The 79th Annual Meeting of the Israel Chemical Society & Exhibition: February 4–5, 2014, Dan Panorama Hotel, Tel Aviv, Israel

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With almost no interruption since its establishment in 1933 the Israel Chemical Society (ICS) has kept its tradition of Annual Meetings, each providing an opportunity for students, faculty members, industrial chemists and chemistry teachers to refresh their networking, exchange scientific and social information and establish fruitful collaboration projects. Typically, each of these vibrant meetings has featured heterogeneous scientific programs that included reports from academic labs and industrial research centers, as well as lectures by guests from abroad. This year approximately 750 participants enjoyed a broad range of over 100 lectures on diverse subjects, approximately 200 posters, special symposia and discussion groups, as well as a large commercial exhibition by vendors of research equipment and scientific instrumentation, chemicals, materials, services of analytical chemistry, diagnostics and biotechnology, publishing houses and offices of intellectual property.

The conference center of Dan Panorama Hotel, although a bit tight for a meeting of this size, offered convenient halls for the parallel sessions, exhibition and poster sessions, along with excellent food services. Its location provided easy access to attractive sites in the Tel Aviv area and other parts of the State of Israel. The location at the Mediterranean beaches at the southern part of Tel Aviv offered pleasant strolls along the coastal promenade to the scenic harbor of ancient Jaffa, to outdoor cafés and art galleries, the famous flea market and the adjoining historic neighborhoods of early Tel Aviv. The Tel Aviv weather in this period of early February is typically dry, sunny and pleasant, not too cold for outdoor activities. Indeed, this attractive setup provided good reasons for a few participants and guests to extend their stay by a few days.

The ICS meetings have usually been held every year in early February, which is the inter-semester break of all Israeli universities at the end of the short rainy season in Israel. The responsibility for every meeting has been revolving in a six-year cycle among the chemistry departments of the six major research universities. Thus, looking over the history of one decade, the 69th meeting (2004) was organized and hosted by Tel Aviv University (TAU), the 70th meeting (2005) was organized by Bar Ilan University (BIU), the 71st meeting (2006) by Ben-Gurion University of the Negev (BGU), the 72nd meeting (2007) by the Weizmann Institute of Science (WIS), the 73rd meeting (2008) by the Hebrew University of Jerusalem (HUJ), the 74th meeting (2009) by the Technion, the 75th meeting (2010) by TAU, the 76th meeting (2011) by BIU, the 77th meeting (2012) by BGU, and the 78th meeting (2013) by WIS.

Thus, it became again the responsibility of the Institute of Chemistry of the Hebrew University of Jerusalem to organize the 79th Annual Meeting. Prof. Dima Gelman as Chairman and Prof. Roy Shenhar as Co-Chairman were helped by a strong organizing committee, including professors Noa Seri, Roie Yerushalmi, Yoel Sasson, Assaf Friedler, Lioz Etgar, Eylon Yavin and Sanford Ruhman. Ms. Paula Lam-Haim, CEO of the ICS, provided much additional help. The actual operation, including all technical aspects, administration, organization of the exhibition, promotion, etc. was carried out by an experienced team of Bioforum Ltd., including CEO Mr. Amir Malka, Dr. Liora Shiftan and Ms. Reut Lazar.

Another unique tradition of the ICS, which has already attracted much worldwide attention and interest, has been hosting delegations of eminent chemists from top academic institutions abroad who presented plenary and invited lectures. This initiative has created outstanding opportunities for many Israeli scientists, and particularly for graduate students to interact with top-tier chemists, thus enhancing prospects for networking, scientific collaboration and extensive exchange of ideas. Each visit of these delegations has left a long trail of mutual visits of students and faculty members, postdoctoral and Sabbatical programs, joint research proposals and other fruitful international activities. The ICS has already hosted distinguished delegations from The Scripps Research Institute (1997), California Institute of Technology (1998), University of Cambridge, UK (1999), ETH-Zurich (2000), Columbia University (2001), University of California at Santa Barbara (2006), the Max Planck Society (2009), the

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Chemical Society of Japan together with the Japan Society for the Promotion of Science (2010), Academia Sinica (2011) and the University of California at Berkeley (2012). This year, in addition to excellent lecturers from the USA, Italy, Russia and Germany, we had the pleasure of hosting a delegation of 8 outstanding scientists from the University of Oxford (Figure 1).

Opening Ceremony

Formally opening the conference in Tuesday morning, Prof. Dima Gelman, Chairman of the Organizing Committee, greeted the large audience of over 500 chemists, the Oxford delegation and many other guests, including Mr. Matthew Gould, British Ambassador to Israel, Rabbi Shai Piron, Minister of Education, Eng. Andre Uzan, Head of the local-industrial council Ne’ot Hovav, Prof. Tim Softley, Head of the Department of Chemistry at the University of Oxford, Mr. Yaron Razon, Director of the Israel Philatelic Service and Prof. Dan Shechtman, Laureate of the 2011 Chemistry Nobel Prize (Figure 2).

In his welcoming speech, ICS President Prof. Ehud Keinan, pointed out that chemistry has always been a prominent area of scientific and technological excellence in the State of Israel. The chemical industry has contributed significantly to the national economy, with chemical products forming over 40% of the industrial production and 25% of the country’s exports. It is not surprising that two out of nine State Presidents, Chaim Weizmann (first President) and Ephraim Katzir (fourth President), were professors of chemistry. All six Nobel Prizes awarded to Israeli scientists: Avram Hershko, Aaron Ciechanover, Ada Yonath, Dan Shechtman, and more recently Michael Levitt and Arieh Warshel, were in Chemistry. These achievements are remarkable, considering the fact that the Israeli chemistry community is quite small with only 6000 chemists, 5000 chemical engineers and 800 teachers. Since its establishment in 1933, the ICS has been striving to promote the chemical research and development, the chemical industry and chemistry education, as reflected by its diverse membership, including academic faculty members and students, industrial chemists, chemical engineers and chemistry teachers.

Unfortunately, the current situation of chemistry teaching in the State of Israel is far from satisfactory, with less than 400 out of about 1200 high schools around the country offering chemistry education. Keinan explained that serving as both Chairman of the Advisory Council for Chemistry at the Ministry of Education and ICS President allowed him to initiate the Negev-Nobel educational program together with Dr. Dorit Taitelbaum, Chief Inspector for Chemistry Education. The program aims at encouraging high school pupils of the Southern towns, including Dimona, Yeruham, Netivot, Sderot, Ofakim, Kiryat Malachi and Mitzpe Ramon, to pursue chemistry education. The project reflects a fruitful collaboration between the ICS, Ministry of Education and the local-industrial council Ne’ot Hovav. In 2012–2013 six new chemistry classes were established in Dimona, Yeruham, Sdot Negev and Eilat with external chemistry teachers. All Israeli Nobel Prize Laureates in Chemistry volunteered to help and encourage the pupils and teachers. The formal opening ceremony of the Negev-Nobel program took place on January 1st at the visitors’ center of Teva Pharmaceuticals in Ne’ot Hovav in the presence of ministers, mayors, top executives of the Ministry of Educations and four Israeli Nobel Prize laureates (Figure 3). In 2013–2014 the program has doubled with more classes and an increased number of attending pupils.

Keinan then referred to his role as Editor-in-Chief of the Israel Journal of Chemistry (IJC), which is the official journal of the ICS. A year ago we were very pleased with the statistics that reflected steeply rising worldwide visibility and popularity of the Journal, with an Impact Factor of 1.535 reported in June 2012, which was nearly double the value of June 2011. This year the Impact Factor has doubled again and exceeded 3.0. Furthermore, while in 2011 our journal ranked 90th among 150 chemistry journals, it ranked 42nd this year. Clearly, the IJC has already become a major player among the chemistry journals, and we expect this trend to continue. Keinan took this opportunity to encourage ICS members and guests to consider becoming Guest Editors of future issues on specific topics at the forefront of all chemical sciences.

The ICS continues various activities that increase the popularity of chemists among young people and the public at large. For the third year in a row, two teams of chemists from all universities and the biotech industry participated in the internationally known Mountain to Valley (M2V) relay race along more than 220 km. The 2013 race included more than 2500 runners within 360 teams. Meeting non-trivial challenges of hot weather and difficult night-navigation the ICS runners interacted with hundreds of other runners and completed the race in the 26th mixed men/women category and 61st in the all-male category. Two ICS teams have already registered for the next race, which will take place in May 15–16, 2014.

The main event of last year was the 78th ICS Meeting, held at the Dan Panorama Hotel in Tel-Aviv in February 12–13, 2013. A team of WIS organized the meeting with Prof. Milko van der Boom as Chairman and the late Prof. Michael Bendikov as Co-Chairman. The 950 participants attended 90 oral presentations, 200 posters, special symposia, round tables and a large exhibition. Plenary lectures were delivered by Omar Yaghi (UC Berkeley), Jonathan Sessler (University of Texas), Ronny Neumann (WIS), Yoram Cohen (TAU), Sason Shaik (HUJ) and the two ICS Prize laureates, Aharon Gedanken (BIU) and Ilan Marek (Technion). Koby Levy, winner of the ICS Prize for the Outstanding Young Chemist, presented a keynote lecture. Other guest lecturers included Antonio
Figure 1. Plenary lecturers, members of the Oxford delegation and other international guests. This scanned poster includes the personal signatures of all lecturers who signed under theirs photos.
Facchetti (Polyera), Dmytro Perepichka (McGill University), Jeremy England (MIT), Jan Apotheker (University of Groningen), Jonathan Nitschke (University of Cambridge) and Anke Weidenkaff (EMPA and the University of Bern).

In addition, the ICS held two special symposia. In collaboration with the Ministry of Energy and Water Resources the ICS organized in Tel Aviv the first International Conference on Natural Gas Chemistry (ICNGC), on April 30, 2013, titled “Natural gas is much more than cheap fuel”. Another one-day symposium on “New Biomaterials for Therapy”, honoring the laureate of the 2013 Wolf Prize in Chemistry, Prof. Robert Langer of MIT, took place on May 7th, 2013, at BGU. The symposium, which was organized in collaboration with the Faculty of Engineering at BGU, included a dense program of 12 lectures by scientists from Israel, USA and Canada.

The ICS has successfully established three new prizes in the past year, all secured by long-term contributions to the ICS. The ICS Prize for Medicinal Chemistry in memory of Abraham (Barry) Cohen is based on an endowment fund contributed by Teva Pharmaceuticals to commemorate Barry Cohen, who passed away on November 2012 after serving as a director on the Board of Teva for 20 years. The ICS Prize for Nano Scale Sciences has become possible thanks to a generous endowment.
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fund contributed by the Tenne family to commemorate the late Leah Tenne, first wife of Prof. Reshef Tenne of WIS. The ICS Prize for Technological Innovation has been contributed and sponsored by Israel Chemical Ltd. (ICL) through its subsidiary, ICL Innovation Ltd.

Finally, Keinan announced that the ICS would celebrate its 80th Annual Meeting in February 2015 under the responsibility of the Technion with Prof. Mark Gandelman serving as Chairman of the organizing committee.

Mr. Matthew Gould, British Ambassador to Israel, greeted the Oxford delegation and the audience, expressing his pride in both Britain and Israel for their many years of huge strengths in chemistry, which have been reflected in significant numbers of Nobel Prize Laureates in both countries. He mentioned the fact that in the science of chemistry two of the top five universities in the world are British (Oxford and Cambridge). Obviously, he arrived in this conference with enormous pride of welcoming such an impressive delegation from Oxford. Furthermore, Mr. Gould expressed his desire and belief that the special scientific relationships between the Royal Society of Chemistry and the ICS will serve as a model for UK-Israel relations in other fields. These relationships demonstrated that by cooperation both partners could achieve much more together than can apart, to the benefit of their societies and the entire humanity.

Minister of Education, Knesset Member Rabbi Shai Piron used the opportunity of this meeting to address the community of Israeli chemists and express his commitment for enhancement of science education at all levels and, in particular, boosting chemistry studies in high schools. He emphasized the need to reduce the incredible number of multiple programs, some of which are quite esoteric, in order to focus on the essential core of sciences and humanities. Referring to the matriculation examinations, he explained that while most countries provide

Figure 3. Celebrating the opening of the Negev-Nobel Project at the visitors’ center of Teva Pharmaceuticals in Ne’ot Hovav, January 1, 2013. In yellow (Yeruham) and grey (Sdot Negev) shirts are some of the 140 pupils who joined the project in its first year. Standing from left: Mr. Michael Biton, Mayor of Yeruham; Mr. Andre Uzan, Head of the local-industrial council Ne’ot Hovav; Dr. Dorit Taitelbaum, Chief Inspector for Chemistry Education, Ministry of Education; Dalit Shtauber, Director General, Ministry of Education; Amira Haim, Southern District Director, Ministry of Education; Prof. Daniel Hershkovitz, Minister of Science and Technology; Silvan Shalom, Vice Prime Minister and Minister for Regional Development and for the Development of the Negev and Galilee; Prof. Ehud Keinan, President, Israel Chemical Society. Sitting, from left: Nobel Prize Laureates in Chemistry, Professors Aaron Ciechanover, Avram Hershko, Dan Shechtman and Ada Yonath.
both high school diploma and professional certificates. Israel provides only high school diplomas. Although Israel has a high percentage of matriculation in comparison with other countries, it suffers from low percentage of excellent students, only 5.5% in comparison with 10% in the developed countries.

He claimed that the current number of students who study high level math and sciences is unacceptably low. The current system discourages students from studying challenging subjects, because they have realized that they can achieve high grades with little effort and thereby enter easily the institutions of higher education. Such students gain unjustified advantage over students who struggle and learn more challenging and meaningful subjects.

Mr. Piron expressed his intention to change this situation to provide every student with at least one science subject within the mandatory package, whereas those in science tracks will study two science subjects. He explained that science learning is not a luxury for the country but a necessity. The current situation of too many students learning too many insignificant subjects presents a strategic threat to the State of Israel. Finally, the Minister advocated his new policy of meaningful learning, which aims at producing students who raise questions, allocate the sources of information, process information and create new knowledge that is relevant to their personal world in our technological era. The purpose of meaningful learning is to develop capabilities of thinking, self-learning, ability to create and to intensify personal growth and community involvement. He predicted that this new policy would eventually thicken the layer of excellent students in the country.

Prof. Tim Softley, Head of the Department of Chemistry at Oxford, spoke on behalf of the Oxford delegation and thanked Professors Keinan, Gelman and all members of the organizing committee for their kind invitation to participate in this exciting meeting. Since the ICS is a world-class chemistry community, it was a great privilege and honor for him and his colleagues to be invited. It was also a great pleasure to be able to tear the Oxford people away from a rain-drenched cold and dark UK to the Spring-like weather in Tel Aviv in early February.

Softley indicated that Oxford has one of the largest chemistry departments in the world with over 70 faculty members, over 600 postgraduate and postdoctoral researchers and 750 undergraduates studying for a chemistry degree. Their size enables them to have strength across the full breadth of chemistry, from its interface with biology and medicine to the boundaries with atomic physics. He hoped that in these two days we all have the opportunity to sample something of that breadth. And while the advancement of fundamental science is their major goal, they also have a strong track record in knowledge transfer into the chemical and other industries with 14 spinoff companies from Chemistry since the year 2000. He pointed out that the Oxford team has already established a number of collaborations, interactions and friendships with Israeli chemists. They hoped that over the two-day meeting their visit would stimulate and establish new opportunities for collaboration and indeed friendship, and they looked forward to having discussions with us. Perhaps the outcome of those discussions will be that Israeli chemists will visit Oxford or even come to work there in the future. Oxford is a beautiful historic city with a university history reaching back almost 1000 years – not quite as historic as some parts of Israel, but nevertheless an attractive place to come to.

Eng. Andre Uzan, Head of the local-industrial council Ne’ot Hovav, described the Ne’ot Hovav Eco-Industrial Park as a central economic anchor for the Negev and a unique model for sustainable and environmentally conscious industry in Israel and the world. The park covers 25,000 dunam (6,200 acres) and provides a livelihood for 10,000 families in the Negev. The total export for all of the Park’s factories is estimated at $4 billion a year. He promised that Ne’ot Hovav is committed to the principles of environmental growth and the development of connections and synergies between all partners and elements within the park and beyond. Through a network of connections and collaborations between the industries operating in the Park and the Council itself, the Council can fulfill the commitment for conservation of resources and reduction of emissions into the air, soil and underground. The park maintains extensive relationships with the Israeli and international academic world, with an emphasis on chemistry and sustainability. Thus, it was a natural development that the council of Ne’ot Hovav adopted and supported the Negev Nobel educational program at its early stages. Finally, Mr. Uzan expressed his satisfaction that the Souvenir Leaf of the new stamp, which was introduced for the first time, represents a joint effort of the ICS and the council of Ne’ot Hovav.

Prof. Dan Shechtman dedicated his greetings not only to the importance of science education for strengthening the economy and security of the State of Israel but also to the issue of education in general. Although we all agree that education is an issue of top priority for everyone, most of our teachers still follow the old practice of conveying information rather than actually educating their pupils. Shechtman argued that our Ministry of Education could be more accurately dubbed Ministry of Teaching. We need a serious program for educating our kids to become civilized human beings with basic skills of behavior in a civilized society. The results of the current unsatisfactory situation are visible everywhere with most Israeli citizens lacking basic skills of verbal expression and communication. Most of them, including media interviewers, don’t even listen to their guests, have limited conversation skills and often embarrass themselves and others in public events. Shechtman proposed to establish appropriate programs for educating teachers and pupils alike in order to improve their personal and social skills.
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Mr. Yaron Razon, Director of the Israel Philatelic Service at the Israel Postal Company, highlighted the intense collaboration between the Philatelic Service and the ICS. This warm relationship started with the planning and issuing of two Israeli stamps on January 4, 2011, commemorating the International Year of Chemistry, the 2004 Nobel Prize in Chemistry awarded to Aaron Ciechanover and Avram Hershko of the Technion and the 2009 Nobel Prize in Chemistry awarded to Ada Yonath of the WIS. The third stamp, which was issued on December 3, 2013, commemorates the International Year of Crystallography and the 2011 Nobel Prize in Chemistry awarded to Dan Shechtman of the Technion for his discovery of a new form of matter, quasi-periodic crystals, also known as quasicrystals. This stamp was chosen by the Israel Philatelic Federation (IPF) to represent them in the Philately Day, which was held in Tel Aviv in December 4th, 2013.

Mr. Razon promised that the relationships between the Israeli Philatelic Service and the ICS would intensify. His announcement of a fourth stamp that will be planned to commemorate the 2013 Nobel Prize in Chemistry to two Israeli citizens, Arieh Warshel and Michael Levitt, was received by the audience with intense applause. At the end of his greetings Mr. Razon and Ehud Keinan awarded Professor Dan Shechtman with a framed set of the recently issued Souvenir Leaf of this stamp (Figure 4). Enlarged images of all three stamps decorated the main lecture hall of Dan Panorama Hotel during the entire meeting.

The second part of the opening session was devoted to an award ceremony of ICS prizes (more details are provided in a separate report). Keinan reported on the 2013 ICS gold Medal awarded to Prof. Michael Levitt of Stanford University and Prof. Arieh Warshel of the University of Southern California. The ceremony took place a day earlier, on February 3rd in the Knesset, in the presence of many family members and friends of both Nobel Prize laureates who reside in Israel. He announced that three other prizes will be awarded in the evening during the gala dinner: the 2013 ICS Honorable Member award to Prof. Shmuel Milon Sprecher of Bar-Ilan University, the 2013 ICS Prize of Excellence to Prof. Zeev Gross of the Technion, and the 2013 Green Chemical Industry Prize to Pazkar Ltd.

The 2013 ICS Prizes for Excellent Teachers, which were sponsored by Teva Pharmaceutical Industries Ltd., were awarded together with Minister Shai Piron and Dr. Dorit Taitelbaum, Chief Inspector for Chemistry Education. The ICS Prize for Excellence in Chemistry Teaching was awarded to Mrs. Anat Feldenkrais of the Dror Center for Education, Culture and Sport of the Regional Council Lev Hasharon for her outstanding contribution to chemistry teaching as a teacher and an instructor on the regional and national levels, and for implementing innovative teaching methods and advanced teaching programs. The ICS Prize for the Outstanding Young Teacher was awarded to Mr. Eran Shmuel of the Rothberg High school of Ramat Hasharon for extraordinary devotion to chemistry teaching that produced outstanding students, for making chemistry a prestigious, highly demanded subject at his school.

The ICS Prize for Outstanding Young Scientist was awarded to Prof. Fernando Patolsky of TAU for his seminal advances at the interface between nano-electronics and biological systems. The 2013 ICS Innovation Prize, contributed by Israel Chemicals Ltd. (ICL), was awarded to Prof. Israel Schechter of the Technion for his innovative technology in the area of laser spectroscopy. Mr. Eyal Ginzberg, Chief Technology Officer and Senior VP at ICL explained the purpose of the prize and presented Prof. Schechter who has created an exciting new tool for the analysis and identification of compounds and materials in their original state, whether solid, liquid or gas, without any pretreatment. The use of this method has already been demonstrated on pharmaceuticals, explosives and environmental materials and would be applied to other fields like process control and final product quality. Ginzberg said that the ICL is proud and honored to award this prize to Prof. Schechter and looks forward to the commercial implementation of his invention.

The ICS Prize for Excellent Graduate Students was awarded to six students, one from each university: Ariel Afek (BGU, with advisor David Lukatsky), Assaf Ben Moshe (TAU, advisor Gil Markovich), Sophia Buhiut (BIU, advisor Arie Zaban), Yuri A. Minko (Technion, advisor Ilan Marek), Shahar Sukenik (HUJ, advisors Assaf Friedler and Daniel Harries) and David Tsivion (WIS, advisor Ernesto Joselevich). In addition, the Lise Meitner Prize was awarded to graduate student Eli Kraisler (WIS, advisor Leecor Kronik). These prizes were awarded jointly by the ICS President and a representative of the respective university.

Plenary Lectures

Yitzhak Apeloig (Technion) presented the first plenary lecture on “Low-Coordination Silicon Compounds. Multiple Bonds, Metallosilanes (Silyl Anions) and Silyl Radicals”. He explained that although both silicon and carbon belong to the same group their chemistry is dramatically different. The most pronounced difference is in the occurrence of multiple bonds, which for silicon were believed not to exist until 30 years ago. However, the field has recently undergone a revolution and many multiply bonded silicon compounds have been synthesized and characterized.
Figure 4. The souvenir leaf with the stamp that was issued by the Israel Philatelic Service to commemorate the International Year of Crystallography 2014 and the 2011 Nobel Prize in Chemistry. Crystalline materials have a distinguished role in the Jewish culture and scripture. The most obvious examples are the stones of the breastplate, described in Exodus. The Choshen, a fancy clothing item that was carried by the high priest, was composed of 12 various precious stones and each was named after one of the tribes of Israel. The souvenir leaf displays the 12 stones in their natural crystalline forms. The stamp cancelation was especially designed to commemorate the 79th ICS Meeting, depicting the logo of the Negev-Nobel project with a Hebrew banner ‘Everything is Chemistry’.
Apeloig reviewed some of these exciting developments. Critical to the synthesis of many multiple-bonded silicon compounds are metallosilanes. However, while organometallic compounds are among the most useful reagents in organic synthesis, the number and variety of metallosilanes is small and the knowledge of their structures and reactivity is very limited. Apeloig reported on the synthesis of several groups of novel metallosilanes, including tris-silyl substituted silyl lithiums, functionalized silyl lithiums, the first lithiosilenides and the first geminal dimetallosilanes. Some of the reactions of these compounds and their applications in the synthesis of new compounds, such as silynes and stable silyl radicals, were also discussed.

Zeev Gross (Technion), winner of the 2013 ICS Prize of Excellence, delivered the second plenary lecture on “Corroles: From Fundamental Science to Drug Candidates and Water Splitting Catalysts”. The scientific interest in the macrocyclic metal chelating corroles has evidenced a remarkable increase since Gross’ 1999 discovery of their first one-pot synthesis. Facile synthetic modifications that were introduced during the latest years allow for tuning the most fundamental properties of corroles, such as lipo-/hydro-/amphilicity, photo-excited states, their mode of decay to the ground state, and the stability/reactivity profiles of their metal complexes. Gross exemplified the impact of his investigations by the introduction of corrole metal chelates for bio-imaging with aluminium being the best choice, detection and curing of tumors and treatment of diseases, such as cardiovascular, neurodegenerative, and diabetes, all caused or amplified by reactive oxygen species. More recently, metallocorroles were investigated as drug candidates. He described also the use of metallocorroles as catalysts for the most important chemical reactions involved in energy-relevant processes, such as selective four-electron reduction of oxygen to water and water splitting reactions.

Veronique Gouverneur (University of Oxford) delivered the third plenary lecture on “Fluorine Chemistry: Cold and Hot Recipes”. She explained that the impact of fluorine chemistry in the life sciences is enormous. As many as 30–40% of agrochemicals and 20% of pharmaceuticals on the market contain fluorine, and developmental pipelines are predicted to contain more. Fluorine substitution affects nearly all physicochemical and adsorption, distribution, metabolism and excretion properties of a lead compound. Moreover, systematic fluorine scans of ligands is becoming a powerful approach to strengthen protein-ligand binding interactions, one of the key aspects of lead optimisation. 19F- and 18F-labelled compounds are also finding increasing use in imaging for Magnetic Resonance Imaging (MRI) and Positron Emission Tomography (PET), respectively. These applications demand strategies for the selective installation of F-substituents on complex targets upon manipulation of feedstock functional groups. Gouverneur’s laboratory is dedicated to enabling the discovery of new agents of medicinal value through major advances in fluorine chemistry. Selective fluorination of poorly activated substrates has been a priority task combined with the design, discovery and study of systems that mediate fundamentally interesting and useful organic reactions to streamline access to high value fluorine-containing targets. The control of absolute and relative stereochemistry has been an underlying goal in this work because of the critical role played by the three-dimensional structure of biologically functional molecules.

Itamar Willner (HUJ) delivered the fourth plenary lecture in the morning of the second day on “DNA Nanotechnology for Sensing, Machinery and Controlled Drug Delivery”. He pointed out that the base sequence of nucleic acids encodes substantial structural and functional information in the biopolymer. This sequence-guided information was implemented to developing DNA machineries for amplified sensing, for the switchable control of plasmonic fluorescence properties and programmed reconfiguration of nanoparticle structures and for the development of stimuli-responsive mesoporous nanoparticles and hydrogels for controlled drug delivery for future nanomedicine. These topics were addressed by describing some recent advances in the area of DNA nanotechnology: (i) Semiconductor quantum dots and metal nanoclusters were used for the sensitive, multiplexed, analysis of DNA or aptamer-substrate complexes. (ii) DNA machines, such as tweezers, walkers and rotors, operating in solution and on surfaces were described, including interlocked DNA catenanes and rotaxanes and their use for the programmed, switchable, dynamic reconfiguration of gold nanoparticles. (iii) Stimuli-responsive DNA-based materials were shown to provide functional matrices for controlled drug delivery and release from drug-loaded mesoporous nanoparticles. Also, switchable DNA-based hydrogels, and particularly, shape-memory hydrogels, were introduced.
Harry Anderson (University of Oxford) delivered the fifth plenary lecture on “Molecular Wires for Nanotechnology and Neuroscience”. He showed that conjugated porphyrin oligomers exhibit remarkable properties, including wire-like charge transport, ultrafast energy migration, nonlinear refraction and strong two-photon absorption. They are amazingly amenable to supramolecular control, and the coordination chemistry of the metal centers leads to wide possibilities for template-directed synthesis. Anderson presented the synthesis of π-conjugated molecular nanorings, which enter the size domain of a typical protein. Applications of related oligomers in molecular electronics and for probing electrical signals in neurons were discussed.

Timothy Softley (University of Oxford) presented the sixth plenary lecture on “Cold Chemical Collisions Using Laser-Cooled Ions”. He explained that as temperatures go below 1K, gas phase chemical processes start to undergo a transition from a classical collision picture to one dominated by quantum (wave-like) behavior, as the de Broglie wavelength for translational motion gets progressively longer, becoming greater than the range of molecular interactions. His group aims to explore this novel physical regime for chemical processes, taking advantage of recent technology for producing cold atoms and molecules. Thus, laser-cooled atomic ions, and sympathetically cooled molecular ions provide ideal targets for studying reactive collisions at very low temperatures when combined with sources of cold neutral atoms and molecules. They have commissioned several cold neutral sources including a Stark decelerator and buffer-gas cooled quadrupole guide, both suitable for use with dipolar molecules, and a Zeeman decelerator and a photodissociation source, suitable for paramagnetic species. Progress in developing these sources and combining them with trapped ions was reported. The Stark decelerator was used to decelerate a seeded beam of ND$_3$ with quantum-state selectivity and tunable final velocities 250–35 m/s. Ions in a RF trap provide a highly localized target for the decelerated beam. Softley discussed the progress in studying the reactions of cold Xe$^+$ and other ions with the decelerated ND$_3$. The quadrupole velocity selector has been combined with a 5 K buffer-gas cooled source to produce rotationally cold neutrals. The performance of a Zeeman decelerator for paramagnetic atoms (hydrogen and oxygen) has been characterized and will extend the range of cold ion-neutral reactions to be studied. In the photodissociation experiments, cold Br atoms were produced by photodissociation of Br$_2$ in a molecular beam at such an energy that the backward recoil of the Br atoms matches the forward lab-frame velocity of the molecular beam, leaving near-stationary atoms. A permanent magnetic quadrupole trap has been introduced into the apparatus to accumulate cold atoms.

Fernando Patolsky (TAU), winner of the 2013 ICS Excellent Young Scientist Prize, delivered the seventh plenary lecture on “1D Nanomaterials: From Synthesis to Applications”. He explained that detection and quantification of biological and chemical species are critical to many areas of health care and the life sciences, from diagnostic disease to the discovery and screening of new drug molecules. Nanoscience and nanotechnology exhibit fundamental properties of matter and phenomena that are often drastically different from those shown by the bulk phase. The application of nanotechnology in life sciences, nanobiotechnology, is already having a great impact on sensing, diagnostics and drug delivery. The ability to transduce chemical/biological binding events into electronic/digital signals suggests the potential for highly sophisticated interfaces between nanoelectronic and biological information processing systems. Semiconducting nanowires and nanoribbons are powerful building blocks in nanoscience. During the last decade nanowire-based electronic devices emerged as a powerful and universal platform, demonstrating key advantages such as rapid, direct, highly sensitive multiplexed detection, for a wide range of biological and chemical species from single molecules up to ultimate level of living cells. Patolsky presented various examples in which these novel electrical devices have been used for the sensing of chemical and biological agents. Also, he showed newly developed strategies for the mass-fabrication of nanowire-based arrays in order to realize applications of these devices.

Invited Lectures

The two full days of the meeting were very eventful, with more than 80 invited lectures presented in parallel in five different lecture halls (Figure 5), large poster sessions (Figure 6), special symposia, round table discussions and a large exhibition. As can be seen from the representative photos, the audience was quite diverse, including many nationalities and backgrounds. Obviously, it is impossible to report on every one of the hundreds of presentations.
By no means do the chosen sample of lectures described below, which includes all guest lectures, reflect their relative impact, importance or priority.

Andrew Baldwin (University of Oxford) spoke about “NMR Led Studies of Complex and Heterogeneous Biomolecular Assemblies”. Nuclear Magnetic Resonance (NMR) spectroscopy is unique in that it can simultaneously describe both the motions that proteins undergo, as well as their structure. Far from being a biophysical curiosity, these motions have emerged as vital for functions as diverse as enzyme catalysis, drug binding, molecular recognition and folding. Baldwin described recently developed NMR techniques for interrogating these motions that are being applied to ever-larger biomolecular complexes. By understanding how proteins function, his group gains greater insight into what happens when they malfunction, as is the case in many human diseases. He illustrated this by outlining progress they have made into understanding the function of the human small heat shock protein αB-crystallin. This protein is associated...
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with preventing the protein aggregation associated with neurodegenerative conditions, Alzheimer’s and Parkinson’s diseases. Studies of this chaperone are inherently challenging from a technical standpoint. Even in the absence of aggregating protein it spontaneously adopts a heterogeneous array of inter-converting oligomers (10–40mers). They have developed hybrid methodology combining solution and solid-state NMR methods with nanospray mass spectrometry and electron microscopy to tackle this complex heterogeneous ensemble, which has provided insight into how this dynamic chaperone functions.

Darren J. Dixon (University of Oxford) lectured on “Enantioselective Cooperative Catalysis and Complexity Building Reaction Cascades in Library and Natural Product Synthesis”. He explained that enantiomerically pure compounds with the capacity to activate simultaneously electrophilic substrates and pro-nucleophilic reagents towards one another offer numerous opportunities for the discovery of powerful new catalytic asymmetric carbon-carbon and carbon-heteroatom bond forming reactions. He described new families of bifunctional catalysts and their use in highly enantioselective Michael addition reactions, Mannich, aldol and alkylation reactions as well as other synthetically relevant transformations. He also discussed the application of these and other catalysts, separately and in concert, to the discovery of new one-pot reaction cascade processes to generate novel, stereochemically defined scaffolds and architectures useful for library and target synthesis. He described further application of selected methodologies as pivotal C–C bond forming steps in the total synthesis of a range of manzamine and daphniphyllum alkaloids. These syntheses serve to illustrate how complex natural product targets can be rapidly accessed when combinations of catalyst-controlled reactions, one-pot multistep procedures and powerful route-shortening cascades are designed into the overall synthetic sequence.

Tim Claridge (University of Oxford) spoke about “Reporter-based Ligand Screening by NMR: Applications to 2OG-Dependent Oxygenases”. He explained that ligand screening methods employing NMR spectroscopy have become well established techniques for the study of small molecule binding to macromolecular targets and have a role to play in the development of new pharmaceuticals and ligands designed as probes to investigate biochemical pathways. The methodologies available generally fall into two classes: “protein observe” where the resonances of the isotopically labeled macromolecule are detected or “ligand observe” where the behavior of the small molecule itself is monitored. In the absence of isotopically labeled protein, ligand observe techniques are favored and methods such as saturation transfer difference (STD) and WaterLOGSY are widely employed. In some cases, however, techniques employing direct observation of the binding ligand can be susceptible to false negatives (high-affinity ligands may give no detectable response on binding) and false positives (non-specific binding to the macromolecule). In such cases the use of reporter molecules in competition-based assays may overcome these limitations whereby the response of the reporter is monitored as it becomes displaced by the ligand of interest under investigation. Claridge described the application of reporter-based NMR screening methods to members of the so-called 2-oxoglutarate (2OG) dependent oxygenases. This family of proteins comprises Fe(II) dependent enzymes that target either small molecules or complete proteins as substrates for hydroxylation and have many essential roles in mammalian biology including, for example, responses to oxygen levels, fatty acid metabolism and epigenetic regulation. Examples of reporter ligand methods were described, including the use of the co-factor 2OG as a generic reporter for the enzyme family and the use of solvent water itself.

Andrew Weller (University of Oxford) spoke about “The Mechanism-Led Design of Catalysts for the Dehydrocoupling of Amine and Phosphine Boranes”. He explained first that the dehydrocoupling of amine- and phosphine-boranes as catalyzed by transition-metal fragments allows for the controlled release of H2 and the production of B–N or B–P oligomeric or polymeric materials via dehydropolymerisation. Such main group polymers of empirical formula (NRHBH2)x or (PRHBH2)x are valence isoelectronic with technologically pervasive polyolefins, and show promise as piezoelectric materials, electron beam resists, and precursors to boron–phosphate or boron–nitride materials. In addition, the development of routes for the construction of E–E’ (E = p–block element) bonds by catalytic routes is important, but lags significantly behind those used for the construction of C–E or C–C bonds. Despite the significant potential for these new and virtually unexplored materials the mechanism for these processes remains ill-defined with only a handful of mechanistic investigations reported. Weller reported that by use of well-defined precatalysts based upon intermediates, final products in the dehydrocoupling of amine- and phosphine-boranes are revealed and isolated. Detailed investigations into the likely catalytic cycles lead to proposed mechanisms for these processes, i.e., dehydrogenation and B–N/B–P bond forming events, with a coordination/insertion type mechanism postulated for chain growth, not unrelated to olefin polymerization. He also discussed the implications for the design of new catalysts that can deliver these new materials for specific applications.

Henry J. Snaith (University of Oxford) lectured on “Meso-superstructured and Thin-Film Organometal Trihalide Perovskite Solar Cells”. Thin-film solar cells promise to reduce the cost of sunlight-to-electricity conversion compared to conventional monocrystalline silicon. A variety of approaches have been developed with different device architectures and materials systems. The most effi-
cient thin-film absorber materials can fulfill the multiple roles of light-absorption, charge separation, and transport of both holes and electrons. Materials that can be processed with solution-based techniques at low temperatures, such as printing, should ultimately lead to the least expensive solar cell technology. However, those materials processable with the lowest cost methods are usually composed of complex architectures of distributed heterojunctions, which inherently introduce losses at the high density of internal material interfaces. Recently organometal trihalide perovskite absorbers have emerged as an exciting new material family for photovoltaics, with power conversion efficiencies having already exceeded 15%. Snaith presented recent results on improving and understanding meso-superstructured and thin-film planar heterojunction perovskite solar cells, exhibiting both excellent mesoscopic and thin-film properties as compared to palladium(0) or copper(I) catalysts. Detailed mechanistic insight into the working mode of the C–H bond ruthenation step set the stage for the development of ruthenium-catalyzed twofold C–H bond functionalizations as well as step-economical oxidative annulations of alkynes. These oxidative C–H bond functionalizations could be performed in an aerobic fashion with ambient air as the terminal oxidant, and provided atom- and step-economical access to various important bioactive heterocycles.

Evgueni Nesterov (Louisiana State University, USA) spoke about “Bottom-Up Design of Organic Semiconducting Polymer Thin Films”. Organic semiconducting polymers are rapidly entering the areas traditionally occupied by inorganic materials, including electronic and photovoltaic devices, as well as becoming valuable platforms for the development of new applications, such as chemosensing devices. Such practical applications typically require utilizing organic materials as either surface-attached or free-standing thin films. Currently the mainstream top-down paradigm is based on utilizing solution-based processing of soluble semiconducting polymers. This approach generally provides only modest control over nanoscale molecular organization and phase separations. In many instances, performance of thin-film devices suffers due to the intrinsically amorphous and disordered nature of organic polymer materials. Thus, the ability to precisely control nanoscale organization and molecular structure of the polymers in thin films remains an unmet challenge. In his presentation Nesterov outlined his recent achievements in developing a bottom-up approach to prepare surface-grafted thin films of semiconducting polymers by surface-confined polymerization of small-molecule monomers. This allowed in situ preparation of organic semiconducting polymeric thin films directly from the monomers, and afforded greater control over molecular structure, nanoscale organization and arrangement in the polymer films. A number of different strategies were described toward accomplishing this goal, as well as properties of thin-film materials prepared via surface-confined polymerization.

Luigi Vaccaro (University of Perugia, Italy) spoke about “Waste-Minimized Approaches to Pd-Catalyzed Cross-Coupling Reactions”. His group has been interested in the optimization of synthetic procedures for the sustainable production of target compounds. Their approach includes the synthesis of novel heterogeneous catalytic systems specifically designed for being used in flow conditions and in eco-friendly reaction media. The goal is to define efficient catalytic reaction protocols operating in flow that would allow waste minimization, paying attention to the recovery and reuse of the solid catalyst without compromising its efficiency, and of the minimal
amount of reaction medium and reactants. This approach was exemplified by cross-coupling reactions.

**Irina Nesterova** (Louisiana State University, USA) lectured on “Dynamic Range and Sensitivity of an I-Motif: Rational Control via Manipulations of Structural Elements and Folding Mechanism”. She explained that abnormalities as small as 0.2–0.3 pH units in tightly regulated living organisms can be associated with a variety of severe cellular malignancies, including propensity towards neoplastic transformations and inhibition of apoptosis. The majority of probes currently utilized for pH monitoring in biological media are intrinsically limited to the response sensitivity of 2 pH units, a consequence of the Henderson–Hasselbalch equation. In an effort to circumvent the limitation, she developed a general strategy towards design of pH sensors with tunable dynamic range and response sensitivity based on a DNA i-motif. The approach allows tuning the sensor dynamic range over the physiologically relevant range of 6.3–7.3 with a precision of transition point manipulation of about 0.1 pH units. Further, deliberate manipulation of the i-motif folding cooperativity yielded a sensing system with adjustable response sensitivity. In particular, sensors with overlapping dynamic range and response sensitivity within 0.25–0.65 pH units were designed and evaluated. The potential applications of reported approaches are not limited to pH sensing but may extend to systems geared up towards molecular logic applications and development of biocompatible ultrasensitive motifs for artificial molecular signaling networks.

**Doron Pappo** (BGU) lectured on “Sustainable Oxidative Cross Coupling Techniques in Target and Diversity Oriented Synthesis”. He explained that oxidative cross coupling methods have become a powerful synthetic tool for the construction of complex molecular architectures. These reactions proceed through a single transformation and without the need of pre-functionalization of the coupling partners. The utilization of iron and copper complexes as catalysts in these reactions highlights the potential of the oxidative cross coupling reactions in developing sustainable and economical chemical transformations, which are useful in the synthesis of natural products and pharmaceutically active compounds required for medicinal chemistry study. Recently, his group demonstrated that catalytic iron(III) in the presence of oxidant can catalyze the oxidative cross coupling of phenols with betaoesters, 1,3-diketones, beta-ketoamides and conjugated alkenes. These simple yet highly efficient methods provide direct entry to complex phenolic bioactive natural products in a step- and atom-economical manner. To demonstrate the advantages this environmentally benign chemistry has to offer in natural product synthesis and in medicinal chemistry, a two-step, gram-scale diversity-oriented synthesis of the phytoestrogen coumestrol was developed.

**Mark Gandelman** (Technion) lectured on “New Efficient Approaches to Organic Halides”. He pointed out that organic halides are extremely useful materials; due to their unique physical, chemical and biological properties they have found wide use in numerous valuable products and industrial applications. As final products they are used as flame-retardants, gasoline additives, dry cleaners, solvents, biocides, pharmaceuticals, agrochemicals and dyes. They are also broadly used as valuable synthetic intermediates in organic synthesis. Development of selective, efficient, robust and general methodologies for the preparation of organic halides as well as the new strategies for their synthetic applications, represent important goals of organic chemistry. New efficient and robust methodologies and reagents to the preparation of iodo-, chloro-, bromo- and fluoroorganic compounds, as well as a straightforward approach to the preparation of geminal dihalo-alkanes, were presented. Gandelman demonstrated that geminal dihaloalkanes have a great potential for further functionalization to produce valuable complex organic compounds. He emphasized the catalytic enantioselective synthesis of tailor-made organic fluorides, which usually require non-trivial synthesis.

**Micha Fridman** (TAU) presented “Aminosugar-Based Antimicrobial Cationic Amphiphiles: Design Synthesis and Mode of Action”. He explained that bacterial membranes have been poorly exploited as targets for the development of antibiotics even though such drugs offer a solution to infections caused by multi drug resistant bacteria. Since such antimicrobial agents may non-selectively disrupt all membranes, avoiding cytotoxicity to eukaryotic cells remains an obstacle for the development of bacterial membrane targeting antibiotics. Fridman chemically modified two aminoglycoside antibiotics, which target the bacterial ribosome, and prepared a selection of membrane targeting antimicrobial cationic amphiphiles. These compounds demonstrated high potency against a broad spectrum of bacteria that were in some cases highly resistant to the parent AGs. Using several biological assays his group demonstrated that the cationic amphiphilic AGs in this study target bacterial membranes and not ribosomes. Red blood cell hemolysis tests indicated that there was no correlation between the antimicrobial potency and hemolytic activity of these antimicrobial cationic amphiphiles.

**Ashraf Brik** (BGU) spoke about “Chemical Biology with Deubiquitinases”. He explained that ubiquitination, the attachment of a ubiquitin (Ub) monomer, composed of 76 amino acids, or of a polyubiquitin (polyUb) chain to a protein target, is involved in a wide range of cellular processes, including protein degradation, trafficking, transcription and the DNA damage response. Ubiquitination is a reversible post-translational modification and the reverse reaction, namely, deubiquitination is controlled by a family of enzymes known as deubiquitinases (DUBs), which hydrolyze isopeptide bonds within Ub bioconju-
Ernesto Joselevich (WIS) lectured on “Guided Growth of Horizontal Nanowires: A New Path to Self-Integrated Nanosystems”. He explained that the large-scale assembly of nanowires with controlled orientation on surfaces remains one of the most critical challenges toward their integration into practical devices. He reported on the vapor-liquid-solid growth of perfectly aligned, millimeter-long, horizontal GaN and ZnO nanowires with controlled crystallographic orientations on different planes of sapphire and other substrates. The growth directions, crystallographic orientation and faceting of the nanowires vary with each surface orientation, as determined by their epitaxial relationship with the substrate, as well as by a graphoepitaxial effect that guides their growth along surface steps and grooves. Despite their interaction with the surface, these horizontally grown nanowires display few structural defects, exhibiting optical and electronic properties comparable to those of vertically grown nanowires. Guided GaN nanowires and ZnO nanowires present general similarities and a few interesting differences, which shed light onto the guided growth mechanism. The controlled horizontal growth of nanowires of different materials on different substrates proved the generality of the guided growth approach. Recently, his group demonstrated the feasibility of massively parallel “self-integration” of NWs into functional systems based on guided growth, including hundreds of sing-NW based field-effect transistors made all at once, and complex logic circuits, such as a 3-bit address decoder, highlighting the potential of guided growth for the large-scale integration of nanowires into practical devices.

Parallel Sessions and Special Symposia

Most of the oral presentations were delivered within parallel sessions. The first day included two sessions on Chemical Biology & Biophysics, organized by Assaf Friedler (HUJ) and chaired by Meital Reches (HUJ) and Uri Raviv (HUJ), two sessions on Bioinorganic & Medicinal Chemistry, organized by Assaf Friedler (HUJ) and Eylon Yavin (HUJ) and chaired by Dan Gibson (HUJ) and Gonen Ashkenasy (BGU), and two sessions on Organic & Organometallic Chemistry, organized by Dima Gelman (HUJ) and chaired by Alex Szpilman (Technion) and Dmitry Tselilikhovsky (HUJ).

In addition, a special session on Entrepreneurship in Chemistry, organized and chaired by Yoel Sasson (HUJ), hosted five speakers from the chemical industry: Sobhi Basheer (TransBiodiesel), Ofer Toledano (Sol-Gel Technologies), Fernando de la Vega (PV Nanocell), Hovav Gilan (WellToDo, Inc.), and Eliezer Manor (Shirat Enterprises Ltd.) who focused on renewable energy resources, water purification, printed electronics, and pharmaceuticals. They shared with the audience their personal experience with the challenges that entrepreneurs are facing when starting up a chemical company, all the way from the initial stage of a scientific idea to fabrication and marketing of their first product.

Another special session on Chemical Engineering, organized by Roy Shenhar (HUJ) and chaired by Ronit Bitton (BGU), represented an effort to tighten the relationship with the community of chemical engineers. The lecturers, Hanna Dodiuk (Shenkar College), Reuven Zidon Cohen (Engineering Consulting Services), Yaron Paz (Technion), and Zeev Aizenshtat (HUJ), discussed the development of ice-repellent coatings, large-scale production of agrochemical intermediates, air decontamination by TiO₂ photocatalysis, and development of bio-fuel additives.

The program of the second day included two sessions on Nanochemistry & Materials, organized by Roy Shenhar (HUJ) and Roie Yerushalmi (HUJ) and chaired by Danny Porath (HUJ) and Daniel Nessim (BIU), two sessions on TheoChem PhysChem & ChemPhys, organized by Sanford Ruhman (HUJ) and chaired by him and Ilya Averbukh (WIS), two sessions on Sustainable Chemistry, organized by Lioz Etgar and chaired by Yoel Sasson (HUJ), a session on Nanotechnology for Bio Applications, organized and chaired by Eylon Yavin (HUJ) and a session on Analytical Chemistry, organized by Roie Yerushalmi (HUJ) and chair by Dima Gelman (HUJ).

The increasing attention given by the ICS to chemistry education at all levels was manifested by an intensive one-day symposium on Chemistry Education, which was attended not only by teachers but also by faculty members and students. The program included a panel discussion, round tables and lectures. Chaired by Dr. Noa Seri of the Hebrew University, the panel discussed various strategies to encourage science students to pursue chemistry-teaching careers in high school. The panel (organized and chaired by Noa Seri and Dorit Taitelbaum) included Prof. Assaf Friedler (HUJ), Dr. Rachel Mamlok-Naaman (WIS), Dr. Dorit Taitelbaum (Ministry of Education), Orit Herscovitz (Technion), Rachel Metuki (Head of Pedagogical Affairs, Ministry of Education), and the fresh winners of the ICS teachers’ prizes, Mrs. Anat Feldenkrais and Mr. Eran Shmuely.

Each of the three round tables focused on a specific topic. Prof. Raz Jelinek (BGU) led a discussion on “New Color Indicators in Chemistry: Not Just pH”, discussing the development of color-based sensors for studying and
visualizing properties and interactions of cellular membranes. Sharon Waichman and Roie Yerushalmi (HUJ) led another round table on “Architecture at the Nanometric Scale: Synthesis and Assembly of Complex Nanometric Building Blocks”, discussing the ability to design materials at the nanometer scale and their current research activities and strategies for the formation of nanometric functional architectures and their implementation. Jordan Chill (BIU) led a third round table on “Using NMR to visualize hidden events in the life of proteins”. He explained that proteins adopt a wealth of local and global structural folds, which provide the necessary diversity for efficient execution of their biological roles, and discussed how new developments in NMR methodology provide exciting options for observing the molecular events in the life of a protein.

The special session on Chemistry Education included oral presentations as well: Dr. Ron Blonder and Shelley Rap (WIS) lectured on “Social Networks for Chemistry Education”. Ronit Herscu-Kluska and Rivka Weiser Biton (Ort Braude) spoke about “The Study of Chemistry among Third Age Learners”. Ruthy Sfez, Esti Hefer and Tuvia Lewenstin (Azrieli college of engineering, Jerusalem) presented “Grading Students’ Performance in Laboratory Courses: Standardization, Self-Evaluation and Ethics”.

Social Events and Gala Dinner

In addition to a welcoming reception for the Oxford delegation on the evening of February 3rd, the main social event was the congress gala dinner on the evening of February 4th. Both events took place in the Dan Panorama Hotel. About 80 participants attended the gala dinner, including the Oxford delegation, prize winners, their families, many of their past and current students, friends and colleagues (Figure 7). The gala dinner has always provided a perfect opportunity to award three of the ICS prestigious prizes. Prof. Keinan thanked again all eight members of the Oxford delegation and awarded every one of them with a lifetime honorary membership of the ICS.

The ICS Honorable Member award was presented to Prof. Emeritus Shmuel Milon Sprecher (BIU). Keinan stated that very few people have contributed to chemistry in the State of Israel over so many years as did Prof. Sprecher since 1955 when he founded the Chemistry Department at BIU. In addition to his service as Dean of the Faculty of Natural Sciences and Mathematics and later as Rector of BIU, Prof. Sprecher has revolutionized the teaching of General, Organic and Bio-Chemistry all around the country. Over 3000 Israeli chemists at BIU, TAU, WIS, Technion, HUJ and BGU can claim that Sprecher significantly influenced their career. Being one of them, Keinan shared with the audience anecdotes and personal experience as an undergraduate student in Tel Aviv University in 1969. In his response Prof. Sprecher shared with the audience his experience and satisfaction.
of 60 years as research scientist and an educator. He cited the relevant phrase from the Talmud: “Much Torah have I learnt from my teachers, more from my colleagues, but from my disciples most of all.”

While awarding the 2013 ICS Prize of Excellence to Prof. Zeev Gross (Technion), Keinan emphasized the unique entrepreneurial spirit and risk taking character of Prof. Gross that allowed him to identify the great potential in his 1999 discovery of a simple synthesis of corrole ligands. Gross had anticipated that the extremely facile synthetic pathway to novel corroles could generate a flurry of opportunities with corrole metal complexes as mediators for important processes in human health and catalysis. From that respect, scientists are opportunists in the good meaning of the term. Indeed, Gross has demonstrated the relevance of corrole complexes to a large number of important applications in catalysis and in biomedicine. Selected examples include the attenuation of atherosclerosis, elimination of protein nitration and subsequent cellular dysfunction and death of insulin producing beta cells, as well as both the detection and growth-elimination of breast cancer tumors.

In his response, Professor Gross first cited the Babylonian Talmud, “Three partners have a person: God, father and mother”, for thanking god and his parent. He particularly mentioned his father, who insisted that his children would get the highest possible education since he never received a formal education because of World War II. He then continued by a citation for the Midrash Tanhuma: “Every person has three names: one given to him by his parents; one that people use to call him, and one that he acquires for himself; and the latter is the most important of all.” He thanked his Ph.D. supervisor, Prof. Shmaryahu Hoz, and all his students who helped in acquiring the reputation that brought him the prize.

The ICS Prize for the Green Chemical Industry was awarded to Pazkar Ltd. for their contributions to protection of the environment and for the development of energy saving products and in particular, for their development of InoPaz H20, a revolutionary green polyurethane product that proves high waterproofing capabilities. The Pazkar representatives, Mr. Gil Biran, CEO, and Dr. Nitsa Galili, Head of Chemistry & Technology, thanked the ICS for the honor. Keinan indicated that this is the second time that this prize goes to the Paz Oil Group, following the winning the 2010 prize by Paz Ashdod Oil Refinery. He also described the history of this prize, which was established by the ICS Board four years ago in order to highlight the environmental awareness among many of the chemical industries around the State of Israel and the need to convey this message to the public who keeps an adverse image of the chemical industry. If fact, many chemical plants make major investments to minimize wastes and pollution, and protect the environment. These efforts and remarkable results should be acknowledged.

**Closing Ceremony**

The Closing Ceremony of the conference which took place on Wednesday evening, included awards for excellent posters (Figure 8). The first poster award was presented to Or Szekely (WIS) for her poster “The Potential of Ultrafast 2D NMR in Kinetic Studies of Protein Folding”. The second poster award was presented to Amani Zoabi (HUJ) for the poster “Heterogenization of Chiral Ruthenium Catalysts within Silica Microcapsules”. In addition, a special award for Energy & Environmental poster was contributed by the journal Energy & Environmental Science.

**Figure 8.** Awarding the poster prizes. From top: The first and second poster awards are presented to Or Szekely (WIS) and Amani Zoabi (HUJ) by Roy Shenhar and Ehud Keinan. The special poster award for Energy & Environmental Science is presented to Dr. Sabrina Sartori (Norway) by Ehud Keinan, Lioz Etgar and Roy Shenhar.
mental Science of the Royal Society of Chemistry. The prize was awarded to Dr. Sabrina Sartori of UiO/UNIK/IFE, Oslo, Norway, for her poster “Nano-Confined Metal Hydrides in Porous Scaffolds for Hydrogen Storage”.

In his closing remarks, Keinan acknowledged again those who made the 79th ICS Meeting so successful, particularly Prof. Dima Gelman as Chairman and Prof. Roy Shenhar as Co-Chairman and the entire organizing committee, Ms. Paula Lam-Haim, CEO of the ICS, the people of Bioforum Ltd., particularly Mr. Amir Malka, Dr. Liora Shifman and Ms. Reut Lazar, and the entire delegation of Oxford University, particularly Profs. Tim Softley and Veronique Gouverneur. Finally, he reminded the audience that the ICS will celebrate its 80th Annual Meeting in February 2015 under the responsibility of the Technion with Prof. Mark Gandelman serving as Chairman of the organizing committee.