



Welcome to ASME International Design Engineering Division Newsletter, Summer 1997

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Message From The Division Chair Sheri D. Sheppard, Ph.D., P.E



It is an exciting and challenging time to be an engineer involved in design. This goes for design practitioners, design educators, and design researchers. Design practitioners are challenged with global competition, stringent environmental standards, and staying up-to-date technically. The design possibilities created by innovative technologies and materials are increasing annually.

Design educators are challenged with balancing content and process learning goals in their courses, and integrating new technologies into degree programs. At the same time, new ABET standards offer faculty the opportunity to map out their program's particular objectives. Design researchers are challenged with defining and exploring problems that

extend our understanding of the physical and social worlds of engineering, and adapting this understanding to practice.

The Design Engineering Division (DED) of ASME offers many forums for mechanical engineering design practitioners, educators and researchers. These forums include:

- Design Technical Conferences: this suite of conferences is typically held in September. Each of the conferences is organized by one of the DED Technical Committees. The 1996 Conferences, chaired by Mike McCarthy, were at UC-Irvine and featured the first ASME Conference Proceedings on CD-Rom. The

September 14-17, 1997 Technical Conferences, chaired by Bahram Ravani, will be in Sacramento, CA. Additional details can be found in this newsletter.

- Technical Sessions at ASME's International Mechanical Engineering Congress and Exposition (IMECE). In 1996 the Design Division organized 21 sessions, coordinated by Crispin Hales of the Executive Committee. The 1997 IMECE will be November 16-20, in Dallas, Texas.
- The National Design Engineering Conference (NDEC) in March in Chicago, held in conjunction with a major design show and exhibition. Dick Hirsch organized 18 DED sponsored sessions at the 1997 NDEC.
- Ten Technical Committees (Design Automation; Design for Manufactuability; Design Theory and Methodology; Design Education; Fastening and Joining; Mechanisms; Power Transmissions and Gearing; Reliability, Stress Analysis and Failure Prevention; Vehicle Design; Vibration and Sound.)
- Two peer-reviewed Journals (Vibration and Acoustics, editor Dan Inman; Mechanical Design, editor Bahram Ravani).

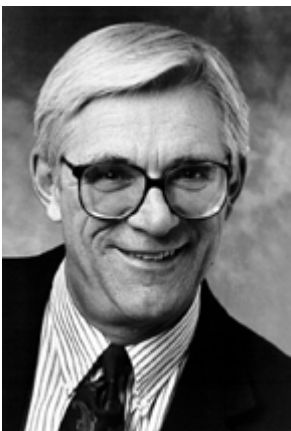
The forums listed above provide opportunities to get together to discuss, inform and even debate ideas and visions of the present and future of mechanical engineering.

For those of you actively involved in organizing, defining, implementing and/or attending DED activities, "thanks" and I look forward to your continued involvement this upcoming year. To those of you who are not actively involved, I invite you to become active. Attend a conference or contact an Executive Committee member or Technical Committee Chair (contact information is given in this newsletter). I am sure that you have much to contribute.

It is the combination of mechanical engineering design practitioners, educators, and researchers that makes DED the vibrant group that it is. Being involved in DED means that you are part of ASME's largest Division: over 11,500 ASME members express their primary interest in DED, and another 24,000 indicating DED as their secondary interest. This totals 37% of the overall ASME membership!

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Past Chair's Report Roger W. Mayne, Ph.D.



The 1996-97 year has passed quickly for me as Chair of the DED. It has been a very interesting year including the successful Design Engineering Technical Conferences (DETC) held at the University of California, Irvine in August 1996 and the National Design Engineering Conference (NDEC) in March 1997.

The NDEC was part of the extravaganza known as National Manufacturing Week at the new McCormick Place in Chicago. For those of you that have never been to this conference, I highly recommend it as an exposure to the latest in the practice of engineering design. The vendor's exposition is the most complete that I have seen from mechanical components to computer software. This year Dick Hirsch once again provided the ultimate in organizational effort for the NDEC.

The DETC at UC Irvine featured a number of true innovations orchestrated by Mike McCarthy. This was the first time that the conference was held on a university campus, the first time for a summer DETC and the first proceedings publication on a CD ROM. Congratulations to Mike for putting it all together.

I am happy to be leaving you with an outstanding Executive Committee to carry on governance of the Division. Dr. Sheri Sheppard of Stanford University is, of course, the new Chair and the first Woman Chair of the Design Division after fifty-two years. Sheri has most recently been Vice Chair and Treasurer of the Division but has

served two years as DED Coordinator for the International Mechanical Engineering Congress and Exposition and has also been organizer of the DED committee roster. Sheri is personally involved in design research and knows the business well. Dr. Steve Velinsky of UC Davis is the new Vice Chair and Treasurer. Dr. Crispin Hales of Triodyne Inc. is now the IMECE and roster coordinator. Dr. Ken Waldron of Ohio State is the new DETC Conference Coordinator and Dr. Dan Segalman of Sandia National Laboratories is the newest member of the Committee. He will serve as Secretary this year. You, of course, know Dan from his great editorial work on this newsletter for the past years.

The Design Engineering Division is in healthy condition. Our two journals are ably led by Barham Ravani (UC Davis) and Dan Inman (VPI), our conferences are well attended and, due largely to the efforts of John Wesner (Lucent Technologies) in past years, we also have a secure custodial account for operating funds. Based on my experience, Sheri Sheppard will have an exciting year with plenty of willing assistance from fellow executive committee members and ASME Staff. Best wishes to Sheri and the rest of the DED Executive for 1997-98.

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Editors Corner

Dan Segalman and Tom Chase

You will notice a change in the structure of the printed version of the newsletter. We have included a large number of short stories on a wide range of topics and reduced the overall length.

Two factors motivated this change. The first is our hope that the new format will broaden the newsletter's appeal to our division members. The second is the availability of the newsletter in web form, (here) where we can provide uncropped originals of the stories summarized here.

We send our heartfelt thanks to our authors. One of the unfortunate consequences of the new format is that we had to brutally crop most of the stories; some bear little semblance to the originals. Please honor our authors' efforts by checking out their full-length originals on the web. You will find much additional relevant information here in this web page.

As usual, we include a listing of the officers of the Design Division and the chairs of the Technical Committees. Please consider becoming active with a technical committee. Just phone or e-mail a committee chair and offer to participate.

We invite feedback! You can contact Tom Chase at trchase@tc.umn.edu. We hope to hear from you!

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Design Division Executive Committee

Chair: Sheri D. Sheppard, Ph.D. Mechanical Engineering Stanford University Stanford, CA 94305 PHN: 415-725-1590 FAX: 415-723-3521 email: sheppard@car.stanford.edu	V. Chair: Steven A. Velinsky, Ph.D. University of California Dept. of Mechanical Engineering Davis, CA 95616-5224 PHN: 916 752-4166 FAX: 916 752-6714 email: savelinsky@ucdavis.edu	Crispin Hales, Ph.D. Triodyne Inc. Consulting Engineers 5950 West Touhy Ave. Niles, IL 60714-4610 PHN: 708-677-4730 FAX: 708-647-2047
Kenneth J. Waldron, Ph.D.	Dan Segalman	Past Chair: Roger W. Mayne, Ph.D.

<p>Mechanical Engineering Ohio State University 206 West 18th Ave Columbus, Ohio 43210-1154 PHN: 614 292-0500 FAX: 614 292-3163 email: waldron.3@osu.edu</p>	<p>Org. 9234, MS 0439 Sandia National Laboratories PO Box 5800 Albuquerque, NM 91324 PHN: 505 844 0972 FAX: 505 844 9297 email: djsegal@sandia.gov</p>	<p>Mechanical & Aerospace Engr SUNY Buffalo - 321 Jarvis Hall Buffalo, NY 14260-0001 Phone: (716)645-2593, Ext. 2254 FAX: (716)645-3875 email: mayne@eng.buffalo.edu</p>
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Chairs of the Design Division Technical Committees

<p>Design Automation Shapour Azarm, Ph.D. Dept. of Mechanical Engineering University of Maryland College Park, Maryland 20742 (301)405-5250 Email: azarm@eng.umd.edu</p>	<p>Design for Manufacturability J. Richard Behun IBM Microelectronics Division D/N18 B/967-2 1000 River Road Essex Junction, VT 05452-4299 802-871-3524, fax: 802-871-3577 behun@vnet.ibm.com</p>	<p>Design Theory and Methodology Jonathan Cagan, Ph.D., P.E. Mechanical Engineering Carnegie Mellon University Pittsburgh, PA 15213-3890 (412)268-3713 Email: jon.cagan@cmu.edu</p>	<p>Design Educa Thomas G. Lit Aeroquip 2323 Green Rd Ann Arbor, MI (313)741-5300 Email: TLIBERT@tri</p>
<p>Fastening and Joining Sayed A. Nassar, Ph.D. Mechanical Engineering Department Lawrence Technological University 21000 W. Ten Mile Road Southfield, MI 48075-1051 810-204-4000 X2562 fax: 810-204-2576</p>	<p>Mechanisms Dr. Harvey Lipkin George W. Woodruff School of Mechanical Engineering Georgia Institute of Technology Atlanta, GA 30332-0405 (404)894-7410 Email: harvey.lipkin@me.gatech.edu</p>	<p>Power Transmission & Gearing Neil Anderson General Motors - Gear Center 37350 Ecorse Road Romulus, MI 48174-1385 Email: LNUSRECO.KZK0KM@gmeds.com</p>	<p>Reliability, St Analysis and Prevention Lola Boyce, PI Division of En University of T San Antonio San Antonio, T 0001 210-691-5512, 691-5586 lboyce2@runn</p>
<p>Vehicle Design Jeffrey S. Freeman Department of Mechanical Engineering University of Iowa 2129 Engineering Building Iowa City, IA 52242-1527 319-335-5675, fax: 319-335-5669 freeman@icacn.uiowa.edu</p>	<p>Vibration and Sound Prof. Kon-Well Wang Dept. Mech. Engrg. Penn State University 157 Hammond Building University Park, PA 16802 814-865-2183, fax 814-863-7222 kww@ecl.psu.edu</p>		

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Conference Calendar

The Design Engineering Division plays a major role in three conferences each year. The first is the National Design Engineering Division (and Show) held in Chicago in March. This event attracts over 20,000 practicing engineering designers each year. Over 400 also attend the technical conference with 40 to 50 sessions. These sessions address issues ranging from finite element analysis for design, career advancements and survival for engineers, to Quality and DFM.

The Design Engineering Technical Conference, to be held in Sacramento, California this year, changes venue each year. Typically these conferences have been under the direction of the Technical Committee on Vibration and Sound or the Mechanisms Committee. This year, the DETC is organized by the Design Automation Committee of this Division.

The Design Engineering Division also sponsors between 20 and 24 sessions at the "International Mechanical Engineering Congress and Exposition (IMECE)". In 1997 the IMECE will held November 16-21, at the Wyndham Anatole Hotel in Dallas Texas.

A summary of upcoming conferences.

1997

[Design Engineering Technical Conference](#), Sept. 14-17, Sacramento, CA.

[The 1997 International Congress \(former WAM\)](#), Nov. 16-21, Dallas, TX

1998

National Design Engineering Conference, March 16-19, Chicago, IL

[Design Engineering Technical Conference](#), Sept. 13-16, Atlanta, GA

The 1998 International Congress (former WAM), Nov. 15-18, Anaheim, CA

1999

National Design Engineering Conference, March 15-18, Chicago, IL

Design Engineering Technical Conference, Sept.12-15, Las Vegas, NV

The 1999 International Congress (former WAM), Nov. 14-17, Nashville, TN

Additional information can be obtained by writing, calling or e-mailing:

Steven A. Velinsky, Ph.D.

University of California

Dept. of Mechanical Engineering

Davis, CA 95616-5224

PHN: 916 752-4166
FAX: 916 752-6714
email: savelinsky@ucdavis.edu

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DETC '96 Breaks New Ground

J. Michael McCarthy, Ph.D.

The Computers in Engineering Division joined the Design Engineering Division to test a number of innovations for the ASME 1996 Design Engineering Technical Conferences. The conference date was moved forward one month from September to August. The venue was changed from a hotel to a college campus. A WWW web page was used to distribute conference information. Tutorial and exhibition programs were organized. New authors kits were developed to support electronic submission of papers; and the Proceedings was published in the form of a CD-ROM with an accompanying Book of Abstracts. *(Picture: Cynthia Clark and Phil Divietro - sitting to her left - of ASME Publications demonstrate their innovative CD-ROM Proceedings.)*



South Orange County's coastal summer climate and a college environment provided a particularly comfortable setting for the conference. 480 papers were presented in 12 parallel sessions organized by the ASME Committees on Design Automation, Mechanisms, Flexible Assembly Systems, Design Theory and Methodology, as well as by the Computers in Engineering Division and the Engineering Information Management Program. *(Picture: Lung Wen Tsai and Michael McCarthy present the ASME Machine Design Award to An Tsu Yan.)*

Yan.)



Keynote speakers opened the conference each of the three days. Gerry Rescigno of Black and Decker spoke on the challenges and opportunities for design automation tools that meet the needs of industry. Delbert Tesar of the University of Texas discussed the revolution in the level of intelligence in machine operation and its impact on research issues. William Powers of Ford Motor Company discussed the importance of emerging information technologies on the effectiveness of product development for a rapidly changing global marketplace.

Beginning with a jazz quartet at the Sunday evening reception in the UCI Engineering Plaza and ending with country western dancing at noon on Wednesday, this conference was clearly a unique experience.

However, it is the CD-ROM Proceedings that will be the singular distinction of this event. The Proceedings constituted ASME Publication's first effort in the new world of electronic publishing. The search features of the CD-ROM make the contents of the entire conference available in a way never before possible. The ease with which color illustrations can be included as well as links to e-mail and web sites argues for continuing use of CD-ROM Proceedings. However, the lack of standardization in word processing formats posed a serious challenge. Standardizing electronic submission is the focus of an on-going collaboration between the Committees and

ASME Publications.

The [1997 DETC moves up the coast to Sacramento](#) , CA on September 14-17.

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New Facility Hi-Lites 1997 National Design Engineering Show

Richard A. Hirsch, P.E.

The 1997 National Design Engineering Show and Conference was held March 10 - 13 in the new South Building at McCormick Place in Chicago. The great new facility has to be seen to be believed.

This event is part of National Manufacturing Week sponsored by the Reed Exhibitions Companies. The Design Conference is cosponsored by ASME through our Division. The show had over 2,000 exhibitors with every product or service of interest to design engineers represented.

The conference had 44 technical sessions with 21 organized by ASME. Our Division committees organized sessions as follows: Design for Manufacturability Committee 7; Design Education Committee 7; Technical Committee on Vibration & Sound 2; Mechanisms Committee 1. We were also assisted by the Management Division who organized 4 sessions. Our thanks to each committee and all the individuals involved for their time and effort.

The total attendance at all of the sessions was 1,133 which is the highest since the record year of 1993. The ASME sessions drew 56% of the attendance. The Design for Manufacturing track was the most popular with an average of 42 per session. Overall the sessions averaged 25.8 with the ASME sessions averaging 30.3.

National Manufacturing Week had other ASME involvement. The concurrent Plant Engineering and Management Conference was cosponsored by the Plant Engineering Division. The new Manufacturing Enterprise IT Solutions Conference had two sessions organized by ASME members from the Engineering Information Management Program. Professional Development held 5 short courses.

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DETC 97 - Mark Your Calendars

**Mark your calendars now!
September 14-17, 1997**

The 1997 Design Engineering Technical Conferences will be held in sunny Sacramento, California this fall. This is a great opportunity to network with your DED colleagues while seeing the latest and greatest in mechanical design!

Details can be found at <http://www-detc.engr.ucdavis.edu:80/detc97/index.html>. Remember to use your browser's *backspace* key to return here!

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Announcement and Call For Papers 1998 ASME Design Engineering Technical Conferences

1998 ASME Computers in Engineering Conference ***1998 ASME Engineering Information Management Symposium***

September 13-16, 1998

Omni Hotel at CNN Center, Atlanta, Georgia

Web Site: <http://helix.gatech.edu/1998DETC>

General Information

The 1998 ASME Design Engineering Technical Conferences, Computers in Engineering Conference and Engineering Information Management Symposium will be held in Atlanta, Georgia at the Omni Hotel at CNN Center. The conference is hosted by the Mechanisms Committee of the Design Engineering Division and the George W. Woodruff School of Mechanical Engineering at the Georgia Institute of Technology. The overall conference consists of several individual conferences sponsored by technical committees within the Design Engineering and Computers in Engineering Divisions of ASME. A list of conferences and associated conference chairs is provided below. Most recent information about the overall and individual conferences is available at the web site.

Author Information

- Papers due: 15 January 1998
- Acceptance notices: 1 April 1998
- Final submission due: 1 May 1998

Please see web site for mailing addresses of the paper review chairs for each conference.

General Conference Co-Chairs

Professor Harvey Lipkin
George W. Woodruff School of Mechanical Engineering
Georgia Institute of Technology
Atlanta, GA 30332-0405
Voice: (404) 894-7410
Fax: (404) 894-8496
Email: harvey.lipkin@me.gatech.edu

Professor Farrokh Mistree
George W. Woodruff School of Mechanical Engineering
Georgia Institute of Technology
Atlanta, GA 30332-0405
Voice: (404) 894-8412
Fax: (404) 894-9342
Email: farrokh.mistree@me.gatech.edu

Constituent Conferences

25th Biennial Mechanisms Conference Prof. Lung-Wen Tsai, Conference Chair Department of Mechanical Engineering	24th Design Automation Conference Prof. Alan Parkinson, Conference Chair Department of Mechanical Engineering	10th International Conference on Design Theory and Methodology Dr. Jami Shah, Conference Chair Department of Mechanical and Aerospace Engineering Arizona State University
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University of Maryland College Park, MD 20742 Voice: (301) 405-6629 Fax: (301) 405-6707 Email: lwtsai@isr.umd.edu	Brigham Young University Provo, UT 84602 Voice: (801)378-2625 Fax: (801)378-5037 Email: parkinson@byu.edu	Tempe, AZ 85287-6106 Voice: (602)965-6145 Fax: (602)965-2412 Email: jami.shah@asu.edu
Design for Manufacturing Conference Dr. Jai Menon, Conference Chair IBM T.J. Watson Research Center P.O. Box 704 Yorktown Heights, NY 10598 Voice: (914) 784-6942 Fax: (914) 784-7667 Email: menon@watson.ibm.com	18th Computers In Engineering Conference Prof. Richard Crawford, Conference Chair Department of Mechanical Engineering University of Texas at Austin ETC II 5.160 Austin, TX 78712-1063 Voice: (512)471-3030 Fax: (512)471-7682 Email: rhc@mail.utexas.edu	12th Engineering Information Management Symposium Dr. Biren Prasad, Conference Chair Automated Concurrent Engineering Lab Electronic Data Systems (EDS) P.O. Box 250254 West Bloomfield, MI 48325-0254, USA Voice: (810) 696-5487 Fax: (810) 661-8333 Email: bprasad@cmsa.gmr.com

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1996 Student Design Contest

Charles J. Hurst



Student Designs Transfer Water--Carefully and Quickly!

Their setup complete and their talk about their system finished, Damon Lawrence and Doug Schrandt waited nervously in the charged silence for the judges to signal them to start their device during the Student Design Competition held at the 1996 IMECE. The challenge this year was for students to design and build a device which would transfer 250 +/-15 ml of liquid from a Styrofoam cup containing 300 ml to a second cup two m away in the shortest period of time. All teams had to use the same small battery-powered electric motor to drive the system.

Because the water simulated a hazardous liquid the student teams were heavily penalized for spills or for fluid left in their device.

Contestants Lawrence and Schrandt represented Region V and Michigan State Univ. They were one of the 14 teams which competed in this annual event. In common with many competitors, their device lifted the source cup and tipped to a predetermined angle to pour the correct amount of fluid into a trough (part of their device) leading to the receiving cup.

Other teams tried pump and piping systems, with varying success. One team even designed and numerically milled their own centrifugal pump impeller to better match the given motor characteristics. Most systems worked well despite some pre-race problems with devices which had been stored and shipped since the students had worked with them.

When the water had stopped flowing, however, Lawrence and Schrandt emerged with the winning score, and

took home the \$3000 first prize, with an additional \$1000 going to their school.

The second place went to Brian Stobaugh and Barrett Mayes representing Region X and Texas A&M - Kingsville. The second place finish was worth \$1000 to them and \$500 to their school. The third place was won by Todd Hickman of Region VII-South. He won \$500 for himself and \$250 for Southern Illinois University - Edwardsville.

The 1997 Student Design Contest is now underway at the Regional level. It requires students to move two ping-pong balls and one golf ball from a starting location into a specified receiving box. Preliminary indications are that a very close and exciting competition can be expected between the Regional winners at the 1997 IMECE.

More information about these annual student competitions can be found at http://www.lance.colostate.edu/~dga/asme_design.html

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Padnos Awards

Winners Announced in Padnos International Design Competition Grand Prize Entries Invited to Publish Their Work

August 19, 1996 -- The Winners of the Third International Padnos Design Competition were announced today at the ASME Technical Design Conference held in Irvine California.

The Padnos Design Competition recognizes work done by senior level engineering students which, through innovative design techniques, address environmental problems. The Padnos Design Competition is sponsored by the Luis and Helen Padnos Foundation, the Grand Valley State University (Grand Rapids, Michigan) Seymour and Esther Padnos School of Engineering and the American Society of Mechanical Engineers (ASME International).

The structure of the competition normally provides for a Grand Prize award of \$6,000 to the student team and their University and two Honorable Mention awards of \$2,000 each to the University. This year, however, due to the outstanding quality of the entries, two Grand Prize Winners were selected. In addition, the student teams have been invited to submit their work to the Technology Journal of the Franklin Institute. This is one of the oldest technical journals published in the United States. After reviewing the Grand Prize winning entries, Alan Moghissi, the editor of this peer reviewed journal, commented "it is overwhelmingly apparent that the projects selected by this very prestigious judging committee are of the caliber for publication in our journal." Thus it has been established that review by the Padnos judging panel will be recognized by the journal as the peer review required for publication. Each year the Grand Prize winning entry will be invited to publish in the journal.

The Grand Prize winning entries are a design which allow the manufacture of several products from the by-products generated in paper making and a the design of a novel waste treatment system for dairy farms. An honorable mention was awarded to the design of a very high efficiency engine for use in lawn and garden equipment.

"These designs reflect a new way of approaching design; it's called Environmentally Responsible Design," said Paul D. Plotkowski, the Director of the Padnos School of Engineering at Grand Valley State University. "The Padnos Competition encourages tomorrow's engineers to consider the entire life-cycle of a product and a full range of environmental factors in their design work."

The first grand prizes was awarded to the team of Ellen Barayuga, Vangie Parico, Rebecca Cushman, and Lisa

Richards under the direction of Professor Nirmala Gnanapragasam. This all- female team was made up of Civil and Environmental Engineering students from Seattle University. Their project, sponsored by the Weyerhaeuser Corporation (one of the worlds largest producers of wood and paper products) addresses the re-use of three inorganic solid residuals generated by the pulping process in the production of paper.



The first of these by-products is the ash generated by the system that produces steam from fuel energy provided by recycled bark, sawdust, wood chips and other wood waste materials. The students determined that this ash can be incorporated into the production of low strength materials including concrete. According to the students "it really works; we produced over a ton of concrete during

our project."

The second and third by-products to be reused are Lime Slaker Grits and Green Liquor Dregs. Both of these are produced by the Kraft pulping process. The students determined that the lime slaker grits can be used in the manufacture of raised pavement markers (reflective lane markers for highways). The Green Liquor Dregs can be used in brick production. The students reflected that "currently, in each case, these products can be produced more economically using other materials." They hope, however, that with further development these materials will be used economically in the manufacture of these products.

The team of Lara Beal, Jason Crouch, Mike Orr, Alex Peters, Henry Moody, Terry Ogle, and John Wesner under the direction of Professors Raj Raman and Roland Mote from the University of Tennessee at Knoxville received the second Grand Prize for their design of the Dairy Waste Treatment System. This group of Agricultural Engineering students designed a system which addresses a problem which faces every livestock based producer.



In current practice, waste products are often treated in large lagoons to degrade the waste products prior to the application of these materials to croplands. These lagoons, however, have the drawbacks of requiring large land areas, produce substantial unwanted odors, and release methane gas to the atmosphere.

The system designed by the students addresses these issues by first separating the solid and liquid wastes. The solid waste is then stabilized through composting, and the finished compost is sold as landscaping material. The liquid portion of the waste enters a much smaller lagoon which has a high-density polyethylene film cover. This cover contains the odors and allows for the collection of the methane gas which is produced. The methane is then scrubbed and used to fuel an internal combustion engine which powers an electric generator providing power to support the dairy farm. Finally the lagoon effluent passes through a constructed wetland where plant nutrients are removed and the resulting liquids are applied to pasture land as fertilizer.

The students report that this system has a net cost of only \$340 per month to operate. This is a net decrease of \$105 per month compared to the existing approach and in addition substantially less land area is required.

The Cedarville College team of Eric O'Brien and David Preston under the supervision of Professor Larry Zavodney received an Honorable Mention for their project to redesign a small internal combustion engine for tremendously improved fuel economy. Engines such as the Briggs & Stratton engine four cycle engine are

commonly used in many lawn and garden applications.

The design developed by O'Brien and Preston incorporates substantial weight reductions in the mass of both the connecting rod and the crankshaft. In addition the aerodynamic aspects of both components were analyzed and the components were redesigned to optimize this behavior. The carburetor was replaced with a fuel injection system which allowed for the use of two spark plugs as well as multiple intake and exhaust valves. The intent of these design innovations is to both improve fuel efficiency and reduce emissions.

The students point out in their report that, engines for lawn and garden applications are currently designed only with economy in mind. "There do not appear to be any environmental regulations for this type of device." The students indicate that with the number of lawn mowers, tillers and tractors in use today, the use of designs similar to those they propose could make a major impact on oil consumption and air quality.

The Louis and Helen Padnos Foundation will grant \$6000 for each grand prize and \$2000 for the honorable mention award.

The 1997 Padnos Competition is currently being launched. Information on eligibility requirements and entry deadlines may be obtained from Paul D. Plotkowski at Grand Valley State University, Tel: (616) 771-6750; Fax (616) 771-6742; e-mail plotkowp@gvsu.edu or by visiting the GVSU Engineering home-page at <http://www.engineer.gvsu.edu/>.

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Liability Insurance Available

Randi Kurtz, ASME Member Services

An important member benefit is available. ASME has developed a professional liability insurance program geared specifically toward self-employed engineers and small engineering firms. The program is underwritten by one of the Reliance Insurance Companies and is being administered by Kirke Van Orsdel, Inc. Cover age is subject to plan approval in your state or country.

If you are interested in obtaining more information, you may call KVI at 1-800-435-7931 or 1-800-THE-ASME.

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Practicing Design Engineer's Forum

CAE -- Too Much or Not Enough?

by Richard A. Hirsch, P.E.

I attended the National Design Engineering Conference last March and at one of the sessions a speaker made the point that, with today's PC's and engineering software: "All engineers do analysis, more analysis gets done and products are improved." My immediate thought was "maybe, maybe not".

I have been a practicing engineer for a long time and when I think about, say, the last thirty years or so, I wonder about the following. Suppose I could plot a graph of the number of engineers using computer programs for analysis vs the number of design failures over the past thirty years. I have the feeling that there would be a strong positive correlation. My reasons for this feeling are based on my experiences in the workplace.

When I entered the profession as an Aerospace Structures Engineer, I worked under the direction of an experienced man. He could examine a drawing, explain how the loads would be transmitted through the

assembly, tell me what sections would probably be critical, and suggest a method of analysis. Working like this, I and others in our group developed our knowledge about how structures behaved and how to analyze them. Any of our analyses on critical components would be verified by instrumented tests.

The situation today in many companies is quite different. Young engineers have PC's on their desks running sophisticated finite element analysis programs. They may have little or no experience with how real structures behave. They import a design from their company CAD system, mesh it, perhaps automatically, click a few buttons and out come stresses and deflections. Rarely does anyone ask: "How good is the model?" "How good is the FEA program?" I have seen cases where the answer to both questions is: "Not very". In one case, the same structure was analyzed using three different commercial codes and three different answers resulted. Testing proved that one of the codes gave the correct answer which was some small comfort.

I invite those of you reading this to tell me about your experiences, good or bad. Contact me by e-mail at hirschr@asme.org or the old fashion way at Richard A. Hirsch, PE, 8220 Marcie Drive, Baltimore, MD 21208. Perhaps we can put together a panel discussion on this subject at one of our Division conferences.

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Report of the Design Automation Technical Committee

In September 1996, the Design Automation Committee sponsored the 22nd Design Automation Conference. The conference had 29 technical sessions including two panel sessions. The keynote address, delivered by Mr. Gerald Rescigno from Black & Decker, was entitled: "Challenges and Opportunities of Meeting Industry Needs". Professors John Renaud and Anthony Luscher organized a panel session on "An Industry Review of the Design Automation Research: Academic, Industry, and Government". Also, Professors F.C. Park and K. Lee from Korea organized a panel session on "Critical Issues in CAD/CAM: A Perspective from Korean Manufacturing". The keynote talk and panel sessions were well received and attended with a very high interest level.

The conference had a total of 136 submitted papers of which 64 papers were from outside the U.S. with 107 papers accepted for publication in the proceedings. The accepted papers in general were of high quality and addressed many interesting and emerging topics in mechanical and structural design automation.

Several people worked very hard to make the conference a success. European submissions were handled by Professor Hans Eschenauer (Germany), Pacific Rim submissions by Professor Masataka Yoshimura (Japan), and other overseas papers by Professor Alan Parkinson. The North American submissions were co-ordinated by the Paper Review Chair, Professor Deba Dutta, with the help of a team of dedicated subcommittee chairs that included Bert Bras, Mark Ganter, Jeff Ge, Hae Chang Gea, Brian Gilmore, David Hoeltzel, Mark Jakiela, Madara Ogot, Jagannatha Rao, John Renaud and Duane Storti. The efforts of these individuals, who contributed significantly to the success of the conference, are recognized and appreciated.

Our 1996 conference best paper award was supported by Black & Decker and consisted of \$1000 cash plus a plaque of recognition. The winner was the paper, co-authored by Gerard Kim and Simon Szykman from National Institute of Standards and Technology, entitled: "Combining Interactive Exploration and Optimization for Assembly Design". The best paper award represented Black & Decker's continuing efforts to support work that would lead to significantly improved product design and was presented to the winners by Greg Harris from Black & Decker.

In terms of our committee activities, our main progress was to revise our operating manual or bylaws. Professor Brian Gilmore took the lead on that effort and we are glad to report that it was completed in July 1996 and approved subsequently and now reflects our current practice in the design automation committee.

For further information about the activities of the Design Automation Committee, please contact:

Shapour Azarm	.....	Deba Dutta
Chair, Design Automation Committee	.....	Vice Chair, Design Automation Committee
Dept. of Mechanical Engineering	.....	Dept. of Mechanical Engineering & Applied Mechanics
University of Maryland	OR	University of Michigan
College Park, MD 20742	.....	Ann Arbor, MI 48109
Voice: (301)405-5250	.....	Voice: (313)936-3567
Fax: (301)314-7477	.....	Fax: (313)647-3170
E-Mail: azarm@eng.umd.edu	.....	E-Mail: dutta@umich.edu

24th ASME Design Automation Conference
Sept. 19-22, 1998
Atlanta, Georgia

The ASME Design Automation Committee invites papers in all areas of design automation related to mechanical systems. Papers with examples from industrial practice are encouraged. Suggested technical areas for paper submissions are listed below. Papers in other areas of design automation are also welcome.

Artificial intelligence and knowledge based systems in design

Concurrent design, design for manufacture

Mechanical and structural design optimization

Design issues in mechanical systems simulation

Decomposition methods in design and optimization

Finite element applications in design and optimization

Robust design and life-cycle issues

Geometric modeling

Parametric and variational geometry

Feature based design

Object-oriented design and analysis

Tolerance analysis and synthesis

Layered manufacturing

Virtual reality in design

Web-based design

Industrial examples, developments and perspectives

All papers will be reviewed for simultaneous presentations at the conference and publication in the CD-ROM

conference proceedings. Title page must include address and telephone number of contact, key word(s), and an abstract. Two part papers will be accepted. All inquiries related to the conference and suggestions for special session topics and panel sessions should be directed to the Conference Chair:

Dr. Alan Parkinson, Conference Chair
Department of Mechanical Engineering
Brigham Young University
Provo, UT 84602
Voice: (801)378-2625
Fax: (801)378-5037
Email: parkinson@byu.edu

All papers must be submitted in printed form. Please submit 5 copies of the papers by January 15, 1998 to the Paper Review Chair:

Dr. Mark Ganter, Paper Review Chair
Department of Mechanical Engineering
University of Washington
Seattle, WA 98195-2600
Voice: (206)543-5487
Fax: (206)685-8047
Email: ganter@u.washington.edu

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Report of the Design Theory and Methodology Committee

The Design Theory and Methodology Committee is busy planning the 1997 Conference. Conference Chair Kris Wood from UT Austin and Paper Chair Jami Shah from Arizona State University report that 66 papers were submitted with an estimated 50-60% acceptance rate. DTM will again run a single track of 10 sessions including topics on design practice, lifecycle design, computational design, formal design methods, decision making, and industrial applications. The 1996 conference again saw capacity-filled rooms with lively conference discussions and a great forum for professional interactions; the same excitement is anticipated for this year.

The committee is proud to announce a new best paper award for the conference: The Xerox/Design Research Institute Best Paper Award, sponsored by Xerox. Selection guidelines are that paper must:

1. relate to design of complex systems through integration of multiple engineering disciplines, and
2. demonstrate an innovative and useful application in an industrial context. The award carries a cash prize of \$500 to the authors and a plaque. In addition the winners will have the opportunity to present their work at Xerox.

The 1998 conference chair will be Jami Shah from Arizona State and the paper chair will be Kevin Otto from MIT.

As of January, 1997, the new DTM officers for a 2-year term are:

- Chair - Jon Cagan from Carnegie Mellon University
- ViceChair - Ken d'Entremont from Triodyne
- Secretary - Steve Hoover from Xerox

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Report of the Design Education Committee

Ronald M. Wolosewicz, PE

Conference Participation

Design Education Committee sponsored three sessions at IMEC'96. These were: Case Studies in Design Engineering, Failure Analysis and the Student Paper Competition. For NDEC'97 the following sessions were organized: Design of Weldments, Geometrical Tolerancing, Designing with High Strength Aluminum for the Space Shuttle, and Effective Design Engineering in the Small Manufacturing Company. For IMEC'97 the following seven sessions are scheduled: Student Paper Competition, Case Studies in Design Engineering, Failure Analysis I and II, Science Engineering in Pre-College, What Happened to Safety Factors, and Successes in Design Engineering Education.

Student Paper Competition

This competition designed to encourage students to write a publishable paper based upon the capstone design project is into its eighth year. The ASME Old Guard is a joint sponsor and provides cash awards of \$500 for the winning papers. The paper session at the 1996 IMEC, chaired by Professor M. Keefe, was well attended, the presentations were well received and the students answered all questions in a professional manner. The 1996 Student Paper Competition winners were: "The UT Prosthetic Hand" by R. Colwell and E. Harwood from the University of Toledo (Ohio); "Design of a Back seat Wheelchair Loader for a Two-Door Car" by Ms. V. Ennis of the University of Alabama, Tuscaloosa; "Two-Dimensional Demonstration Smoke Tunnel" by D. Vaughn from Christian Brothers University in Memphis, TN; and "Design of a New Singularity Free Robotic Wrist", by a team of J. Wiitale, J. Schmiedeler and B. Rister from the University of Notre Dame. Our congratulations to all of the winners.

Additional congratulations must be given to the Mechanical Engineering Departments at the University of Alabama and the University of Notre Dame. These two schools have had winners in the Student Paper Competition for the past two years. Shall we try for three?

ME advisors, please encourage your students to enter this competition. The experience of preparing and publishable paper and then presenting this paper is well worth the effort. The Design Division is providing funds to cover the mailing costs associated with the 1997 Student Paper Competition. The Chair for the competition is Professor M. Keefe, Mechanical Engineering Department at the University of Delaware. He can be reached at (302) 831-8009. Also check the Design Education Committee's Home Page (discussed below) for additional details.

Committee Home Page

T. Liberty, incoming DEC chair, has prepared a committee home page. The home page can be accessed from either the ASME home page or directly from the following address:

<http://www.asme.org/divisions/ded/education/asmedec0.html>.

Leadership Development Intern

T. Liberty, incoming DEC chair, has been selected as one of the Leadership Interns with the ASME Council on

Public Affairs for 1997-98. Congratulations on your selection to the ASME's Leadership Development Initiative.

New Vice Chair

At the DEC meeting held at NDEC in March 1997, elections for the Vice-chair were held. As a result of the elections, the incoming Vice Chair is: Dr. Lucy King from GMI Engineering and Management Institute. T. Libertiny and Lucy King will assume their positions on July 1, 1997. The addresses for new DEC officers are:

T. Libertiny	.....	Dr. Lucy S-B King
Associate Engineer	.....	IMSE Department
Aeroquip	.....	GMI Engineering & Management Institute
2323 Green Road	.....	1700 W. 3rd Avenue
Ann Arbor, MI 48105	.....	Flint, MI 48504
(313) 741-4855 P	.....	(810) 762-7850 P
(313) 662-6922 F	.....	(810) 762-9924 F
email: tlibert@trinova.com	.....	email: LKING@NOVA.GMI.EDU

Call For Papers

DEC traditionally sponsors the following sessions at IMEC: Case Studies in Design Engineering, Failure Analysis, Success in Design Engineering Education, and the Student Paper Competition. With the exception of the Student Paper Competition, the papers for the remaining sessions at IMEC 1997 will have been selected by the time you receive this newsletter. If you are interested in presenting a paper at IMEC 1998, please contact the appropriate session chair.

<i>Case Studies in Design Engineering</i>	.....	<i>Failure Analysis</i>
Professor John A. Wilson, PE	.....	Mr. R. Dean Harris, PE
Department of Mechanical Engineering	.....	Consulting Engineer
University of New Hampshire	.....	Engineering Design & Testing Corp.
Kingsbury Hall	.....	P.O. Box 8027
Durham, NH 03824	.....	Columbia, SC 29202
(603) 862-1839	.....	(803) 791-8800
email: jawilson@christa.unh.edu	.....

Committee Meetings

DEC meets twice a year at the IMEC and at the National Design Engineering Conference and Show. If you would like to contribute to our committee, please join us in Dallas on November 17, 1997 at 3:30 PM. Contact T. Libertiny or Dr. Lucy S-B King at the addresses given above.

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Report of the Technical Committee on Vibration and Sound

The Spring meeting of TCVS held in Chicago, the Committee elected Professor Jian Sun of University of Delaware, Dr. Mark Moeller of Ford Motor Co., Professor Robert Parker of Ohio State University and Dr. Zissimos Mourelatos of General Motors as new members of the committee. Professor Dean Mook of Virginia Tech. was re-elected to serve a second term. The Committee also selected Ali H. Nayfeh of Virginia Tech. and Donald E. Bently of Bently Nevada Corporation to be the recipient of the Den Hartog and the Myklestad awards, respectively. The Den Hartog award is given in recognition of lifetime contributions to the teaching and/or

practice of vibration engineering while the Myklestad award is presented for a major innovative contribution to vibration engineering.

Recently, the following committee members were promoted to the Fellow grade: Robert Greif, Christophe Pierre, Subhash Sinha and H.S. Tzou. The next TCVS meeting will take place in Sacramento, CA during the 16th Biennial Conference on Mechanical Vibration and Noise scheduled for September 14-17, 1997. The current officers of the committee are: Kon-Well Wang (Chair), Subhash Sinha (Vice-Chair) and Chin An Tan (Secretary). Those interested in the activities of TCVS should contact Professor Wang at kwwang@psu.edu.

Ali H. Nayfeh



Donald Bently



Subhash Sinha



H. S. Tzou



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'97 Mechanical Vibration and Noise Conference Takes Shape

**Lawrence A. Bergman, Ph.D.
and Subhash C. Sinha, Ph.D.**

Approximately 370 technical papers have been submitted for review to the 16th Biennial Conference on Mechanical Vibration and Noise, according to Professor Ben Yang, Technical Program Chair of the conference.

Technical papers will be spread over 21 symposia. In addition, keynote talks will be presented every day of the conference. Invited speakers will be Professors Jerry Ginsburg from Georgia Tech, Dan Mote from the University of California at Berkeley, and David Newland from Cambridge University.

A highlight of the conference will be the awards luncheon. The prestigious Den Hartog award, recognizing lifetime contributions to the teaching and/or practice of vibration engineering, will be presented to Ali H. Nayfeh of Virginia Tech. The equally prestigious Myklestad Award, recognizing major innovative contributions to vibration engineering, will be bestowed on Donald E. Bently of Bently Nevada Corp.

This conference constitutes one of the six conferences sponsored in association with the [1997 Design Engineering Technical Conferences](#).

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Liberty Receives the ASME-Triodyne Safety Award

The Design Division of the American Society of Mechanical Engineers (ASME) announces that the recipient of the 1997 ASME-Triodyne Safety Award is Dr. George Z. Liberty, a fellow of ASME. This award for outstanding contributions to teaching or research in the safety aspects of mechanical design was presented to Dr. Liberty at a reception in Chicago on the evening of March 10, 1997 at the residence of Professor R. Barnett.

Dr. G. Liberty, while an engineering student at the University of Technical Sciences in Budapest, joined Hungarian freedom fighters against the former Soviet Union. After the revolution was put down by the Soviet army, he and his wife escaped to Scotland. In 1959, he received his BS with honors in Mechanical Engineering from the University of Strathclyde. Dr. Liberty was awarded a Ph.D. in Mechanical Engineering from the University of Bristol in 1964. He received two Ford Foundation Scholarships to complete his studies.

In 1964 Dr. Liberty and his wife emigrated to the United States where he began his academic career at the University of Miami. In 1968 He joined the faculty of the Illinois Institute of Technology as an Associate Professor in Mechanical Engineering as well as the Director of the Fluid Power/High Pressure Engineering Laboratory.

In 1971 he was recruited by Ford Motor Company and worked in the Advanced Testing Methods Department and the Automotive Safety Office. While Dr. Liberty has retired from Ford, he remains active in the safety field as a consultant for Design and Manufacturing Defect Consultants. Dr. Liberty holds a US patent, has received from the Society of Automotive Engineers the R. R. Treator award as well as the F.R. McFarland award, is a fellow of ASME, a member of the Society of Experimental Stress Analysis and Sigma Xi. He has organized and chaired numerous technical sessions for ASME and SAE, was an instructor in society-sponsored short courses and has authored many technical papers.

Past recipients of the ASME-Triodyne Safety Award include: Professors John Grimaldi, Charles Smith, Thomas Talbot, and Mr. Jerome Lederer. Nominations are now open for the 1998 ASME-Triodyne Safety award and forms may be obtained from:

Dr. Ronald M. Wolosewicz, PE
5410 Country Club Drive
LaGrange, Illinois 60525
(708) 354-1172.

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DED Mourns Loss of Barkan

Philip Barkan, a very active contributor to the Design Division, died recently. Following is a memorial resolution

prepared by Professors Kos Ishii, Drew Nelson and Mark Cutkowsky for publication in the Stanford University paper "Campus Report".

Memorial Resolution

Philip Barkan

1925-1996

Philip Barkan, Professor Emeritus of Mechanical Engineering, died in Mountain View, California on June 21, 1996 at the age of 71. His distinguished engineering career spanned nearly fifty years, both in the private sector and in academia. He was internationally recognized as a "master design engineer" in high-speed machinery. More recently, he became internationally well-known for pioneering what is probably the first and most extensive graduate curriculum on design for manufacturability and the product design process.

Born in Boston, Phil earned his BS in Mechanical Engineering at Tufts University in 1946, an MS from the University of Michigan in 1948, and his Ph.D. from Pennsylvania State University in 1953. During his Ph.D. studies, he served at Penn. State as a Research Assistant, and later as an Assistant Professor of Engineering Research from 1948 to 1951. Phil also served in the US Navy while completing his Ph.D. In 1953, he was honorably discharged with the rank of Lt. (J.G.). His Ph.D. research provided the first successful dynamic simulation of the high-speed valve motions in internal combustion engines. This work led to Phil's reputation as an international expert on dynamic analysis and design of high-speed machinery.

Upon completing his Ph.D., Phil joined the General Electric Company (GE) and began his outstanding career with the company's Switchgear Equipment Business Division in Philadelphia. His areas of expertise covered electro-mechanical systems, dynamics of high-speed machinery, fluid mechanics, magneto-hydrodynamic applications, and electro-magnetic devices. He held various positions related to product design research and development and gained an international reputation in the area of circuit breaker design. He developed and was granted 53 US patents in related areas and was widely regarded throughout the company as one of their most outstanding mechanical engineers. In recognition of his considerable contributions he was awarded the first General Electric Charles P. Steinmetz Medal for technical excellence in 1973. These contributions included basic research on contact phenomena in switchgear, study of impact phenomena, development of high-speed mechanisms, investigation of arc interruption in oil circuit breakers, analysis of the dynamic behavior of transformer windings during short circuits, determination of failure modes in suspension insulators and bushings, and seismic analysis of electrical equipment. In 1964, Phil prepared an invited chapter on "Impact" phenomena for Mechanical Design and Systems Handbook, published by McGraw-Hill and widely used by mechanical engineers. Over 30 years later, his chapter is still so relevant that the publisher recently tried to contact Phil to request a revision.

His many important technical contributions in the field of circuit breakers also earned him the Fellow Grade of the Institute of Electrical and Electronic Engineers (IEEE) in 1972. He was also an active member of the American Society of Mechanical Engineers (ASME), the Society of Manufacturing Engineers and Sigma Xi. According to one of his former supervisors at GE, Phil was always assigned the most challenging tasks requiring a thorough knowledge of mechanical engineering fundamentals, analytical ability, creativity, and a practical viewpoint. His solutions to difficult problems were invariably innovative, usually simple in concept, cost effective, and most important of all, they were practical. Phil had a talent for quickly getting to the heart of any problem he investigated and was equally skilled at using analytical tools or experimental procedures to validate his solutions. In 1980 Phil was elected to the National Academy of Engineering (NAE) for his significant contributions to the field of mechanical engineering, and specifically his pioneering work on circuit breakers.

While at GE, he developed an interest in design education. In 1958, he organized and taught comprehensive review courses for GE mechanical engineers preparing for Pennsylvania State professional engineers license examination. In 1961, he taught to GE engineers a 20-week course on analysis and synthesis of high-speed mechanisms and circuit breakers.

Phil took a sabbatical leave from GE in 1971 and served as Visiting Professor of Mechanical Engineering at The Israel Institute of Technology. During this 14-month period, he completely revised and led the instruction of a major course that is compulsory for third-year mechanical engineering students. The course included both design theory and substantial projects of design practice. By all measures, from the students' view and that of the faculty, this was a highly successful course that replaced a seriously deficient prior course. He also taught an elective course for seniors and graduate students entitled "Analysis, Synthesis, and Design of Cam- actuated Systems." In recognition of his teaching contributions, the Board of Regents of the Israel Institute of Technology offered to appoint him as a senior Professor of Mechanical Engineering in 1973. This was particularly significant because no other full professors had ever been appointed in that area of the department.

From 1973, Phil served as Chairman of the ASME Design Education Committee. Under his leadership, this largely inactive national committee has become vigorous and productive. While he had intended to step down at the completion of a three-year term in office, he continued for another term in response to the urging of several educators on the committee. He remained active on the committee until his retirement in 1993 and brought in many practicing engineers to participate in the committee. A member he recruited in the 1970s is now a Vice President of ASME.

After an exhaustive national search, Stanford University offered Phil a full professor position in recognition of his impressive qualifications and accomplishments as a "master design engineer." He accepted the challenge and moved to the Design Division of the Mechanical Engineering Department at Stanford University in 1977. Phil saw very early, long before it was evident to most observers, that US industrial performance in design and manufacturing was beginning to deteriorate. Phil reasoned that to implement the changes that were necessary to get America back on track in manufacturing, he would be more successful in a university teaching environment.

After his highly successful years at GE, Phil started over again. At a time when many might begin to relax their efforts, or stay focused in their area of expertise, Phil continued to innovate and look for new challenges. He quickly responded to the Design Division's expectations by enhancing its graduate engineering design project curriculum. He brought in more industrial contacts, solicited companies to provide real life examples, and linked design theory and methodology with actual design project experience. His three-quarter course sequence ME210, was the most memorable experience for many of the masters students in the Design Division. In twelve years, over 500 students took Phil's ME210 course, many of them winning awards in the prestigious Lincoln Arc Welding Foundation Design Project Competition. ME210 entries were so strong in this national competition that they routinely won over half of the awards given, a tradition that continues today. His course has now been emulated at numerous other US universities.

Like all pioneers, he was ahead of his time, and it is only recently that the magnitude of his contribution to the field of design-for-manufacturability is becoming clear. After solidifying Stanford's excellence in design-oriented courses with close industrial interaction, he looked for more innovations in design education. Since 1985, he focused on the development of courses linking design to manufacturing and management issues. The US industrial enterprise has been in the process of a renaissance, and university engineering education likewise has been undergoing structural changes in values and in content. His determination, courage, and energy have been fundamental and pivotal in producing these changes. In 1985, he began collaborating with General Motors (GM) in developing a comprehensive graduate curriculum on design for manufacturability. He worked with Professor Mark Cutkosky in developing what is probably the first graduate course on this subject in the world. The course, whose original focus was "how to design products that were easy to manufacture," quickly expanded its focus. With Professor James Jucker's participation and further interest from GM, the curriculum grew into a three-quarter course sequence that addressed not only ease of manufacture, but overall product competitiveness and "World-class Product Design Process."

There were three major innovations in his curriculum for ME217, Design for Manufacturability. First was the expanded, more comprehensive definition of competitiveness. Most people associate competitiveness with performance and cost. Phil added another axis of competitiveness, "speed." Speed refers to time-to-market issues,

both in development time, and delivery time. Most industry experts now agree that for many products, speed is the most important ingredient. Phil argued that different industries and products demand a different mix of the three elements of competitiveness: performance, cost, and speed. Phil insisted that engineers need to thoroughly understand this mix before proceeding with design.

The second innovation was stressing the importance of product planning. Most practitioners and educators agreed that by the time design is completed, 80% of the product cost is committed, whereas only 20% has been actually expended on the project. Phil argued further that product profitability was determined even before design, at the stage of product planning. He named this stage of product development "product definition" and argued that 95% of product profitability was determined even before engineers started sketching conceptual designs. Phil firmly believed that the most critical element of product development is a clear understanding of the competitiveness ingredients and the product requirements.

The third innovation lies in the integrated use of formal design methodologies. In the past decade, many design researchers and educators have created various tools and formal design methodologies, often claiming their methods to be a panacea for every problem. Phil studied these methodologies carefully: Value Engineering, Quality Function Deployment, Functional Analysis, Design for Assembly, Failure Modes and Effects Analysis, Concept Generation and Selection, Taguchi Method for Robust Design, Conformance Quality, Six-Sigma Tolerancing, and many more. He then concluded that what people were missing was a systematic procedure in the integrated use of these methods and tools. Phil argued that a screw driver may be useful in many tasks, but is totally inadequate in building a house. One needs to strategically combine the use of all the tools in one's toolbox. His ME217 curriculum stresses how engineers can determine the need for the various tools and plan for strategic combination and timing of their use. A major difference between ME217 and other courses of its kind is that Phil did not allow students to "start designing" until the second quarter of the curriculum. He insisted that students thoroughly study the competitiveness issues and spend ample time and effort in clarifying "product definition" and setting strategy for the integrated use of different methods and tools.

ME217 embodies all three of Phil's innovations and the course has been enormously successful. Phil taught over 500 on-campus students through ME217 during 1986-1993. Perhaps more strikingly, ME217 was delivered through Stanford Instructional Television Network (SITN) to over 1000 students working for more than 20 companies during the same period. Many companies report tangible profit improvements through ME217. Students at Boeing applied Phil's principles to its 737 aircraft and saw millions of dollars of cost savings. The Dean of GM's Technical Education Program claims that GM has documented millions of dollars in savings that can be attributed directly to the lessons learned from this course. GM credits Phil and his ME217 course with "changing the way we think about design." By 1992, Phil was hailed by many companies as one of the leaders who helped change and improve the direction of US manufacturing. Behind Phil's success was his relentless zeal to make a direct impact on US industries through his course. He traveled monthly to the ME217 SITN sites in Detroit, Seattle, Rochester, and many other locations. By his frequent trips, Phil stayed completely in tune with industry needs and continually improved his curriculum. From 1993 until his death, he was a Member of the Board of Directors for the Xerox Design Excellence Institute.

Both his scholarship and teaching in design-for-manufacturability are world-class in quality and reflect extraordinary vision. It is truly remarkable that an individual with so many accomplishments in industry and after making a significant mark in university education, set out at the age of 60 to develop what we now recognize as a landmark design for manufacturability curriculum. In 1995, Phil passed on his successful design course sequence to one of his former doctoral students, Kosuke Ishii, now an Associate Professor at Stanford. Until his death, Phil remained active in improving the ME217 curriculum. Recent years have seen many universities adopt Phil's curriculum in developing design-for-manufacturability courses. In 1996, just before his death, students at General Motors voted ME217 the best distance learning course out of over 200 courses offered by GM's Technical Education Program. The current ME217 teaching staff attributes Phil's efforts during the past ten years as the major reason for Stanford winning this award.

For someone entering academia relatively late in his career, Phil was quite successful in delivering Ph.D. graduates to carry on his objectives. He attracted and successfully advised over ten Ph.D. graduates, many with similar qualities to his own—those who combined practical design experience with cutting edge theory and methodology. Phil led the design and manufacturing research community in guiding Ph.D. dissertations in advanced topics such as artificial intelligence in engineering design, high-speed machinery design-for-manufacturability, conceptual design-for-robustness, quality design and processing of plastic parts, and product definition. One dissertation he guided in 1992 on the topic of "quality-by-design" received nationwide attention and is now a company-wide initiative at his former employer General Electric. The 1993 paper he co-authored with Martin Hinckley, "The Benefits and Limitations of Structured Methodologies" appeared in ASME Manufacturing Review, Vol.6, No.3 and received national attention. In training Ph.D. students, Phil was always quite demanding and expected the best effort from his students. All of his students appreciate Phil's guidance and attribute their success to the high standards demanded by Phil. They all remember him as a "master design engineer." Three of his Ph.D. graduates entered academia and established strong design-for-manufacturability programs from coast to coast: San Jose State University, The Ohio State University, and University of Massachusetts Amherst. Others have successfully implemented Phil's methodology in government labs and industry. The philosophy Phil embodied in ME217 is alive and well and continues to grow. To his students and friends, Phil was a man of the highest integrity. He was honest, direct, and caring. Everyone around Phil remembers him for his genuine interest in his students' and friends' success.

Phil is survived by his wife Susan, daughter Ruth Barkan of Berkeley, son David and daughter-in-law Nancy Melrose of Forest Knolls, CA. Phil loved the outdoors and was an avid hiker. While at Stanford, Phil regularly went on strenuous backpacking trips in the Sierra. More recently, Phil and Susan enjoyed the outdoor landscape and natural history of the Bay Area foothills. Many of his friends will forever remember Phil's happy face during day hikes complaining about how he could never find a well-engineered backpack. He was a born design engineer, lived through several careers all with extraordinary accomplishments, and will forever be remembered as a true "master designer and educator."

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In Closing

Dan Segalman

Ed Feldy and I are stepping down as Design Division Newsletter editors and Tom Chase and Tom Libertiny are taking over. We want to thank our new editors for their willingness to take on this responsibility.

Occasionally, I have found extracting articles from potential contributors a tedious task. Meeting deadlines has also been difficult occasionally. Still this has been a delightful job.

It has been made delightful by the wonderful people I have dealt with. Among those wonderful people have been my co-editor, the officers of the Design Division, and the chairs of the technical and standing committees. Others, whose names should be mentioned, are: Dick Hirsch - who does so many tasks for the design division besides writing columns for the newsletter - and Fred Goldfarb who has been our staff contact with ASME.

Those readers who have written with suggestions, corrections, and contributions deserve our gratitude for steering the newsletter in new directions.

Let's hope that our new editors will find this as rewarding an experience as Ed and I have. Let's wish them the best of luck!!!

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Join ASME and its Design Division

You may fill out the relevant form on the ASME site at <http://www.asme.org/member/app.html>, you may email Mr. Fred Goldfarb at ASME staff (70544.3475@compuserve.com), or you may fill out and mail the following to have the appropriate forms sent to you.

Mr. Fred Goldfarb, ASME 345 E. 47th St., NY, NY 10017

From: _____ Date: _____

Affiliation: _____ Phone: _____

Address: _____

e-mail: _____

[..] I am an ASME member and wish to join the Design Division.

[..] I wish to join ASME and become a member of the Design Division.

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