El-Khalili Hall of the Pyramisa Hotel. The excellent selection from the Egyptian cuisine was further enlivened by a Nubian folklore program, including a sufi dancer. This program was followed by the performance of a belly-dancer, who induced many participants to show their mastery of this kind of dynamic art.

An important number of participants extended their exposure to Egypt by taking part in the post-conference excursion to Aswan, with visits to the temples of Edfu, Esna and Kom-Ombo on the way.

In conclusion, I am sure to speak in the name of all attendees when I congratulate Prof. Sabry Abdel-Mottaleb and his staff with a highly successful and enjoyable SOLAR ‘05/Enpho’05 and we all look forward to the following meeting in this series.
XX IUPAC Conference on Photochemistry, Granada
July 17–22, 2004

This past summer, lovely and scenic Granada, Spain was the host city for the 20th IUPAC Symposium on Photochemistry. This conference featured participants from over 40 different countries and was well attended by students, in part due to the over 100 fellowships that were provided for student travel. Because the conference was fairly large and contained several parallel sessions, I can only hope to offer here a short overview of a few of the many interesting talks I was able to attend. My apologies, therefore, to those whose talks do not appear in this report.

The first day opened with a plenary talk by John Polanyi (U. Toronto) who discussed ways to achieve maskless photochemical patterning on silicon as studied by scanning tunneling microscopy. The method has promise as a way to achieve printing on a molecular length scale. Jean Cadet (CEA Grenoble) spoke about photo-induced DNA damage in cells and, in particular, the efficiencies of UVA and UVB radiation in producing homo- and hetero-base dimers. In one of the afternoon sessions, having the theme of photochemical devices, Paul Barbara (UT Austin) described a novel technique to measure charge injection or field mobility and single molecule fluorescence as a way to understand charge mobility in photo-conducting polymers such as MEH-PPV. This is also important as a way to understand and quantify oxidative damage to these systems which can degrade their function in light emitting diodes (LEDs) and photo-cells. Alberto Credi and Belén Ferrer then described some ongoing work in the groups of Vincenzo Balzani and Fraser Stoddard in the clever design of molecular machines and molecular abacuses. Fernando Pina described a read-write-erase molecular system based on light-driven cis-trans isomerization in flavylum. Jean-Pierre Desvergne spoke about the self assembly and photochemical properties of soluble tetracenes being developed for organic LEDs. Ross Brown discussed the photophysical properties of soluble tetracenes being developed for organic LEDs. Arthur Nozik (National Renewable Energy Lab) spoke about methods to improve the efficiency of solar cells using quantum dots. In a similar theme, James Durrant focused on the dye-semiconductor interaction in solar cells and on the need to tune the distance between the dye and the semiconductor to achieve optimal performance. Hiroshi Masuhara (Osaka University) discussed the absorption and emission properties of an interesting system of nanoparticles made from the polythiophene-based P3DDUT polymer by solvent poisoning to obtain microdroplets. These nanoparticles showed interesting thermochromic behavior. Rachel Méallet-Renault (ENS-Cachan) described using nanoparticles consisting of polyaromatic organics in a fluorescence energy transfer system for biological detection. Arnold Kell and Minjoong Yoon rounded out the session discussing nano-particle properties.

Sunney Xie (Harvard) delivered a plenary lecture on single molecule studies of biological electron transfer in the from a donor tyrosine to an acceptor flavin in the enzyme flavin oxidoreductase. Because the rate of electron transfer is distance dependent, it is a sensitive probe of protein conformational changes on the length scale of a few Angstroms. This study revealed protein fluctuations over four decades of time (milliseconds to seconds). The second part of the talk covered the use of a novel fluorescent amplification probe based on β-galactosidase acting on a fluorescent substrate as an alternative to green fluorescent protein to probe gene expression in live cells.

The plenary talk following was given by Tetsuro Majima (Osaka University) who spoke about photosensitized oxidation of DNA. In the afternoon, a session on single molecule and single cell spectroscopy contained contributions from Johan Hofkens (Katholieke Universiteit, Leuven) who discussed recent results on the dynamics of excitation transfer in organic dendrimers. David Talaga (Rutgers, Newark) described a ‘hidden-Markov model’ that is designed to help researchers assess the impact of photo-bleaching and fluorescence lifetimes on the accuracy of the correlation functions measured by single molecule spectroscopy. The web site that he developed, www.singlemolecule.net, details this method. Alice Ting (MIT) described some novel enzyme catalyzed site and protein specific probes for use in cellular imaging. In the Polymer Photochemistry session, Paula Bosch (Instituto de Ciencia y Tecnologia de Polimeros) discussed novel fluorescent probes of polymer micro-environments, Hugh Burrows (Universidade de Coimbra) described pulsed radiolysis measurements of triplet dynamics in polymers important for making organic LEDs. Kenneth Ghiggino (University of Melbourne) then gave a talk on engineered polymers designed to optimize light harvesting by a dye antenna (coumarin) to a trap species (ruthenium trisbipyridyl), and I discussed work in our lab on the photophysics of aggregates of oligomers used for organic LED’s. Ana Moore (Arizona State University) closed out the afternoon with an overview of her group’s work in bio-inspired energy conversion and hydrogen production.
On Wednesday, Massimo Olivucci (Università di Siena) opened with a plenary lecture on progress in computing the excited state properties of chromophores in a protein environment which is applicable to complex systems such as green fluorescent protein and rhodopsin. Luisa de Cola then delivered the second plenary lecture on energy transfer in metal complexes in which two metals are connected by a phenyl bridge and the role of distance and geometry of the bridge in affecting the degree of energy transfer was examined. Polymers of such complexes show emission that changes from red to green based on the sign of the applied voltage in an electroluminescent device.

On Thursday, the winner of the Porter medal, Graham Fleming (UC Berkeley) spoke on his group’s work in using ultrafast spectroscopy to understand the workings of photosystem I and II in plants. He showed how calculating the coupling between the chlorophyll molecules in this system as well as the development of novel spectroscopic methods can elucidate the ultra-fast dynamics of energy transfer that were observed.

That evening, the conference had organized a wonderful tour of the Alahambra which is a famous Moorish castle in Granada and a beautiful banquet outdoors on the castle grounds. All in all, it was a very informative conference in a truly lovely setting. My compliments to the hard working organizers!
– Linda A. Peteanu

15th International Symposium on Photochemistry and Photophysics of Coordination Compounds (15th ISPPCC), Hong Kong, July 4–9, 2004

Brief report from Professor Vivian W. W. Yam of the University of Hong Kong and Chair of the 15th ISPPCC.

The 15th ISPPCC, which was originally scheduled to be held on July 6–11, 2003 at The University of Hong Kong, was re-scheduled to July 4–9, 2004 due to the outbreak of SARS.

The symposium was successfully held in Hong Kong and attracted over 160 participants including leading inorganic, coordination, and organometallic photochemists from all over the world. The scientific programme comprised 4 Plenary Lectures, 24 Invited Lectures, 19 Oral Presentations, and 90 Poster Presentations, spanning all areas of inorganic photochemistry and photophysics. The 15th ISPPCC also expanded its scope of interests to include related research in

(1) Materials Science, such as in the development of molecular light-emitting materials for organic light-emitting diode (OLED) applications, luminescence signaling devices, optical and photo-memory and imaging devices, photovoltaics, photochemical molecular devices (PMD) and machines, and optoelectronics;

(2) Biomedical Science, such as in the development of luminescence chemosensors, photovoltaics, and photochemical energy storage.

The 15th ISPPCC in Hong Kong provided a forum to arouse and widen the scope of interests of researchers in the field, and provided a good opportunity for delegates from Asia, in particular Mainland China and the region, to attend the symposium.

As a usual practice of the ISPPCC, the plenary and invited lectures as well as a number of selected oral presentations will be published after review in a special issue of the Coordination Chemistry Reviews (Elsevier Sciences Publishers).

Snapshots of the 15th ISPPCC can be found at the following link:
http://chem.hku.hk/~chemhome/isppcchk/
– Vivian W.W.Yam

14th International Congress on Photobiology (ICP)—Conference Report
Jeju, Korea, June 10–15, 2004

The 14th ICP was held on the island of Jeju, Korea, June 10–15, 2004. The congress was hosted by Korean Society for Photoscience and co-hosted by the Photobiology Association of Japan, The Asia and Oceania Society for Photobiology, and the Association for Photosciences in the Tropics. It was organized under the leadership of Jae-Young Lee, Congress President (Seoul National University) and Pill-Soon Song, President of the Organizing Committee (KLESL and University of Nebraska, Lincoln). The congress attracted approximately 700 attendees, with approximately 300 scientists and students from Korea.

The conference venue was the modern International
Convention Center located in the Jungmun Resort on the island of Jeju. Both the welcoming reception and the banquet, which featured a local dance troupe, were held at the Convention Center. Jeju is a volcanic island of great natural beauty and a subtropical climate. The Jungmun resort is located on a highland above a beautiful sandy beach and boasts several deluxe international hotels among its diverse accommodations for visitors. During breaks in the schedule, conferees were able to visit the beach, botanic gardens, waterfalls, volcanic formations, folk villages, major towns and other interesting sights. The island is of sufficient size and separation from the mainland to have developed a distinctive culture. The local cuisine features the rich harvest of the sea surrounding the island.

The two major scientific themes of the conference were the effects of sunlight on plants and animals. In the former domain, symposia topics included photosynthesis, phytochrome, photomorphogenesis, and photoreceptors. In the latter, topics included photodermatology, photodynamic therapy, photoprotection, photoaging, and phototherapy. In addition, there were symposia on DNA photorepair and electron transfer, bioorganic photochemistry and photophysics, and bioluminescence.

The scientific program consisted of 9 plenary and 4 award lectures, held in single session, and 35 symposia held in parallel session, each with five to seven speakers. There were in excess of 200 poster presentations in addition to the 220 lectures. Each of the plenary lectures were sponsored by a cooperating photoscience association. It was my privilege to present the plenary lecture sponsored by I-APS, DNA Molecular Photonics. John Simon presented the plenary lecture sponsored by the American Society for Photobiology, Shedding Light on Melanin. The US contingent included several speakers well known to I-APS members, including Gary Schuster, Bob Liu, Irene Kochevar, Bob Blankenship, Nick Giacintov, and Vladimir Shafirovich. As would be expected, the photobiologists far outnumbered the photochemists.

For your representative, the ICP presented the opportunity to meet and interact with an impressive international gathering of photobiologists in a most attractive setting. The perfect weather and superb local organization added to the pleasures of attending this congress.

– Frederick D. Lewis

27th Annual Reunion of the Brazilian Chemical Society
Salvador, Bahia,
May 30 – June 2, 2003

The 27th Annual Reunion of the Brazilian Chemical Society (SBQ) took place in Salvador, Bahia, from May 30 through June 2. This year the meeting was held together with the 26th Latin-American Chemical Reunion, which helped to swell the number of participants to a bit under 3000, compared to the usual 2000. Salvador is a rather large city (population 2.5 million) known for its beaches, great sea food and the predominant African influence in its culture. With all these attractions in the city itself, the large and boisterous turnout at the meeting was an indication of its quality.

The Photochemical Section of the SBQ has always been one of its smallest sections, with probably less than 30 independent groups working in this area in the entire country. In spite of this, the Photochemical Section was able to put together a program which included a short course for undergraduates and beginning graduate students, two invited lectures, three short talks and approximately twenty posters.

The “Short Course on Methods in Photochemistry” was given by Profs. Frank Quina (University of São Paulo), who talked about general principles, José Carlos Netto Ferreira (Federal University of Bahia), who talked about transient absorption methods and Antonio Claudio Tedesco (University of São Paulo at Ribeirão Preto), who talked about methods applied to biological systems.

The two invited lectures were;

1) “Photodynamic Therapy (PDT): A New Therapy for Cancer Diseases Treatment”, given by Prof. Antonio Claudio Tedesco. In his presentation Prof. Tedesco talked about the basic photochemical processes which lie behind PDT treatments, various delivery systems of the absorbing dye to the cancerous cells and highly successful clinical results against skin cancer. Much of the work cited came from Prof. Tedesco’s own laboratory.

2) “Chemometrics: The Art of Extracting Information from Chemical Measurements”, given by Prof. Marcel Maeder (University of Newcastle, Australia). Without going into the mathematical basis of the various chemometric treatments, Prof. Maeder illustrated five different types of chemical problems, of increasing complexity, which can be resolved via chemometrics. These problems ranged from kinetics to thermodynamics and covered various types of data, much, but not all, spectroscopic. According to Prof. Maeder, what has made
In recent years many new nanoscale materials have been synthesized and characterized. Nanoparticles, nanowires and nanotubes all show unique and attractive properties. Most of these materials are coated with organic molecules (ligands) that prevent them from coalescing in larger aggregates. In many occasions the ligands provide additional properties to the nanomaterials thus making them more attractive from a scientific and technological point of view. Ligands have been used to modify nanoparticles and nanowires to make them efficient sensors, catalysis, light energy conversion materials. The symposium will explore and analyze all of the most recent developments in the characterization of the physical phenomena that happen on the molecular monolayers that coat nanoparticles, nanowires and nanotubes. Particular emphasis will be placed in the understanding of the photo-physical properties of ligand shells and of the ligand/nanomaterials composite.

Photophysical Dynamics in Biological Molecules

**Pacifichem 2005—Symposium 252**

December 15–20, 2005, Honolulu, Hawaii

**Symposium Description**

Excited electronic states are important in many biological contexts. Electronic energy transfer is highly optimized in light harvesting proteins, while ultrafast nonradiative decay is responsible for the remarkable photostability of the DNA bases. In other biomolecules, excited electronic states may not occur naturally, but are of paramount interest as spectroscopic probes that report on dynamical motions over a wide range of time scales. This symposium will highlight new frontiers in excited states of biological and biomimetic molecules. Model peptides and isolated DNA bases are increasingly studied in molecular beams, where the unperturbed excited states can be observed. On the
other hand, time-resolved and steady-state spectroscopic techniques are used to study the photophysical properties of biomolecules in condensed-phase environments. Here, experiments on large systems reveal how supramolecular architecture modifies the photophysical pathways of single chromophores. Theoretical studies provide a natural bridge: quantum chemical calculations can now be performed at high levels of theory for single chromophores, while promising new methods are emerging for excitations in multichromophoric macromolecules. Sessions with invited and contributed talks are planned on photoactive proteins, natural and biomimetic light harvesting, DNA photophysics, and theoretical advances.

**Symposium Format**
The symposium features 30 invited talks and a number of contributed talks that will be selected from abstracts submitted through the Pacifichem Web Site: http://www.pacifichem.org. Poster presentations are also encouraged. Abstracts can be submitted any time between January 17 and April 13, 2005. Contributors will be informed of the status (oral or poster presentation) of their submission by May 30, 2005. Further information is available at the symposium web site: http://www.chemistry.ohio-state.edu/~kohler/pacifichem/.

**The Organizers**

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Mikio Kataoka, Nara Institute of Science and Technology

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Takayoshi Kobayashi, The University of Tokyo

Wei Kong, Oregon State University

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Susanne Ullrich, University of Georgia

Rienk van Grondelle, Vrije Universiteit Amsterdam

Michael Wasielewski, Northwestern University

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**International Symposium on Reactive Intermediates and Unusual Molecules (ISRIUM)**

This is a brief advance notice that the 2005 ISRIUM conference will be held at Pollock Halls, The University of Edinburgh from Sunday 7th August till Friday 12th August 2005. The format of the conference will be similar to that of previous ISRIUM meetings, involving short presentations and poster sessions.

The Pollock Halls site has a stunning location close to Arthur's Seat (one of Edinburgh's 350 million year old volcanoes) and is next door to the Commonwealth swimming pool (hence continuing the geothermal theme of ISRIUM 2003 in Iceland). It is about one mile from the historic part of the city and close to bus routes.

Conference accommodation will be in 'Chancellor's Court' a new complex of 350 deluxe twin and single bedrooms which is about 100 yards from the conference venue (check http://www.edinburghfirst.com to get an idea of the facilities).

I hope to send further details regarding registration (and activate the web-site) very soon indeed. I am still awaiting final details from Pollock Halls, but the cost is likely to be £57 per night bed and breakfast (£285 in
Upcoming Symposia & Conferences

photoproducts of biopigments. These techniques have allowed them to follow physical and chemical decay processes at the very instant when an excited chromophore is created. Simultaneous advancement in theory has provided logical explanations for the ultrafast decay processes in condensed media.

In this symposium we have assembled international experts specializing in biophysical studies of rhodopsin, bacteriorhodopsin, photoactive yellow protein and phytochrome, physical organic studies of excited polyenes and theoretical studies of decay pathways of excited polyenes. In addition to formal lectures by invited and contributing speakers in the scheduled three sessions, there will be a poster session for presentation of new results on photoisomerization. Contributions from new researchers are particularly welcome. We expect the symposium will foster an atmosphere for productive discussion among experts of varied background on a topic of common interest.

Invited speakers:
Drs. Arai (Japan), Diao (Taiwan), Fuss (Germany), Hayashi (Japan), Hellingwerf (Netherland), Houk (USA), Ishiguro (Japan), Kandori (Japan), Liu (USA), Martinez (USA), Mathies (USA), Moffat (USA), Saltiel (USA), Shichida (Japan). Also, Lewis (USA), Olivucci (Italy).

Photoisomerization Processes, Torsional Relaxation and the Hula-twist


Technical Subject Area: Physical and Theoretical Chemistry

Two 1/2-day (3.5 hour) sessions and one evening (~2 hour) session; and one poster session. For submitting poster abstract: http://www.pacifichem.org/c_abstracts/

Symposium Abstract:
The symposium on photoisomerization reaction was prompted by recent major development in several directions. On the mechanistic front, the traditional torsional relaxation mechanism has now been supplemented by other the volume-conserving mechanisms of isomerization, such as the Hula-twist. Spectroscopists have introduced a dazzling array of new techniques to elucidate the nature of the primary process and structure of the primary photoproducts of biopigments. These techniques have allowed them to follow physical and chemical decay processes at the very instant when an excited chromophore is created. Simultaneous advancement in theory has provided logical explanations for the ultrafast decay processes in condensed media.

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Rocky Mountain Conference on Analytical Chemistry

Dates: July 31 - August 4, 2005
Location: Grand Hyatt Denver, Denver, Colorado
Sponsor: Colorado Section - American Chemical Society and Rocky Mountain Section - Society for Applied Spectroscopy

Number of Attendees: 500
Number of Exhibitors: 40
Net Square Feet of Exhibit Space: 4,000
Products Displayed: Services and equipment used in analytical chemistry
Attendee Profile: chemist, environmental engineer, laboratory director, professor, researcher, scientist, technician

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Upcoming Symposia & Conferences

web: www.rockychem.com
contact person: Mark Stone

Write-Up:
47th year for this exhibition and conference that consists of various symposia dedicated to analytical chemistry. Sponsored by the Colorado Section - American Chemical Society and the Rocky Mountain Section - Society for Applied Spectroscopy. This is an international event.
47th Rocky Mountain Conference on Analytical Chemistry

July 31 – August 4, 2005 • Grand Hyatt Denver • Denver, Colorado

SPONSORED BY
Colorado Section — American Chemical Society
Rocky Mountain Section — Society for Applied Spectroscopy

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Tours & Activities • Vendor Workshops

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CALL FOR PAPERS

47th Rocky Mountain Conference on Analytical Chemistry
July 31 – August 4, 2005 • Grand Hyatt Denver • Denver, Colorado

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hurtubis@uwyo.edu

DEADLINE FOR ABSTRACTS IS MAY 1, 2005
Electronic submission of abstracts is required. To obtain formatting procedures and information concerning electronic submission of abstracts go to www.milestoneshows.com/rmcac and click on Call For Papers & Abstract Submission. Send the electronic version of the abstract and one hard-copy of the abstract to the symposium chair. If you are unable to access the internet, abstract forms, procedures and information can be obtained by calling 800-996-3233 or 303-690-3233.
Schedule

Sunday, June 26, 2005
8:00 AM - 12:00 PM Short Course
1:00 PM - 5:00 PM Presentations
6:00 PM - 9:00 PM Reception

Monday, June 27, 2005
8:00 AM - 12:00 PM Presentations
12:00 PM - 1:00 PM Lunch
1:00 PM - 3:00 PM Poster Session
3:00 PM - 6:00 PM Open
6:00 PM - 7:00 PM Dinner
7:00 PM - 9:15 PM Presentations

Tuesday, June 28, 2005
8:00 AM - 12:00 PM Presentations
12:00 PM - 1:30 PM Lunch
1:30 PM - 5:30 PM Presentations

Accommodations
The conference will be held at the Beaver Run Resort in Breckenridge, Colorado. Hotel reservations should be made directly with the resort by phone 1-800-367-7052 or e-mail stay@beaverrun.com, requesting the "University of Colorado" group rate.

Hotel room - $94
(2 queen beds, sitting area, private bath)

Deluxe Studio - $114
(queen bed, pull-out sofa, mini-kitchen, spa tub)

One Bedroom Condominium - $124
(queen bed, pull-out sofa, full kitchen, fireplace, private balcony)

Two Bedroom Condominium - $172
(queen bed, pull-out sofa, two queen beds in second bedroom, full kitchen, fireplace, private balcony)

For more information about the resort, visit its website at http://www.beaverrun.com.

Photopolymerization Fundamentals

June 26-28, 2005
Beaver Run Resort
Breckenridge, CO, USA
http://photopolymers.colorado.edu

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Photopolymerizations I/UCRC
RadTech
Introduction
Photopolymerizations have gained prominence in recent years for the pollution-free curing of polymer films as well as emerging applications in dental materials, conformal coatings, electronic and optical materials, and high resolution rapid prototyping of 3D objects. These solvent-free polymerizations proceed very rapidly with a fraction of the energy requirements of thermally cured systems, and the resulting polymeric materials possess highly useful properties. With 20% per annum growth in current and developing applications, photopolymerizations are destined to assume an increasingly important role in the production of high-technology and other materials. A fundamental understanding of the relationship between the molecular-scale mechanisms, dynamic, and structural aspects of the polymerization and the resulting macroscopic material properties is imperative to fuel technological advances in a rational and systematic manner.

This meeting will attempt to address critical, fundamental questions related to photopolymerization by bringing together numerous outstanding investigators from both academia and industry.

Topics will include:
- Monomer development
- Thiol-Ene polymerizations
- Oxygen inhibition
- Cationic and radical polymerizations
- New materials development
- Process and material modifications for current photopolymerization applications
- Biomaterials
- Emerging Applications

The meeting will take place in beautiful Breckenridge, Colorado, and allow extensive time for interaction and questions.

Presentation Format
The presentations will be focused on raising and attempting to answer unanswered questions regarding photopolymerizations. Each speaker will be asked to present their results and critical issues including unanswered questions that have resulted from their research or those that would aid them in product development. One third of each speaker’s time will be allotted for audience discussion and answering of questions. It is hoped that significant dialogue will occur between academic and industrial scientists in this rapidly expanding, critical area.

Invited Speakers
Invited Speakers that plan to attend and present include: Kristi Anseth (University of Colorado), Christopher Bowman (University of Colorado), Wayne Cook (Monash University), James Crivello (Rensselaer Polytechnic Institute), Christian Decker (CNRS, Mulhouse, France), Charles Hoyle (University of Southern Mississippi), Sonny Jonsson (Fusion Systems), Douglas Neckers (Bowling Green University), Alec Scranton (University of Iowa), Jeffrey Stansbury (University of Colorado Health Sciences Center), Allan Guymon (University of Iowa).

Short Course
A short course will be offered on the fundamentals of photopolymerizations on Sunday preceding the meeting. This short course will involve one-hour lectures on photopolymerization systems, kinetics, and initiation from several of the invited speakers.

Meeting Website
Bookmark the meeting website for meeting updates including the conference program, short course, registration fees, and hotel reservations. http://photopolymers.colorado.edu

Photopolymerization Fundamentals
June 26-28, 2005

Registration fee includes the following meals:
- June 26th (short course), dinner; June 27th, breakfast/lunch/dinner; June 28th, breakfast/lunch
- $200 Short Course Registration
- $450 Registration (non-students)
- $125 Student Registration
- $50 Student Short Course Registration
- $125 Late Fee (After May 6, 2005)

Method of Payment:
- Check/Money Order Enclosed.
- Please make payable to “University of Colorado”
- Mastercard
- Visa

Credit Card No. Expire Date
Name on Card Signature

Yes, I plan to contribute a presentation or poster.

Title

Author

Return this form via fax to 303-492-4341, or mail to:
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* 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
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- Imaging Systems (Nonsilver) (RG)
- Lasers (LS)
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- Mechanistic (MP)
- Ordered Media (OM)
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- Photosynthesis (PS)
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