

American Society of Biomechanics Newsletter

Vol. 8

June, 1995

No. 1

From the President

Phil Martin

I hope that everyone was able to meet the abstract deadline for the upcoming annual meeting and are making travel arrangements to Stanford. Gary Beaupré and his colleagues at Stanford are working hard as our hosts to ensure that we have a well organized and enjoyable meeting. Likewise, Keith Williams and representatives of the Program Committee are finalizing the scientific program. All preliminary indications suggest that it will be an excellent meeting.

In my remarks in the December 1994 ASB Newsletter I commented on two issues: financial developments in ASB and ASB's expanding outreach to other professional organizations. I would like to expand on these discussions related to ASB growth and development. By many objective measures, ASB has sustained regular growth during its existence. In the past decade, the number of members, annual income, annual expenditures, and total assets of the Society have all approximately tripled. At the close of 1994, ASB had 629 members and a closing balance of \$67,000. Programs within ASB have also gradually evolved and expanded. To recognize outstanding biomechanics scholarship, ASB annually presents the Borelli Award, the Post- and Pre-doctoral Young Scientist Awards, and the Clinical Biomechanics Award; and to encourage research collaboration among ASB colleagues, the Society established the Travel Fellowship. Tutorial lectures are now a regular feature of the annual meeting and are presented by some of our more senior and well recognized scholars for the benefit of the entire membership, but particularly so for our student members.

What is the point of this commentary? This brief summary highlights the evolution of ASB over the years. However, the growth of ASB also raises many questions about what we want the future impact of ASB to be. For example, how do we want to shape our interactions with other professional groups? ASB seems to be contacted with increasing frequency by colleagues in other organizations seeking our affiliation with, or support for, special projects or professional meetings. Do we want to encourage exchange between ASB members who share common research interests by promoting the establishment of work-

ing groups within the society? Many ASB members already participate in such groups through other organizations. As examples, the International Society of Biomechanics formally recognizes a Technical Group on Computer Simulation and a Working Group on Functional Footwear. Satellite symposia are routinely organized by individuals within these special groups in conjunction with the biennial meeting of ISB. What are our membership and fiscal goals? Questions pertaining to future directions of the Society have been part of the discussions of the Executive Board for many years. Perhaps this is an appropriate time, however, to formalize long range planning efforts within ASB and to readdress the mission of the Society. This has already been initiated with respect to the handling of ASB assets but the effort, in my opinion, needs to be extended to all aspects of the Society as we examine ways to manage our growth most effectively and maximize the impact of the Society on the field of biomechanics. I would very much like to hear your opinions regarding the need for long range planning efforts and on some of the more specific issues I raised above. Please consider sending me your comments (atpem @ asuvm.inre.asu.edu) in the next few months.

In closing I am pleased to note that the Executive Board voted at its mid-year meeting to award the 1996 annual meeting to Georgia Tech University. Congratulations to Bob Gregor, who will serve as Meeting Chair, and his colleagues in Atlanta. Finally, I would like to extend special

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From the President, cont.

appreciation to three individuals who are scheduled to rotate off the Executive Board at the Stanford meeting after providing extensive service to ASB: Tom Brown, ASB Past-President and former Chair of the Membership and Program committees; Mark Grabiner, Secretary-Treasurer; and Keith Williams, Program-Chair and former ASB Newsletter Editor. ASB cannot function effectively without the dedicated and quality service provided by individuals like these. I hope to see you all at Stanford.

From the Secretary/Treasurer

Mark Grabiner

This is my final Newsletter report as ASB Secretary-Treasurer and now, in retrospect, it is surprising how quickly the last three years have passed. It has been a pleasure to have served the Society during this period of growth and to have had the opportunity to interact personally with a large number of ASB members on the many individual issues that have kept me scurrying for much of the time. I complete my term as Secretary-Treasurer having demonstrated the (sometimes frightening) ability to match many ASB members with the specific patterns on their personal checks, an enhanced appreciation of just how bizarre accounting departments at large academic and health-care institutions can become, and a sense of wonder that keeping ASB's books and doing its taxes should be easier than my own. I wish my successor the best of luck and hope that I may be of as much assistance to him or her (*Don't forget to mail in your ballots everyone!!*) as my predecessor, Melissa Gross, was to me. And now the news... The American Society of Biomechanics is continuing its growth from a standpoint of its membership, the participation by its membership, and also financially. By the end of 1994, ASB's membership stood at 629, an increase of 8.6 percent from its 1993 roster. The increase was reasonably similar across membership categories and disciplines.

There has been a consistent growth in financial strength of the Society over the past several years. At the end of 1994, ASB's net worth was \$66,997.08. Generally, this

reflects the net financial efforts and guidance of the Executive Boards for 18 years. Specifically, to a large extent, this growth has been a function of extremely successful Annual Meetings over the past five years (including NACOB II). This continued trend of growth is a two-edged sword and has brought with it a number of emerging issues, not least of which is related to balancing the longterm financial goals of the Society with its new and planned programmatic objectives. One such objective, initiated at the University of Iowa meeting, consists of substantially subsidizing student attendance and involvement at the Annual Meeting.

During his term as President, and recently as Past-President, Tom Brown spearheaded the efforts of the Executive Board to develop a longterm financial plan. This plan was presented to the membership at the Business Meeting at OSU and was formalized in January. The general intent of the investment is to increase the interest revenues without incurring substantially larger investment risk. It is conservatively estimated that the revenues generated by these investments should exceed those previously generated by ASB's checking account. The most immediate difference between our present and previous financial profiles, but one that has little impact on the operation of the Society, is a reduction in liquid assets. At the upcoming Stanford meeting we will have the better part of a six month period on which the initial results of this plan can be reported at the Business Meeting.

From the President-Elect

Andy An

The Georgia Institute of Technology has been selected as the site for the 1996 Annual Meeting of the American Society of Biomechanics. Dr. Robert Gregor will serve as meeting Chairperson. The Executive Board welcomes receiving the proposal to host the 1997 ASB annual meeting. Anyone interested in hosting the 1997 meeting should please contact me for detailed procedures.



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Sustaining Members

The sustaining membership category is aimed at encouraging affiliation by commercial organizations that market products which are used by the biomechanics research community, or companies that are otherwise engaged in activities that fall within the Society's general interest areas. Each member contributes \$500 per annum to the Society. A significant benefit for companies is that the exhibitor's fee at the annual meeting is waived. We are happy to acknowledge and thank the following companies for their support as Sustaining Members:

Aircast

DePuy

Howmedica

Kistler Instrument

Motion Analysis Corporation

MTS Systems

Noraxon U.S.A

Orthofix, S.R.L.

Orthomet

Peak Performance Technologies

Zimmer

Don't Forget !!



Vote For President & Program Chair

We invite all members of the Society to suggest names of potential sustaining members. Please send your suggestions to Melissa Gross (Membership Committee Chairperson) at the address indicated on page 4 of this newsletter. If you have a particular contact person at the company, please make sure to include his/her name.

For Sale

For those of you who may be interested, there are extra copies of NACOB II abstract books, and the tote bags, available. Contact Mark Grabiner (his details are on page 4) about these or other ASB conference proceedings that you wish to purchase.

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1994-1995

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Membership Chair's Report

Melissa Gross

The Membership Committee continues to receive a growing number of applications for membership. A total of 120 applications were received in 1994, nearly 40% more than the previous year. The distribution of applications by membership type is remarkably stable, within a few percent of the 1993 distribution in each category. Typical of past years, most of the applicants are in the area of Engineering/Applied Physics (58%), followed by Exercise/Sport Sciences (15%), Health Sciences (12%), Ergonomics/Human Factors (9%), and Biological Sciences (6%). Students represented 38% of the total number of applicants. Membership activity is well under way for 1995, with over 40 individuals already applying in the first four months of the year.

Who serves on the Membership Committee? They are: (1) Melissa Gross, Chair, representing Exercise/Sport Sciences, (2) Scott Delp, representing Engineering/Applied Physics, (3) Claire Farley, representing Biological Sciences, (4) Irene McClay, representing Health Sciences, and (5) Mark Redfern, representing Ergonomics/Human Factors.

To continue the growth and vigor of the Society, the Membership Committee reminds you to encourage your colleagues and students to apply for membership.

We Need Your Contribution

Members are encouraged to contribute to the newsletter. A note, a letter to the editor, a lead on an interesting story, information about a scientific meeting, in fact anything of interest to the ASB membership, would all be most welcome. Send information scrawled in longhand, via e-mail, or on computer diskette (5.25" or 3.5") for IBM or Macintosh. Plain ASCII text files are preferred! If you have any other ideas, please get in touch. The next newsletter will be published in December, 1995. Deadline for submission of material is 15 November 1995!

Education Committee Chair

Jill McNitt-Gray

Biomechanics Graduate Program Database Accessible using Gopher

Basic information regarding graduate programs in biomechanics may be accessed using Gopher. Information includes the name, address, phone, email, and FAX of the program contact person, research areas, advisor/student ratio, availability of assistantships and names of affiliated departments. The current list of 55 graduate programs has been compiled from information provided by 1994 ASB annual meeting attendees, as well as the biomechanics program data base compiled by Julianne Abendroth-Smith of AAHPERD. To access the Index of Biomechanics Graduate Programs on USCgopher, select the following lists in sequence: Other Gopher and Information Servers, North America, USA, California, University of Southern California- USCgopher. From USCgopher, select the following lists: University Information, Academic Departments, Exercise Science, biomechanics. A pointer from the biomechanics home page on the World Wide Web is currently being created. If you would like to add or update information regarding your program, please contact Jill L. McNitt-Gray at 213-740-2492 or mcnitt@usc.edu.



International Symposium on Slip Resistance: *The Interaction of Man, Foot- wear, and Walking Surfaces*

The symposium will be held at the National Institute of Standards and Technology (NIST), Gaithersburg, Maryland on October 30-31, 1995.

The purpose of the symposium is to reduce "falling accidents" by calling on other disciplines to participate in the endeavor to increase our understanding of the complex interactions of the elements contributing to slips, trips, and stumbles, through the exchange of information by scientists and engineers in all fields concerned with human locomotion safety.

For more information, contact Symposium Chair:
Dr. Alex Sacher, Universal Petrochemicals, Inc.,
Algonquin Parkway, Whippany, NJ 07981
Tel: 201 887-8777 Fax: 201 887-8998

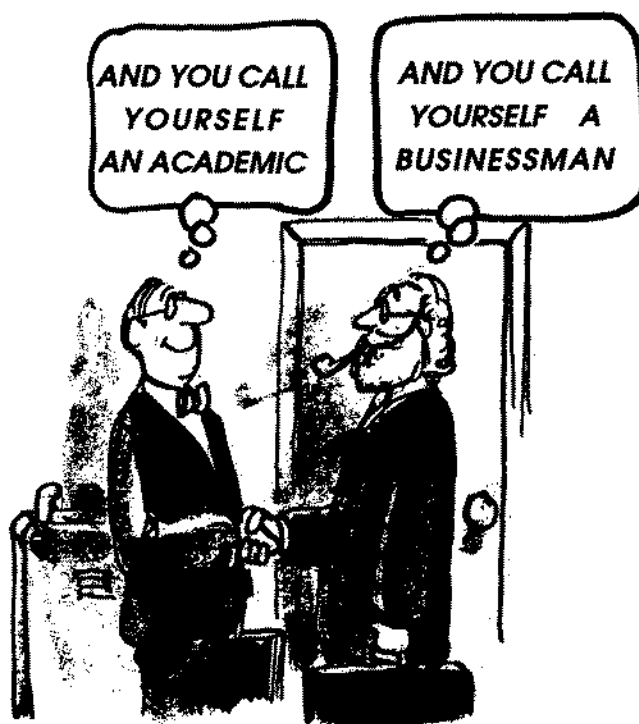
A View from the Academical Village

Kit Vaughan

The topic I have chosen for my editorial is the vexatious issue of the relationship between academia and industry. Is it symbiotic or antagonistic? What can universities, whose goal it is to seek the truth, expect from companies which must, of necessity, be concerned about profits and the bottom line? By the same token, what can companies expect from universities? Although we like to think that our profession of biomechanics is an ancient one, tracing our roots back to Aristotle and Leonardo Da Vinci, the emergence of companies specializing in biomechanical products is a more recent phenomenon which has occurred in the past three decades. I will explore some of these issues, highlighted by the accompanying cartoons (© *Chronicle for Higher Education*), in the following paragraphs.

A year ago, the Scripps Research Institute of La Jolla, CA, announced an agreement with Sandoz Pharmaceutical Corporation of East Hanover, NJ, that would have brought the institute \$30 million per year for 10 years (Agnew, 1994). In return, Sandoz would have received an option on most Scripps biomedical discoveries. There were howls of protest, with politicians charging that a foreign-dominated company would receive the fruits of NIH-funded research. The deal was renegotiated and the contracted scaled back to a "mere" \$20 million a year, with Scripps agreeing to allow small businesses better access to their technology and Sandoz agreeing to manufacture the products in the USA. In the end, all sides, including the American taxpayer, have benefited by the deal.

Much of the legal and political discussion that surrounded the Scripps-Sandoz brouhaha had its origins in the technology transfer legislation known as the 1980 Bayh-Dole Act. Subsequent legislation, known as CRADAs, which stands for Collaborative Research and Development Agreements, was authorized by the 1986 Federal Technology Transfer Act (Public Law 99-502), and encourages contracts between the NIH and industry (Rhein, 1994). Any scientist whose research is supported by the NIH is obliged to enter a CRADA if his or her findings lead to a commercially-viable product. While there have been



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some grumblings from both scientists (whose publications must be delayed) and companies (who think the NIH is gouging them), it would appear that in balance the process benefits all parties.

As some of you may recall from my first editorial in December 1992, Thomas Jefferson was the founder of the University of Virginia and designed our "academical village". Besides writing the Declaration of Independence, he was also instrumental in creating the U.S. Patent Office in the late 18th century. Patents are, of course, a common meeting point for universities and industrial companies. Almost without exception, companies require new employees to sign a contract waiving their patent rights and assigning these to the company. In contrast, universities tend to be far more generous, offering faculty, students and staff a percentage of the royalties. One institution with which I am familiar is exceedingly generous, giving the individual 50%. In 1987 an invention related to artificial implants and bone cement provided \$375,000 to the faculty member! Most people would agree that is quite an incentive for university employees to seek patent protection. However, it does create a clear conflict of interest. Under US patent law, the inventor must apply for a patent

within one year of publishing the results (in other countries you automatically forfeit your rights to the invention if you publish before submission). As all serious academics would acknowledge, the life blood of science is the free, open and unfettered exchange of ideas and information (Charrow, 1995). Despite these conflicts of interest, I believe that with careful thought it is possible for both universities and companies to benefit financially from their employees' inventions and still uphold the tradition of timeous reporting of their findings.

Many of you will have heard "scientific" presentations at national meetings, or perhaps even read a paper in a peer-reviewed journal, that constitute a thinly-disguised commercial for some product. The field of orthopaedics, where every surgeon always seems to have an idea for a new hip joint, was particularly hard hit by this practice. Clinical studies, of short-term duration and dubious validity, were routinely published. The potential financial benefits -- to both academics and companies -- were huge and the temptation to play fast and loose with facts (not to mention patients' lives!) was great. It is therefore not surprising that the flagship orthopaedic publication, *The Journal of Bone and Joint Surgery*,



"The R&D Dept. saved us 25% of our operating expenses last year. We could save an additional 25% by eliminating the R&D Dept. this year"

(©. Chronicle for Higher Education)

instituted a conflict-of-interest policy: authors must state if they will derive any financial benefits, either directly or indirectly, related to the subject of the article. This has been a healthy trend for the field, ensuring that all parties understand the implications.

The Professor-entrepreneur is now a relatively common player in the biomechanics community. How should we judge such a person? I believe that he or she can make a significant contribution to our field, and particularly to the symbiotic relationship between academia and industry. In this era of tightening federal budgets, it is imperative for universities and companies to pool their resources, but still uphold the very best traditions of scholarship and business.

References

- Agnew B (1994) *Journal of NIH Research*, 6(7):38.
- Charrow RP (1995) *Journal of NIH Research*, 7(4):90-92.
- Rhein R (1994) *Journal of NIH Research*, 6(8):45-46.



"You have to make a basic decision: What means more to you, your glowworm research or Star Wars?"

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Calendar of Events

1-3 June 1995

2nd Annual North American Clinical Gait Laboratory Conference; Waterloo, Ontario, CA; Betty Bax, Department of Kinesiology, University of Waterloo, 200 University Ave. W., Waterloo, ON N2L 9Z9; Tel. 519-885-1211, ext. 2610; bax@healthy.uwaterloo.ca

3-7 June 1995

Canadian Orthopaedic Research Society; Halifax, Nova Scotia, CA; Robert B. Bourne, M.D., FRCSC, Canadian Orthopaedic Research Society, 1440 O. Ste-Catherine W., Suite 421, Montreal, Quebec H3G 1R8; Tel. 514-874-9003.

17-22 June, 1995

Biomechanics & Neural Control of Movement IX: Neural-Mechanical Control: Interaction Between Neural Circuits and Biomechanics; Deer Creek Resort and Conference Center, Mt. Sterling, Ohio; Engineering Foundation, 345 East 47th Street, New York, NY 10017; Tel. 212-705-7836 Fax: 1-212-705-7441 E-mail: engfnd@aol.com

18-23 June 1995

International Meeting of ASAE; Chicago, IL; Timothy L. Foutz, Ph.D.; Biological and Agricultural Engineering; Driftmier Engineering Center; The University of Georgia; Athens, GA 30602; Tel: 706-542-0868 FAX: 706-542-8806; tfoutz@gamma.bae.uga.edu.

21-23 June 1995

BIOMED '95: 3rd International Conference, Simulations in Biomedicine (Organized by the Wessex Institute of Technology); Palazzo delle Stelline, Milan, Italy; Jane Evans, Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton, SO40 7AA UK; Tel: 44 (0)703 293223 FAX: (0)703 292853; CMI@ib.rl.ac.uk

28 June - 2 July 1995

ASME Summer Bioengineering Conference; Beaver Creek, CO; Kathy Vickers, Dept of Mechanical Engineering and Materials Science, Box 90300, Duke University, Durham, NC 27708; Tel: 919-660-5309, -5310 FAX: 919-660-8963; kvickers@acpub.duke.edu.

28-30 June 1995

ISB Working Group on Functional Footwear: Biomechanics of Functional Footwear Symposium; Cologne, Germany; Dr. Axel Knicker, German Sports University Cologne, Institute for Athletics and Gymnastics, Carl Diem

Weg 6, 50927 Cologne, Germany; Fax +49 221 4973 454 or email: turn_knick@rz.dshs.uni-koeln.de

30-31 June 1995

Vth International Symposium on Computer Simulation in Biomechanics; Jyväskylä, Finland; Vth International Symposium on Computer Simulation in Biomechanics, Dr. Erkki Laitinen, Laboratory of Scientific Computing, University of Jyväskylä, P.O. Box 35, FIN-40351 Jyväskylä, Finland; Tel. +358 41 602745 Fax. +358 41 602731; biomech@math.jyu.fi.

2-6 July 1995

XVth Congress of the International Society of Biomechanics; Jyväskylä, Finland. XVth ISB Congress; Jyväskylä Congresses; P.O. Box 35; FIN -40351 Jyväskylä; FINLAND Tel. +358 41 603 664 FAX. +358 41 603 621 tvanttin@jyu.fi

18-22 July 1995

13th Annual International Biomechanics Symposium for Biomechanics in Sport; Thunder Bay, Ontario, CA; ISBS Conference Centre, School of Kinesiology, Lakehead University, Thunder Bay, Ontario, CA P7B5E1 -ortony.bauer@lakeheadu.ca

23-28 July 1995

Biorheology and Clinical Hemorheology, Big Sky, MT; Dr. Giles Cokelet, Dept of Biophysics, University of Rochester, 601 Elmwood Ave, Rochester, NY 14642; Tel. 716-275-5283 Fax. 716-275-6007; E-mail: cokelet@micro.biophysics.rochester.edu.

2-5 Aug 1995

Portland Bone Symposium 1995; Portland, OR; Continuing Medical Education, L602, Oregon Health Sciences University, 3181 SW Sam Jackson Park Road, Portland, OR 97201; Tel. 800-452-1048 or 503-494-4898 FAX. 503-494-3400.

19-22 Aug 1995

2nd International Conference on Cellular Engineering, IFMBE, La Jolla, CA; Robert M. Nerem, Ph.D., Bioengineering Center, Georgia Institute of Technology, Atlanta, GA 30332; FAX. 404-894-2291.

24-26 Aug 1995

19th Annual Meeting of the American Society of Biomechanics; Stanford University, Stanford, CA; Gary Beaupré, Ph.D., Rehabilitation R&D Center (153), VA Medical Center, Palo Alto, CA 94304; Tel. 415-493-5000 ext. 4272 FAX. 415-493-4919; 95asb@bones.stanford.edu

10-11 Sep 1995

International Hand and Wrist Biomechanics Symposium; San Francisco, CA; Kai-Nan An, Ph.D., Department of Orthopaedics, Biomechanics Laboratory, Mayo Clinic, 200 First Street S.W., Rochester, MN 55905; FAX. 507-284-5342.

2-5 Oct 1995

International Congress on Exercise & Sports Medicine; Birmingham, UK; Neil Odell, International Congress on Exercise & Sports Medicine, Gardiner-Caldwell Communications Ltd, The Old Ribbon Mill, Pitt Street, Macclesfield, Cheshire SK11 7PT, UK; Tel. +44(0)1625 615325/618507 FAX. +44(0)1625 616563.

6-9 Oct 1995

Biomedical Engineering Society; Boston, MA; Kate Straus, 45 Avon Road, Wellesley, MA; Tel. 617-237-2277 E-mail: bmes95@aol.com.

27-28 Oct 1995

International Conference on Clinical Movement Analysis: 4th Annual Meeting of the European Society for Movement Analysis in Children; Best Western DISH Hotel, Enschede, The Netherlands; ir. Rob Kleissen and prof. dr. Gerald Zilvold, Roessingh Research and Development b.v., ACON Convention services; Tel. (+).31.53.335800 Fax: (+).31.53.341219 e-mail: rrd@euronet.nl

30-31 Oct 1995

International Symposium on Slip Resistance: The Interaction of Man, Footwear and Walking Surfaces; National Institute of Standards and Technology - Gaithersburg MD; Dr. Alex Sacher, Universal Petrochemicals Inc., Algonquin Parkway, Whippany, NJ 07981 Tel. 201-887-8777 Fax. 201-887-8998.

6-8 Nov 1995

2nd Combined Meeting of the Orthopaedic Research Societies of USA, Japan, Canada and Europe; San Diego, CA; Sheril King, Orthopaedic Research Society, 6300 N. River Road, Suite 727, Rosemont, IL 60018; Tel. 708-698-1625 FAX. 708-823-0536.

9-11 Nov 1995

2nd Interdisciplinary World Congress on Low Back Pain: The Integrated Function of the Lumbar Spine and Sacroiliac Joints; La Jolla, CA; University of California at San Diego, Office of Continuing Medical Education, 9500 Gilman Drive 0617, La Jolla, California 92093-0617. Tel. 619-534 3940. Fax. 619-534-7672.

30 Nov - 1 Dec, 1995

Computer Assisted Orthopaedic Surgery Symposium; Bern, Switzerland; CAOS- Secretary, M.E. Mueller Institute for Biomechanics, P.O. Box 30, CH-3010 Bern, Switzerland; Tel. +41-31-632-8722 Fax +41-31-632-4951 e-mail caos@mem.unibe.ch

4-6 Dec, 1995

International Conference on Pelvic and Lower Extremity Injuries; Washington, DC; Sponsored by the National Highway Traffic Safety Administration (NHTSA), U.S. Department of Transportation; Dr. Michael Kleinberger, National Highway Traffic Safety Administration, Office of Crashworthiness Research, Biomechanics Research Division, 400 Seventh Street, SW, Washington, DC 20590; Tel. 202-366-4698 Fax. 202-366-5670 E-mail: mkleinberger@nhtsa.dot.gov.

20-23 May 1996

3rd International Workshop on Animal Locomotion; National Equestrian School of Saumur - Saumur, France; Secretariat of IWAL3 - E. Barrey, INRA, SGQA, 78352 JOUY-EN-JOSAS CEDEX, France; Fax. + 33 1 34 65 22 10 E-mail: ugeneba@dgal.jouy.inra.fr; Deadline for abstract submission the 30th October 1995.

1-5 July 1996

9th International Conference on Mechanics in Medicine and Biology; Ljubljana, Slovenia; ICMMB 96, A. Kregar, Cankarjev dom, Cultural and Congress Centre, Presernova 10, 61000 Ljubljana, Slovenia; Tel.: +386 61 223 988, Fax: +386 61 217 431 e-mail: icmmb@robo.fer.uni-lj.si; Submission of final camera-ready papers: February 1, 1996

21-26 July 1996

Bioartificial Organs Science and Technology; Nashville, Tennessee; Engineering Foundation, 345 East 47th Street, New York, NY 10017; Tel. 212-705-7836 Fax. 212-705-7441 - mail: engfnd@aol.com

28-31 Aug 1996

10th Conference of the European Society of Biomechanics; Leuven, Belgium; 10th Conference of the European Society of Biomechanics, Katholieke Universiteit Leuven, Division of Biomechanics and Engineering Design, Dr. J. Vander Sloten, Celestijnenlaan 200A, B-3001, Heverlee (Belgium); Tel. +321 632 7096 FAX. +321 629 2716; email: jos.vandersloten@mech.juleuven.ac.be.

Job Opportunities in Biomechanics

DOCTORAL POSITIONS

Doctoral Research Assistantship in Motor Development Research focusing on the effects of treadmill stepping practice on the onset and quality of walking patterns in infants with Down syndrome. Dr. Beverly Ulrich; Dept of Kinesiology; Indiana Univ; Bloomington, IN 47405. 812-855-0166 UlrichB@indiana.edu

Doctoral Research Opportunity Finite element modeling of soft tissues and dynamic interface mechanics between the residual BK limb and the socket wall. Joan Sanders, PhD; Centre for Bioengineering, FL-20; Univ of Washington; Seattle, WA 98195. 206-685-8296 fax: 206-543-6124 sanders@Limbs.bioeng.washington.edu

Biomechanics Research Group Leader Doctorate with expertise in clinical biomechanics; experience in spine biomechanics desirable. Limited tenure of 2-3 years/no teaching responsibilities. Lutz-P. Nolte, PhD; Maurice E. Mueller Institute for Biomechanics; P.O. Box 30; 3010 Bern; Switzerland. +41-31-632-8722 fax: +41-31-632-4951 nolte@mem.unibe.ch <http://cranium.unibe.ch/>

Post-Doctoral Position Research in geriatric biomechanics with emphasis on studies of falls and mobility impairments. Experience with dynamics, control systems and instrumentation desirable. James A. Ashton-Miller, PhD; Dept of Mechanical Engineering and Applied Mechanics; Univ of Michigan; Ann Arbor MI 48109-2125. 313-763-2320 fax: 313-763-9332

Doctoral Student Positions in Posture Graduate student fellowships for Fall 1995 are available for doctoral students to conduct research in biomechanics of posture and elderly falls. Ge Wu, PhD, Center for Locomotion Studies, The Pennsylvania State University, University Park, PA 16802, gwu@ecl.psu.edu.

RESEARCH POSITION

Biomechanics/Orthopaedic Research BS or MS in Mechanical Engineering or related fields with laboratory experience in soft tissue and joint testing. J.J. Crisco, PhD; Director Bioengineering Laboratory; Orthopaedic Research, SWP-3; Rhode Island Hospital; 593 Eddy Street; Providence, RI 02903.

FACULTY POSITIONS

Research/Lecturer in Biomechanics to direct a productive independent research laboratory, secure external funding and teach biomechanics in our undergraduate and graduate programs. Tenure track, academic year appointment at assistant, associate or professor rank. Harold Burton, PhD. Dept. of Physical Therapy & Exercise Science, 405 Kimball Tower, SUNY at Buffalo, Buffalo, NY 14214.

Lecturer in Biomechanics to teach under- and post-graduate courses and contribute to Research Methods and Information Technology modules. Dr V. Baltzopoulos; Dept of Movement Science; Univ of Liverpool; Liverpool L69 3BX; U.K. +44 151 794 3223 fax: +44 151 794 3229 baltz@liverpool.ac.uk

Biomedical Engineering Assistant Professor, tenure track, to teach undergraduate and graduate courses and to develop productive research program, with preference for rehabilitation engineering. Search Committee; Biomedical Engineering; Catholic Univ of America; Cardinal Station; Washington, D.C. 20064. winters@pluto.ec.cua.edu.

Biomechanical Engineers PhD or MS with demonstrated capabilities in the areas of analytical, computational, and experimental mechanics. Experience in the field of injury biomechanics desirable. Tara Khatua, PhD, PE; Failure Analysis Associates; 149 Commonwealth Drive; Menlo Park, CA 94025. 415-688-7150 fax: 415-326-8072 kha@fail.com

Spine Biomechanics Asst/Assoc Prof level. Pursue independent research plus teaching/supervision of undergrad and graduate engineering students. Savio L-Y Woo, PhD; Ferguson Professor and Vice-Chair for Research; Dept of Orthopaedic Surgery; Univ of Pittsburgh; Suite 1010 Liliane Kaufmann Bldg, 3471 Fifth Avenue; Pittsburgh, PA 15213.

Sports Biomechanics Asst Prof level. Teach & advise undergrad phys. ed. & sport science majors and grad (M.S.) students in exer. science. Ph.D. (or near completion) in sport biomechanics, college teaching experience in biomech. highly desired. Contact Dr. Jon Nelson (906) 227-1113 or Jonelson@nmu.edu.

OTHER POSITIONS

Technical Support Engineer. Applicants must have a technical BS or MS degree, solid working knowledge of PC's, MS-DOS, MS-Windows as well as statistics and spreadsheet software. Experience in the fields of Biomechanics, Sports Science, PT, Human Factors or Behavioral Science. TSE-B, Peak Performance Technologies, 7388 S. Revere Parkway, Suite 601, Englewood, Colorado 80112, 76244.3047@CompuServe.com.

Gait Lab Director - M.S. or PhD preferred. Responsible for analysis of Cerebral Palsy patients, adult neurological and sports related injuries. Work in collaboration with orthopaedic surgeons and PM&R physicians. Research and clinical orientation preferred. Contact: Ron Stone, Director, Santa Rosa Outpatient Rehabilitation, 4319 Medical Drive, San Antonio, TX, Phone: 210-616-6560.



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GEO-CENTERS, INC., a high-technology, research and development firm has an opening for a Master's level Biomechanist to work at our Natick, MA location. Qualified applicants will have an M.S. degree in Biomechanics, Mechanical Engineering, or a related Human Movement Science discipline. The successful applicant will have experience including 3D video motion analysis; ground reaction force plates; and human movement analysis-software development. A thorough understanding of human anatomy, physiology and biostatistics is required. Responsibilities will include conception and implementation of innovative research designs, participation in collaborative research projects, and collection and analysis of biomechanical data.

The GEO-CENTERS, INC. Biomechanics Group supports the Center for Military Biomechanics Research and the U.S. Army Natick Research, Development, and Engineering Center in Natick, Massachusetts. The Biomechanics Program conducts basic and applied human movement research to support the ergonomic design and sizing of personal protective clothing, equipment, and workstation/crewstation geometries.

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ASB Newsletter



BIOENGINEERING ALLIANCE OF SOUTH CAROLINA

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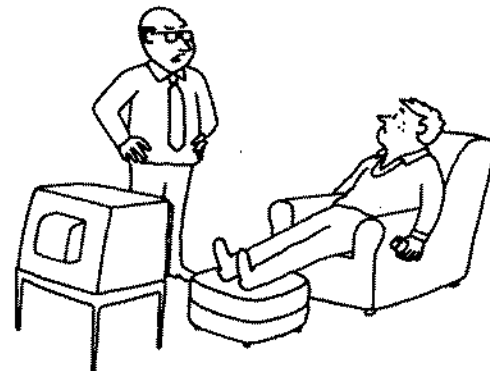
The Department of Bioengineering, Clemson University invites applications and nominations for the position of Director, Bioengineering Alliance of South Carolina.

The Bioengineering Alliance of South Carolina is a structured effort between Clemson University, the University of South Carolina and the Medical University of South Carolina. The mission of the Alliance is to foster and promote collaborative bioengineering research and teaching in South Carolina and to generate external funding for these efforts. The Director of the Alliance holds a tenure track appointment in the Bioengineering Department at Clemson University.

The ideal candidate will be an experienced researcher with a demonstrated record of extramural funding and collaborative research, and is expected to teach courses and supervise graduate research in Bioengineering. We anticipate filling the position at the Associate Professor level or higher. Review of applications will begin June 1, 1995, and will continue until the position is filled.

To apply, please send your curriculum vitae and the names, addresses and telephone numbers of at least three references to Vasanti M. Gharpuray, Chair, BASC Director Search Committee, Department of Bioengineering, Clemson University, Clemson, SC 29634-0905. Tel: (803) 656-5555 Fax: (803) 656-4466 e-mail: vasanti@eng.clemson.edu

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NOTE: Applicants are strongly encouraged to contact the listing individual/institution directly to determine current status and obtain additional information.

Book Reviews

Kit Vaughan

Gait Analysis. Theory and Application edited by Rebecca L. Craik and Carol A. Oatis, Mosby, St. Louis, MO, 1995. 471 pp., 190 illustrations, cloth, \$41.95.

The editors, both physical therapists on faculty at Beaver College in Pennsylvania, have set up a design for their text which cuts across disciplinary boundaries. They have assembled over 40 contributing authors from diverse backgrounds: psychology, mechanical engineering, motor control, physical education, rehabilitation medicine, podiatry, neuroscience, and physical therapy. Their aim is to stimulate and facilitate discussion. Only time will tell if they succeed in this endeavor, but I am confident their book will be a useful adjunct to the many texts on human gait analysis that have appeared in the past few years. The book is divided into four parts. Part I, entitled *Case Report*, introduces an unusual walking pattern of a toddler. Four different conceptual frameworks -- a biomechanical perspective, a neural control perspective, a motor learning perspective, and a dynamical systems perspective -- are described and applied to the child's gait. These brief introductions are extended in Part II, entitled

Conceptual Frameworks for Ambulation, where four separate models -- mathematical, neurophysiological, motor learning, and dynamical systems theory -- are explored in greater detail. In Part III, the *Theory, Technology and Normative Data* of human gait are described. Topics include reliability, observational gait analysis, temporal-distance factors, kinematics, kinetics (including force plates, joint moments and powers), and electromyographic theory, methodology and interpretation. Finally, Part IV covers *Applications*, where the chapters address a broad range of subjects: goals of gait assessment; standards; locomotor recovery after stroke; functional electrical stimulation; anterior cruciate ligament injury; foot and ankle function in children; running injuries; head injury; gait training; and mobility problems in the elderly. Although it is the editors' intent to introduce diversity, there is also a danger when producing a textbook with multiple authors that the chapters will have a different "look and feel". This is particularly evident when contrasting the chapter on kinematics theory, which makes extensive use of vector algebra and matrices (total of 96 equations and 14 figures introduced) with the previous chapter on spatial-temporal characteristics of foot fall patterns, where there are no equations or figures. Many of the chapters are literature reviews, very often emphasizing the authors' own research, and this is obviously to be expected. One chapter that I



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particularly enjoyed, on the neurophysiology of human locomotion, was extraordinarily well-researched, citing over 100 papers. The author, Charles Leonard of Montana, set about asking fundamental questions, such as: Is human locomotion innate or learned? What is the evidence for the existence of central pattern generators in humans? Are data from invertebrate studies relevant to humans? The editors of *Gait Analysis Theory and Application* have done extremely well to assemble such a diverse group of authors. It is fitting that they have dedicated their text to the memory of Mary Pat Murray, one of the pioneers of the multidisciplinary approach to human locomotion.

Basic Biomechanics (second edition) by Susan J. Hall, Mosby, St. Louis, MO, 1995. 533 pp., 824 illustrations, cloth, \$49.95.

The Biomechanics Academy of the American Association for Health, Physical Education, Recreation and Dance (AAHPERD) recommends that under-graduate students devote approximately one-third to anatomical considerations, one-third to mechanical considerations and the remainder to applications. Susan Hall of California State University in Northridge, California has followed these guidelines in her text with an integrated approach. The first three chapters introduce the student of human movement to biomechanical concepts, including kinematics and kinetics. The following six chapters emphasize anatomy, covering bone growth and development, skeletal articulations, skeletal muscle, the upper and lower extremities and the spine. The final six chapters then follow a traditional layout: linear and angular kinematics, linear kinetics, equilibrium, angular kinetics, and human movement in a fluid medium. A real strength are the worked problems, sprinkled liberally throughout the text, as well as the problem sets (many with numerical answers) at the end of each chapter. A further strength is the instructor's manual which includes pedagogical materials, problem solutions, and a bank of test questions corresponding to each chapter. Also included are 100 overhead transparencies displaying selected illustrations and sample problems. I used *Basic Biomechanics* as the required textbook for an undergraduate course in Kinesiology that I taught this year and last. I was pleased with the text but I would caution instructors that a few of the multiple choice questions in the instructor's manual are far too ambiguous which led to a few unhappy students! This minor concern notwithstanding, I would certainly recommend the text to anyone faced with the challenge of introducing biomechanics to tomorrow's generation of physical therapists, coaches, athletic trainers and physical educators.

Biomechanical Basis of Human Movement by Joseph Hamill and Kathleen M. Knutzen, Williams and Wilkins, Media, PA, 1995. 532 pp., 406 illustrations, cloth, \$49.95.

Joe Hamill, of the University of Massachusetts, and Kathleen Knutzen, of Western Washington University, have put to-

gether a textbook for undergraduate students in exercise science that is visually very appealing. While it is an introduction to biomechanics, they have emphasized the quantitative rather than qualitative nature of human movement. Their goal is to integrate basic anatomy, physics, calculus and physiology and I believe they have succeeded admirably. Their layout follows the AAHPERD guidelines, with the organization based on three major sections: Part I - Foundations of Human Movement; Part II -- Functional Anatomy; and Part III -- Mechanical Analysis of Human Motion. There are 12 chapters which all have a similar layout: subject headings, student objectives, the chapter itself, review questions, additional questions, references, and a detailed glossary. It is obvious that a great deal of thought and effort went into the creation of this textbook. It has a superb collection of illustrations (among the very best that I have seen in a biomechanics book), the mechanics is both rigorous and comprehensive, and I have no hesitation in stating that *Biomechanical Basis of Human Movement* by Hamill and Knutzen will become a very successful text for advanced-level undergraduates.

Biomechanics of Human Movement (second edition) by Marlene J. Adrian and John M. Cooper, Brown & Benchmark, Madison, WI, 1995. 572 pp., 361 illustrations, cloth, \$50.95.

As with the two previous books reviewed, this text is also aimed at the undergraduate student in physical education and sports science. The authors, Marlene Adrian of the University of Illinois at Urbana-Champaign and John Cooper of Indiana University, Professors Emerita and Emeritus respectively, have invited 23 of their colleagues as contributors to this second edition. There is a strong emphasis on qualitative analysis with very sparing use of mathematical equations. The book is divided into six parts: basic biomechanical concepts; tools for human movement analysis; movements across the entire spectrum of life; sports movements on land; sports movements in air, ice, snow and water environments; and the future. The quality of the chapters in the latter three parts tends to be very variable, which is to be expected when a large group of contributors is assembled. As an example, the chapter on swimming is extremely comprehensive, well-referenced and nicely illustrated. In contrast, the chapter on cycling is superficial, the author cites his own (mostly) unpublished findings and ignores the substantial body of research emanating from the University of California at Davis over the past decade. I was also surprised to see the illustration of long jumping from Geoff Dyson's *The Mechanics of Athletics* reproduced on page 321 without acknowledgement. While *Biomechanics of Human Movement* by Adrian and Cooper will no doubt find a home in some departments of kinesiology and physical education, I am much less enthusiastic about its biomechanical rigor than the two previous books reviewed.

Students' Corner

Michael Torry

At the midyear meeting, the Executive Committee discussed many details concerning the operations of the Board and its subsequent committees. Much debate centered around the financial aspects of the Society and the best methods to utilize/invest the funds to improve the standing of the Society as a whole. Dr. Gary Beaupré presented a tentative itinerary for the 1995 Annual Meeting at Stanford. Dr. Beaupré and co-sponsors have put together an exceptional program consisting of tours of NASA, a wine and cheese poster session, and a wide variety of keynote lectures. In addition, the ASB is also sponsoring a student luncheon for all paid student-members to help promote student involvement (and curb costs!). I am currently seeking out speakers to talk to us about biomechanics in academia and in the industry settings during the luncheon. So make a note of its date and time and I'll see you there.

So what have I been doing as Student Rep? I have been trying to organize "mini" symposiums across the country to help promote professional development in students affiliated with biomechanics. Typically these symposiums are one day events, and have consisted entirely of graduate student presentations. Topics have varied, and have ranged from independent studies, thesis/dissertations, or even thesis/dissertation pilot work and/or proposals. The main influence of these symposiums is to facilitate student-faculty involvement in a research atmosphere encouraged by the ASB, and to provide a "springboard" into larger arenas of research reporting. In addition, as money for travel becomes tighter throughout the educational realm, these symposiums offer affordable and effective means of professional growth for both students and faculty. I would like to congratulate Dr. Carol Widule and her staff at Purdue University which hosted the Tenth Annual Midwest Graduate Student Biomechanics Symposium this past March. Their commitment to educational quality is to be commended. Next year's Midwest Symposium is to be hosted by Dr. Alfred Finch at Indiana State University, and those interested are urged to contact him.

Lastly, the Student Representative to the ASB is an elected position for a term of one year. The responsibilities include attending the annual and midyear meetings (financial assistance available if needed), and to express the students' concerns to the Executive Committee. Becoming student rep provides an avenue for interacting with top people in biomechanics. Elections for the position will be held at the 1995 Annual meeting at Stanford. I urge anyone interested in running for the position to contact me by e-mail (biomechl@siucvmb.siu.edu).

As always, if you know of anyone interested in becoming a part of the ASB, ask them to contact me. I will be glad to assist in anyway I can.

See you at Stanford!

Fourth International Symposium of 3-D Analysis of Human Movement, July 1-3, 1996 Grenoble, France

The International Symposium on 3-D Analysis of Human Movement is a scientific and technical forum for investigators of human motion, whether their work is applied to the study of musculo-skeletal disability of disease, sport and elite performance, or basic studies of biomechanics. By generating further communication and contact between investigators in diverse areas, this meeting encourages discussions to cross the boundaries between scientific disciplines and specialties. The Symposium will be directed at sharing information and results relating to philosophies for solving problems of measurement and analysis, rather than only delivering recent research study findings.

THEMES

Data capture: New instrumentation, and specific hardware, accuracy and precision of various reconstruction techniques, interpolation and calibration, lens distortion correction, etc. Joint motion: Location of markers, relation between external reference markers and joint movements, definition of local and global coordinate systems. Modelling: 3-D kinematic and kinetic/dynamic joint models, finite element techniques, estimation of internal forces, model validation and sensitivity analysis. 3-D Representation: Computer-aided graphic techniques, animations, simulation, and virtual reality applied to human movement. 3-D Applications and interpretation: 3-D variables used in the analysis of human movement and their relation to conventional 2-D parameters.

SUBMISSION

The four-page manuscript is intended to be a complete mini-paper with figures and references. Each submission is to represent original work that has not been reported elsewhere. The paper may report significant results of current pilot studies that may be leading to a journal publication, and as such we do not claim any copyright privileges.

All papers are to be up to FOUR 8 1/2" by 11" or A4 pages in length. Title of paper, in capital letters, must be centred on the first page at about 2cm from the top. The character must be of 10 points Times type or equivalent and single spaced. This is an example. Name of author and co-authors, affiliation and address should be beneath each name, leaving a line in between. The text is to be written at about 7cm from the top of the first page and 2.5cm on the others. It must be within two columns 8cm wide and separated by

a 1.5cm space leaving an equal margin on each side. Indent beginning of each paragraph by 4 spaces. Text must be justified to use maximum column width. Text ends 2.5cm from the bottom. Left justify and underline each heading in the column and use capital letters with one space above each heading. Figures may be full width if necessary. SI units are to be employed. The manuscript will be reproduced exactly as submitted so new black ribbon or laser quality are best.

Send the original and Three copies of the manuscript to Professor Jean-Pierre Blanchi, Grenoble, France. It must be postmarked before March 15th, 1996. The manuscript will be published in the proceedings of the Symposium.

DEADLINES

Abstract submission: March 1st, 1996

Notification to authors: May 1st, 1996

Early bird registration: May 15th, 1996

SYMPOSIUM REGISTRATION

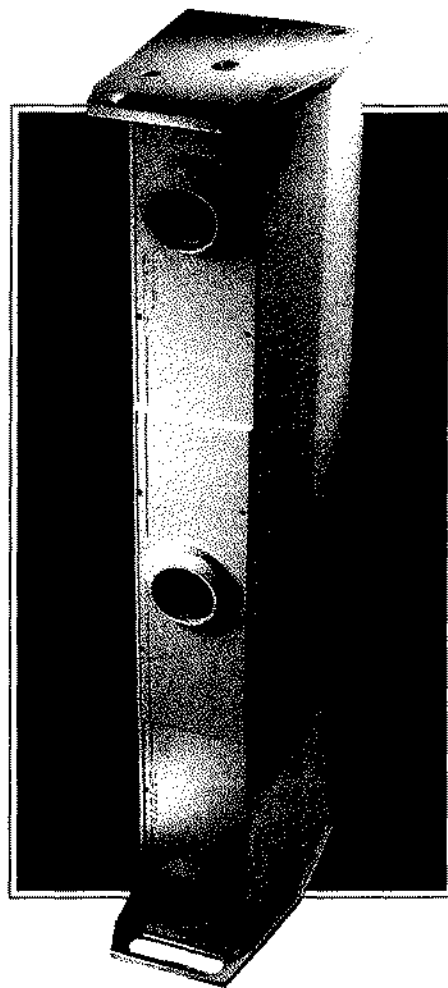
The fee for the Fourth International Symposium on 3-D Analysis of Human Movement is 1975FF (about 395.00 US\$) prior to May 15th 1996 and 2250FF (about 450.00 US\$) afterwards. The registration fee includes meeting material and all scientific and social activities. Checks, money orders or bank drafts drawn in French Francs (no credit cards) are made payable to the International Symposium on 3-D Analysis of Human Movement and Mailed to Professor Jean-Pierre Blanchi, Grenoble, France.



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1995 ASB Annual Meeting

The 19th Annual Meeting of the ASB will be held at Stanford University on August 24-26. All sessions will take place on the Stanford University Campus. On-campus housing has been arranged at the "Governor's Corner" at a rate of \$92/single plus tax for two nights. Rooms are also being held at the Holiday Inn and Best Western until July 28, 1995.

Tutorials

Acceleration, Force & Pressure Distribution: Measurement Techniques and their Application in Biomechanics
Ewald Hennig

Muscle Force Determination

Richard Hughes, Kenton Kaufman, Kai-Nan An

Lab Tours

NASA Ames Research Center
VA Rehabilitation R&D Center

Keynote Symposia

Running on Water
James Glasheen

Predictions for Neural Control Based on Limb Dynamics
Judith L. Smith

Neural Control of the Circulation During Exercise
Jere Mitchell

Registration Fees	before 6/23	after 6/23
member	\$150	\$ 180
non-member	\$180	\$ 210
student	\$ 30	\$ 45
student non-member	\$ 45	\$ 60
tutorials*	\$ 25 (ea)	\$ 35 (ea)
guest banquet ticket	\$ 50	\$ 60

*No charge to students for tutorials.

For more information or to register, contact:

Gary S. Beaupré
1995 ASB Meeting Chairperson
VA Medical Center
Rehabilitation R&D Center (153)
3801 Miranda Avenue
Palo Alto, CA 94304
95asb@bones.stanford.edu

ASB Tutorial Presentations

Acceleration, Force & Pressure Distribution: Measurement Techniques and their Application in Biomechanics

Ewald Hennig
Sportsmedizinisches Institut Essen, Germany

This tutorial describes various techniques for the measurement of accelerations, forces, and pressure distributions. The requirements, limitations, and advantages of various transducer types for biomechanical research, especially human locomotion, will be discussed.

Muscle Force Determination

Richard E. Hughes, Biomechanics Laboratory, Mayo Clinic
Kenton Kaufman, Motion Analysis Laboratory, San Diego Children's Hospital
Kai-Nan An, Biomechanics Laboratory, Mayo Clinic

Accurate determination of muscle forces in the human body can provide important and useful information for improving athletic training, prevention of occupational injury and designing treatment modalities for the musculo-skeletal system. However, muscle force determination poses significant challenges. In this tutorial, various techniques and consideration related to analytical modeling and experimental measurement of muscle force determination will be reviewed and discussed.

ASB Tours

Tour 1: NASA Ames Research Center

The NASA Ames Research Center is located approximately 3.5 miles east of Stanford University. Ames is noted for its fundamental and applied research in the areas of planetary sciences, high performance computing, aeronautics, air safety, space life support and space life sciences. The visit will conclude with a tour of the Biocomputation Center and demonstration of the altered gravity locomotion simulator.

Tour 2: VA Rehabilitation R&D Center

The RR&D Center is located two miles south of Stanford University on the campus of the Palo Alto VA Medical Center. Included in this tour will be an overview of the Center as well as project demonstrations related to musculoskeletal biomechanics and rehabilitation, stroke rehabilitation using robotics, and computer simulations of human motion.

