



# International Society of Biomechanics Newsletter

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### AFFILIATE SOCIETIES OF ISB:

American Society of Biomechanics; British Association of Sports Science; Bulgarian Society of Biomechanics; Canadian Society of Biomechanics; China Sports Biomechanics Association; Czechoslovak Committee on Biomechanics; French Société de Biomécanique; Japanese Society of Biomechanics; Korean Society of Biomechanics; Polish Society of Biomechanics; Romanian Comisia de Biomecanica, Ingineria Si Informatica.

# ISB News

## From the President - Ron Zernicke

First, on behalf of the ISB Executive Council, I extend to all ISB Members and Affiliated Societies a wish for a stimulating, productive, and prosperous 1994. This will be an important year for the ISB, as we prepare for our next biennial Congress in Jyväskylä, continue to develop existing scientific and educational programs, and initiate exciting new ventures.

Which new ventures? Let me comment on two that I find particularly stimulating: Relations with Affiliated Societies and Long-Range Planning.

As I stated in my comments in the previous ISB Newsletter, at the ISB General Assembly Meeting in Paris, there was a wide-ranging discussion about developing a coherent and proactive plan to support and foster biomechanics colleagues in those countries with severe economic conditions. Since that time, your ISB Affiliated Societies Officer, Micheline Gagnon, and your ISB Education Officer, Sandra Olney, have formed a committee to generate a proposal for the ISB. In the past few months, there has been a flurry of activity with this committee, as they solicited suggestions and ideas from each of the ISB Affiliated Societies on what is needed and how best can the ISB contribute to biomechanics in each country. In conjunction with her scientific trip to the International Centre of Biocybernetics in Poland in November, Micheline Gagnon was also able to meet personally with Kazimierz Fidelus (President, Polish Society of Biomechanics) to discuss potential ways of enhancing biomechanics. Among the ideas exchanged were (1) a lowering of ISB membership fees to allow more scientists to become members, (2) an exploration of ways of financing a partial reduction in ISB Congress fees to permit more biomechanists to attend the Congress, (3) faculty or student exchanges, (4) lecture tours by visiting ISB scientists, and (5) equipment loans and journal subscriptions.

Those ISB members who have suggestions, ideas, or plans that will help this committee are encouraged to contact either Micheline Gagnon (University of Montreal, Dept. Physical Education, C.P. 6128, Succ. A, Montreal, Quebec, H3C 3J7, Canada; (514) 343-2181 fax) or Sandra Olney (School of Rehabilitation Therapy, Queen's University, Kingston, Ontario, K7L 3N6, Canada; (613) 545-6776 fax; Email OLNEYS@QUCDN.QueensU.CA).

The second "venture" is the ISB Long-Range Planning Committee, chaired by Peter Cavanagh, the ISB President-Elect (contact details on front cover). This committee will be essential for the continued and effective development of the ISB. From the membership lists, from the attendance at the XIVth Congress, and from general knowledge, it is apparent that the ISB (and

the field of biomechanics as a whole) is growing. But where will this growth take the ISB? What will (should) be the focus of the ISB, compared with other "biomechanics" societies? Should the ISB merge with other "related" societies? Is the ISB getting too large? (Some members have opined that the Paris Congress was too big, while others welcomed the opportunity to partake in a broad range of biomechanics topics).

If you have views and opinions about your society, please contact Peter or any other member of your Executive Council to make your thoughts known.

For example, one important issue that emerged in the past several years is the relation between the ISB and the World Congresses of Biomechanics (WC). For those who were at the General Assembly meeting in Paris, you may recall that John Paul (UK) raised this issue and asked for the ISB Council to provide a position stand on the WC.

Dating back to the Los Angeles Congress (1989), the ISB Council has maintained a neutral position relative to the WC, officially neither integrating nor being antagonistic. Several current and former members of the ISB Council, however, have been liaisons between the ISB and the World Committee for Biomechanics (the umbrella committee for the WC, Chaired by Y. C. Fung). In particular, Robert Norman (CAN) contributed substantially, on behalf of the ISB, to a Subcommittee on Future Organization of the World Committee for Biomechanics. At the upcoming II World Congress of Biomechanics in Amsterdam in July 1994, I will step into the role that Bob Norman had on this Subcommittee. In addition, ISB members are organizing specific symposia for the WC in Amsterdam. Thus, there are continuing communication lines between the ISB and World Committee for Biomechanics. I believe that this communication is important for the development of biomechanics, world-wide, and for the ISB to clearly establish its role in the world of biomechanics.

But that is my view. What is the "collective" view of the ISB membership? That is something that needs to be assessed. Should the ISB be a protagonist for future WC? Should the ISB remain "neutral" -- maintain the current status? Should the ISB be antagonistic to future WC? Members of the ISB Council have received some feedback indicating that the ISB should definitely not combine any future ISB Congresses with a WC, as some societies have done for the II World Congress in Amsterdam. Other ISB members have stated that it may be worthwhile to consider the possibility of a future ISB Congress being held in conjunction with a World Congress on Biomechanics.

Important decisions must be made by the ISB members and Executive Council. It will only be through informed discussions and a opinion consensus that we will make the best decisions for the development of the ISB. In this respect, the Long-Range Planning Committee will be seeking your input. Look for news of the work of this committee in future issues of the ISB Newsletter.

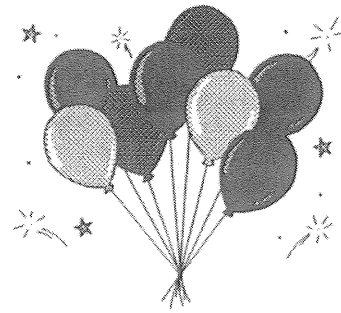
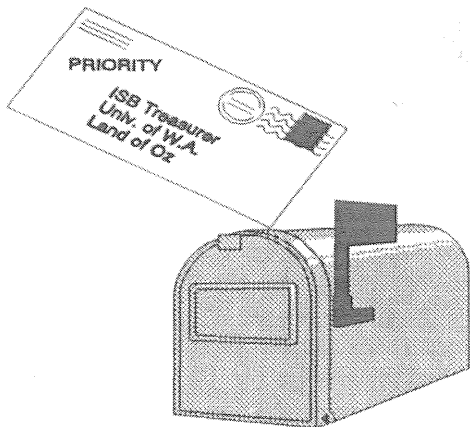
## From the Treasurer - Graeme A. Wood

Enclosed with this Newsletter is your 1994 ISB Membership Dues and Journal Subscription renewal form. Please return this form to the Treasurer as *quickly as possible* so as to avoid disruption to Newsletter and journal mailings. In past years the journal publishers have continued to mail journals to members well into the new year even in the absence of a renewal advice from the ISB Treasurer, but this practice has caused some confusion and has consequently now been stopped.

It is equally important that members who do elect to take a journal subscription notify this office promptly if journal issues are not being received from the publishers or if their address changes. There is inevitably some delay in initiating a new subscription, but thereafter journals should arrive on a regular basis and in sequential order.

Please note that the apparent increase in membership fees only reflects a movement in the currency exchange rate between the Australian and US dollars and does not constitute a rise in the society's fees - it's just that the fees happen to be stipulated in US dollar amounts. Journal subscriptions have also been kept at last year's prices and represent to ISB members very good value. Also, the *Clinical Biomechanics* journal has been added to the list of offerings, making it very easy for members to maintain all their scientific links with just one stroke of the pen!

Finally, **NO CHEQUES IN \$US** please! Payment should be in Australian dollars (AUD) - otherwise your Society incurs significant expense in renegotiating foreign currency amounts. Credit card payments are our preferred method, but any cheque drawn on an Australian bank (preferably WestPac) is quite acceptable.



**Happy 20th Birthday ISB !!**

by  
Richard C. Nelson

The ISB Congress in Paris last July coincided with the 20th birthday of our Society. I was asked to share some thoughts about the early days of the organisation during the General Assembly meeting and was subsequently asked to prepare this commentary for the Newsletter. Let me begin by asking the question, "how could the 14th Congress be associated with the 20th anniversary?". To answer this question it is necessary to explain what preceded the founding of the Society. The first international meeting on Biomechanics was held in Zurich, Switzerland in 1967 under the direction of Prof. Dr. Jurg Wartenweiler. This was followed by a second "Seminar" in Eindhoven, The Netherlands in 1969 through the efforts of Jaap Vredendregt. The Third Seminar on Biomechanics was held in Rome in 1971 at which time plans were initiated to create an international society. Also at that meeting it was decided to hold the Fourth Seminar at Penn State University in 1973. It was during this Fourth Seminar that the founding meeting was held and it is that event which marks the birth of the Society. At the conclusion of that meeting Paavo Komi announced that the next meeting would be held in Jyväskylä, Finland in 1975. It was subsequently decided to change the name of that meeting from "Seminar" to "Congress" to reflect the growth of the field of biomechanics and to better identify the role of the newly founded International Society of Biomechanics. While this was the first Congress under the ISB it was labelled the "Fifth" in order to maintain the link with the previous seminars. Since then successful Congresses have been organised every two years with the 14th Congress held this past July in Paris. Although the Society has now reached its 20th birthday the "Congresses" have existed for only 18 years. It is of historical significance that the next Congress (the 15th) in 1995 will return to Jyväskylä, Finland the site of the first Congress organised under the auspices of the International Society of Biomechanics.

## XVth Congress Update

XVTH Congress of ISB July 2.-6. 1995  
at the University of Jyväskylä, Finland

The Department of Biology of Physical Activity at the University of Jyväskylä organised the Vth International Congress of Biomechanics 1975 in Jyväskylä, Finland. This congress was the first one organized under the auspices of the International Society of Biomechanics (ISB), which was founded in 1973. The ISB Congress 1975 was also the first one, where the scientific program included presentations from a variety of basic and applied aspects. Thus it was the first time when Sport biomechanics did not have the dominating role in these congresses, previously called symposia.

Since 1975 the University of Jyväskylä has organized regularly international scientific congresses in various fields. Today more than ten international congresses are being held every year at the University of Jyväskylä. It is a pleasure and great honour for the Department of Biology of Physical Activity to be able to, once again, keep the University's international role active by organising the XVth ISB meeting on July 2.-6. 1995.

### Organisers

The main congress organiser is the Department of Biology of Physical Activity<sup>1</sup> with close collaboration with a special Congress Unit at the University of Jyväskylä. The City of Jyväskylä and the Foundation for Promotion of Physical Culture and Health (LIKES-Foundation<sup>2</sup>) are active partners to the University and together form an organisation called Jyväskylä Congresses. The Ministry of Education<sup>3</sup> of Finland gives extensive financial support and take part on the congress organising committee work as well.

### Organising Committee

Dr. Paavo V. Komi, Congress Chairman<sup>1</sup>  
Dr. Keijo Häkkinen, Congress Vice-Chair<sup>1</sup>  
Dr. Kari L. Keskinen, Secretary General<sup>1</sup>  
Mr. Jarmo Hakamäki<sup>2</sup>  
Mr. Timo Haukilahti<sup>3</sup>  
Mr. Pekka Sihvonen  
Dr. Timo Takala<sup>1</sup>  
Ms. Anna-Liisa Takkinen<sup>6</sup>  
Ms. Tiina Multasuo<sup>6</sup>

### Scientific Committee

Dr. Paavo V. Komi, Congress Chairman<sup>1</sup>  
Dr. Keijo Häkkinen, Congress Vice-Chair<sup>1</sup>  
Dr. Kari L. Keskinen, Secretary General<sup>1</sup>  
Dr. Martti Mela<sup>4</sup>  
Dr. Antti Mero<sup>1</sup>  
Dr. Robert W. Norman  
Dr. Matti Ranta<sup>5</sup>  
Dr. Timo Takala<sup>1</sup>  
Dr. Jukka Viitasalo<sup>1</sup>

Mostly the members of the scientific committee are in the academic staff of the Department of Biology of Physical Activity<sup>1</sup>. Professors Mela and Ranta are active collaborators of the Jyväskylä team and they represent, respectively, the Department of Biophysics<sup>4</sup> at the University of Oulu, and the Department of Mathematics and Systems Analysis<sup>5</sup> at the Helsinki University of Technology. Professor Norman is one the honorary doctors of the Faculty of Sport and Health Sciences. Thus the main core of the Congress organisation represents a variety of biomechanical interests. All of the members have substantial experience in both congress organisations as well as in active participation in congresses. The scientific committee will be later expanded to include a special international scientific advisory board.

### Dates

The congress will be held on July 2.-6. 1995. This will be convenient both in terms of student vacations and the summer condition. In early July the Jyväskylä area has more than 20 hours of daylight. The average temperature is 16 C with day temperatures rising to 20-26 C. The First Announcement has been given at the XIVth ISB meeting in Paris last summer and delivered to the ISB members via the ISB News Letter in October 1993. These brochures are available on request from the secretariat of ISB XV. The second Announcement and Call for Papers will be given at latest August 15th 1994. The deadline for two page abstracts submission is December 15th 1994. The notification about acceptance or rejection of the abstracts will be given to authors before March 15th 1995. Deadline for preferential fee is April 15th and the deadline for registration by mail is June 15th 1995.

### Congress Format

The congress program includes the traditional Wartenweiler and Muybridge lectures. Keynote lectures, and oral and poster presentations form the nucleus of the entire congress. Laboratory demonstrations in various fields of Biomechanics will be organised during the congress.

### Congress Topics

Biomechanics of Human Movement  
Normal and Non-Normal Locomotion  
Sport Biomechanics  
Occupational Biomechanics  
Assessment of Muscle Function  
Physiotherapy and Rehabilitation  
Clinical and Orthopaedics Biomechanics  
Biomechanical Methodology  
Methods and Instrumentation  
Measurements and Data Processing  
Computer Modelling  
Muscle Stimulation  
Simulation and Optimisation in Biomechanics  
Human-Machine System

Neuro-Musculo-Skeletal Biomechanics  
 Neuromuscular Control of Posture and Movement  
 Neuromuscular Performance  
 Muscle Mechanics and Energetics  
 Biomechanics of Joints, Ligaments and Spine  
 Electromyographic Analyses  
 Biomechanics of Tissues and Biomaterials  
 Soft- and Hard-Tissue Biomechanics  
 Biomaterials  
 Prostheses, Orthoses and External Fixations  
 Environmental Biomechanics in Humans and Animals  
 Impact and Vibrations Biomechanics  
 Micro and Hyper gravity  
 Water and Air Locomotion  
 Cardio-Respiratory Biomechanics  
 Cardiac and Vascular Biomechanics  
 Respiratory Biomechanics

*Publication of Congress material*

A book of two page abstracts will be edited and published in time for the Congress. Publication will be through the University Press of Jyväskylä. The invited papers as well as the short abstracts will be offered to be published in the Journal of Biomechanics.

*Location*

The City of Jyväskylä is located about 250 km north of the capital, Helsinki. Helsinki is within easy reach of the main centres of both Europe and the other continents. The Conference takes place on the campus of the University of Jyväskylä. The campus is located in the heart of the city within easy walking distance from a range of comfortable hotels.

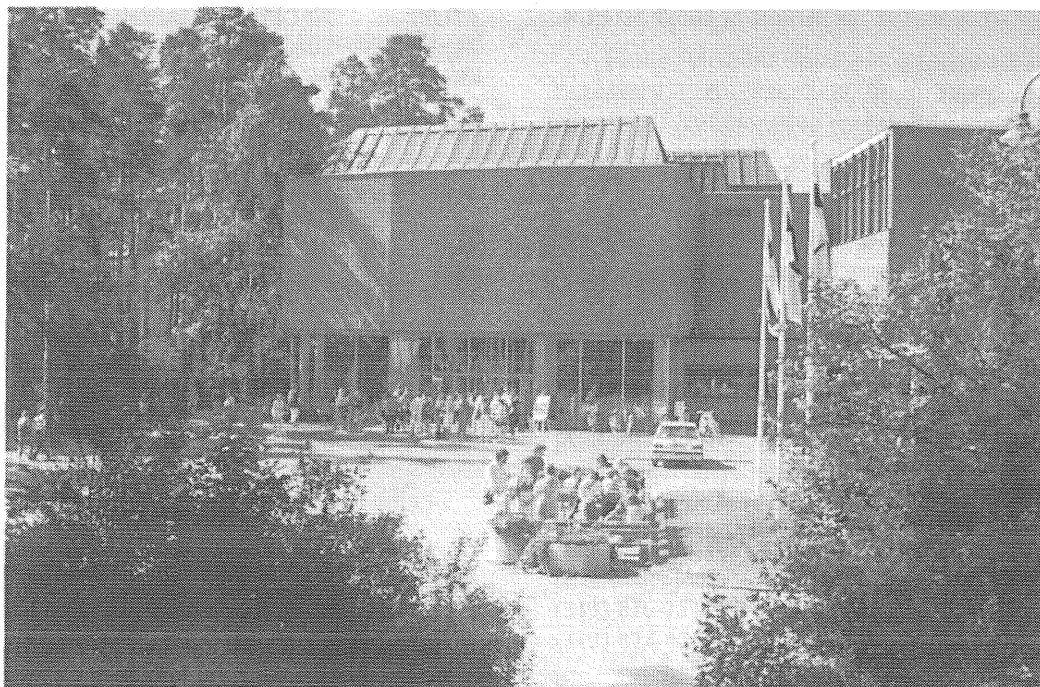
The University has 8,000 students representing all traditional academic faculties. The Department of Biology of Physical Activity belongs to the Faculty of Sport and Health Sciences. The Department is known in its international research activities both in Biomechanics and Exercise Physiology. It has moved into a new research building two years ago. We have now one of the most modern biomechanics research laboratories in Europe.

*Facilities*

**Housing:** The Congress site is located in close proximity to the centre of the city of Jyväskylä. Several hotels ranging from 3 to 5 stars are within a short distance from the congress place. The standard of hotels in Finland is generally high. A buffet breakfast is commonly included in the room rates. The prices per night range between 300-400 FIM (single) and 200-300 FIM (double, per person). Most hotels have also sauna facilities free of charge in the morning. Negotiations are under the way that also low price student dormitories would be available.

**Meals and coffee breaks:** Coffee, tea and soft drinks will be served, free of charge, during the congress coffee breaks in the mornings and afternoons. There are several small restaurants and cafeterias on the University campus within a walking distance to have lunch at a decent price (20-40 FIM). Evening meals will be available on campus restaurants and also in many other restaurants in the city centre within only 1-2 km distance from the University.

**Meeting rooms:** Main congress building includes three larger lecture rooms (1 x 300 and 2 x 150) and several smaller ones (1 x 60 and 4 x 30). In addition one



The Main Congress Building at the University of Jyväskylä

large ballroom can be equipped to serve as a lecture room for 200-300 seats. The main lecture hall of the University seating 750 persons is also available within 200 m from the congress building. All these facilities have modern audio-visual equipment. For the poster presentation two large halls in the congress building next to the lecture rooms will also be available.

**Exhibition area:** One large hall adjacent to the lecture rooms and the next door to the poster presentation halls will be available for the exhibitors.

**Planned tours:** The laboratories of the Department of Biology of Physical Activity as well as of the whole Faculty of Sport and Health Sciences will be open for guided visits during the congress. Social program will include various lake cruises, sight seeing tours etc.

**Recreation facilities:** The sporting facilities of the Faculty of Sport and Health Sciences of the University of Jyväskylä as well as of the LIKES-Foundation are available to delegates free of charge. These include tennis, squash, weight training, swimming, track and field etc. The campus and the surrounding area near by the lakes provide excellent possibilities for jogging and walking. These lakes are suitable for surfing and swimming. The city golf lawn is located within 3-4 km from the campus.

#### *Travel arrangements*

Finland is serviced by many international airlines all over the world. The connections between Helsinki, the capital of Finland and Jyväskylä are frequent. The flight time from Helsinki to Jyväskylä is 35 min. There is bus transportation after each flight from the airport to the centre of the city of Jyväskylä with low costs (20 FIM). Shuttle taxis are available at the airport at about 50 FIM.

#### Contact Address by Mail:

XVth ISB Congress  
Jyväskylä Congresses<sup>6</sup>  
P.O. Box 35  
FIN-40351 Jyväskylä  
FINLAND

#### Contacts by Telephone:

Secretariat (Ms. Multasuo) +358 41 603664  
Secretary General (Dr. Keskinen) +358 41 602056

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(Congress Secretariat TVANTTIN@jyu.fi)  
Secretary General KESKINEN@palo.jyu.fi



## AWARD WINNERS AT THE XIVTH ISB CONGRESS HELD PARIS, JULY 1993.

#### *Young Investigator Award (Oral)*

**Caroline Nicol** from the University of Jyväskylä, Jyväskylä, Finland. Paper entitled: "SSC fatigue effects on stretch-reflex sensitivity".

#### *Young Investigator Award (Poster)*

**Felix Eckstein** from the Ludwig Maximilian Universität, München, Germany. Paper entitled: "Load distribution in the human elbow joint: assessment of subchondral mineralisation by CT-osteodensitometry and humero-ulnar contact areas by polyether casting".

#### *Clinical Biomechanics Award*

**M. Adams** from the University of Bristol, Bristol, United Kingdom. Paper entitled: "Posture and the compressive strength of the lumbar spine".

#### *Clinical Biomechanics & ISB Abstract Award*

**Klaus Nicol** from the Universität Münster, Münster, Germany.

## ISB PUBLICATIONS

The following Society publications can be obtained at the special rates shown by writing to the person concerned with sales and distribution.

#### **BOOK OF ABSTRACTS, XIVth Congress of the International Society of Biomechanics.**

*Price:* 550 FF plus postage

*Supplier:* Professor S. Metral  
Explorations Fonctionnelles du Systeme  
Nerveux

C.H. Bicetre

78 Avenue du General Leclerc

94275 Kremlin Bicetre, FRANCE

Fax: (33.1) 45.21.27.14

#### **BOOKS OF ABSTRACTS, XIIth and XIIIth Congresses of the International Society of Biomechanics.**

*Price:* \$AUS 40 plus postage (\$AUS40 airmail) ea.

*Supplier:* Graeme A. Wood

Department of Human Movement

The University of Western Australia

Nedlands, WA 6009, AUSTRALIA

Fax: +61 9 380-1039

#### **BIOLOCOMOTION: A CENTURY OF RESEARCH USING MOVING PICTURES**, edited by A. Cappozzo, M. Marchetti and V. Tosi (ISB Book Series-Volume 1;

Hard-bound, 356 pages, 180 b&w and 7 colour figures).

*Price:* \$AUS 65 plus postage (\$AUD 20 airmail)

*Supplier:* Graeme A. Wood

(address as above)

# Biomechanics Positions Available

## DEPARTMENT OF HUMAN MOVEMENT STUDIES THE UNIVERSITY OF QUEENSLAND

Each year The University of Queensland offers a number of centrally funded **Postdoctoral Research Fellowships**. These awards are for two years but in exceptional circumstances, a shorter appointment may be offered. The University is inviting applications for positions to commence in January 1995. The basic eligibility requirements are listed below. The Department of Human Movement at the University of Queensland has an excellently equipped biomechanics laboratory including both a 2D and 3D Motion Analysis system (PC and SUN based), 2 AMTI and 1 Kistler force plate, numerous load cells, accelerometers, excellent technical support, well established contacts with the Engineering departments on campus, numerous PCs with A/D, treadmills, drop-testing rigs, access to wind flumes, etc.

### *Eligibility:*

- \* not more than 5 years equivalent full-time experience since completing a PhD
- \* an applicant who does not hold a degree may be offered appointment provided that evidence is subsequently provided that a doctoral thesis has been submitted by the following dates (Australia, NZ or PNG - 30 June 1994; Everywhere else - 1 Sept 1994)

### *Value:*

- \* current salary range \$31,980 - \$37,618 (Australian dollars)
- \* air fare to Brisbane to take up the appointment and a return journey at the expiration of the appointment

*All correspondence and applications should be directed to:*

Professor Bruce Abernethy  
Head, Department of Human Movement Studies  
The University of Queensland  
Queensland 4072  
AUSTRALIA

Applications must be received by 28 February, 1994 and applicants will be notified by late April/early May, 1994.

## BONE AND JOINT CENTER LABORATORIES HENRY FORD HOSPITAL, DETROIT, USA

Two positions are now available at Henry Ford Hospital for individuals who have recently completed (or are about to complete) a Ph.D. degree in Biomechanics or a related field. These positions are with the Bone and Joint Center Laboratories, which are staffed by a multi-disciplinary team of 7 Ph.D. faculty, one

postdoctoral fellow and 15 technicians. Laboratory capabilities include motion analysis, mechanical testing, numerical computing (including finite element analysis), biochemistry, histomorphometry, anatomy and cellular biology, as well as machine and electronics shops. The laboratories are also associated with a large, research-oriented clinical orthopedics department and the Henry Ford Hospital Center for Athletic Medicine. These positions offer excellent opportunities for individuals with suitable backgrounds and interests to gain experience in a diverse research environment.

### (1) POSTDOCTORAL POSITION IN BIOMECHANICS OF HUMAN MOVEMENT

Experience in computer modeling and simulation of musculoskeletal dynamics required. Experience in human movement analysis, image processing, sports biomechanics and/or motor control desirable, but not required. Motion analysis laboratory includes a biplanar X-ray digital imaging system for high-speed analysis of joint function, a 5-camera 250fps 3D video-motion analysis system, force platforms, EMG, and extensive computer hardware/ software for data collection and visualization as well as for the development and analysis of musculo-skeletal models. Primary research interests are in orthopedic/sports biomechanics as related to joint function, disease, injury and repair.

### (2) POSTDOCTORAL POSITION IN BIOMECHANICS OF HARD TISSUE

Finite element analysis programming experience necessary. An excellent opportunity for learning all aspects of collaborative research in biomechanics.

If you are interested in one of these positions, please contact the appropriate individual below (Dr. Tashman for the Human Movement Biomechanics position or Dr. Fyhrie for the Hard Tissue Biomechanics position), preferably by E-mail. We would like to interview qualified candidates at the Orthopaedic Research Society meeting in New Orleans February 21-24, so if you are planning on attending please contact us as soon as possible. If you are unable to attend the ORS, we can make other arrangements.

Scott Tashman, PhD  
Head, Motion Analysis Section  
tashman@bjc.hfh.edu  
(313) 876-7572  
(313) 873-4031 FAX

David P. Fyhrie, PhD  
Head, Biomechanics Section  
fyhrie@bjc.hfh.edu  
(313) 876-7572  
(313) 876-8064 FAX

Bone and Joint Center  
Henry Ford Hospital  
2799 West Grand Boulevard  
Detroit, MI 48202, U.S.A.

## ASSOCIATE PROFESSOR OF PHYSICAL EDUCATION, BIOMECHANICS

Department of Health and Human Performance, Iowa State University of Science and Technology, Ames, IA, U.S.A.

*Employment Date:* August 21, 1994

### *Responsibilities:*

1. Teach undergraduate and graduate level biomechanics
2. Teach in one additional area of specialization (motor learning, research design/statistics)
3. Advise graduate students (MS)
4. Conduct research and scholarly writing
5. Pursue grant and external funding opportunities
6. Participate on departmental, college, and university committees

### *Qualifications:*

#### Required -

Earned doctorate with a specialization in biomechanics  
Publication record/evidence of scholarly achievement in a biomechanics line of research.

Familiarity with forceplates, EMG, motion analysis systems.

College/University teaching experience

#### Preferred -

Experience with the use of a human cadaver as a teaching tool.

Expertise in an additional area of specialization.

A record of extramural support

### *Salary:*

Commensurate with education and experience.  
Position is for 9 months tenure track.

### *Application Details:*

Review will begin on February 15, 1994 and continue until the position is filled. Send letter of application, including a concise statement of professional goals, resume, and names and addresses of five referees to:

Dr. Shirley Wood, Chair  
Iowa State University  
Department of Health and Human Performance  
237 Physical Education Building  
Ames, IA 50011, U.S.A.

Iowa State University is an equal opportunity employer and particularly encourages women and minority applicants.

## RESEARCH ENGINEER - LOWER LIMB PROSTHESES

Simon Fraser University, Canada

A biomedical/rehabilitation engineer is required in the School of Kinesiology, Simon Fraser University. Project work is related to research and development for the manufacture of prostheses (artificial limbs), involving design and specification of components and automated manufacturing techniques. The primary responsibilities will be the design and development of an automated alignment coupling device for below knee

prostheses, and assistance with the development of computer aided design and manufacture of lower limb shapes.

Experience in some of the following would be an asset: materials, process selection and testing, mechanical design and electromechanical prototype development and computer aided design and drafting. The term of the appointment is for one year, renewable subject to continuing funding. Salary is negotiable, commensurate with experience.

The application should include a C.V. and the names and addresses of three individuals to whom reference can be made. The University is committed to the principle of equity in employment. Send applications to Dr. James Morrison at the following address:

School of Kinesiology  
Simon Fraser University  
Burnaby, B.C. V5A 1S6.  
CANADA

Tel: (604) 291-3756 (604) 291 3669

Fax: (604) 291-3040

(E-mail:james\_morrison@sfu.ca)

## ASSISTANT/ASSOCIATE PROFESSOR OF BIOMECHANICS

Department of Exercise and Sport Science  
College of Health and Human Movement  
University of Florida

### *Responsibilities:*

Establishing and developing a biomechanics laboratory, mentoring graduate students, conducting an independent line of research, and working primarily with motor behavior researchers on performance evaluation and enhancement as well as learning and control.

### *Qualifications:*

PhD with Biomechanics specialization and at least two years of university research, teaching, and graduate advising experience.

*Salary:* Commensurate with qualifications (\$33,000-\$37,000)

*Application Deadline:* February 11, 1994

*Effective Date of Employment:* August 1994.

*Send:* Letter of application, transcripts, curriculum vitae, and three letters of recommendation to:

Dr James Cauraugh  
Chair, Search Committee  
Department of Exercise & Sport Sciences  
Motor Behaviour Laboratory, 25 FLG  
University of Florida  
Gainesville, FL 32611  
U.S.A.

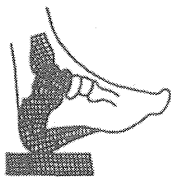
Tel: (904)392-9575; Fax: (904)392-0316



# Conference Announcements

## SYMPOSIUM ON THE BIOMECHANICS OF FUNCTIONAL FOOTWEAR

The University of Calgary  
Calgary, Canada  
August 18-20, 1994



A Symposium on the Biomechanics of Functional Footwear will be held in conjunction with the Canadian Society of Biomechanics Biennial Meeting in Calgary, Alberta, Canada, from August 18 to August 20, 1994.

The Symposium is being organised by the ISB Working Group on Functional Footwear. The Working Group was officially established at the XIV ISB Congress in July of 1993, and aims to encourage research and promote discussion of biomechanical issues related to functional footwear, including sports shoes, clinical and prescription footwear and footwear designed for special purposes.

The Symposium will be a one and a half day meeting, running in parallel with the Canadian Society of Biomechanics sessions. This inaugural scientific meeting of the Working Group will include presentations on several different aspects of functional footwear biomechanics and time will be allotted for extended discussion of relevant issues. In addition, a number of seminars by experts in the field of footwear biomechanics will be presented. A detailed programme will be announced early in January of 1994.

All those interested in the biomechanics of footwear are encouraged to attend and participate. Registration is included that of the CSB Meeting.

For further information on the CSB Meeting, please contact:

Margaret-Anne Stroh  
Conference and Special Event Services  
The University of Calgary - Olympic  
Volunteer Center  
1833 Crowchild Trail, NW  
Calgary, Alberta T2M 4S7  
CANADA  
Phone: (403) 220 6229  
Fax: (403) 284 4184

For more information on the Footwear Symposium, or on the ISB Working Group on Functional Footwear, please contact:

Martyn Shorten  
Coordinator, ISB Working Group on  
Functional Footwear  
73700.263@compuserve.com

## INTERNATIONAL CONFERENCE ON CLINICAL GAIT ANALYSIS

Dundee, Scotland  
5-8 July 1994

### *Organised by:*

The Department of Orthopaedic and Trauma Surgery, University of Dundee and  
The Tayside Rehabilitation Engineering Service,  
Dundee Limb Fitting Centre, Dundee Teaching Hospitals NHS Trust.

An international conference on Clinical Gait analysis will be held between 5th and 8th July 1994 in Dundee, Scotland. This University city and seaport is located on the banks of the River Tay and within easy reach of the Scottish Highlands.

The conference will take place in the University of Dundee's West Park Conference Centre with the scientific meeting, exhibition and delegates' restaurant conveniently located in adjacent accommodation.

Inexpensive accommodation is available on the same site in the University's West Park Hall of Residence. Hotel accommodation is also available in a number of modern hotels close to the Conference Centre.

### *Scientific Programme*

The conference is intended for physicians, surgeons, therapists, prosthetists/orthotists, bioengineers and other professionals involved in the assessment and treatment of locomotor disorders.

The scientific programme will comprise an introductory address by Dr David Winter, Waterloo, Canada followed by sessions on the following topics made up of presentations by leading experts and submitted papers.

### Instrumentation

Dr Julian Morris, Oxford, England.  
Prof. Arthur Spaepen, Leuven, Belgium.  
Mr Rob Kleissen, Enschede, Netherlands.  
Prof. Aurelio Cappozzo, Rome, Italy.

### Orthopaedics

Dr Ed Chao, Baltimore, USA.  
Dr Fabio Catani, Bologna, Italy.

### Upper Motor Neurone Disease

Dr Jim Gage, St. Pauls, USA.  
Ms Sylvia Ounpuu, Newington, USA.  
Mr Yves Blanc, Geneva, Switzerland.

### Foot Disorders

Dr Peter Cavanagh, Pennsylvania, USA.  
Ms Marilyn Lord, London, England.

### *Exhibition*

A scientific and commercial exhibition will be held in conjunction with the scientific meeting.

### *Social Programme*

A Welcome Reception will be held on Tuesday 5th July and a Civic Reception will take place the following evening. A Conference Banquet with a Scottish theme will be held on the evening of 7th July.

### *Transport*

Dundee is served by AIR from Manchester and by Rail through the Inter-City network. A night sleeper service is available from London-Euston Station. Local transport to and from the hotels and the scientific meeting and social events will be provided.

### *For further details contact:*

Mrs Jean Whyte,  
Dundee Limb Fitting Centre  
133 Queen Street,  
Broughty Ferry,  
Dundee DD5 1AG,  
Scotland, U.K.  
Tel: ++ 44 (0)382 730104  
Fax: ++ 44 (0)382 480194

Michael J. Dolan  
School of Biomedical Engineering,  
University of Dundee  
Dundee DD1 4HN  
Scotland, U.K.  
Tel: ++ 44 (0)382 344642  
Fax: ++ 44 (0)382 344644  
E-mail: m.j.dolan@dundee.ac.uk

## THIRD INTERNATIONAL SYMPOSIUM ON 3-D ANALYSIS OF HUMAN MOVEMENT

July 5th to 8th, 1994, Stockholm, Sweden

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 or disease, sport and elite performances, or basic studies of biomechanics.

### *Scientific Program*

The conference is spanned over three days. There will be keynote speakers from the field of computer vision, virtual reality, computer simulation and applied biomechanics in addition to oral presentations. Additional papers will be accepted in the form of poster presentation and a Hyde Park Speakers' Corner is also planned.

### *Technical Programme*

As a complement to the scientific programme, manufacturers of data capture systems will be given time during the meeting to inform the participants about their products. There will be no exhibits.

### *Deadlines*

Abstract submission March 1st, 1994  
Notification to authors May 1st, 1994  
Early bird registration (390USD) May 15th, 1994

### *Organizing Committee*

President  
Arne Lundberg Sweden

### *Scientific Committee*

Arne Lunberg Sweden  
Jean-Pierre Verriest France  
Dwight Meglan United States  
Hakan Lanshammar Sweden  
Jacques deGuisse Canada  
Irene McClay United States

### *Further Information*

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Huddinge University Hospital  
SWEDEN  
Tel: +46-8-7462420  
Fax: +46-8-6497177  
E-mail: arne.lundberg@okh.ki.se

or

Dr. Paul Allard, Ph.D., P.Eng.  
Permanent Secretariat  
International Symposium on 3-D Analysis  
of Human Movement  
Centre de Recherche  
Sainte-Justine Hospital  
3175 Cote Ste-Catherine  
Montreal, PQ, H3T 1C5, CANADA  
Tel: +1-514-345-4740  
Fax: +1-514-345-4801  
E-mail: allardp@ere.umontreal.Ca

INTERNATIONAL SYMPOSIUM ON BIOFLUID  
MECHANICS - Blood Flow in Large Vessels

A Satellite Symposium of the 2nd World Congress of  
Biomechanics Organised by the Biotechnical Institute  
Munich, Germany

July 16-19, 1994

The 3rd International Symposium will explore topics  
of interest to physicians, bioengineers, mechanical and  
aerospace engineers, clinicians, biorheologists and other  
investigators in areas such as blood flow, laser-Doppler  
anemometry, ultrasound, fiber optics, biomaterials and  
numerical studies. In vivo and in vitro, as well as  
numerical studies will be examined. Special emphasis will  
be placed on state-of-the art technology and medical  
applications. Only new, unpublished papers will be  
accepted.

*Preliminary Program Topics*

Clinical Methods and Problems - Atherosclerosis,  
localization of plaques, diagnostic techniques, heart  
valves (tissue and artificial), bypass surgery, vessel  
surgery, anastomosis techniques, varicose veins.

In vivo measuring methods - Ultrasound, MRI, laser  
techniques.

Model experiments - Ultrasound and MRI measurement  
in vitro, flow visualization, laser-Doppler  
anemometry and other laser techniques, heart valves,  
coronary arteries, arterial wall, collapsible tubes,  
endothelial response to shear stress cell/cell  
interactions.

Rheological studies - Cell-cell studies, shear stresses on  
white and red blood cells, blood-like fluids.

Biomaterials - Artificial grafts

Numerical studies

*Deadlines*

Abstract submission January 15, 1994

Paper submission May 1, 1994

*Instructions for submission*

Please include the title of the paper, authors,  
affiliations, and address. Please use WordPerfect 5.1 or  
WordPerfect 5.2 for Windows, or Word for Windows. A  
5.25 or 3.5 inch disk in MS-DOS format is required.  
Please label your disk with your name, the software and  
hardware used. If you wish to be placed on the mailing  
list to receive Symposium announcements and another  
instructions please write to:

Dr Dieter Liepsch  
FB05, Fachhochschule Munchen  
Lothstr. 34  
80335 Munchen  
GERMANY  
Tel: 0049-89-1265-1533  
Fax: 0049-89-1265-1502

EDITOR'S NOTE

This Newsletter is published quarterly: February-March  
(Spring); May-June (Summer); August-September  
(Autumn), and November-December (Winter). Deadlines  
for material and articles are the first day of each first  
named month, and the Newsletter is mailed to members  
early in the second named month.

Members can submit *Letters, Special Articles, Affiliate  
Society News, Laboratory Features, Reports, or  
Announcements of Meetings, Conferences, and Jobs  
Available*. Also, *Short Abstracts* from biomechanics  
society meetings and *Thesis Abstracts* can be published.  
In special circumstances a complete edition of the  
Newsletter can be devoted to the publishing of a  
Society's "Proceedings".

Submitted material must be in letter-quality print and  
computer scannable, or on a computer disk as a text-only  
file, and in English. Graphics or complex equations  
must be in camera-ready art form, and photographs must  
be black and white.

*Society abstracts* should not be more than 250 words in  
length. They should be submitted with full details of the  
conference, and accompanied by any conference or  
society logos which could be printed as well.

*Thesis abstracts* should be submitted with full details of:

Title, Student's Name, Department, Name of  
Degree and Conferring Institution, together  
with Supervisor's Name.

*Thesis abstracts* should not be more than one Newsletter  
page in length.



# Thesis abstract

## ON THE REGULATION OF INTRA-ABDOMINAL PRESSURE DURING DIFFERENT MOTOR TASKS

by

Andrew G. Cresswell

A Dissertation from the Department of Physiology and Pharmacology  
and the Department of Neuroscience, Karolinska Institute, Box 5626, S-114 86  
Stockholm, Sweden

The aim of this thesis was to investigate the development and function of the intra-abdominal pressure (IAP) during maximal - sub-maximal and voluntary - involuntary trunk loading conditions in man. The activation and coordination of muscles of the ventro-lateral abdominal wall were especially considered. A method was developed to obtain intra-muscular electromyographic activity from all abdominal muscles. Transversus abdominis (TrA) appeared to be the abdominal muscle contributing most to the changes in IAP. Large IAP increases occurred during maximal isometric trunk extension with strong activation of TrA, and with little activation of the trunk flexor muscles, indicating that an IAP trunk extensor moment could be generated to provide a possible unloading of the spine. During standardised dynamic loading, increases in IAP were lower, and abdominal muscle activation patterns differed depending on what strategy and loading level were required. When unexpected loading applied a forceful flexor moment to the trunk, activation of the unstretched ventral muscles, particularly TrA, and an increase in IAP preceded the onset of back extensor activity. Self induced sudden loading resulted in pre-activation of all ventral and dorsal muscles and an increase in IAP before the perturbation acted to stiffen the trunk.

Trunk loading achieved via constant velocity lifting and lowering showed that for a given velocity the level of IAP produced while lowering was less, despite the

generation of higher forces. At sub-maximal force levels, IAP increased linearly with increasing lifting or lowering force. However, at any given force level IAP was less during lowering than lifting. Strong correlations between IAP and TrA activity and low levels of activity from primary abdominal flexors indicate that an IAP trunk extensor moment may be produced by the IAP during the loading tasks. The idea that the IAP response can be augmented by increased strength of the IAP generating muscles was tested by specifically training the trunk rotators (TrA inclusive) over 10 weeks. The absolute level of IAP that could be generated voluntarily and the rate of IAP increase were greater after training. Levels of IAP developed during rotational and flexion - extension trunk loadings were, however, largely unchanged despite significant strength increases in the trained muscles.

It is unclear what mechanism(s) governs the level of IAP production, however, the type of task and magnitude of effort seem to be integral factors. The coordination of the muscles surrounding the abdominal cavity is critical to how IAP is developed and whether the outcome of the pressure increase is unloading and/or stabilisation.

Key words: intra-abdominal pressure, IAP, electromyography, EMG, intra-muscular, abdominal muscle, load, perturbations, balance, training, strength, motor control.

STOCKHOLM 1993

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# Calendar of scientific events

*April 7-9, 1994*

**International Conference on Biomedical Engineering (BME'94)**, Hong Kong. Contact: BME'94 Conference Secretariat, c/o Rehabilitation Engineering Centre, Hong Kong Polytechnic, Hung Hom, Kowloon, Hong Kong. Tel: 852-766-7683; Fax: 852-362-4365; E-Mail: PCRS@HKPCC.HKP.HK.

*April 16-17, 1994*

**Thirteenth Southern Biomedical Engineering Conference**. Engineering Research Institute, University of the District of Columbia, Washington, DC, U.S.A. Contact: Jaar Vossoughi, PhD, 4401-A Connecticut Ave., NW, Suite 327, Washington, DC 20008, USA. Tel: +1 202 282-2388; Fax: +1 202 282-2389.

*June 21-24, 1994*

**Tenth Congress of International Society for Electrophysiology and Kinesiology (ISEK)**, Charleston, South Carolina, USA. Contacts: Richard Shiavi, Biomedical Engineering, Vanderbilt University, Nashville, Tennessee 37235, USA; Tel: (615) 322-3598; Fax: (615) 343-7919; E-mail: rgs@use.vanderbilt.edu, or Steve Wolf, Rehabilitation Medicine, Emory University School of Medicine, Atlanta, Georgia 30322, USA; Tel: (404) 727-4801; Fax: (404) 727-5895.

*July 5-8, 1994*

**Third International Symposium on 3-D Analysis of Human Movement**, Stockholm, Sweden. Contact: Dr. Arne Lundberg, Dept. of Orthopaedics, Karolinska Institute, Huddinge University Hospital, Sweden. Tel: +46-8-7462420; Fax: +46-8-6497177; E-mail: arne\_lundberg\_okh@kicom.ki.se.

*July 5-8, 1994*

**International Conference on Clinical Gait Analysis**, University of Dundee, Scotland. Contact: Mrs Jean Whyte, Dundee Limb Fitting Centre, 133 Queen Street, Broughty Ferry, Dundee DD5 1AG, Scotland, U.K. Tel: +44 (0)382 730104; Fax: +44 (0)382 480194.

*July 10-15, 1994*

**Second World Congress of Biomechanics**, Amsterdam, The Netherlands. Congress Office: Biomechanics Section, Institute of Orthopaedics, University of Nijmegen, PO Box 9101, 6500 HB Nijmegen, The Netherlands. Tel: +31-80-613366; Fax: +31-80-540555; E-mail: ortho\_sec@mc01.azn.kun.nl.

*July 16-19, 1994*

**Third International Symposium on Biofluid Mechanics**, Institut für Biotechnik, e.V. München, Munich, Germany. Contact: Prof. Dr. Dieter Liepsch, FB05, Fachhochschule München, Lothstr. 34, 80335 München, Germany. Tel: 0049-89-1265-1533; Fax: 0049-89-1265-1502.

*July 31 - August 4, 1994*

**4th International Congress of Vertebrate Morphology**, Chicago, IL, USA. Contact: Dr. Susan W. Herring, Dept. of Orthodontics, SM-46, University of Washington, Seattle, WA 98195, USA. Tel: (206) 543-3203; Fax: (206) 685-8163; E-mail: herring@u.washington.edu.

*August 9-11, 1994*

**International Congress on Applied Research in Sports**, Helsinki, Finland. Contact: The Finnish Society for Research in Sport and Physical Education, Stadion, torniporras, SF-00250 Helsinki, FINLAND.

*August 18-20, 1994*

**VIIIth Biennial Conference of the Canadian Society of Biomechanics**, The University of Calgary, Calgary, Alberta, Canada. Contact: Conference and Special Event Services, The University of Calgary, 1833 Crowchild Trail, NW, Calgary, Alberta, Canada, T2M 4S7. Tel: (403) 220-6229; Fax: (403) 284-4184.

*August 21-26, 1994*

**World Congress on Medical Physics and Biomedical Engineering**. Rio de Janeiro, Brazil. Secretariat: Congrex do Brasil S/A, 20040-030 Rio de Janeiro RJ, Brazil. Tel: +55-21-224-6080; Fax: +55-21-231-1492.

*July 2-6, 1995*

**XVth Congress of the International Society of Biomechanics**. Jyväskylä, Finland. Contact: XVth ISB Congress, Jyväskylä Congresses, P.O. Box 35, FIN-40351 Jyväskylä, FINLAND. Tel: +358 41 603621; Fax: +358 41 603 664.

# ISB membership news

## NEW MEMBERS

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FIN-40351 Jyvaskyla  
FINLAND

BELLI, Alain (#1577)  
Laboratoire de Physiologie de L'Exercice  
Faculte de Medecine de Lyon Sud  
Chemin du Petit Revoyet - B.P. 12  
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Email(Internet): GBARIEL@UCI.EDU  
Compuserve Address: 71742,621

Further to the equipment list which was advertised in the last issue of the ISB Newsletter, we are proud to be able to now announce the availability of a new high speed video camera.

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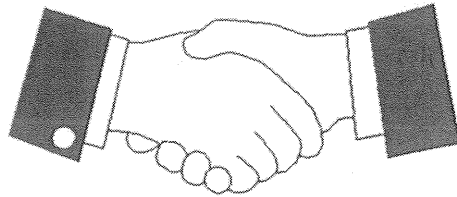
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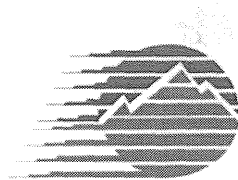
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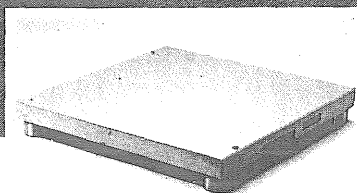
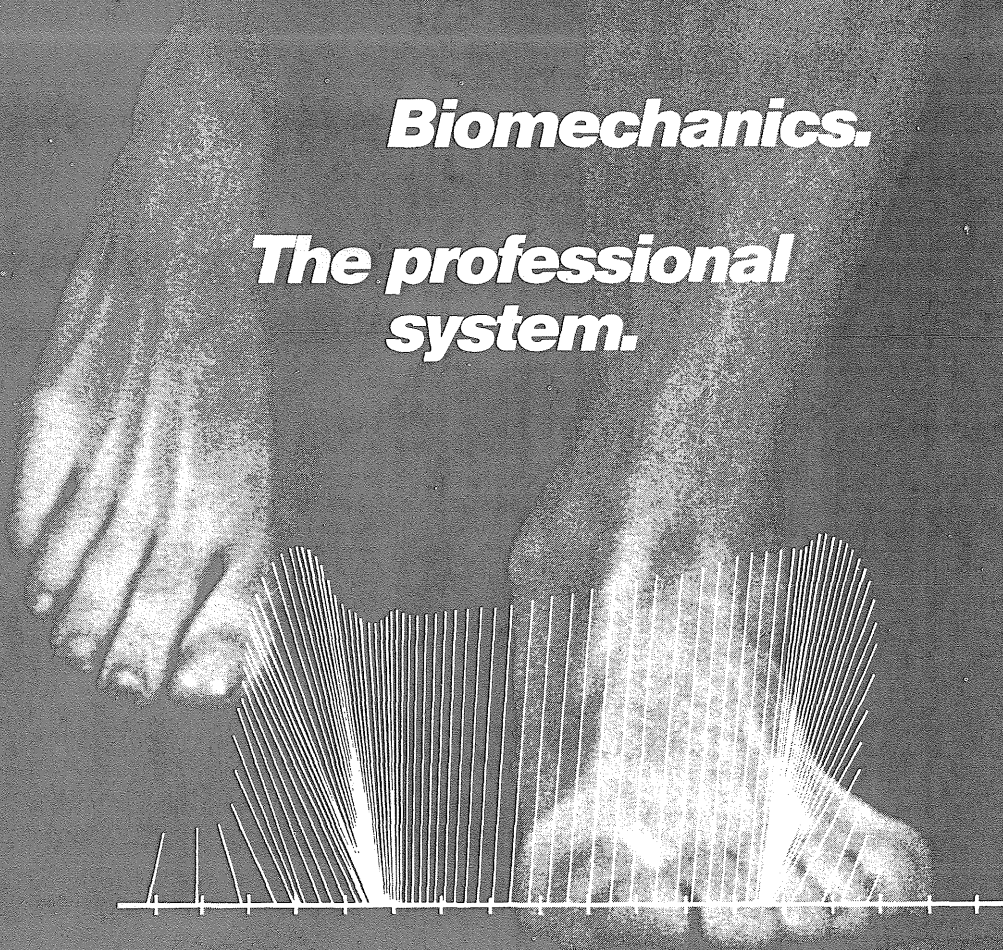
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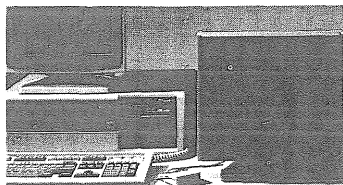
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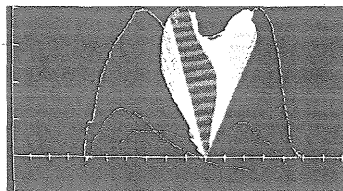
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