Chapter 2 IUMRS History

2.1 Establishment of IUMRS

Foundations

1984/1985: An “International Committee” was informally established, to explore a future formal development of a global Materials Research organization. Leaders of the effort included Woody White, Bob Chang, Elton Kaufmann, Masao Doyama, Paul Siffert, and others. “The purpose of the Committee is to serve as a vehicle for communication between Societies concerned with Materials Research - not as a governing body, but rather to foster interaction among autonomous regional peer Societies in various parts of the World.”

1984-1989: With MRS encouragement and advice, MRS organizations formed independently in Europe, Japan, China, Mexico, Taiwan, India, Australia, and others also developed.

1990-91:Formal establishment of the International Union of Materials Research Societies, with formal incorporation in Pennsylvania, and accounting and banking services generously provided by MRS.The new Union was specifically to be modeled on IUPAP and IUPAC. Founding members were MRS, E-MRS, MRS-Japan, Chinese-MRS, MRS-Mexico, MRS-Taiwan, MRS-India and Australian-MRS.

Registration document showing IUMRS registration date: September 21, 1989

IUMRS was registered as a non-profit organization (501c3) with the IRS (internal Revenue Service) in July 1990. IRS reference EIN 25-162988.

From Professor R. P. H. (Bob)Chang: Origin of IUMRS

The concept of an integrated approach to materials research and education was conceived by Professor Rustum Roy and colleagues at Penn State University in the early 70’s.

Taking this approach, researchers from all fields of materials came together to discuss their investigations led to the establishment of an interdisciplinary and integrated Materials Research Society (MRS) where all aspects of materials are discussed by scientists [e.g. chemists, physicists, biologists]; and engineers under selected themes/topics.

The “Mission” of the IUMRS is to serve and lead, through research and education, the global materials community in support of a sustainable world by processing and regeneration of new materials for all citizens.

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http://tmsearch.uspto.gov/

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Goods and Services	IC 041. US 100 101 107. G & S: Arranging and conducting educational conferences of a scientific/engineering character in conjunction with international materials research. FIRST USE: 19910311. FIRST USE IN COMMERCE: 19910311
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2.2 Words from founding scientists

The Birth of IUMRS By Prof. Siffert

Professors Abdelilah Slaoui and Paul Siffert

The 20th Anniversary of the creation of IUMRS was celebrated during the 2011 conference in Nice. However, the origin of international cooperation in the field of advanced materials goes back to the early 1980s, when the MRS President Woody White agreed that a similar society should be established in Europe, based on identical values to those of MRS, especially the multidisciplinary approach. During a Fall Meeting in Boston this agreement was finalized which led to the first E-MRS conference in 1983. During this meeting the President of the largest national material society in Europe entered the room crying that the initiative was not acceptable: as the national structures could solve all the problems. We had to push him out of the room!

Progressively the multidisciplinary approach of the Boston MRS conference attracted more and more people especially from Asia.Several countries there were interested in creating similar organizations to the MRS.Before the agreement to inaugurate the "International Materials Research Community" was reached rather long and difficult negotiations were necessary, which, because the political tensions in certain areas were still very strong at the time, required all the tact and diplomatic skills of Woody White and RPH Chang. Finally, with the very good will of the delegates success was achieved and IUMRS was born: scientists are always in advance of the political interests。Now in the globalized world the materials community is united throughout the world, but again remember the scientists took the first steps in 1991, largely well ahead of the politicians!

I hope that we will agree on new ambitious objectives to help solve the major problems facing the world. It is evident that materials play the essential role in finding the solutions for the world's energy demands, water supply and the control of CO_2 in the atmosphere.

Paul Siffert
IUMRS Founding President
August 2019

◎ Paul Siffert, EMRS, EURORAD, Scientific adviser to EURORAD; General Secretary, E-MRS Headquarters. https://www.european-mrs.com/about/executive-committee

The Single IUMRS Thread by Dr. Elton N. Kaufmann

Dr. Elton N. Kaufmann

A dry enumeration of 30 years-worth of facts and figures or a little insight into the founding and continuing spirit of the organization, that is the choice faced by those of us who would contribute to this anniversary opus. But a false choice it is. There is a constant and consistent thread that connects all IUMRS events from before its birth to today. That thread is the recognitionand pursuit of multidisciplinary materials R&D. From the 1973 founding of the Materials Research Society (MRS) in the USA as an alternative to single-disciplinesocieties that had yet to accept the multidisciplinary ethos to the subsequent rise of similar societies in Europe (1983), Asia (1989), and Latin America (1990), the advent of the IUMRS in 1991 was an inevitable next milestone withinthe burgeoning recognition of how advanced materials research is actually pursued.

At the heart of multiple IUMRS successes over the intervening years are not the people or the structures of these regional organizations, even though those attributes have been crucial elements, but the core is and has been since the beginning the conferences that these societies produce. Once experienced, those multitopic, multidisciplinary symposia become participants' most favored and productive venue to deliver their results to a broad community and to access the advances of others. I contend that it has been the single motivating force behind the propagation of the

MRS philosophy globally and that it will continue to be the raison d'etre for IUMRS.

While staying centered around that core mission with three conference series dating back to the early days, some innovative excursions have been pursued. A conference series that explicitly focuses on next-generation researchers, not only as attendees but also as organizers, has been an exciting addition. Promotion of a series of World Materials Summits that connect the R&D community to industry and government policy makers has provided a vital service. Early in this century, A hybrid newsletter-cum-technical-notes print publication demonstrated over a five-year span a mode of communication that remains cited in the vitae of its worldwide authorship. Now, IUMRS cooperates with a relatively new archival journal whose impact factor rises year after year. Under the aegis of IUMRS, several awards are recognizing multi-continent collaboration, global community leadership, and young researchers. In all cases, one or more IUMRS member societies lead and support these ongoing activities.

It is rewarding to enjoy and reassuring to acknowledge the cross-cultural, multi-discipline, highly collegial collaboration within and among the IUMRS member societies. Perhaps not a unique phenomenon in the context of the larger global scientific community, but in its own way, IUMRS epitomizes how political divisions and national borders can be bridged by people who share a common training and approach to analysis and problem solving. Not a bad example for a world faced with energy, environmental, and sustainability challenges.

Elton N. Kaufmann
Emeritus Scientist, Argonne National Laboratory
Member of Mrs, MrssAndEmrs
Iumrs Chief Advocacy Officer, 2015-Present
Chairperson, Iumrs Commission on Development, 2015-2016
Iumrs Facets Founding Executive Editor, 2001-2005
Iumrs Secretary, 2001-2002
Chairperson, Iumrs Commission On Publications (1998 –2006)

IUMRS History by John Baglin

1.Foundations:

John Baglin
Senior Scientist, IBM, USA

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2.Development and Progress:

Adhering Bodies: The Founding members were since joined by African-MRS, Brazil-MRS, MRS-Indonesia, MRS-Japan, MRS-Korea, MRS-Russia, MRS-Singapore, and MRS-Thailand.

Institutional Affiliates: This category of membership was established in 2002. It was intended to provide a path of communication and collaboration between institutions and organizations with Materials Research interests all over the world. Affiliates included national laboratories in the U.S. and in Europe, and research institutions in Asia. This program has been terminated due to poor participation.

Meetings: Series of International Technical Meetings that are hosted by individual Adhering Bodies, with IUMRS endorsement and cooperation have become fixtures in the Materials Calendar. They include ICEM, ICAM, ICA, and ICMAT.

Awards:

1.The Sômiya Award for distinguished international collaborative Materials Research has become a prized international landmark.

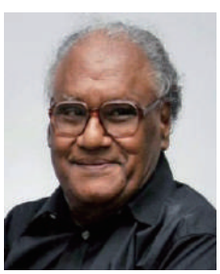
2.The Young Researcher Award is presented to young (under 40) researchers every two years since 2012 during the International Conference of Young Researchers on Advanced Materials (IUMRS – ICYRAM).

Publications: The Quarterly Newsletter "Facets" was first published in 2002, as a high level print journal presenting news and reviews representing the status of the Materials Research enterprise, worldwide. It was developed and edited by Elton Kaufmann, at his offices at Argonne National Lab. "Facets" developed a substantial subscribership, and it also served as a flagship publication for IUMRS and as a member benefit for Adhering Bodies and Institutional Affiliates. Its publication was suspended in 2006, due to cost of production, with the intent to create a fully electronic equivalent, to more effectively serve the broad international community.

ICSU Membership: In 2005, sensing its readiness for this elevated international involvement, IUMRS made formal application for Full International Scientific Union Member status in ICSU (The International Council for Science). ICSU has just 29 such International Union Members. At the ICSU General Assembly Meeting that year, the IUMRS application was accepted with acclaim. IUMRS has since participated in current ICSU activities, and had developed specific efforts to contribute the Materials perspective in global study projects that ICSU conducts. IUMRS considers that it has a unique and substantial role to play in such top-tier studies of globally important science issues. In 2018, ICSU merged with the International Social Science Council (ISSC) and formed the new International Science Council (ISC). The Council is the unique global representative body of both the natural and the social sciences, with a select global membership of 40 international scientific unions (including IUMRS) and interdisciplinary science bodies, and over 140 national and regional scientific bodies.

John Baglin has had various supporting roles through the above history. They included participation in the founding committee discussions, the development (and subsequent updating and archiving) of the IUMRS Statutes and Bylaws, Chair of the IUMRS Membership Affairs Committee, Second Vice President, Secretary, and ICSU Liaison. He also served briefly as Executive Editor for Facets and is still smiling as his photo will testify.

2.3 Words from IUMRS volunteers



Professor C. N. R. Rao

Many years ago, in the mid 1980s, when I was a member of the Executive Board of ICSU, I remember the discussion about the possibility of inducting a new Union devoted to materials research as part of the ICSU". I was the only member who knew about IUMRS, having been involved in early discussions about this matter. I, of course, strongly supported the importance of materials research and the need to include IUMRS in the ICSU family. I am very delighted that happened.

In the last few years, it has been a pleasure to see IUMRS becoming a global influence in materials research. The meetings under the auspices of the IUMRS have attracted wide attention of scientists and engineers from all over the world. In India, IUMRS is highly reputed as an important scientific union. I have no doubt that IUMRS will continue to contribute to materials research

in a big way and be an influence in all the countries of the world.

It is particularly important that IUMRS sponsored meetings are held in various countries. It could offer sponsorship to more regional and other national meetings. I am a great supporter of IUMRS and as I am growing old, I can foresee that it will continue to be an organization of great value for years to come.

◎ C. N. R. Rao, Honorary President & Linus Pauling Research Professor, Jawaharlal Nehru Centre for Advanced Scientific Research, India.

http://www.jncasr.ac.in/cnrrao/index.html

Professor Masahiro Yoshimura Yoshimura

Birth and Growth of MRS-J and IUMRS. Materials Research Society (MRS) was established by Professor Rustum ROY (Penn State University) et al. in 1973 in the US. It covers Physics, Chemistry, Biology, Polymer & Plastics, Metallurgy, Semiconductor, Ceramics Composites and hybrids. This novel concept of an integrated approach to materials topics investigation grew so quickly that the development of MRS surpassed all previous individual societies. The European MRS followed this lead in 1983.

When Professor Robert (Bob) P.H. CHANG (Northwestern University) visited Professor Masao DOYAMA (University of Tokyo) and Professor Shigeyuki SÔMIYA (Tokyo Institute of Technology) in Japan in 1986 to discuss the possibility of establishing the MRS-Japan, they considered seriously on how to establish it together.

First, they organized an International Conference for Advanced Materials (ICAM). The event was held in 1988 from May 30 to June 3 at Ikebukuro Sunshine City, Tokyo and sponsored by Nikkan Kogyo Shinbun (Daily Industrial News) Co. Ltd. It succeeded in attracting more than 1,500 participants from 34 countries. I, the author attended as one of the Organizing (secretary) members. However, I had to practically serve as the representative Secretary because the Organizing Chairs (Professors Doyama and Sômiya) were too busy engaging in building a new private university, the Nishi Tokyo University of Science and Technology after their retirement in March, 1988; and Official General Secretary Mr. Takayoshi AGATA, KSP (Kanagawa Science Park) and Nikkan Kogyo Shinbun's members had encountered many challenges in organizing this International Meeting.

For example, after getting the agreements from Professors Doyama and Sômiya, I had made on-the-job-training in "How to organize an International Conference" available to their members, starting with "How to write 'Call for papers' in English", then "Assembling of Session Chairs' requests to manage to correspond to the Organizing Committee". Even the conference used Simultaneous Translators via a famous Simul Company, where they hired many graduate students who took English Courses. I had to conduct seminars on Technical Terms in Materials Science & Engineering for them. During those seminars, I learned to recognize the major differences between Japanese Language and English Language: Logic and Structure in Sentences, Pronunciation (Accents & Intonations and Voice Making & Blessing), etc.

Based upon the great success of the International Conference, MRS-J (initial name AMSES: Advanced Materials Science and Engineering Society), was established on March 16, 1989, with Professor Doyama as President, Professor Sômiya as Vice President, and Mr. Agata as Secretary. AMSES held three Meetings in 1989 and three meetings in 1990. In 1990, AMSES changed its name to MRS-Japan (MRS-J). Profs.DOYAMA, SÔMIYA and Masaki HASEGAWA (Tokyo University) were the "first" generation members of MRS-J, then Professors Ryoichi YAMAMOTO (University Tokyo), TisatoKAJIYAMA (University of Kyushu) and myself, Masahiro YOSHIMURA were the "second" generation members. Today, MRS-J is continuing its expansion in membership and operation.

As for IUMRS (The International Union of Materials Research Societies), the success of the above-mentioned International Conferences led to a new paradigm of operation.On November 30, 1989 during MRS's Fall Meeting in Boston, International Materials Research Committee (IMRC) was established with attending representatives from USA, Japan, Taiwan, Europe, China, India, Australia and Mexico when they elected Professor Bob Chang as the Chairperson, Professor Paul Siffert as the Vice-Chairperson, Professor Rod Ewing as the Secretary and Professor

Sômiya as the Treasurer. They established IUMRS in 1991, with members from USA, Japan, Taiwan, Europe, China, India, Australia and Mexico. And now, Korea, Singapore, Russia, Brazil, Thailand, Indonesia and Africa, have also joined.

Professor Bob Chang thanking Professors Sômiya and Doyama for their lead in organizing the 1988 ICAM in Tokyo, Japan.

Since 1990, IUMRS has organized ICAM (International Conference for Advanced Materials), and ICEM (International Conference for Electronic Materials) in alternate years. In addition, ICA (International Conference in Asia) is held every year. Thus we, MRS-J believes that the 1988 Tokyo Conference was the first IUMRS activity and up to now MRS-J has organized nine IUMRS Meetings.More details are available on the IUMRS Website: iumrs.org.

As described above, the Key-person of establishment of MRS-J and IUMRS was Professor Bob Chang, who was born in Chongching, China, from Chinese parents who were educated in Japan. After WW-II, Bob's family moved to Japan in 1952 via Shanghai and Hong Kong. After finishing high school, Bob went to USA where he received a B.S. in Physics from MIT and a Ph.D. in Astro Physics from Princeton University. He joined MRS in 1984 while working at Bell Labs, and became its president in 1989 when he was a professor at Northwestern University. He was acquainted with Professor Doyama who was working at Argonne National Lab. After getting his Ph.D in Physics from University of Illinois, Professor Doyama returned to Tokyo University as a professor. Professor Sômiya spent his graduate student years at Penn State University, where Professor R. Roy was one of his mentors. Professor Roy was also one of my mentors since the 70s when I was a Post-Doc at MIT. I have worked with Professor Sômiya since 1978. Our cooperation had continued until his retirement in 1988, and even after my promotion to a full professorship in 1985.

Thus, many major activities that I took partin over the years had been related to MRS-J and IUMRS.I experienced being in the positions of MRS-J President, Organizing Chairs, Advisory members, Keynote/Invited speakers in IUMRS Conferences. I have learnedand gained substantial experience in matters relating to Science and Technology, Human Relations, Cultures and Histories, as well as Nature and Human, which could be so beautiful and gentile, and also very confrontational. As a lucky person who appreciates all of the members in IUMRS and associated people, I would like to transfer all of my knowledge and experience to future generations of researchers and leaders in materials research and education.

Professor Masahiro YOSHIMURA

Department of Material Science and Engineering, National Cheng Kung University, Taiwan.

◎ Masahiro Yoshimura, Professor, Department of Material Science and Engineering, National Cheng Kung University, Tainan, Taiwan.

https://ceramics.org/award-winners/masahiro-yoshimura

Some memories and thoughts from an IUMRS long-time volunteer

Professor Jim Williams

I first heard about the push toward internationalizing MRS at a Boston MRS conference in 1984 from Woody White and Bob Chang. The first step was to establish MRS-like societies in different countries and regions of the world. Several members of the international community, who were regular attendees at MRS and E-MRS meetings, were given the challenge of achieving this task. This group of material scientists came together at MRS meetings as the International Committee for Materials Research to report on progress towards this goal. By 1988, there were 7 countries that had established MRS societies, in addition to the US and Europe, and IUMRS was launched with the first interdisciplinary IUMRS meeting (ICAM/ICEM) held in Tokyo, hosted by MRS-Japan. Since that time IUMRS has developed and become the key international Union for materials scientists and engineers. Although there has been some testing time in the development of IUMRS and some difficulties getting the General Assembly to make decisions that fostered growth and a revenue stream, it has been an enjoyable ride.

Since its inception, IUMRS has been a little like a family, with many life-long friendships forged along the way. Most IUMRS activities have revolved around its conferences, initially its technical meetings ICAM and ICEM.Indeed, these conferences were the focus for scientific interactions, networking and socializing, as well as the venue for the Union's General Assembly and Executive meetings.Two initial global initiatives of IUMRS involved establishing a world material network for students and young researchers, and a platform to engage with governments across the globe. The first initiative was led by Bob Chang, and the second, through the IUMRS publication 'Facets' by Elton Kaufmann. Both initiatives have had their successes but sustaining the activities has been a challenge. Such efforts need to be re-invigorated in the future: that is, aiming for a young researcher network that is self-sustaining and a 'go-to' entity for all young researchers; finding ways of truly engaging with policy makers so that they view IUMRS as one of their 'go-to' organizations in developing science policy and planning.

A particularly successful IUMRS-organised workshop was held in Hawaii in 1998 and focused on establishing collaborative links between countries, materials education, young researcher networking and engagement with policy makers. Bob Chang was the initiator and Chair, and the US NSF provided funding. Many policy makers attended this workshop as well as materials researchers, educators and industry leaders. Since that time there have been forums to discuss these topics, key among them the conference series 'World Materials Summit'. The WMS was an initiative of Paul Siffert and E-MRS and has been very successful in providing a forum for addressing how materials science and engineering can contribute to solving major global issues such as environmental pollution, water quality, clean energy, sustainable manufacturing and more recently, climate change. A mix of scientists, industry leaders, young researchers and industry leaders were the participants of these meetings.The challenge for IUMRS is to more effectively communicate the outcomes or reports of these workshops to global leaders.

Engaging with young researchers and students has been a particular direction for IUMRS but has been challenging. For example, the union's commissions and committees have traditionally been mostly the domain of senior scientists, many near or beyond retirement age. As a result, IUMRS doesn't give the impression of an organization for young scientists and its social media presence, the domain of the young scientists, is poor at best. However, a ray of hope has been through the establishment of a conference for young researchers, ICYRAM, which was initiated by BVRChowdari and MRS Singapore. In this forum, students and young researchers can take control of organizing conferences for themselves, with events and workshops that they need. It is important that IUMRS builds on this initiative to more effectively engage with young scientists who are our future, to integrate them more effectively into IUMRS commissions and committees: that is, to give them a strong voice in our global materials community.

IUMRS has had several strategic planning meetings, most associated with GA and EC meetings. I can remember such a meeting in Singapore for a day and a half in about 2005 that came up with a number of significant opportunities for the future, but unfortunately none of them were followed through in any detail and these opportunities were lost. IUMRS cannot afford to do this in the future. With the establishment of the new head office of IUMRS in

China then Singapore, along with hopefully vibrant regional IUMRS offices, I am optimistic for the future. However, we must all pull in the same direction and involve our young scientists in our future planning to be truly successful.

2.4 Brief Introduction of founding Adhering bodies of IUMRS

1. From Prof. R. P. H Chang: Founding Members

The founding members of IUMRS were societies from the United States (MRS), Europe (E-MRS), Japan (MRS-J), Mainland of China (C-MRS), Mexico (Mexican-MRS), MRS-Taiwan, India (MRS-I) and Australia (A-MRS). These were joined later by MRS-Korea, MRS-Russia, MRS-Singapore, MRS-Brazil, MRS-Argentina, African-MRS and, most recently MRS-Indonesia and MRS-Thailand.

2. Introduction to Founding Adhering Bodies

United States (MRS)

The Materials Research Society (MRS) was established in 1973 by a visionary group of scientists who shared the belief that their professional interests were broader in scope than existing single-discipline societies and that a new interdisciplinary organization was needed.

Today MRS is a growing, vibrant member-driven organization of more than 14,000 materials researchers from academia, industry and government, and is a recognized leader in the advancement of interdisciplinary materials research. Headquartered in Warrendale, Pennsylvania (USA), MRS membership now spans over 90 countries.

MRS members hail from physics, chemistry, biology, mathematics and engineering—the full spectrum of materials research—and they choose MRS because it is important to their work and their careers. In MRS, they find an environment for collaboration and open exchange of ideas across all scientific disciplines. Where students and Nobel Laureates come together to share their research.Where multilateral projects are a global enterprise.And where the ultimate goal is to advance materials that improve the quality of life.

The tremendous growth and success of our society is the result of member input and the energetic efforts of many MRS volunteers. They offer their precious time, their spirit, their expertise and their unique perspectives for the betterment of the materials community worldwide. These volunteers, together with our exhibitors, sponsors, partners and headquarters staff, are the framework upon which our society will continue to flourish.

Approximately 50 percent of MRS members, more than 40 percent of meeting attendees, more than 50 percent of authors in MRS publications and more than 50 percent of MRS website visitors reside outside the United States. This international character is also reflected in MRS leadership. Recent MRS boards have consisted of individuals with diverse backgrounds and perspectives reflecting many parts of the globe, including Africa, Asia, Europe, the Middle East, and North and South America. The renewal of the president every year and the board of directors every three years, based on election by the members, promotes participation from all over the world, bringing new ideas and expertise to advance our vibrant society.

Europe (E-MRS)

Founded in 1983, the European Materials Research Society (E-MRS) now has more than 4,000 members from industry, government, academia and research laboratories, who meet regularly to debate recent technological developments of functional materials.

The E-MRS differs from many single-discipline professional societies by encouraging scientists, engineers and research managers to exchange information on an interdisciplinary platform, and by recognizing professional and technical excellence by promoting awards for achievement from student to senior scientist level.

As an adhering body of the International Union of Materials Research Societies (IUMRS), the E-MRS enjoys and benefits from very close relationships with other Materials Research organizations elsewhere in Europe and around the world.

Each year, E-MRS organizes, co-organizes, sponsors or co-sponsors numerous scientific events and meetings. At

the heart of the meetings portfolio are the E-MRS Spring and Fall Meetings. The major society conference, the E-MRS Spring Meeting, is organized every year in May or June and offers on average 25 topical symposia. It is widely recognized as being of the highest international significance and is the greatest of its kind in Europe with about 2,500 attendees every year. Based on the same model, the E-MRS Fall Meeting, is organized every year in September and consists of 20 topical symposia. Both conferences are augmented by an exhibition of products and services of interest to the participants.

Each symposium publishes its own proceedings that document the latest experimental and theoretical understanding of material growth and properties, the exploitation of new advanced processes, and the development of electronic devices that can benefit best from the outstanding physical properties of functional materials.

Chinese MRS (C-MRS)

The Chinese Materials Research Society (C-MRS) was established in 1991. It is a national academic and non-profit social organization voluntarily formed by individuals and units engaged in materials research. It is a constituent of China Association for Science and Technology (CAST) and members of the International Union of Materials Research Societies.

The C-MRS has 9 subordinate working committees, 25 branches, 200 unit members and more than 8000 individual members. It is guided by the seventh Council, Li Yuanyuan and Wei Bingbo serves as the president, while Han Yafang serves as the secretary-general.

The society was published, Progress in Natural Science: Materials International, Rare Metal Materials and Engineering, Journal of Materials Science & Technology, Materials China, and other professional academic journals.

The C-MRS organizes the China Congress on Materials, the International Seminar on Advanced Material Research, the Symposium of National Youth Materials Science and Technology, and other academic activities.

The society has also established awards including C-MRS Science and Technology Award, C-MRS Contribution Award, and C-MRS of Excellent Doctoral Dissertation Award, to reward outstanding talents in the field of materials research.

MRS-Japan

Since its establishment and in cooperation with related organizations, MRS-J has organized IUMRS-ICAM93 (Ikebukuro, August 1993), IUMRS-ICA97 (Makuhari, September 1997), MRS-J 10th Anniversary symposium (Tokyo, July 1999), IUMRS-ICAM2003 (Yokohama, October 2003), IUMRS-ICA2008 (Nagoya, December 2008) and MRS-J 20 th anniversary symposium as well as approximately 50 symposia and conferences. IUMRS-ICA2008 became a large-scale conference with more than 1800 participants. The next IUMRS-ICEM2012 will be held in Yokohama in September of 2012. Periodic publications include MRS-J News and Transactions of the Materials Research Society of Japan. As a founding member of IUMRS (International Union of Materials Research Societies), commitment to the promotion of international activities is one of the main characteristics of our organization.

MRS-J considers that science and technology have become too fragmented and too specialized. This organization aims at contributing to the development of material science and technology through their reintegration, bringing the academic theory to industrial and social applications, and disseminating the knowledge in materials development, processing and application technologies, from the experts in each field to the citizens and policy-makers, providing a forum for discussion of all issues related to materials, and offering research results and data as common property. MRS-J strives to become a forum to discuss all issues in a timely manner in a multidisciplinary and interdisciplinary way. This can be only achieved through the active participation and support of many people from various fields, for which we are deeply thankful.

MRS-Korea

The Materials Research Society of Korea has been established on February 23, 1991 under industry/university/institute cooperation in order to contribute to the development of the domestic new material research using wide

variety of knowledge in physics, chemistry, medicine, materials science, etc. as well as activation of industry-university technology exchange in materials science and engineering fields. Under the above purpose of establishment, the society has published the first edition of its journal in June 1991 which is now listed in SCOPUS and E-SCI. There were numerous active societies about materials related such as metal, ceramics and polymer. However, MRS-K is one of fast growing societies in Korea. The materials used in the modern advanced industries require high performance, multi-function and accuracy due to its complex manufacturing process. In order to respond to the demands of these current issues, the Materials Research Society of Korea (MRS-Korea) is continuously growing under support by the academic world and the industry for the development of the material industry. The society has been hosting two conferences (spring and fall) every year and an international conference of IUMRS and we hope to contribute to the growth of the technology and study of the materials science and engineering and to exchange the friendship among members of the society.

Mexican-MRS

The SMM is a group formed by participants in the International Materials Research Congress (IMRC), both Mexican and foreign, who carry out activities aimed at disseminating the research work they carry out, the academic development of students in science, technology and engineering materials, as well as the proper use of science and technology for the benefit of humanity.

The Mexican Materials Society's mission is to serve as a meeting place for academics, professionals, industrialists and institutions interested in the advancement of Materials Science and Engineering, providing forums where scientific and technological advances in the field are exposed. Similarly, the SMM promotes research, technological development, teaching, dissemination and dissemination activities in order to raise interest and culture in science, especially in the field of Materials Science and Engineering.

To be a community in constant development, with members who generally promote the improvement of the quality of life of the population, particularly in Mexico, through the activities and collective initiatives of its members.

MRS-Taiwan

The Materials Research Society-Taiwan (MRS-T) was founded with the official name of "The Chinese Society for Materials Science (CSMS)" by Chih-Houng Lu of National Taiwan University, James C. M. Li (then at Edgar C. Bain Laboratory and later moved to University of Rochester), and some other mechanical and metallurgical pioneer engineering people in September, 1968. Prof. Lu, who was educated and trained as a metallurgist in Japan and served as the president of National Taiwan University during August 1946 to April 1948, was elected as the first president of the society. The Chinese name of CSMS has been used domestically since it was founded. However, as a founding adhering body of IUMRS, the name of "MRS-T" was adopted to participate in international activities in order to differentiate from C-MRS. It was not until 2008 that the official English name of CSMS was changed to MRS-T to avoid confusion.

Since there has been a fast growth and expansion of high-tech industries, such as IC, IT, TFT-LCD, LED, solar cells, etc. in Taiwan since the 1980s, there is a high demand of manpower in materials science (MS). This leads to expansion of MS programs in the universities. In addition to materials science and engineering departments, most traditional chemical engineering departments have been recently transformed to chemical engineering and materials science departments to train students with materials science knowledge. This makes the number of MS-related departments increasing to more than 50 in Taiwan, probably the highest density in the world. Currently, MRS-T has more than 1600 individual members and nearly 100 group members. It has served as a platform to link industry, academia, and government together to promote the R&D of materials science in Taiwan. Since it was founded, MRS-T organizes an annual meeting every year. For example, MRS-T commemorated its 40th anniversary in 2008. More than 1200 papers (poster and oral) were presented, and more than 1500 people participated in the meeting.

In addition to publishing professional books, magazines, journals, and web-based courses related to materials

science, MRS-T has also been publishing an international journal “Materials Chemistry and Physics (MCP)” in co-operation with Elsevier since July, 1992. The wide distribution and high impact of MCP can be appreciated by the growth of impact factor from 0.78 in 2000 to 2.015 in 2010 and over 4000 submissions in the year of 2009. MRS-T has been closely working with IUMRS to promote international materials R&D activities. For instance, MRS-T has hosted ICA-1994, ICEM-1994 and ICA-2004, and will host ICA-2011 this September. It also plans to organize ICAM and ICEM in the near future.

MRS-India

The Materials Research Society of India came into existence in February 1989, thanks to the farsighted vision of Prof. C N R Rao. Prof. Rao functioned as the first President and laid the foundation for its impressive growth over the past decade.

MRSI functions through 18 Regional Chapters and 16 Subject groups. MRSI is supported by individual members and institutions who will be patrons of the society. Its current membership includes 2745 Life members, 07 Annual members, 156 Honorary members and 83 Patron members amounting to a total of 2991 members.

MRSI recognizes contributions to materials research through Distinguished Materials Scientist of the year Award, MRSI-ICSC Superconductivity and Materials Science Senior Award and MRSI Distinguished Lecturership Award. There are number of other prizes including the MRSI Medal Lectures. Every February an annual technical meeting is held.

The hosting of IUMRS-ICA 98 meeting at Bangalore during October 13-16, 1998 was a major activity of MRSI. The Conference had 22 Theme Symposia and was held in 7 parallel sessions. More than 150 invited talks were delivered and nearly 700 contributed papers were presented. The proceedings of the Conference, consisting of the invited talks was published as a special issue of Bulletin of Materials Science.

Another major activity was the hosting of IUMRS-ICAM 2007 meeting at Bangalore during October 8-13, 2007. The conference had 23 theme symposia, 6 plenary lectures and 250 invited talks. Around 1100 delegates attended the conference.

The MRSI has been regularly publishing the MRSI Newsletter. This is a quarterly publication.. Several issues have been brought out successfully for the past ten years.

MRSI co-sponsors the publication of Bulletin of Materials Science (BMS) published by the Indian Academy of Sciences.

MRSI is a founding Adhering Body of the International Union of Materials Research Societies (IUMRS) and participates in the international arena of materials research.

Australian-MRS

History: A-MRS was a founding adhering body within IUMRS in 1991. It began as an entity some 3 years earlier through extensive discussions between existing materials research-related societies in Australia as to the best model for A-MRS. It was decided that it should not be a separate society in Australia but an umbrella organisation that co-ordinated materials activities across around 10 national materials societies. In its early years, it took leadership in sponsoring interdisciplinary materials conferences and workshops between two or more of the national materials societies, as well as providing a conduit between the local societies and IUMRS. In the mid to late 1990s, A-MRS lobbied the government to establish funding for materials networks, principally an industry network that linked Australia’s materials researchers more effectively with industry.

A Future Materials Network was funded by the Federal Government in 2002 and has run a number of interdisciplinary industry events and workshops (most often co-sponsored by A-MRS) across the country, with both industry and researcher presentations to broad audiences. Another network that was proposed was to provide special career and other opportunities for materials students and early career researchers across Australia. In late 2004, two such networks were funded by the Federal Government: The Australian Research Network for Advanced Materials (ARNAM) and Australian Research Council Nanotechnology Network (ARCNN).

These networks have formed a very important role for A-MRS since this time:

i) providing an interactive web-based network amongst young researchers across the country, including databases containing researcher profiles and an institutional materials research facilities database across the country

ii) providing a funding scheme to support students and young researchers to access facilities and undertake col laborative visits both nationally and internationally

iii) running interdisciplinary workshops specifically for students and young researchers, including industry days (with Future Materials) and grant writing events

iv) running an international nanoscience and nanotechnology conference (ICONN) in Australia every two years.

A-MRS has also promoted international materials workshops in recent years as well as successfully bidding for the IUMRS's International Conference on Electronic Materials (held in Sydney in 2008).

2.5 IUMRS publication- Facets

As an IUMRS official publication , Facets was a quarterly newsletter/technical-notes published in print from 2002 through 2006 (i.e., 5 years). As the editor-in-chief of Facets , Dr. Elton Kaufmann made great contribution to Facets publication. Unfortunately the cost and the increasing popularity of purely electronic newsletters led to the discontinuing of Facets. Facets is still cited by many authors in their CVs now. Some highlighted articles are shown as follows.

IUMRS
Facets

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To inform and promote the enabling role of advanced materials for global progress

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Innovation

Industrial Research and Development in a Changing World: Leadership through Innovation and Technology

Claus Weyrich

Global competition, especially in the area of electronics and electrical engineering, is characterized by faster innovation cycles, changes in production processes and in industrial structures, growing cost pressure, and increasing price erosion for products, systems, and services. The resulting pressure on industry forces corporations to renew themselves continuously. Every organizational unit, including the research and development (R&D) department faces this challenge.

Evolving Global Electrical Industry Thrives on Innovation

The global electrical industry, which enjoys an annual growth rate of 7–8%, is undergoing continual technological and structural change. A breakthrough innovation, microelectronics, has led to massive growth in information and

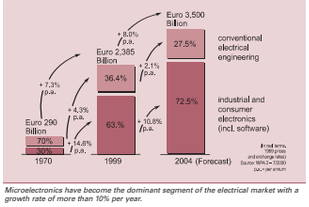
"The winners will be those that master the synergy…"

communication technologies in both industrial and consumer electronics. These areas have become the dominant segment of the market with a growth rate of more than 10% per year, a figure well above the growth rate of conventional electrical engineering markets.

Future development of the electrical industry will be characterized by:

- Continued progress in microelectronics and software;
- Ever-shorter product and system cycles;

Go to page 3 *(Industrial Research… continued on page 3)*



Microelectronics have become the dominant segment of the electrical market with a growth rate of more than 10% per year.

Perspectives

One Hundred Years of the Nobel Prize: Its Relevance for Society

Anders Bárány and Hermann Grimmeiss

When Alfred Nobel died on December 10, 1896, he bequeathed his fortune to prizes to be awarded "to those who, during the preceding year, shall have conferred the greatest benefit to mankind" in five categories: physics, chemistry, physiology or medicine, literature, and peace. Four institutions were to bestow the awards: the Royal Swedish Academy of Sciences (physics and chemistry); the Karolinska Institute (physiology or medicine); the Swedish Academy (literature); and the Norwegian Nobel Committee (peace), a committee chosen by the Norwegian Parliament.

Nobel pointed out that "in awarding the prizes no consideration whatever shall be given to the nationality of the candidates, but that the most worthy shall receive the prize, whether he be a Scandinavian or not." This statement angered many, including the Swedish king, Oscar II, who would rather have had the Prize reserved

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A Letter from the Publisher

Dear Readers,

Why create a new publication dedicated to advancing the role of materials in global progress? The publishers of *IUMRS Facets* believe that communication and collaboration among international materials research, education, and technology groups is critical for the advancement of forward-thinking policies. *IUMRS Facets* offers a new forum for promoting the exchange of ideas and information and for inspiring the development of new research and policy initiatives.

As we enter this new millennium, the possibilities of science and technology have never been more fascinating or more globally significant. Collaboration among technical disciplines lies at the root of materials development, and such collaborations are becoming increasingly international in nature because of economic globalization and rising research costs. Researchers are probing more deeply than ever into the frontiers of materials, and accurate communication of the implications and applications of new findings has never been more important. *IUMRS Facets* is dedicated to reporting on materials-relevant policy and programs on an international scope and in areas where current periodical literature is lacking.

Our first issue devotes special attention to descriptions of programs, policies, and plans. Readers will find analyses of important developments in science and technology, perspectives from the industrial and nonprofit sectors, articles on the state of education in materials-related fields, editorial opinion, news, and reports on the activities of the IUMRS, its adhering bodies, and other materials-research-related organizations.

In the future, *IUMRS Facets* readers can look forward to interviews with science attachés from embassies around the world, articles by members of the science press, articles about innovative activities of materials-related societies, and a chance to respond by sending letters to the editor.

On behalf of the IUMRS, welcome to the first issue of *IUMRS Facets*. We hope you enjoy its contents and celebrate the spirit in which it was born.

Bob Chang
IUMRS General Secretary

Nobelists Stormer, Alferov, Bednorz and Heeger in Singapore with ICMAT 2001 officials A. F. Yee and C. F. Shih at left and B. V. R. Chowdari at far right… see story on page 10.

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(Industrial Research… continued from page 1)

- Increasing services market connected with products, systems, and plants;
- Ongoing changes in value-added chains and "digitization" of business processes ("e-business");
- Continuing price erosion for products, systems, and services; and
- Accelerated globalization and competition spurred by deregulation and liberalization.

These dynamics pose new challenges to companies. The winners will be those that master the synergy among productivity, innovation, and growth, those that are willing to adapt to changes. Innovation, the catalyst for consumer benefit, productivity gain, and growth, is therefore the focus of entrepreneurial activities.

Innovation Requires Change

Innovation applies not only to new products, systems, or services (product innovations) but also to the value-added processes within a company (process innovations). Innovation may be either evolutionary or revolutionary. The former refers to

"…we are faced with a decisive paradigm shift in industrial research."

incremental progress in products and processes, whereas the latter is often a result of a disruptive technological development (breakthrough innovation). Breakthrough innovations lead to completely new applications and may even create new industries. A reciprocal relationship exists between breakthrough innovations and change: Although such innovations provoke change, they are also often a result of change—changes in perspectives, established structures, or corporate culture.

For instance, a new perspective may create new values in the form of new benefits to the customer. Breaking up established value chains could lead to new businesses and create a new set of rules. Changes in human resource management may also promote innovations by allowing enough freedom to lateral thinkers or by rewarding their readiness to take risks. To be successful, it is not enough for a company merely to optimize a product or process; the objective must be to do it differently, not just better.

Today, more than 75% of all successful innovations are driven by the market. Selecting the right areas of growth is of decisive importance in any innovation planning process. Knowledge about the customer is an indispensable source of innovation, with the ultimate objective being to "help your customer to earn more money."

As a result, we are faced with a decisive paradigm shift in industrial research. The driving force is not just what is technically possible and feasible but also customers' future needs and the way in which these needs are met through innovative products, systems, and services. A holistic approach to future business scenarios is mandatory in planning technologies and innovation. Working methods are also changing: Interdisciplinary teamwork, systematic knowledge management, and working in partnership with customers, suppliers, and public research are gaining in importance. In addition, intellectual property, secured by patents, plays a decisive role in the competitiveness of a company.

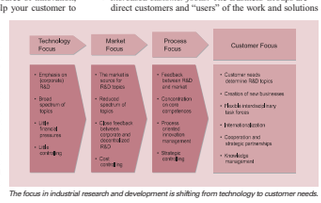
Even when corporate R&D is the starting point for industrial innovation, incorporating new ideas within the company and successful market imple-mentation take the lion's share of work in the process as a whole. This in no way minimizes the significance of corporate R&D; rather, it emphasizes that the quality of interaction between the corporate departments and the business divisions is decisive in ensuring the effectiveness of an innovation, its benefit, and hence, its success.

Research and Development at Siemens

In fiscal 1999–2000, Siemens spent US$5.6 billion globally on R&D, more than 7% of sales. About 96% of that amount was spent in the Business Groups and Regional Units and about 4% within the Corporate Technology Departments in Germany, Siemens Corporate Research in the United States, and Roke Manor Research in the United Kingdom. The mission of Corporate Technology is to secure the technological future and competitiveness of the company, through research, basic development, technological consulting, and patent work—in close collaboration with the Business Groups.

Taking into account the paradigm shift in industrial R&D, the organization, processes, and strategy of Siemens Corporate Technology have been developed to generate the maximum economic value for the company. With its vision "Network of Competences—Partners for Innovation," Corporate Technology focuses its strategy on seven elements:

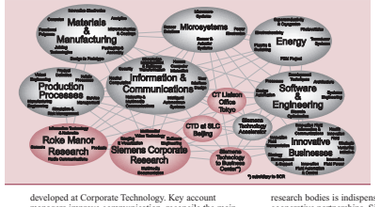
- *Concentrating on strategically important core technologies:* About 40 technologies are clustered in six technology divisions and Siemens Corporate Research. Each core technology aims to result in technological leadership while demonstrating benefits to the future business of the Siemens Groups. These benefits are effectively promoted by Corporate Technology's requirement to have more than 50% of projects financed by the Siemens Business Groups concerned.
- *Internal networking and cooperation:* Many strategically important issues involve more than a single technology. To create optimum solutions for the Business Groups, Corporate Technology takes an interdisciplinary approach. Innovations in mobile information and communications, for instance, have been created by using several teams and pooled expertise on networks, software architecture, security, intelligent systems, and human-computer interaction.
- *Increased customer focus:* The Business Groups are direct customers and "users" of the work and solutions



The focus in industrial research and development is shifting from technology to customer needs.

developed at Corporate Technology. Key account managers improve communication, reconcile the main R&D strategies, and transmit customer requirements to Corporate Technology. They act as heads of "virtual group laboratories," representing existing competences, channeling the Group's needs to the responsible technology departments, and initiating interdisciplinary projects for innovative business solutions.

- *Fostering entrepreneurship ("technopreneurship"):* Decentralized responsibility and an entrepreneurial spirit are needed to manage the complexity of a corporate R&D laboratory. Each core technology department represents a small enterprise responsible for its own budget, projects, acquisition of new projects, and building new competences. The reward system for managers and employees must support the change in mindset.
- *Systematic technology and innovation planning processes:* Roadmaps are used to extrapolate future technologies on the basis of current business, providing a sound basis for short- and medium-term planning. For the longer term, holistic scenarios are developed that take into account influences such as socioeconomic factors, the development of markets and industrial structures, and regional and cultural differences. By retropolation from these scenarios, new technological requirements and applications can be deduced. Extrapolation and retropolation are complementary, helping to design as consistent a "picture of the future" as possible.
- *Business incubation:* To translate innovative business ideas into rapid market success, Corporate Technology operates the Technology-to-Business Center in the United States, a subsidiary of Siemens Corporate Research, in cooperation with the Automation and Drives Group and the Siemens Technology Accelerator in Germany. Its mission is to:
  - Drive innovative technologies for emerging markets;
  - Combine technology and business orientation;
  - Generate new business through innovation both based in existing Siemens structures and also as a start-up foundation;
  - Provide support through seed money from business partners; and
  - Build a new innovative and entrepreneurial culture.
- *Cooperation with the international scientific community:* Effective and efficient cooperation between industrial research and international public research bodies is indispensable. With more than 500 cooperative partnerships, Siemens Corporate Technology pursues three major objectives:
  - Strengthen its own research activities;
  - Complement research in areas in which competence does not exist or needs to be developed; and
  - Recruit top junior research scientists and engineers, mainly in the field of natural and engineering sciences.



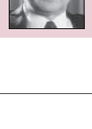
Corporate Technology at Siemens AG forms a network of competences and partners for innovation.

Conclusion

Global competition, particularly in electrical engineering and electronics, is characterized by the increasing dominance of information and communications technologies, shorter

"The rules are changing, creating new challenges for companies…"

innovation cycles, digitization of business, enormous cost pressure, continuing price erosion, and the importance of knowledge management. The rules are changing, creating new challenges for companies and their research activities. Concentration on what creates economic value added for the company, increased customer and business orientation, and internal and external networking are the decisive elements of Siemens´s Corporate Technology strategy, coupled with policies that foster innovation, such as entrepreneurship, creativity, and a risk-taking culture. Innovation is also closely related to fun. This applies not only to what Edison referred as the 5% "inspiration" required in any inno- vative process but also to the 95% "perspiration" needed to turn an idea into a market success. This alone justifies the term "innovation."



Claus Weyrich studied physics at the University of Innsbruck. He joined Siemens in 1969 and has held several positions in Corporate Research and Development. He is now Senior Vice President and a Member of the Managing Board of Siemens.

(Nobel Prize… continued from page 1)

for Scandinavians. The King did not participate in the first award ceremony, held in Stockholm on December 10, 1901. Instead, the Crown Prince awarded the four "Stockholm Prizes," as they were known then.

During the five years from 1896 to 1901, the procedures and rules for the "Nobel System" were developed and set down in the statutes of the Nobel Foundation. One of the most important rules was the interpretation of Nobel's wish that the Prize should be given for work done "during the preceding year." This rule states that "awards shall be made for the most recent achievements in the fields of culture referred to in the will and for older works only if their significance has not become apparent until recently."

Another rule requires that the Prize-awarding institutions send letters all over the world asking for nominations every year. Today each institution sends out several thousand letters. The nominations must reach the Prize-awarding institutions by the end of January. The various Nobel Committees then meet to read the nominations and supplement them with their own. In 1901, for instance, the five members of the Nobel Committee for Physics jointly nominated both Wilhelm Conrad Röntgen and Philipp Eduard Anton von Lenard for the first Nobel Prize in Physics. But in a move that has been repeated several times during the 20th Century, the Academy did not follow the Committee's recommendation but voted for a single Prize to Röntgen alone.

More than 650 medals and diplomas have been awarded since 1901. Most of the Prizes are connected with fascinating stories of scientific, literary, and peace-forging activities. These histories reflect Man's attempts to find new knowledge and new ways to express cultural activities and to master the many conflicts that have taken place during the 20th Century. Many of the Nobel Prizes have had a direct bearing on societal questions, such as energy consumption, environmental pollution, medical care, and peace-keeping activities.

Since the beginning, the Prize-awarding institutions have discussed the exact definitions and boundaries of the prize areas. For example, pure astronomy is excluded from the Physics Prize as was pure theoretical physics initially. In general, the boundaries defining the area of physics have been more restrictive than those for chemistry. For example, the Chemistry Nobel was awarded to Ernest Rutherford in 1908. It is said that the only question Rutherford could not answer was why he received the Prize in chemistry and not in physics! Later, however, it came to light that the reason was the attempt of an Academy member to emphasize the atomic concept by awarding Max Planck the Physics Prize and Rutherford the Chemistry Prize in the same year. But this attempt failed, and the Academy voted for Gabriel Lippmann instead of Planck. Planck had to wait another 10 years for his Physics Prize. Though the Physics Prize has been awarded 94 times, only nine or ten have been awarded to researchers outside of universities. As in other research councils, a topic frequently discussed is basic research versus applied research, often in "either/or" terms. A discussion in the Royal Swedish Academy of Sciences during the "timeout" created by World War I favored basic discoveries in physics over more practical technical inventions. In physics, basic discoveries are frequently made at universities, whereas practical technical inventions are more often the product of research institutes or industry.

> *"…Nobel Prizes have had a direct bearing on societal questions…"*

Nevertheless, there have been exceptions. The 2000 Physics Prize was remarkable in many respects, not least because it was awarded to researchers active in both academia and industry. The Royal Swedish Academy of Sciences awarded the Prize "for basic work on information and communication technology." This work laid the foundation for modern information technology, and the Royal Swedish Academy of Sciences wanted to recognize this fact. The recognition also underlines another well-known fact: Information technology is based on physics. This Prize clearly shows that one of the greatest achievements of mankind was made possible only through combined efforts in both basic and applied science and that any restriction to only one of these areas could have severely hampered this outstanding accomplishment.

Other examples in the history of the Physics and Chemistry Prizes relate to the courage to make mistakes. In some cases, senior scientists trapped in traditional thinking were not convinced by new concepts elaborated by their younger co-workers and therefore urged them to give up. The obstinacy of the "wild generation" finally, under the eyes of the despairing senior scientists, resulted in a breakthrough and later in a Nobel Prize. Many scientists have been restrained from success by not realizing how constructive failures can be (as pointed out by Leo Esaki, Nobel Prize in Physics, 1973). Or, as Eugene Ionesco once observed, "It is not the answer that enlightens but the question." Rare is the research council willing to act on the basis of such a statement!

> *"…greatest achievements… through combined… basic and applied science…"*

Recently, a new research laboratory was established in a European country. At the first board meeting, the chairman declared that the laboratory could perform any kind of research as long as it resulted in at least one Nobel Prize within the next ten years. He was asked why he was so fixated on the Nobel Prize. His answer was that he was not interested in the Prize as such, but an award would show that the laboratory had not just published papers but had made an outstanding contribution to the benefit of mankind. This statement reflects the conviction that the Nobel Prize is not only a prize but a recognition. It is based on a unique worldwide competition that makes Nobel laureates special and can imply a considerable amount of responsibility. This responsibility is sometimes exercised for better or worse.

A recent example of the willingness of Nobel laureates to live up to such expectations occurred when 80 Nobel laureates called for the continuation of stem cell research in a letter to U.S. President George W. Bush. The laureates are aware that there are legitimate ethical concerns about this issue, but they are nevertheless convinced that this kind of research should go forward. Those who are not in favor of stem cell research believe that this question is too important to be dealt with only by scientists, even if they are Nobel laureates. Whatever the outcome of this controversial issue may be, it clearly shows that Nobel laureates can perform an active role in society. With the means of communication available today, this kind of "Nobel action" will probably become more common.

The direction of the Nobel Prizes in the 21st Century is, of course, a question intimately connected to the future direction of science, culture, and societal conflicts. Since 1974, the deliberations of the Prize-awarding institutions are to be kept secret for 50 years. Thus, no information is available concerning possible policy discussions. Extrapolating from the Prizes of the last few years also gives no clear picture of future Nobel Prize policy. But one thing seems quite clear: The Nobel Prize enters the 21st Century with an exceptional *curriculum vitae*, which promises rewards to many interesting and important future developments in physics, chemistry, physiology or medicine, literature, and peace!

To List or Not to List?

E. F. Krimmel, Board of Corresponding Editors

In context to this article on the Nobel Prize, should *IUMRS Facets* have provided a list of Nobel Prizes more or less subjectively ascribed to research in the materials sciences? This idea certainly did occur to us. We know that it is the prerogative of the Nobel Committees, and a delicate one at that, to delineate the subject areas of the Prizes under a long-standing charter—a charter that predates explicit recognition of multidisciplinary materials science. On the other hand, IUMRS, and therefore *IUMRS Facets*, intends to offer a worldwide platform for interdisciplinary communication concerning current and future research and development in materials science. Moreover, such a mission requires a view "beyond the rim of the plate," a view of the impact of such activities on society and humanity itself. As long as more than two millennia ago, Aristotle recognized that, far from being isolated, one's work interacts with the surroundings and the society in which it is embedded. He expressed this (*Staatsmanship*, III, 6; loosely translated) as: "It is in the nature of man to be a social being."

Which of the Nobel Prizes was awarded for work only in the science of materials? Ultimately, which of these works materially benefited humanity? How would the individual laureate and how would our society evaluate this? For instance, few would object to the claim that Bardeen received his Nobel Prizes for work in materials science. But what of many of the other laureates where the relationship is not so obvious? On the other extreme, we could argue that materials are after all just forms of matter and Einstein's relation, $E = mc^2$, equates that to energy, which encompasses just about everything. Thus, any attempt to clearly specify which Prize is and which is not related to materials becomes problematic.

We therefore decided not to present a long list of Nobel Prizes considered to be related to work in materials science but rather simply to offer the Internet addresses where full information on the Prizes can be found:

- Nobel Prize Home Page *www.nobel.se*
- Physics Prizes *www.nobel.se/physics/laureates/index.html*
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Hermann Grimmeiss received his degree in Physics and a Ph.D. in Physical Chemistry in 1957 from the Ludwig Maximilian University in Munich. In 1996, he retired as Head of the Solid State Physics Department and Dean for Research at the University of Lund. He is an AFS Fellow and a member of several academies. He has also been awarded Bundesverdienskreuz 1 Klasse and The King's medal of 8th Dimension with blue ribbon.

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Facilities

Modern Neutron Beam Research Reactors and Their Applications in Materials Science

Wolfgang Gläser

Neutrons, the uncharged particles of matter, have become a versatile and powerful research tool in physics and material science. Since the first research reactors were built in the 1940s, thermal neutron beams have been used to study the structure and dynamics of condensed matter. Intense neutron sources are now in great demand for use in neutron scattering techniques, production of neutron-induced radioisotopes, and non-destructive neutron activation analysis for characterizing materials in both basic and applied research.

> *"…FRM-II is competitive with … research reactors worldwide."*

Research Requirements Necessitate New Reactors

The first research reactor in Germany, the Forschungs-Reaktor-München (FRM) at Garching, was commissioned in 1957 under the leadership of H. Maier-Leibnitz. During its 43 years of successful and safe operation, the FRM was often used for developing neutron physics techniques and applications. The reactor was shut down in July 2000 to prepare for the commissioning of a new neutron source, the FRM-II.

Scheduled to begin operation in 2001, the FRM-II is a response to the future scientific and technical requirements of a modern neutron source. These requirements also influenced the design of the Advanced Neutron Source (which was not built), the upgrade plans for the High Flux Isotope Reactor at Oak Ridge National Laboratory in the United States, and the upgrade program for the High Flux Reactor at the Institute Laue-Langevin in France (currently one of the most successful beam tube research reactors in the world).

The concept for the new compact-core reactor was developed at the Technische Universität München on the basis of more than 40 years experience in designing research reactors and optimizing beam port installations for neutron scattering techniques and other neutron applications. The Deutscher Wissenschaftsrat strongly recommended that the FRM-II be built as a future neutron source for Germany and a base for international cooperation. Construction of the new facility began in 1996 and was completed at the end of 2000.

Features of the New FRM-II Beam Tube Research Reactor

The usefulness of a research reactor is determined by its maximum thermal neutron flux and the available scientific instrumentation. With a thermal reactor power of only 20 MW but a neutron flux density of 8×10^{14} neutrons/cm^2 sec in the vicinity of the experimental beam ports, the FRM-II is competitive with higher power high-flux research reactors worldwide. This flux-to-power ratio was achieved through the design of the compact core. The core consists of a single fuel element with a diameter of 24 cm and an active height of 70 cm. Like other high-flux reactors, the FRM-II will be fueled with highly enriched uranium. It will be cooled with light water and is surrounded by a 2.5-m-diameter heavy water vessel that serves as the moderator. It offers a large useful volume for in-pile irradiation and test installations. In addition to cold and hot neutron sources, which extend the available thermal neutron spectrum to lower and higher energies, several optimized irradiation facilities have been integrated into the moderator tank. The useful experimental space around the cold neutron source will be doubled by an additional neutron guide hall with neutron guides and super-mirrors. The containment building is the first research reactor building that is protected against airplane crashes and other possible external impacts.

The 12 neutron beam ports will be used mainly for research on the structure and dynamics of condensed matter (crystalline and amorphous solids and liquids) using new and improved techniques. In addition to the microscopic and mesoscopic structures of technically promising materials, special problems of polymers and biological materials can be also be examined with these methods, such as the characterization of miniaturized biological systems on solid surfaces.

Innovative Instrumentation and Facilities Available

The first generation of the planned 30 research and scattering instruments is under construction with contributions from research groups at several German universities and the Max-Planck and Helmholtz societies. Many of these instruments are innovative. Much progress is expected from new techniques for high-energy resolution of condensed matter excitations using the spin echo technique with neutrons. For basic and applied studies of magnetic materials, high-intensity polarized neutron beams will be made available through the use of helium-3 filters and magnetic supermirrors. This technique may be applied to the characterization and optimization of magnetic layers on surfaces, for example.

Electron-positron pair production by neutron capture gamma rays will provide a new high-intensity source of positrons. It will be available for detailed surface and defect investigations of materials with slow positrons, opening a broad new field of positron applications for the characterization of materials.

Modern optimized irradiation facilities will produce special radioisotopes for medical and technical applications and for neutron activation analysis, one of the most sensitive nondestructive analytic techniques available. Impurity concentrations as low as 10^{-15} gram per gram in highly purified materials can be identified with this technique. A large-volume irradiation facility has been installed for applications of this technique to the analysis of liquids. The relatively new "prompt gamma" analysis technique can be realized with an intense neutron beam.

To enable homogeneous doping of large silicon crystals by neutron transmutation, a special irradiation facility (up to 8 inches in diameter) has been installed in the flat and low-background region of the heavy water moderator tank. This facility, which may be used for the homogeneous doping of semiconductor power devices, will be available for commercial use shortly after nuclear start-up.

Other applications under development concern the microscopic and mesoscopic characterization of new materials by means of neutron small-angle scattering, neutron reflectometry, and newly developed tomographic techniques with thermal and fast neutrons. Because of their penetration depth in samples, neutrons used with modern detection and imaging systems offer the possibility of obtaining a three-dimensional model of the interior of an otherwise opaque material. A special high-resolution diffractometer has been constructed for space- and temperature-dependent stress and strain analysis of materials and larger samples.

Finally, an improved facility for the medical therapy of near-surface tumors using fast and epithermal neutrons, reconverted from thermal neutrons with a fission converter, has been built, the result of successful prototype work at the FRM. This facility may also be used for technical applications of fast neutrons in the field of radiography and tomography.

Editor's Note: Readers may recognize that the use of highly enriched uranium (HEU), as is currently used in the FRM-II research reactor, has been the subject of some international controversy in the context of the proliferation of nuclear arms. In comments to this editor, the author notes that "the flux-to-power ratio of FRM-II, compared with existing research reactors, is due to the compact core using HEU, and the current core design occurred in the mid-1990s in parallel with discussions with concerned agencies, particularly in the United States. Intentions are to replace the HEU core by a core with lower enrichment when new higher density fuel materials have been developed and qualified." *A good summary of the ongoing concerns may be found in the March 30, 2001 issue of* Science *(**291**, pp. 2527-2529) and references therein. [ENK]*

Wolfgang Gläser is Professor head of the Institute E21 of the Technische Universität München and the scientific head of the FRM. He was also the spokesman of the board of directors for the FRM-II.

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Facilities

The SESAME Project: An International Synchrotron Radiation Research Center in the Middle East

Herman Winick and Ercan Alp

The SESAME (Synchrotron-Light for Experimental Science and Applications in the Middle East) Project aims to establish the Middle East's first major international center for materials science and other research activities as a cooperative venture by the scientists of the region. It is being developed under the umbrella of the United Natiides Educational, Scientific, and Cultural Organization (UNESCO) and will be located in Allaan, Jordan (30 km from Amman and 30 km from the King Hussein/Allenby Bridge crossing of the Jordan River). Eleven countries have joined the project so far: Armenia, Cyprus, Egypt, Greece, Iran, Israel, Jordan, Morocco, Oman, Palestrian Authority, and Turkey. Observer countries include Germany, Italy, Japan, Russia, Sweden, the United Kingdom, and the United States. Several other countries have expressed interest in joining.

> *"…SESAME will serve as a catalyst…"*

SESAME will have as its centerpiece a synchrotron radiation source ("ring") based on a gift from Germany of the 0.8-GeV BESSY I storage ring and injector system that ended operation in November 1999. With the technical support of teams from Armenia and Russia and funds provided by SESAME member countries and UNESCO, the components of these machines have been dismantled and documented in a controlled way and are now stored in Berlin ready for shipment to Jordan and for their upgrading and reassembly.

The BESSY I ring will be significantly upgraded in size and energy. It will accommodate four insertion devices rather than the two that BESSY I originally accommodated. Superconducting multipole wigglers will extend the spectral range

of the x-rays produced to 20-25 keV. With these upgrades, the facility will become a very capable, broad spectral range source—it has been called a "super second-generation" or a "2.5-generation" source. Because of its low beam emittance (50 nm-rad), a measure of beam diameter and angular divergence, high stored beam current (up to 700 mA), and small apparent source size at the wiggler source points (0.45 x 0.05 mm sigmas, or standard deviation), very high flux and flux density will be available from the infrared region to hard x-rays. Undulators, another type of insertion device, will provide relatively high brightness at photon energies up to about 1 keV.

Thus, SESAME will provide excellent performance for most applications, including those now done at multi-GeV rings. Specific research programs planned for SESAME include structural molecular biology, molecular environmental science, surface and interface science, micro-electromechanical devices, x-ray imaging, archeological microanalysis, materials characterization, and medical applications. As an international scientific and technological center of excellence open to all qualified scientists from the Middle East and elsewhere, SESAME will serve as a catalyst for the scientific, technical, and economic development of the region and strengthen collaboration in science. The center will be jointly operated and supported by all member countries, with additional support from other countries interested in promoting the peaceful development of science and technology in the Middle East.

Major benefits of the project have already been realized at workshops and schools on accelerator science and technology, materials research, and structural molecular biology. Reports on these meetings are available on the World Wide Web at *www.sesame.org.jo*. These and other meetings have brought scientists and engineers from SESAME member countries together with experts in synchrotron radiation sources and applications. Twenty scientists and engineers are currently spending six to twelve months each working on accelerator projects at European laboratories, and eight scientists have completed or are now completing long-term visits to U.S. synchrotron radiation laboratories working on applications of synchrotron radiation. Support for these activities has been provided by UNESCO, SESAME member countries, the U.S. Department of Energy, the International Center for Theoretical Physics (Trieste), and the International Atomic Energy Agency, as well as synchrotron radiation laboratories in Europe and the United States.

After the selection of a building location, studies of the land at the site pertinent to construction were conducted, and building design is in progress. There are efforts to form multinational research groups that can work towards raising the necessary funds to build scientific instruments at the beamlines. With continued progress in these developments, it is expected that the research program can start in 2003 or 2004.

Herman Winick and Ercan Alp are cochairs of the SESAME Scientific Committee.

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Community

The National Materials Advisory Board

Based in Washington, D.C., the National Materials Advisory Board (NMAB) is an organization of the National Academies (U.S.). The National Academies survey the broad possibilities of science, engineering, and medicine, promoting cooperation in research both within the United States and internationally and bringing attention to the value of the scientific and technical communities in achieving national goals. The National Academies assess the state of current scientific understanding, which helps illuminate public policy decision making, and disseminate research works throughout the world.

Since 1951, the NMAB has affected U.S. policies for competitiveness, public health and safety, research directions, and other issues critical to materials science. The rich history of the NMAB goes back to its roots in the War Metallurgy Board in the U.S. Department of Defense.

The NMAB acts in four general ways:

1. Meets twice each year to examine issues of national importance to materials science and determine the board's direction.
2. Provides a public forum for issues of importance to materials science:
   - Disseminates results of NMAB studies and other activities,
   - Provides user-friendly web pages as a gateway to reliable information,
   - Writes opinion and policy articles based on NMAB activities,
   - Provides requested information to the U.S. government, and
   - Participates in materials science coordination activities.
3. Coordinates with overall activities of the National Academies in areas of education, innovation, and awareness, and ensures that materials issues are considered in studies and activities carried out by other boards in the National Academies.
4. Studies pressing issues of the day. The following constitute most of the NMAB's programmatic activities:
   - Topical workshops and similar meetings that may be called together with experts in synchrotron radiation sources and applications. Twenty scientists and engineers are currently spending six to twelve months each working on accelerator projects at European laboratories, and eight scientists have completed or are now completing long-term visits to U.S. synchrotron radiation laboratories working on applications of synchrotron radiation. Support for these activities has been provided by UNESCO, SESAME member countries, the U.S. Department of Energy, the International Center for Theoretical Physics (Trieste), and the International Atomic Energy Agency, as well as synchrotron radiation laboratories in Europe and the United States.
   - Topical roundtables to bring together policy makers, technical experts, and practitioners for discussion: The roundtable may set any schedule for meetings or workshops. No reports or recommendations are produced, and no activity reporting is required. Committee members are appointed by standard National Academies procedure, except for government members, who are appointed by virtue of their position title rather than their personal resume.
   - Assessments of technical programs to provide advisory guidance to federal initiatives and organizations: This activity may be done on a one-time or ongoing basis. Full activity reporting is required, as is a full consensus report review.
   - Standing committees to maintain awareness of issues of continuing importance: These committees issue letter reports or sponsor other NRC activities. Committee members are appointed, and full activity reporting is required.

   Other activities are also possible under National Academies guidelines that apply to the goals of advising the nation and facilitating high-level discussion.

   Current NMAB studies address topics ranging from advanced energetic materials to structural nanomaterials to advanced fibers. One of the NMAB's flagship efforts is a wide-ranging study on *Materials Research for "Defense-After-Next."* For more information, refer to the NMAB Web site at *www.nationalacademies.org/nmab*.

   The NMAB's activities rely on a cadre of experts in many areas who volunteer their time to participate in and advise our committees and review final reports. If you are interested in helping us in our mission as "advisors to the nation," please contact the author. Look for coverage of the activities of the NMAB in future issues of *IUMRS Facets*.

— *Toni Maréchaux, Director*
National Materials Advisory Board
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Community

Workshop on International Collaboration and Networking Focuses on Nanotechnology

The Workshop on International Collaboration and Networking was held at the IUMRS-ICAM conference in Cancun, Mexico, on August 28, 2001. Chaired by professors R. P. H. Chang (Northwestern University, USA) and Miguel Yacaman (University of Texas–Austin, USA), the event sought to lay the foundation for building a network of materials researchers around the world.

Nanotechnology was the theme of the workshop, and the participants extended their ideas to the broader, interdisciplinary field of materials. While researchers presented updates on the state of nanotechnology in their countries, representatives of funding agencies and policy institutions described the context in which research is undertaken. The presentations offered a balance between infrastructure and implementation, which led discussions about ways in which a worldwide network can serve a range of interests.

Professor Chang demonstrated a model, the "International Virtual Institute," that included on-line laboratories and virtual offices. At its height, the workshop hosted 80 people from 12 countries. The participants represented programs that ranged from those that already invest heavily in nanotechnology to those that are now identifying an investment strategy. They agreed that easy and free access to information would make a significant difference to the success of materials research and the likelihood of international collaborative projects. Breakout groups debated ways the infrastructure to support such a network should develop. For more information about the workshop, write to *mri@northwestern.edu*.

John Rumble of the National Institute of Standards and Technology speaks on "Databases for Nanotechnology."

— *Kimberly Bartlett*

Prospect

News of the IUMRS and its Adhering Bodies

International Conference on Materials for Advanced Technologies (ICMAT2001)

Good things come in small packages, at least such was the case recently for the relatively small and newly founded Materials Research Society of Singapore. It successfully organized the International Conference on Materials for Advanced Technologies (ICMAT2001), which was held at the Singapore International Convention and Exhibition Centre from July 1-6, 2001. The response to ICMAT2001 was overwhelming: About 1400 members of the international scientific and materials research community representing 42 countries attended the conference. The conference was chaired by B.V. R. Chowdari, president of MRS-Singapore, and co-chaired by the director of the Institute of Materials Research and Engineering, Prof. Albert F. Yee.

Among the plenary speakers at the conference were four Nobel laureates, who also gave special evening lectures to the public. The topics addressed in these public lectures were Semiconductor Heterostructures (Z. I. Alferov, Ioffee Institute, St. Petersburg, Russia), Perovskites (J.G. Bednorz, IBM Zurich Research Laboratories, Ruschlikon, Switzerland), Plastic Electronics (Alan J. Heeger, University of California, Santa Barbara, USA) and Physics in the Communication Industry (Horst L. Stormer, Columbia University and Lucent Bell Laboratories, USA).

The materials areas covered at ICMAT 2001 included ionic and mixed conducting materials for advanced batteries and fuel cells, biomaterials for tissue engineering, ceramics, magnetic materials for data storage, diamond-like carbon, polymers and composites, environmental materials, nanoscale materials and technologies, semiconducting materials for optoelectronics and high-frequency electronics applications, and ceramic superconductors for quantum devices and power transmission. Specialized aspects of crystallization and interfacial processes, thin films, modeling, microelectronic packaging, and materials education were also addressed. A detailed summary of ICMAT2001 may be found at *www.iumrs.org/docs/ ICMAT2001rpt.doc*.

— *B.V.R. Chowdari*

Prospect

News of the IUMRS and its Adhering Bodies

Expansion of European Materials Research Society Activities to Central and Eastern Europe

Ryszard Ciach

Advanced materials are being used not only in construction and machinery but also in electronics, automation, and biomaterials. These new materials require special technologies and a wide variety of research methods. To address this growth, the European Materials Research Society (E-MRS) was

> *"The growing number of participants from Central European countries has been a noticeable feature of recent meetings…"*

founded 17 years ago. At first, its activities were concentrated in countries of the European Union; they have now extended throughout Europe and beyond. The E-MRS is a member of the International Union of Materials Research Societies (IUMRS), which includes similar organizations from countries around the world. These societies organize symposia, conferences, and training; publish journals and books; and support research and technology transfer to industry.

Current E-MRS membership numbers approximately 5000. Among the many conferences E-MRS sponsors, perhaps the most important is the Spring Meeting held every June in Strasbourg, France. These meetings are a unique opportunity for forming new cooperative networks and fostering research in materials science. In 2000, the Spring Meeting was held in conjunction with the IUMRS International Conference on Electronic Materials. Approximately 1500 participants attended 18 specialized symposia. The growing number of participants from Central European countries has been a noticeable feature of recent meetings, but much untapped research potential remains.

Symposium in Krakow

On November 16–17, 2000, the Executive Committee of the E-MRS organized a symposium in Krakow, Poland, entitled "European Materials Research Society in Central and Eastern Europe," to bring together scientists from all of Europe. The symposium was a response to the remarkable increase in materials science activity and the broadening scope of materials applications, which are leading to the development of more complicated morphologies and structures, such as composites and nanomaterials.

E-MRS founder Paul Siffert

Participants included Giovanni Marletta, 2000 E-MRS President; Paul Siffert, E-MRS General Secretary; Peter Glasow, 2000 IUMRS Vice President; and Kazimierz J. Flaga, Chancellor, and Marcin Chrzanowski and Ryszard Henryk Kozlowski, Deputy Chancellors, of the Krakow University of Technology.

In an initial session, the achievements of two leading institutes were presented. Zbigniew N. Rak discussed electronic and nanotechnology materials at the Netherlands Energy Research Foundation ECN in Petten. Petro Smertenko, representing the Eureka project in Ukraine, reported on similar investigations at the Semiconductor Institute in Kiev and on the Eureka projects based on 20 years of Polish-Ukrainian cooperation.

Siffert Honored

The Foundation of Material Science Development honored Siffert with the Prof. J. Czochralski Gold Medal. Glasow described Siffert's career, emphasizing his unique scientific achievements in electronic materials. Siffert graduated 50 PhDs, was an author or co-author of more than 500 scientific publications, and was one of the founders of E-MRS. Anna Pajaczkowska, President-Elect of the Polish Crystal Growth Society, presented a silhouette of Czochralski to Siffert. She remarked that Czochralski is the most commonly found Polish name in the materials science literature, and she has used the Czochralski method in crystal synthesis at the Institute of Electronic Materials Technologies for many years. The Polish Crystal Growth Society has long collaborated with the German Crystal Growth Society because Czochralski performed a substantial part of his research during the years 1907–1928 in Germany, where he founded the Deutsche Gesellschaft für Metallkunde (now Deutsche Gesellschaft für Materialkunde).

In a formal ceremony near a statue of Czochralski, exhibited for the occasion by the Polish Ministry of Culture and National Heritage, Ryszard Ciach, President of the Foundation for Materials Science Development, presented the medal to Siffert. A nephew of Czochralski also participated in the ceremony. Approximately 70 representatives from Poland, Germany, France, Belgium, The Netherlands, Ireland, Sweden, Great Britain, Ukraine, Lithuania, Latvia, Hungary, Belarus, and Bulgaria enjoyed a reception following the ceremony.

Society Business

The E-MRS Executive Committee met with participants from Central European countries to discuss E-MRS activities in that part of Europe. Central European scientists wish to work with other European scientific institutes and participate in European Union projects. For example, institutions in Poland are joining forces with organizations from other parts of Europe:

- Warsaw University of Technology is developing its Institute of Materials Science.
- Krakow University of Technology participates in scientific projects supported by the European Union and establishes international schools. The university has demonstrated its commitment by creating an E-MRS area committee for Central Europe with the help of the Foundation for Materials Science Development.
- The Foundation for Materials Science Development has a strong tradition of cooperating with E-MRS and has cosponsored several joint conferences, including the NATO

Prospect

News of the IUMRS and its Adhering Bodies

Advanced Study Institute on Advanced Light Alloys and Composites and the E-MRS European Conference on Photovoltaics joined with the Contractors Meeting of European Commission Photovoltaics Projects JOULE II in Krakow.

The Executive Committee agreed on the following:

- The E-MRS Committee for Central Europe will be established with offices at the Krakow University of Technology. The committee consists of 12 scientists from Poland, Ukraine, Lithuania, Latvia, Hungary, Belarus, and Bulgaria. Ryszard Ciach was elected chairman.
- The committee will initiate international cooperation and integration in the field of materials engineering. Special care will be taken to help scientists from Central Europe participate in European Union projects.
- One of the committee's tasks will be to organize E-MRS Fall Meetings in Central European countries. These events will be similar in nature to the E-MRS Spring Meeting.

The first E-MRS Fall Meeting will be held in Krakow in August 2002. Topics will include:

- Memory shape effects (materials, technologies, applications)
- Photovoltaics (advanced technologies, new ideas, modern photovoltaics technologies)
- Light alloys and composites (structure, properties, applications)
- Copper and its alloys
- Nanomaterials
- Software development for process and materials design.

— *Prof. Ryszard Ciach*
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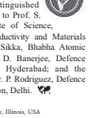
2001 Sōmiya Award

Each year, the International Union of Materials Research Societies (IUMRS) presents the Sōmiya Award for International Collaboration in Materials Research for the most significant research (on real materials) conducted by a team whose members are drawn from at least two continents. The award honors Prof. Shigeyuki Sōmiya, Emeritus Professor of Tokyo Institute of Technology, Dean at Teikyo University of Science and Engineering, and winner of the MRS Medal and the Japanese Scientific Academic Award.

The IUMRS Commission on Awards selects a winning team on the basis of nominations received from member societies and the broader materials research community. In addition to the award, the winners are given an opportunity to make a presentation at the annual IUMRS conference and complimentary registration at the IUMRS International Conference on Advanced Materials (ICAM), hosted this year by the Materials Research Society-Mexico in Cancun, Mexico, August 26–30, 2001.

Selecting the winner among this year's outstanding nominations was a challenging task. The Commission chose a U.S.-European joint research team led by Dr. Antonio Tomsia of Lawrence Berkeley National Laboratory. They are cited for their research into improving the durability of the bone-metal interface in medical implants through the introduction and testing of new advanced materials interlayers—a contribution of great potential effect on human health worldwide. An abstract of their investigation, entitled "Graded Bioactive Coatings for Medical Implants," is available through the IUMRS web site at *www.iumrs.org/somiya.html*.



Dr. Antonio P. Tomsia

Prof. Jose S. Moya

The collaborators on this award-winning research are as follows:

- Dr. Antoni P. Tomsia, Lawrence Berkeley National Laboratory, United States
- Prof. Jose S. Moya, Instituto de Ciencia de Materiales de Madrid-CSIC, Spain
- Prof. S. de Aza, Instituto de Ceramica y Vidrio (CSIC), Spain
- Prof. E. Guitian, Instituto de Ceramica y Vidrio (CSIC), Spain
- Prof. Grayson W. Marshall, University of California at San Francisco, United States
- Prof. Sally J. Marshall, University of California at San Francisco, United States
- Dr. Eduardo Saiz, Lawrence Berkeley National Laboratory, United States
- Dr. Jose Gomez-Vega, Lawrence National Berkeley Laboratory, United States (now at Nagoya University, Japan).

MRS India Presents Annual Awards

At its most recent Annual General Meeting, held at Science City, Kolkata, India, the following awards were presented: the Distinguished Materials Scientist of the Year Award to Prof. S. Ranganathan of the Indian Institute of Science, Bangalore; the MRSI-ICSC Superconductivity and Materials Science Annual Prize to Dr. S. K. Sikka, Bhabha Atomic Research Centre, Mumbai, and Dr. D. Banerjee, Defence Metallurgical Research Laboratory, Hyderabad; and the Distinguished Lectureship Award to Dr. P. Rodriguez, Defence Research and Development Organisation, Delhi.

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