Dynamic Systems and Control Division Newsletter

Editor: Manish Paliwal

Fall 2005

Nejat Olgac, Chair, DSCD

Chairperson's corner

We are passing through some very tumultuous and challenging times of the Division these days. The reorganization and redirecting that is taking place at every level of ASME, and financial pressure introduced on the entire society are playing as major prompters on the main events. ASME is, and has been running a deficit and is using up its reserve. As a consequence its financial systems are experiencing a major overhaul.

As I write these lines, I still think positively and suggest that we, as a Division, should use these dire straights as opportunities for a brighter future, and I continue iterating on this string. I will try to convey to you some of the highlights of this mental exercise and welcome you to respond with your own thoughts as we take to the road.

As most of you know, there are numerous initiatives that started in DSCD within the recent past, which are the direct results of the organizational wave we are in:

1. *Decentralization of the governance*. At the ASME level there is a major change: the Group Leader is no longer a VP and is no longer selected by the Nominating Committee. It is up to each Group to select its own leader in whatever manner it finds appropriate and consistent with ASME's rules. This is an indicative move towards distributed governance. At the DSCD level we need to move also. The primary workers in DSCD are the active members of the Technical Committees (earlier known as Technical Panels) who are volunteers. They organize conferences, sessions, paper reviews, and on.. And it is most natural that they should decide the way to govern the Division. Such participation in governance starts with an election of the office holders (from the ExCom to the Technical Committee Chairs and on to the representatives for the conferences). The details of this change are still worked on as you read these lines. As I reported to you at the ACC 2005, I would like to bring this topic for discussions to the membership at the IMECE 2005. The key objective is to secure the "dedicated participation of the members on the Division's day-to-day affairs". Please claim ownership in your Society, in our Society! I strongly urge the young members to come forward and talk with us, the "old-timers", and the "old-timers" to encourage the newcomers to assume responsible and active roles in the society.

2. *Re-distribution of the fiscal responsibility from the ASME to the Groups and Divisions.* The following new measures are put in-place by the ASME: (a) Divisions will be charged for their use of ASME staff time. This money will come from the divisions' custodial accounts. This was done earlier using the ASME revenues. (b) ASME is looking for coherent means of charging all their customers, including divisions, a share of the cost of general overhead (G&A). Although there are some drafted documents already in circulation, this item is yet to be finalized. Nevertheless, I strongly believe that it is coming, in one form or another. (c) No investment return will come from the custodial accounts, which are managed by the ASME.

DSCD should be prepared, and cleverly address these changes. We should find ways to optimally increase our resources. Our operational strategies in Symposia, Conferences etc, need to be reconsidered for the maximum return. Comparison of the DSCD efforts v. the returns at the IMECE, ACC , AIM, Japan-USA Flexible Automation Conference participations are being looked at very carefully as we are preparing some propositions for alternative initiatives.

Some happier news must also be included in this message, and I do this gladly:

1. We have rekindled the Fellow grade nominations and it is my pleasure to report that in the past 10-months alone we have triggered 5 nominations and one has already concluded. A number of you have actively participated in this and I appreciate that very much.

2. DSCD's long-term planning and strategic objectives are being revisited. After I reported on the tentative plans (in Portland – ACC 05 meeting) I received an unprecedented flow of e-mail commentaries primarily pointing NOT to remove the word "Control" from the Division name. I am so excited to hear a strong voice coming from the members! The majority voice is certainly heard loud and clear. We will follow course as you, the members, opted.

3. Some new initiatives in the works:
a) NYQUIST Lecture series have started. This is an annual event which will be repeated every year at a major confer-

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Sensors in Orthopaedics- Towards Intelligent Implant Design

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Today's biomedical sensors rely upon a number of different sensing technologies. Most of these technologies are expensive and their volume, weight, and/or power consumption inherently limit their use as implantable or in-vivo sensors. When considering the parameters available when designing implantable sensors in orthopaedic applications, the design space of implantable sensors can be bounded by three axes: utility, discovery, and time. Along the utility dimension the designer needs to determine whether the device will function only as a passive data gatherer or be part of a system that will use this data to dynamically affect its environment. The discovery dimension makes the designer consider whether the device will be called upon to collect data that will predict a future state in its environment, or collect data that can confirm or verify a "current" condition. Finally, the time dimension is important since the human body is a dynamic system and any combination of the other two dimensions can be asked to be active immediately post implantation or be asked to function during or after decades in situ.

After even a cursory glance at the current state of sensing technologies, we can conclude that they are not well-suited for integration into a single device which can learn from its environment and ultimately, over time, form part of a closed loop control system. That is - can the sensor's inputs, through addition of telemetric capability, trigger or activate a therapeutic response form within the implant that affects its environment, all with non-degrading, long term implantation capabilities?

While the fundamental difficulties of designing and developing a sensor that can function under the highly challenging environment of the human body are self evident, additional requirements such as power consumption, cost, compatibility with on-chip electronic circuitry, long term stability and reliability are specific requirements that need to be met. Due to the complex physiological environment of the human body, it is critical that the appropriate level of integration of electronic, chemical, mechanical, and fluidic sensing technologies be achieved.

Application of telemetry can facilitate the development of "intelligent implants" which will enable implantable devices to sense changes of their environment and either predict - or confirm - the appropriateness of any particular function of an implant in situ. This data could be stored, relayed to a central monitoring station for a physician's review, activate a simple alert signal or in its broadest application, or ultimately trigger a further response from an activity module implanted along with the sensor, in order to directly affect the environment of the implants, such as in the case of an infection.

Potential applications are numerous. In orthopaedics, the goal of any intelligent implant would be the detection of the possible failure of an implant such as an artificial spinal disc, total hip or total knee replacement. The main failure modes of such implants are mechanical loosening or infection, both ultimately requiring a revision surgery. Of importance is the ability of any sensors or therapeutic modules to function longitudinally in time, as infection and loosening can both happen soon after the index surgery or up to 15 to 20 years thereafter. Since loosening and infection can both have distinctly different etiologies, with mechanical loosening having both biological as well as mechanical origins, any sensor array to be used in an intelligent orthopedic implant must be able to continuously sense its environment for changes in the biomechanical as well as biochemical elements.

In the case of infection, the primary candidates for sensor development would be predictive, having the ability to detect the presence, counts of and/or identification of bacterial cells / endotoxins in bodily fluid or the formation of a biofilm on an implant's surface. Additionally, since infections result in inflammation and accompanying heat generation and therefore changes in local tissue temperature, temperature sensors could be early confirmatory indicators of the presence of deep infection. With this knowledge, the physician could determine the best path of treatment of the patient such as the prescription of antibiotics or reoperation. Due to the difficult access to the location of an implant related infection, an active, therapeutic module pre-implanted with then sensor could be activated to release antiseptic/antibiotic compounds of different modalities. The modalities range from standard antibiotic treatments to releasing compounds that would block the formation of biofilms or dismantle them such that the intrinsic resistance of biofilms to antibiotics can be eliminated and to the infection can be better eradicated.

In mechanical loosening, the longevity of implants is directly affected by the patient's activity level, both by mechanical load/overload that can degrade the fixation of the implant within the bone, as well as by the reaction of the human body to wear debris which is a natural byproduct of any articulating joint. The temporal nature of this influence is also evident – while single traumatic event can cause an otherwise well fixed implant to loosen, and the ability to detect such loosening would be advantageous to the patient and physician - it is the long-term fatigue loading and wear of the device that most commonly result in mechanical loosening. Therefore, any sensor may be called upon to continuously sense its environment and collect data, with the probability that any significant information may not be required until years after the initial surgery. Regardless, since implant wear is directly correlated to load levels and cycles of use, this information could be used as a predictive marker in a diagnostic setting. Telemetric implants that can measure the in vivo loads and loading cycles have already been developed implanted and validated in the hip, knee and spine.

In the middle of the spectrum, between predictive markers and confirmatory markers, is the ability to sense, monitor and characterize the actual byproducts of fatigue mechanisms directly such as size, shape, concentration and composition of wear debris, or indirectly such as the proximity of wear surfaces over time, which would indicate levels of wear, could also be used in diagnosis or prognosis of the eventual onset of loosening, allowing the physician to take precautionary measures such as surgery to replace components in a joint before they are extremely worn or they have created a critical mass of wear debris that may cause the body to react and therefore cause the implant to loosen. Acoustic detection of wear debris for chemically inert polymeric materials or identification of trace metals metallic wear debris (Al, Co, Cr, Ni, Ti, and V) are also being developed.

On the other end of the spectrum, confirmatory markers such as the level of biological response to the wear debris that will lead to loosening can also be of help, even if late in the life of an implant, one which may already be suspected of loosening. Specifically, the ability to identify and measure the biochemical markers of osteolysis thus characterizing foreign body reaction, cytokine inflammation markers, and even direct measurement of changes in bone mineral content can lead to an algorithm for detecting the cause for and leading to a specific treatment to stop or even reverse implant loosening. The ability to sense something as simple as absolute migration of an implant from its original position within the bone or its position relative to another structure (implant or bone) can also help confirm true mechanical loosening, which is difficult to do even when studying a sequential series of radiographs, which rarely, if ever are available with adequate and consistent levels of magnification, position, etc.

The previous descriptions of candidate signals that may need to be measured are for the most part localized and because of their mostly biochemical or microbial origin and confined space after implantation, makes the scale of both the device itself as well as the sensing interface bounded from the milliscale to the nanoscale. Miniaturization is a little more complicated than just shrinking components to a smaller size. Achieving the integration of various components of varying scale present challenges not just in the design of the device since the physics and biochemistry will vary with scale. Additionally the there is need for proactive development of manufacturing processes able to integrate and implement variable scale devices with potential variation of orders of magnitude in scale within a single sensor array. Successive reduction in the volume of the sample analyzed in a microanalytical device may also compromise analysis either because the measurement limit of the analytical method is exceeded or because the sample is no longer representative of the bulk specimen. Reduction in sample size needs to be matched to the detection limit of the analytical method designed into any sensor.

Analysis of markers with a low rate of occurrence or concentration (rare cells, wear debris of hard on hard implants, etc.) poses another challenge for biomedical sensors in vivo. Utilizing even relatively large samples from the sensor's own environment is unlikely to provide a signal containing enough of the marker of interest; thus, other functionalities to increase the "gain" of the system may need to be incorporated into the intelligent implant, such as the ability to generate flow-through capture/concentration capabilities, for example.

Data and power management make up the final consideration when designing a sensor enabled orthopaedic implant. Depending on what the data generated will be used for - from research to patient monitoring to diagnostics - the data will need to be stored, processed, and/or transmitted. Very low power applications are being considered both for the generation, storage and transmission of the data. More recently, a mechanistic approach to energy generation such as storage of the kinetic energy generated by the patient when moving, or a thermodynamic approach such as utilizing the natural thermal gradients within the human body to drive a power-producing cycle have shown promise. Additionally, real time data transmission or transmission at discrete time points once stored both have their complexities, due to environmental noise and interference, relatively low signal intensity, and in many cases the copious amounts of dampening of the signal due to the surrounding tissues it traverses on its way to a useful gathering point.

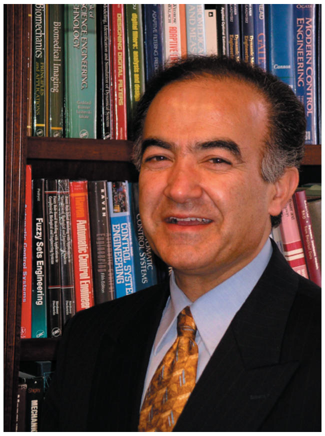
Hence a balance needs to be struck when considering sensing technologies in orthopaedics. One is temporal: how long will the functionality need to be active – from immediately post op and up to decades. Another is whether the data will used for predictive vs. confirmatory purposes. Intimately related to this is the amount of processing the data must undergo before it reaches the final user in order to be useful, that is, how much "intelligence" must be inherent in the microelectronic circuitry that accompanies each sensor. The ability to detect signals from multiple sources (i.e. chemical, mechanical, electrical) while at the same time optimizing the resolution and sensitivity of them all can determine the usefulness of the data gathered. Ultimately, the quality and reliability of this data, whether highly processed or not, needs to be continuously validated, if it is to be used within a closed loop system that will continuously sense the implant's environment, and if equipped to do so, will control an adjacent therapeutic component which may release doses of antibiotic, anti-inflammatory, analgesic compounds or even genetic manipulators in order to affect, in a positive manner, the functional outcome of an orthopaedic implant.

In brief, being able to optimize, in proper proportion, the domains of time, power, electricity, motion, chemistry, biology, physiology, medicine, and now scale, is the key to a successful "intelligent implant." Working effectively at the interface of these disciplines will prove the tool most beneficial to the patient and most useful to the physician.

About the author
Jorge A. Ochoa is the Vice President for Research and Development and Chief Technology Officer of Archus Orthopedics, Inc., a privately held development stage medical device company he joined in 2004. In his previous role, Dr. Ochoa was Vice President, Research and Development, at DePuy Orthopaedics, a Johnson & Johnson Company. He joined DePuy in November of 1998, after serving on the integration team that brought JJPI and DePuy together. His work experience also includes IBM and Chrysler Corporations.

Dr. Ochoa is a native of Guadalajara, Mexico, and holds a B.S. in Mechanical Engineering (Cum Laude) from the University of Missouri-Rolla, and an M.S. and Ph.D. in Mechanical Engineering from Purdue University. He has co-authored over 30 peer refereed Journal publications and conference abstracts, and has 11 patents to his name. He is a member of the Society of Hispanic Professional Engineers, the Society of Mexican-American Engineers and Scientists, ASME International, the Orthopaedic Research Society, the International Society for Technology in Arthroplasty, the Society for Experimental Mechanics and the Society for Biomaterials. He also serves on advisory boards for various professional engineering societies and Engineering Schools.

Should We Re-Engineer the Engineering Education?



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Globalization has introduced new dynamics in the technological world. This environment of constant change means that we need to educate and equip the next generation of engineers for a world as it will be not as it is today. The world of tomorrow will be one where the pace of technological innovation will continue to accelerate; technology will become more accessible for more people; diverse populations will become more intensely connected through technology; and diverse multicultural, social, political and economic factors will shape and be shaped by technology.

Another reality associated with globalization is "outsourcing and offshoring." You can hardly read a professional and business publication and not be reminded of outsourcing to China, India, Eastern Europe, etc. The Mechanical Engineering publication in its March and June 2005 editions had articles entitled: "The China Road," and "Where The Engineers Are" respectively. The notion of closing US automated plants in the face of cheap imports, the transformation of old line producers to distributors of imports, and the fact of mass layoffs as more production is moving to China are some of the alarming realities of globalization.

While previously, we used to hear about production and manufacturing jobs (blue collar) going overseas, now we are experiencing the loss of engineering jobs (white collar) to China, India, and others. Advances in communication technologies have enabled ease of data transfer to India and China as to plants and engineering offices next door. Low cost offshore engineering services have become a powerful pull for businesses to transfer even technology jobs overseas.

To make matters worse, some of the statistics shared at the April 2005 ASEE Annual Engineering Deans Institute (EDI) depicted that while all US Engineering Institutions together graduate about 50,000 or more engineers a year, China and India together produce close to half a million engineers annually. The August 8, 2005 issue of The Dayton Business Journal had an article entitled "Businesses Fear Scientist Shortage." The article argues that if the current enrollment trend in the science and engineering disciplines continues, by 2010 more than 90% of all scientists and engineers in the world will be living in Asia. In its July 11, 2005 issue, The Outlook India.com stated that all present analyses predict that India is likely to be among the five major economies in the first half of this century and will overtake Japan, Germany, Britain and France. It is anticipated that India will experience 7% or 8% annual growth for the next two decades.

As a high school senior deciding to choose a discipline for college education, and as a parent investing between $100,000 to $200,000 per child to go through four years of college, should they be discouraged about choosing engineering as a discipline if all of the jobs are being offshored? Should we in academia and industry consider "re-engineering the engineering education?" The common theme that has surfaced at different fora for engineering education is "innovation." This theme is the centerpiece of the engineering programs at my school. We need to be cognizant of the fact that innovative new technologies are emerging from the collapse of the boundaries between traditional disciplines, and that engineering students create best when immersed in a multi-disciplinary environment.

We have accomplished these through such degree programs as Bioengineering, Mechatronics, System Engineering. About a quarter of our engineering students do a five year BS Engineering and MBA program. Dynamic Systems and Controls is an excellent example of a multi-disciplinary program that investigates systems as a whole. It eliminates boundaries and instills a unique view, something that enables students to cross the traditional boundaries. To build on this strong foundation, we need to create opportunities that enable our students to integrate economical, social, and political factors as part of their system analysis. For example, we are in the process of creating a masters degree (MS) between International Studies and Engineering for our engineering undergraduates. This degree program will enable our students to gain a strong engineering foundation, and also acquire an in-depth understanding of international trade, policies and their impacts on engineered systems.

Therefore, by expanding to a five year professional degree program, we can educate new generations of engineers who not only can compete in a global economy, but be employed in the type of jobs that are difficult (not impossible) to offshore. Fundamentally, we need to bring creativity and innovation skills to the forefront of the education process. We must also instill in our students the mindset of life long learning and the necessity for continual re-education until the end of their careers. To learn more about our exemplary and cross-disciplinary new degree programs, visit our website, www.du.edu/secs/

The *Dynamic Systems and Control Division Newsletter* is published twice annually (Spring & Fall). News items, Call for Papers, conferences, as well as other items of interests are welcome from all DSCD Members. Please submit your items for publication by e-mail.

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2005 American Control Conference Portland, OR June 8-10, 2005: A Report

Suhada Jayasuriya Ph.D.
General Chair, 2005 ACC

The annual American Control Conference (ACC) held under the auspices of AACC, the US National Member Organization of the International Federation of Automatic Control (IFAC), brings together people working in control, automation, and related areas from the American Institute of Aeronautics and Astronautics (AIAA), American Institute of Chemical Engineers (AIChE), Association of Iron and Steel Engineers (AISE), American Society of Civil Engineers (ASCE), American Society of Mechanical Engineers (ASME), Institute of Electrical and Electronics Engineers (IEEE), the International Society for Measurement and Control (ISA), and the Society for Computer Simulation (SCS).

The 2005 ACC was held from 8-10 June 2005 at the Portland Hilton and Towers in Downtown Portland, Oregon. This is the first time in the history of the ACC the conference was held in the beautiful city of Portland, Oregon. The conference dates coincided with the famous Portland Rose Festival which provided an opportunity for the attendees to watch the nation's second-largest all-floral parade from the hotel. Portland's downtown area is scaled to human dimensions. The blocks are short, just 200 feet long. Cafes, restaurants, bookstores, galleries and specialty stores are waiting around every corner. Portland offered many things to see and do for everyone, young and old.

There were 1664 papers submitted for consideration by the ACC program committee, of which 921 papers were accepted for inclusion in the final program. The program was organized into 18 parallel sessions held each morning, early afternoon and late afternoon with six papers per session on the average. Each day of the conference started with an authors' breakfast where the session chairs/co-chairs had an opportunity to meet the presenters of the session so that some advance planning could be done before the session. Many authors and session chairs took advantage of the opportunity. The authors' breakfast was followed by a plenary session.

The plenary talk was given by Col. Micheal J. Leahy of the AFRL entitled, "Control Challenges for the Next Century of Flight," on Wednesday, on Thursday by Dr. Richard Murray of Caltech entitled, "Autonomous Machines: Racing to win the DARPA Grand Challenge," and on Friday by Prof. Panagiotis Christofides of UCLA entitled "Control of Nonlinear Distributed Process Systems".

The plenary session of each day was followed by 18 parallel sessions. The parallel sessions of the program included twelve industry and tutorial sessions a recent addition to ACC programs. These sessions featured a one-hour tutorial presentation on an industrially proven but still relatively new technique followed by a series of short presentations from industrial participants discussing the implementation, application, and benefits of the technique. These twelve sessions covered a number of topics of high industrial relevance. In addition the program included two interactive sessions: Cooperative Control with the MultiUAV Simulation on Wednesday, and Modeling and Control of Systems for Critical Care Ventilation on Thursday. Five special sessions rounded up the conference program. The special sessions were Scanning Probe Microscopy and Modeling of RNA Expressions on Wednesday morning, History of Control and Mid-Career Professional: To Change or Not Change Your Jobs on Wednesday evening , and 5) NSF Funding Opportunities on Friday Morning.

New AACC Policies went in:
A new registration policy went into effect during the 2005 ACC. Accordingly, one full registration at the advanced registration rate had to be paid by a co-author of a paper before the final versions of accepted papers could be uploaded. This new policy created some difficulties, although it was well publicized in ACC 2005 advance announcements. In the end I hope our contributors understood the reasons for this new AACC policy although it created some headaches for a few. It is anticipated that with this new policy in place, future ACCs will be able to better budget the available resources.

ACC Workshops
On Monday and Tuesday prior to the ACC program three two-day tutorial workshops and a single one-day workshop were conducted. The three two day workshops were on Practical Techniques in Control Engineering, Engineering Applications in Genomics, and Recent Advances in Subspace System Identification, and the one day workshop was on Real Time Optimization by Extremum Seeking Control.

There were 18 exhibitor booths sponsored by 16 industry and government organizations. Atul Kelkar of the DSCD served as the Exhibits chair for 2005 ACC. Many conference attendees took advantage of easy access to the exhibits that were conveniently located near the conference registration area. In addition the exhibits area was provided with an internet cafe for which partial funding was provided by Oregon State University.

The social program of ACC 2005 included a welcome reception on Tuesday evening held at the Hilton, a dinner cruise on Thursday down the Willamette river, and a farewell reception on Friday at the World Trade Center a few blocks away from the conference hotel. Many of the conference attendees took advantage of these gatherings to make new friends, renew old acquaintances and to simply have a good time.

The traditional ACC awards luncheon took place on Thursday in the Hilton Grand Ballroom. The annual AACC award winners and ACC 2005 student best paper finalists were recognized at the luncheon.

Student Participation:
Student participation at ACCs has been increasing in recent years. This year we had 238 students attending the ACC. Recognizing the importance of student participation to sustain research interest in controls, AACC provided funds to defray travel costs of students, which were in turn leveraged to get matching funds from the NSF. We are thankful to the NSF's Dynamic Systems and Control program for providing travel support. In addition we are grateful to Dynamic Systems and Control division of the ASME that provided travel funds specifically targeted to ASME students. As in the past ACCs a best student paper competition was held. Our own DSC member Kamal Youcef-Toumi (Vice-chair student affairs) handled the student best paper selection process and student travel grants very efficiently.

Attendees Came from Many Countries:
There were over 1000 registrants who

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Call for Papers

The Pennsylvania Transportation Institute, a University Transportation Center in the College of Engineering at the Pennsylvania State University, will be hosting the

9th International Symposium on Heavy Vehicle Weights and Dimensions

on behalf of the International Forum for Road Transport Technology, June 18 to 22, 2006.

The theme of the 9th symposium is

Vehicles-Roads-Regulations: Crossing the Bridges

Venue:
Nittany Lion Inn
University's Main Campus
University Park State College, Pennsylvania.

We hope that you will consider submitting an abstract and attending the symposium.

Deadlines

For submitting abstracts:	**November 21, 2005**
For submitting final papers:	**March 31, 2006**

For more information, including details on registration and the call for papers, please visit http://www.outreach.psu.edu/proga/9ishvwd.

We look forward to seeing you, and if you have any questions, comments, or concerns, please contact Deb Weaver at 814-865-3965 or by e-mail at 9ISHVWD@psu.edu. Thank you.

Contributed by Sean Brennan (sbrennan@psu.edu)

DSCD Honors Committee
CALL FOR AWARDS NOMINATIONS

Nominations are being solicited for the

2006 Rufus Oldenburger Award

Refer to http://divisions.asme.org/dscd/awards/rtomedal.html for requirements.

Send nomination letter only to
Glenn Masada at **masada@mail.utexas.edu** by **January 15, 2006**.

Nominations are also being solicited for the following three

2006 DSC Division Awards

Leadership Award
Outstanding Investigator Award
Innovative Practice Award

Refer to http://divisions.asme.org/dscd/awards/index.html for requirements.

Send nominations and supporting material in PDF format to
Jim Taylor at **jtaylor @ee.unb.ca** by **August 31, 2006**.

Glenn Masada, Chair, DSCD Honors Committee

To our readers...

The barriers between the technical disciplines are gradually disappearing, and interests from a wide canvas of specialties are converging. These converging interests are opening up the most exciting new vistas in science and technology. This Newsletter includes two invited articles addressing this issue. Dr. Jorge Ochoa, in his article, has emphasized the effectiveness and utility of the interdisciplinary work with a discussion on "Intelligent Implant Design". While, to cope with the fast changing dynamics, Dr. Rahmat Shoureshi has called for a discussion on the need for "*Re-Engineering the Engineering Education*".
I hope you enjoy reading this issue, and look forward for your comments and suggestions.

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ACC 2005...

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attended the ACC in Portland, OR. Most of the attendees came from the United States (663) with participants from 38 other countries. They came from Canada (54), China (47), Japan (34), Germany (23), the United Kingdom (21), Taiwan (18), South Korea (17), Italy (16), France (15), Mexico (13), Netherlands (11), Norway (7), Singapore (7), Australia (6), Greece (6), India (6), Sweden (6), Poland (5) and a total of 35 from 19 other countries.

Thanks are due many:
The annual American Control Conference founded in 1982, has always been an outstanding success. For over 20 years the ACC has been one of the premier international conferences for controls professionals to come together and share experiences, research and knowledge. Thanks to the dedication and hard work of our volunteers on the operating and program committees and the numerous anonymous reviewers over the past two years, ACC2005 was no exception.

In organizing a conference of this magnitude an incredible amount of time and effort is put in by the members of the operating committee. Their commitment and attention to detail made ACC 2005 another successful ACC.

Given that 2005 was a year in which the IFAC World Congress is held there were some concerns about attendance at the ACC. Nonetheless there was tremendous interest in the ACC as evidenced by the over 1600 paper submissions and over 1000 attendees at the meeting. We are particularly happy that we were able to provide high quality conference facilities, social functions, and internet facilities all well within budget. We sincerely hope that our attendees went away with happy memories of 2005 ACC having made new friends, renewed old connections and new ideas for the future.

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Chair's Message...

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ence for the DSCD (for the moment at IMECE). We will try to organize it so that the minimal scheduling conflict occurs with other events. Prof. Karl Astroem, of Sweden will be the first NYQUIST Lecturer at IMECE 05. Incidentally, he was selected using a nomination and voting procedure at the Technical Committee/Panel Chairs level. The topic of his talk is "Nyquist and His Seminal Papers". I am arranging a small reception to follow the talk. We are looking forward to this event in Orlando. b) The Technical Panels are being reshaped into Technical Committees and the relevant rules of formation are about to be distributed to the members. c) Benefits platform – and electronic newsletter of DSCD. This is a posting and internal announcement environment very much like the IEEE-Newsletter. It will have a number of sections including the news of interest, calls for papers-proposals-drafts and on. We intent to broadcast it electronically, but the other details are being worked on at the moment. d) "Chair's words" is a quarterly communiqué that I would like to write to the members. The objective here is to give you a very brief update on the on-going and relevant events. Most importantly I wish to open a two-way communication platform with the members. The first of the series is either in your mail-boxes or just about to be delivered. As always, I will take great pride to respond to the responses to the extent possible.

I would like to end by saying that "there is no perfect world, but the one we live in is so wonderful to bicker about.." While I say that, we all realize, all of these bumps and valleys in societal life are thorns and the roses, respectively, both of which we learn to enjoy.

I wish everyone a wonderful year ahead! See you in Orlando for the IMECE 2005 and later in Minneapolis for ACC 2006 (where one of our own is in the role of the General Chair, Eduardo Misawa).

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The DSCD

The DSCD Executive Committee establishes policy and manages the affairs of the Division. It meets twice a year at the IMECE and at the ACC. For 2004–2005 it is comprised of the following people:

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A full listing of the all the DSCD office bearers, Technical Panel Chairs, and their coordinates can be found at the DSCD web site at:
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