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SALT LAKE CITY
meeting highlights

*ECS President **KARL SPEAR** (left) presented a token of ECS's appreciation to plenary lecturer **CAROL JENSEN**, vice-president of global research and development for performance chemicals, The Dow Chemical Company.*

***BRUCE E. DEAL** (right) became the Society's 2002 Edward Goodrich Acheson Award Medallist. He received the medal from ECS President **KARL SPEAR** (left) and delivered a memorable address to meeting attendees.*

*ECS President Karl Spear welcomes the **2002 CLASS OF ECS FELLOWS** (front row, left to right) Kim Kinoshita, Sigeru Torii, Israel Rubinstein, (Spear), Cor Claeys, and Sorin Cristoloveanu; (back row, left to right) Paul Kohl, William Brown, Mark Allendorf, Tetsuya Osaka, Martin Kendig, Zempachi Ogumi, and Krishnan Rajeshwar. Missing from the picture is new ECS Fellow Toshio Shibata.*

With two spectacular geographic features (the great Salt Lake and the Wasatch Mountain Range) as its borders, Salt Lake City provided a gorgeous setting for the Society's 202nd meeting. The hotel and meeting accommodations drew rave reviews from the over 1,300 attendees on hand to participate in 959 papers in 32 sessions and an array of other meeting activities: poster sessions, social events such as the Monday Evening Mixer, the Technical Exhibit, and several fascinating keynote talks.

Microfluidics for the Rest of Us

On Sunday evening, Antonio Ricco, of ACLARA Biosciences, gave a talk as part of the ongoing educational "XYZ for the Rest of Us" lecture series. Approximately 200 people attended his talk entitled "Advances in Plastic Microfluidics: Disposable Microcircuitry for the Life Sciences." Dr. Ricco described the advantages of combining fluid transport, device fabrication, and detection on a board or chip. By controlling fluid transport and reagent delivery in microchannels, small reactors can be devised. By replicating this design numerous times on a board, multiple samples can be developed simultaneously. Detection by fluorescence methods, for example, allows rapid assay of numerous samples.

Because of small size, limited use of reagents, and reproducibility, a synergy of custom chemistry and custom device is achieved. As such, these systems are ideal for multiplexed bioassays and drug discovery. Miniaturization reduces costs and exposure to hazardous materials because reagents are limited. Parallelization allows automation and multiplexing, which reduces the time needed to survey numerous samples. Integration of microfluidics and reac-

tion vessels reduces sample transfers and manual tasks, which leads to increased reliability and accuracy. Numerous laboratory tasks, including dispensing reagents, filtering, pre concentration, dilution, binding and release, heating, separations, and detection, can be accomplished on a single board. A single board may incorporate channels, reservoirs, fluid interconnects, valves, pumps, electrodes, and sensors. Dr. Ricco concluded his talk by demonstrating several systems he and his colleagues have already optimized.

Plenary Lecture: New Chemical Technologies

Carol Jensen, vice-president of global R&D for The Dow Chemical Co., presented the plenary lecture on Monday morning, entitled, "New Chemical Technologies – The Dow Perspective." She noted that the historical beginnings of the company were in the electrolytic manufacture of bromine from brine by Herbert Dow in 1890. (See *Interface*, spring 2002, p. 23). The company's charter was to bridge academia, research, and engineering; with the Dow-Union Carbide merger, the largest chemical enterprise in the world was born.

Dr. Jensen noted that the Performance Chemicals and Plastics Division accounted for $12.4 billion out of $27.8 billion total revenue. Approximately one billion dollars (U.S.) was earmarked for R&D in this area, and a measure of the return of investment was the award of the National Medal of Technology to Dow in June 2002. Dr. Jensen divided her talk on R&D activities at Dow into three parts: "Old" (polyethylene), "New" (electronic materials), and the "Next" frontier (biotechnology).

In the first category, Dr. Jensen cited the development by Dow of the single-site INSITETM catalyst for olefin polymerization. She contrasted this new-generation catalyst with the classical Ziegler-Natta counterpart. Finally, she pointed out the many applications of polyolefins in the automobile, packaging, wire-coating, and health industries.

In the area of electronic materials, Dr. Jensen noted the emerging need for low dielectric constant (k) materials as the insulator in the modern-day fast, ultra-small, and cheap integrated circuits. She cited Dow's contributions in this area on the development of new families of fluorocarbon-based dielectrics (SiLK) with k values in the

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***Dennis Peters** (right) received the 2002 Henry B. Linford Award for Distinguished Teaching from ECS President **Karl Spear** (left).*

*Carol Jensen (right) received a Diamond Level Leadership Circle Award from Karl Spear on behalf of **The Dow Chemical Company**. Dow was one of the Society's first Contributing Members and has continued to support the program for 62 years.*

*The Corrosion Division honored **Prof. Hans Böhni** on the occasion of his 65th birthday at the fall meeting in Salt Lake City. A symposium in his honor entitled "Critical Factors in Localized Corrosion" included 78 papers. On Wednesday night, about 80 people attended a reception in Böhni's honor. In the picture, from the left to right, are Florian Mansfeld, Hans Böhni, Greta Uhlig (wife of Herbert H. Uhlig), Ron Latanision, and Dave Duquette. Mansfeld, Böhni, and Duquette worked together in Uhlig's lab at MIT in the sixties. The MIT Corrosion Lab is currently headed by Latanision.*

*The Society's new **Leadership Circle Awards** were presented to the following companies by ECS President Karl Spear (sixth from the left). ECS Executive Director Roque Calvo (far right) was on hand to congratulate the recipients pictured above (from left to right): Daniel H. Doughty, Sandia National Laboratories (Gold Level, 27 years); Rick Howard, Kerr-McGee Chemical (Silver Level, 18 years); Michael Root, Rayovac (Diamond Level, 50 years); Clifford Walton, FMC Corporation (Bronze Level, 7 years); John Reynolds, Hach Company, Radiometer Analytical Division (Bronze Level, 5 years); Karl Spear; Louie Scribner, Scribner Associates (Bronze Level, 7 years); Kenneth Browall, General Electric (Diamond Level, 51 years); Chris Berney, Solartron Analytical (Silver Level, 13 years); and Roque Calvo.*

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Meeting attendees had an opportunity to enjoy the beautiful courtyard on the grounds of the ***GRAND AMERICA HOTEL*** *in Salt Lake City.*

2.1 to 2.6 range. An important innovation was the preparation of porous SiLK dielectrics where air filling of the matrix serves to further lower the k value. Another class of materials under development at Dow are light-emitting diode (LED) materials. Here the target is brighter and more energy-efficient (low-power) devices based on organic active components. Long-term stability and multi-color emissive capability were mentioned as challenges in this area.

The next frontier of Dow R&D is biotechnology. Here the company focus is moving chemical synthesis from huge plants (mostly-petroleum based) to cellular factories. Dr. Jensen noted that conventional chemical synthesis (based largely on the petrochemical sector) is inelegant and uses non-renewable resources (fossil fuels), compared with what cellular organisms can do with natural precursors. The biotechnology R&D activities at Dow are organized into plant, pharmaceutical, and industrial categories. Jensen also pointed out the contributions of Dow to the agro-chemical sector, particularly in the area of insect/pest control and the development of natural, low-toxicity chemicals. Dr. Jensen ended her informative and fast-paced lecture with a reiteration of the Dow motto, "It's all about innovation."

Edward G. Acheson Award Lecture: How to Survive More than 40 Years in Silicon Valley

Bruce Deal delivered his award address, "How to Survive More than Forty Years in Silicon Valley," immediately following the Honors and Awards session on Wednesday. Dennis Hess, a past president of the Society and a protégé of Dr. Deal from the Fairchild Semiconductor days, introduced the speaker in glowing and affectionate terms, and with a quote from his mentor that claimed, "Give me a furnace large enough and a place for me to stand and I'll oxidize the world!" Hess noted that the awardee was a recipient of the Electronics Division Award in 1974, the Thomas D. Callinan Award of the DS&T Division in 1982, and the Society's Solid State Science and Technology Award in 1993.

Dr. Deal's talk delighted the audience with its humor and wit interspersed with his reminiscences on the Si-SiO_2 interface. He began his talk by noting that he had been instructed not to insult electrical engineers and women in science, nor to discuss cold fusion! His lecture started with an introduction to Silicon Valley and its early players ranging from Hewlett-Packard (1939) to Intel (1968). The MOS technology featured prominently in the early work by these industry pioneers and their studies culminated in the invention of the transistor and the integrated circuit. Dr. Deal discussed early work on instabilities at the thermal oxide interface on silicon. Capacitance-voltage measurements, and the doctoral research work of Snow on sodium ion drift at the interface, were mentioned in this context.

The next item of discussion was oxide film growth kinetics on silicon in wet and dry O_2 ambients. An indication of the early confusion regarding the source of MOS instability was Donovan's representation of the blind men and the elephant cartoon that appeared in a journal paper on the subject. (See *Interface*, spring 2002, p. 40.) The nomenclature for labeling various types of charge at the Si-SiO_2 was mentioned, along with a listing of the 19 known mechanisms of drift at the interface. Oddly enough Drift No. XIII was identified as "Company Private" and was later revealed to have been assigned to Andy Grove (of Intel fame) by the unofficial "Drift Society."

Dr. Deal concluded his highly entertaining lecture with a remedy for surviving 40 years in the Silicon Valley: "Keep your sense of humor." This is reminiscent of a column in a popular magazine that is entitled "Laughter – The Best Medicine." Indeed, the speaker doled out this remedy in liberal doses throughout his lecture.

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Meeting Highlights

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Leadership Circle Awards

Twelve ECS Contributing Members were presented with Leadership Circle Awards at the Honors and Awards session. The Leadership Circle Award was approved by the Board of Directors at the spring 2002 meeting in Philadelphia to recognize companies that demonstrated continued support of ECS through the contributing membership program.

The award is divided into four levels based on the number of membership years. These levels range from Bronze (5 years) to Diamond (50 years). Of the 65 current ECS Contributing Members, 51 are eligible for this prestigious award, which is a testament to the continued support of our industrial partners. Obviously, without their continued support, the Society would not be able to provide the benefits it does to its members, and our ability to meet our objectives would be significantly lessened.

The following companies and company representatives received awards. (Please see the photo on page 9 showing the representatives who were on hand to receive their awards.) Diamond Level—Energizer, 58 years; General Electric, 51 years; General Motors, 51 years; and Rayovac, 50 years. Gold Level—Sandia National Laboratories, 27 years. Silver Level—Princeton Applied Research, 22 years; Kerr-McGee Chemical, LLC, Electrolytic Division, 18 years; Wilson Greatbatch Ltd., 18 years; and Solartron Analytical, 13 years. Bronze Level—FMC Corporation, Active Oxidants Division; 7 years; Scribner Associates, 7 years; and Hach Company, Radiometer Analytical Division, 5 years. ECS thanks these companies for their continued support. ■

Meeting Highlights was prepared by Krishnan Rajeshwar and Mary Yess, Interface's *Editor and Managing Editor, respectively. Special thanks to Johna Leddy, who was one of the leading forces behind the "XYZ for the Rest of Us" series, for writing about Tony Ricco's talk on microfluidics; and to ECS Director of Development Troy Miller for his report on the Leadership Circle Award recipients.*