



# 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, Inginerie Si Informatica.

# ISB News

## XVth CONGRESS UPDATE

*Final Announcement & Registration and Call for Papers - XVth Congress of the International Society of Biomechanics*  
Hosted by the University of Jyväskylä  
Finland, July 2-6, 1995.



The Organizing Committee of the XVth Congress of the International Society of Biomechanics warmly welcomes the Biomechanists all over the world to participate the next Biennial Scientific Meeting of the ISB at the University of Jyväskylä, Finland. The ISB XV opens on July the 2nd and closes on July the 6th.

As Prof. Dr. Paavo V. Komi, the Chair of the XVth ISB Congress says:

"Please come to Jyväskylä with your best scientific spirit and knowledge so that we can all enjoy the great progress of biomechanics research. Be also prepared to come here fresh and well charged: the long days with the midnight sun demand special professional and social energy."

### *Call for Papers*

Participants are invited to submit proposals for podium and poster presentations at the Congress. The two-page abstracts should be written in English within the scope of the Congress Topics.

**The Deadline for Abstract Submission is December 15, 1994.**

The Final Announcement & Registration and Call for Papers brochures have been posted to the members of ISB already in July 1994. Most of the participants of the 2nd World Congress of Biomechanics in Amsterdam this summer have got their copy also. Those who have not received the leaflet yet, please, send an email message to: [multasuo@jyu.fi](mailto:multasuo@jyu.fi).

or contact the following address:

XVth ISB Congress Secretariat  
Ms Tiina Multasuo  
University of Jyväskylä  
Jyväskylä Congresses  
P.O.Box 35  
FIN-40351 Jyväskylä  
FINLAND  
Fax: +358 41 603621  
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Dr. Kari L. Keskinen  
Secretary General of the ISB XV  
Email: [keskinen@pallo.jyu.fi](mailto:keskinen@pallo.jyu.fi)

## Vth International Symposium on COMPUTER SIMULATION IN BIOMECHANICS

*A satellite event to the  
XVth ISB CONGRESS organised by the*

INTERNATIONAL SOCIETY OF BIOMECHANICS  
TECHNICAL GROUP ON COMPUTER SIMULATION

JYVÄSKYLÄ, JUNE 30-31, 1995

### LOCATION

The University of Jyväskylä is located in the capital of the Province of Central Finland, 270 kilometers North from Helsinki. As a small inland town in the heart of the Finnish lake district it offers quiet and pleasant surroundings for the symposium.

### SCOPE

This satellite Symposium on Computer Simulation in Biomechanics will be a scientific and technical reunion for investigators of computer simulation in the various fields of biomechanics. By the different forms of presentations such as workshops or round table discussions, this meeting will enable the participants as well to see and discuss specific details of programs and techniques, as well as to share information relating to methodology.

### TOPICS - COMPUTER SIMULATION in:

Numerical methods; Locomotion; Human movement and sport; Control systems

### PROGRAMME

Keynote Lectures; Oral Sessions; Software and hardware presentations; Round tables; New Investigator Award

### KEYDATES

Call for papers:	August 15, 1994
Submission of papers:	January 15, 1995
Notification to the authors:	April 15, 1995
Symposium registration:	June 28, 1995
Lodging registration:	June 28, 1995

### REGISTRATION FEE

The 1300FIM registration fee includes congress bag, proceedings, coffee breaks, meals, reception and banquet.

### CONTACT

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  
E-mail: [biomech@math.jyu.fi](mailto:biomech@math.jyu.fi)

Expressions of interest are now sought from those groups who would like to host the XVIIth Congress of the International Society of Biomechanics in 1999. Guidelines for ISB Congress format and details of how to apply can be obtained from the Secretary-General, Dr Kit Vaughan whose address is on the front cover of this Newsletter.



### 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 Fonction. 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

**BIOMECHANICS XI-A and XI-B, Proceedings of the XIth Congress of the Intn'l. Society of Biomechanics.**

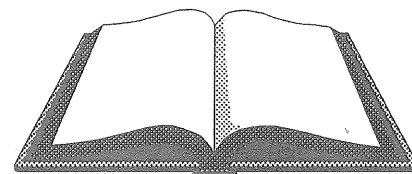
*Price:* 200 Dfl (includes both volumes and postage)  
*Supplier:* Peter Hollander  
 Faculty of Human Movement Sciences  
 Vrije Universiteit  
 van de Boechorststraat 9  
 1081 BT Amsterdam  
 THE NETHERLANDS  
 Fax: +31-20-6442043

### CALL FOR VOLUNTEERS

#### ISB Committee on Standards in Reporting of Kinematic Data

The ISB has been working on recommendations for standardization for reporting kinematic data. In this recommendation, there is a section on definition of joint coordinate system. In the past, several groups have been established to work on individual joints including spine, hand and wrist, shoulder, TMJ, whole body and ankle. Some of the work have been published in ISB Newsletters. Obviously, more groups are needed in order to include other joints such as, for example, knee, hip, elbow, and joints in the foot. Therefore, this message is to call for volunteers to work on these and other joints. People who are interested in this are encouraged to contact me directly at [gxw9@psuvm.psu.edu](mailto:gxw9@psuvm.psu.edu). More information will be available upon contact.

Dr Ge Wu  
 Center for Locomotion Studies  
 The Pennsylvania State University  
 University Park, PA 16802  
 Tel: (814)865-1972  
 Fax: (814)863-4755



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

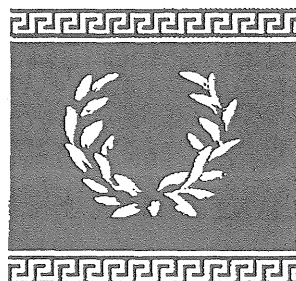
Hard-bound, 356 pages, 180 b&w and 7 colour figures).

*Price:* \$AUS 65 plus postage (\$AUD 20 airmail)  
*Supplier:* Graeme A. Wood  
 (address as above)

**SECOND WORLD CONGRESS OF BIOMECHANICS ABSTRACT BOOKS (Vols I & II)**

*Price:* NLG 100 (both vols including postage)  
*Supplier:* SWCB Office, Biomechanics Section,  
 Institute of Orthopaedics  
 University of Nijmegen  
 P.O. Box 9101  
 NL-6500 HB Nijmegen  
 THE NETHERLANDS  
 Fax: +31-80-540555

IOC OLYMPIC PRIZE



PRIX OLYMPIQUE DU C.I.O.

In order to recognize the evolution of scientific research related to human movement, the International Olympic Committee, under the sponsorship of Parke-Davis, has created a prestigious prize—the IOC Olympic Prize. This Prize will be awarded for findings resulting from outstanding research in the field of science applied to human movement, physical exercise, and sport. The Prize may be awarded in the following fields:

- biological sciences
- medical sciences
- physical sciences
- psychological sciences

The IOC Olympic Prize will be awarded every two years in connection with the Olympic Summer and Winter Games and consists of:

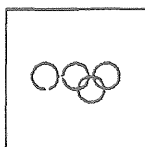
- a medal
- a diploma and
- \$250,000.00 (U.S.)

The initial IOC Olympic Prize will be awarded at the Games of the XXVI Olympiad in Atlanta in 1996.

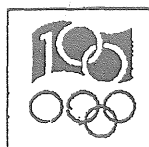
For further information about the IOC Olympic Prize please contact the IOC headquarters in Switzerland:

International Olympic Committee  
Medical Commission  
Château de Vidy  
CH-1007 Lausanne  
Switzerland  
Tel: 41.21 621 61 11  
Fax: 41.21 624 61 66

Chairperson Selection Committee  
Benno M. Nigg  
Human Performance Laboratory  
The University of Calgary  
Calgary, Alberta, Canada, T2N 1N4  
Tel: 403 220 3436  
Fax: 403 284 3553



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COMITÉ INTERNATIONAL OLYMPIQUE  
INTERNATIONAL OLYMPIC COMMITTEE

## GUIDELINES FOR THE ISB/ASB STUDENT AWARD FOR ECONOMICALLY DEVELOPING COUNTRIES (IAEDC AWARD)

The ISB/ASB Student Award for Economically Developing Countries is offered by the International Society of Biomechanics in conjunction with the American Society of Biomechanics to a young scientist in the field of biomechanics who is a citizen from an economically developing country which maintains some links with the International Society of Biomechanics via its Affiliated Societies. The eligible countries are presently the following: Bulgaria, China, the Czech Republic, Poland and Romania.

### ELIGIBILITY

1. The candidate is the first author of the paper submitted and accepted for oral presentation at the relevant ISB Congress.
2. The candidate must be a maximum age of 40 at the time of the Congress.
3. The candidate will have made the major contribution to the research which is being presented.
4. The candidate must personally present the paper at the Congress.
5. The candidate must be a citizen from an economically developing country which maintains ties with the ISB as an ISB Affiliated Society; the candidate must be a member of the Affiliated Society to receive the award.
6. The candidate can only apply to one of two awards, either the Young Investigator Award or the IAEDC Award, but not both; when applying the candidate must mention that the application is for the Affiliated Society Award (or IAEDC Award).

### APPLICATION

1. While submitting the paper to the Congress Organizers, the candidate must apply for the Award. The application must state that the paper meets the eligibility conditions and must be countersigned by the supervisor of the research work or by another senior person with knowledge of the work.
2. The announcements for ISB congresses will carry a call for the IAEDC Award applications (this cannot be applied for the 1995 Congress, though).

### SELECTION

1. The ISB Awards' Officer appoints an IAEDC Committee of five to seven members. This committee should represent as many countries and areas of biomechanics as possible. It is recommended that the Committee includes some members from the economically developing countries and one member from the International Collaboration with Economically Developing Countries (ICEDC) Committee. None shall be supervisor or member of the same institution as the candidates. Willingness to serve may be established early, but composition of the Committee can only be decided at the closing date for abstract submission and after having assessed that Committee members intend to attend the

Congress. This award is managed in collaboration with the ASB.

2. A pre-selection carried out by the Scientific Committee of the Congress will be made so that not more than 15 abstracts remain. These abstracts will then be forwarded to the Awards' Officer. Members of the IAEDC Committee shall be sent copies of the pre-selected abstracts together with a rating form by the Awards' Officer.
3. The abstracts shall be rated (on a form) as excellent (2), acceptable (1), poor (0) for each of the following criteria: Originality; Importance of Study; Quality of Research Design; Quality of Research Presentation and Discussion; Clarity of Abstract. The total mark for each abstract is therefore in the range of 10 to 0.
4. No more than five highest ranking applicants for presentation are selected by the Award Officer based on the procedure in #3.
5. The Awards' Officer will provide the Congress Chair and the IAEDC Committee members with the list of finalists.
6. The IAEDC Committee members at the Congress will rate the presentation of the selected paper.
7. Final selection of the Award recipient will be made during a plenary meeting of the Award Committee.
8. The Awards' Officer will be given the results of the final selection for the preparation of the Award material and ceremony.
9. The Awards' Officer will present a Certificate of Distinction to the finalist at the Banquet.

### RECEIPIENTS BENEFITS

1. The recipient of the IAEDC Award will be offered a certificate, \$US 1000 and reimbursement of the Congress registration fees already paid.
2. Their names together with an outline of their professional personality will be published in the ISB Newsletter. The Award officer is responsible for this publication.

### COSTS

1. Given #1 of Recipient Benefits, the cost for the price will be shared between the ISB and the ASB. The ASB has donated \$US 500 applicable for this Award; the cost the Awardee's conference registration fee and another \$US 500 will be provided by the ISB.

# Special feature article

## OPEN LETTER TO CONFERENCE DELEGATES

by

Michael W. Whittle, M.D., Ph.D.  
Cline Chair of Rehabilitation Technology  
The University of Tennessee at Chattanooga

Last year I posted on BIOMCH-L an "open letter to conference organizers", which was well received, and has been reprinted in the American Society of Biomechanics newsletter. I would like to follow it up by offering an "open letter to conference delegates", which is aimed at improving the quality of oral and poster presentations at meetings. I realize there are books and seminars on this topic - what follows is simply my ideas, gathered from quite a few years of listening to many good presentations - and just as many bad ones!

### *Avoiding common errors when presenting research*

1. Avoid using long complicated words to impress people - it doesn't! "Eschew obfuscation!!"
2. Avoid spurious accuracy
  - \* Percentages: if there are less than 100 in the sample, don't give decimal places: 7 out of 11 is 64%, not 63.64%!
  - \* Statistical values such as "p" and "r" should only be quoted to 2 places, e.g.  $p < 0.05$ ;  $r = 0.94$
  - \* give subject ages as mean (to one decimal place) and range, not standard deviation, for example: mean 43.1 years, range 29-68 (easy to understand); mean 43.148 years, s.d. 7.415 (hard to understand)
3. When drawing charts, don't let a computer design crazy scales for you, e.g. 2.19, 5.38, 7.57...
4. Don't assume that everyone reading or listening to your paper is an expert in the field - make it clear enough for students, and for people from other disciplines.
5. Understand that there may still be a real difference between two groups, even if the statistical test fails to support it (e.g. because the sample was too small).
6. Also understand that a statistically significant result may have no practical significance in the "real world".
7. Whether it is a written paper, an oral presentation or a poster, have someone else review it before you go public!

### *Oral presentations*

#### Planning and preparation

1. Don't simply read a paper that would be suitable for publication - an oral presentation is a totally different medium which requires a totally different approach.
2. One picture is worth a thousand words.
3. Humor is useful within limits - it can make a talk more interesting, but mustn't distract the audience from what you are trying to say. Sometimes a relevant cartoon will help get a point across, but a long irrelevant joke will detract from the talk.
4. Avoid irrelevant slides - nature scenes, glamour pictures, etc. They may "wake the audience up", but they may also distract or offend.
5. Unless you are very experienced, do a dry run for timing. It is better to make it too short than too long - leave them begging for more, not begging you to stop!
6. Look through the slides after loading the magazine, to make sure none are backwards or upside down.

#### Speaking - general

1. Make a point of studying the technique of other speakers when you go to meetings - learn from both their good and their bad points.
2. Preferably, talk "off the cuff", using the slides as notes. If you can't do this, use notes on file cards. If you are too frightened and must use a script, write it as a speech, not as a written paper.
3. If you are using notes or a script, make sure there is enough light to read. If not, try and get a reading light of some sort.
4. Find out how to use the pointer and control the slides before you go up to give the talk.
5. Look at each slide as it goes up on the screen - don't just plough ahead, oblivious of projection problems.
6. Talk to the audience, not to the screen or your notes.
7. Make sure you can be heard - allow for the deaf person in the back row! If using a microphone, stay about 12 inches from it and talk normally - don't either stray away from it, or talk too closely into it.

8. Point to relevant items on the slides. This is difficult if you are reading a script or heavily dependent on notes.
9. What is on the screen must relate to what you are talking about - if you want to talk about something different, you need another slide.
10. Conversely, don't put things on the slide that you don't intend to talk about - make a simpler slide. "Busy" slides are a disaster!
11. Stick to the time limit. No matter how interesting it may be, you will lose your audience's attention if you over-run significantly. My talks average one slide per minute, so for a ten minute talk I aim to use ten slides (maybe eleven or twelve), but certainly not fifteen, twenty, or more!
12. Tell your audience clearly when you have finished. Don't say "Well, that's about it..." or "Any questions?" Thank them for their attention and wait for the applause!

#### Overhead projection

1. Always look at the screen to make sure the image is satisfactory.
2. Don't block the projector beam.
3. Don't block the audience's view. An overhead projector tends to obstruct the view anyway, and you standing beside it makes things worse!
4. Don't "fiddle" with the overhead transparency or with something you are using as a pointer or to cover up part of the text.
5. Only cover up part of the overhead if there is a good reason to do so - otherwise, it is somewhat insulting to the audience!
6. The safest technique is to use overhead transparencies like slides - stand by the screen and point to the projected image.
7. Normal typescript is not big enough to show up when projected: use an enlarging photocopier or presentation graphics.

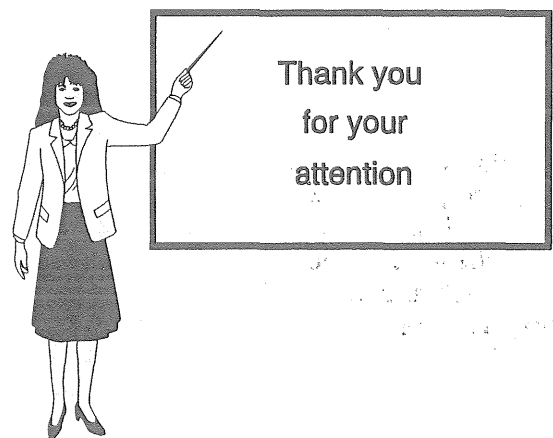
#### Slide projection

1. Don't use dual slide projection just for the sake of it.
2. Advantages of dual projection:
  - \* it allows you to mix illustrations and caption slides
  - \* it allows you to show a lecture plan as you go through the topics
3. Disadvantages of dual projection:
  - \* it doubles (or more) the chance of something going wrong
  - \* it makes the presentation twice as complicated (and costly) to prepare
  - \* it gives you a problem when you only want to show something on one projector.

4. If using dual projection, keep the projectors synchronized.
5. If possible, avoid black backgrounds (stick-type pointers don't show up) or white backgrounds (light pointers don't show up).

#### Poster presentations

1. Don't put too much on the poster - it deters people from stopping to read it.
2. Have a large clear title, name the authors, and institution(s).
3. Don't write a poster all in capitals (except the title) - it makes it hard to read. Use 1 1/2 or 2 line spacing, and keep the sentences and paragraphs short.
4. Have an abstract or summary which says briefly what you did and what you found.
5. Don't write it like a paper - use the same "visual" approach as for a talk, with charts rather than tables (but no jokes!).
6. Don't assume everyone will read it from start to finish - they won't! Every part of it must be complete and self-explanatory.
7. Don't "pounce" on anyone who comes near the poster, but be ready to talk people through it if they are interested.
8. Don't be disappointed if nobody comes to look at your poster - it happens to everybody!



# Laboratory feature

## STATE OF RESEARCH TEACHING IN THE FIELD OF BIOMECHANICS IN POLAND

This paper, prepared by Dr Kazimierz Fidelus, describes the activities of the main biomechanics centers in Poland.

### Center:

Biomechanics Laboratory  
Academy of Physical Education  
al. I.J. Paderewskiego 35  
S1-612 Wroclaw, Poland

*Leaders:* T. Bober, S. Kornecki

*Staff:* 9 persons, including 2 professors and 2 doctors

### *Teaching activities:*

Lectures, labs and seminars for:

- 360 undergraduate full-time students (per year),
- 150 undergraduate part-time students,
- 3-7 master and doctor students.

### *Research activities:*

- Control of mechanical functions of muscles during human voluntary movements.
- Utilization of elastic energy of the bone-muscle system in sports.
- Identification of the properties of the bone-muscle system elasticity with application of the harmonic coercion.
- Modelling and examination of the skeletal muscles cooperation in dynamic conditions.

### *Selected publications:*

Kornecki, S. (1992) Mechanism of muscular stabilization process in joints. *J. of Biomechanics*, No. 3, pp. 235-245.

Sieminski, A. Soft saturation, an idea for load sharing between muscles, In: Cappelzozzo, A. et al. *Bioloocomotion, A century of research using moving pictures*, Roma 1992, pp. 293-303.

Kornecki, S. and Zschorlich, v. (1994) The nature of stabilizing functions of skeletal muscles. *J. of Biomechanics* 27, No. 2, pp. 215-225.

Bober, T. Strength profile of man: measurement and applications. Polish Academy of Sciences, International Centre of Biocybernetics, 1993, pp. 14-29.

### *Original, own constructions:*

- Movement coordination electronic testing system (accuracy, timing and changing outer disturbing forces). Patent No. 123683, PRL, 1984.
- Muscle's stabilizing function testing system (static). Patent No. 1333803, PRL, 1987.
- Pendulum for muscle stabilizing function testing

system (dynamic, three degree of freedom). Patent No. 133891, PRL, 1987.

### Center:

Chair of Anatomy and Biomechanics  
Academy of Physical Education  
ul. Marymoncka 34  
01-813 Warsaw, Poland

*Leader:* K. Fidelus

*Staff:* 15 persons, including 2 professors and 4 doctors

### *Teaching activities:*

Lectures, labs and seminars are conducted for two faculties.

Faculty of Physical Education - for about 300 students,

Faculty of Rehabilitation for about 70 students.

### *Research activities:*

- Optimization of loads during training.
- Force and moment measurements of the hand in the work-space,
- Characteristics of biomechanic performances of the man.

### *Selected publications:*

Fidelus K. (1989) Mathematical model of knee joint extensor muscles fatigue. Abstracts of the XII Congress, International Society of Biomechanics. *J. of Biomechanics*, Vol. 22, No. 10, pp. 1010

Fidelus K., Busko K. (1990) The effect of speed and endurance predispositions of lower extremity muscles on changes of their torques induced by training. *Biology of Sport*, No. 2, pp. 97-112

Fidelus K., Kocjasz J. (1989) *Atlas de Ejercicios Fisicos Para el Entrenamiento*. Editorial Gymnos 1989 Madryt.

### *Original, own constructions:*

Test stands for measurements of forces and moments developed by human arm in the work-space.

### Center:

Chair of Biomechanics  
Academy of Physical Education  
Park Wilsona  
60-776 Poznan, Poland

*Leader:* L. Dworak

*Staff:* 6 persons, including 1 professor and 1 doctor

### *Teaching activities:*

courses of Biomechanics for physical education students



*Research activities:*

- Biomechanics of locomotion.
- Ergonomic biomechanics.
- Research methodology of the muscle force.
- Mechanical properties identification of bone structure.

*Original, own constructions:*

Test stands for measurements of forces and torques developed in static conditions.

**Center:**

Chair of Mechanics of Robots and Heavy Machinery  
Silesian Technical University  
ul. Konarskiego 18a  
44-100 Gliwice, Poland

*Leader:* J. Wojnarowski

*Staff:* 4 professors and 1 doctor

*Teaching activities:*

courses on Biomechanics for students on individual programs

*Research activities:*

- Modelling of blood flow through artificial heart valves
- Bone modelling using Finite Element Method.
- Implants
- Modelling of muscles
- Neuronic networks in diagnostics

**Center:**

Chair of Cutting Processes and Biomedical Engineering  
Higher School of Engineering  
ul. Szafrana 2  
65-016 Zielona Gora, Poland

*Leader:* K. Bacal

*Staff:* 8 persons, including 1 professor and 2 doctors

*Teaching activities:*

- 12 students on individual program "Biomedical Engineering"

*Research activities:*

- designing of the equipment for surgical treatment

*Original, own constructions:*

- Implanted bones and spine stabilizers.

**Center:**

Institute of Machinery Design and Machine Exploitation  
Technical University of Wrocław  
ul. Lukaszewicza 7/9  
50-371 Wrocław, Poland

*Leader:* R. Bedzinski

*Staff:* 25 persons, including 6 professors and 12 doctors

*Teaching activities:*

about 70 students on individual programs

*Research activities:*

- Experimental and computational methods of investigations of bone-joint-muscle systems
- Designing and examination of human dummies
- Investigation of mechanical properties of human tissue.
- Numerical methods in biomechanics.

*Selected publications:*

Bedzinski R., Kozłowska A., Wall A. (1981) Stress distribution in three-dimensional models of the lumbar spine. W: Biomechanics VII-A, Proceedings of the seventh International Congress of Biomechanics, International Series on Biomechanics, Vol. 3A, PWN, University Park Press Baltimore, pp. 65-72

Bedzinski R. (1992) An analysis of the displacements of the vertebral arch for different positions of the vertebral spine, Eight Meeting of the European Society of Biomechanics, Roma, Italy, Book of Abstracts, p. 288

*Original, own constructions:*

- Testing stands for measurements of strain distribution in human bones using optical methods.

**Center:**

Orthopaedic Clinic  
Medical Academy of Wrocław  
pl. 1 Maja 8  
50-043 Wrocław, Poland

This center cooperates with Institute of Machinery Design and Machine Exploitation of Technical University of Wrocław (see above).

*Leader:* A. Wall

**Center:**

Institute of Aeronautics and Applied Mechanics  
Warsaw University of Technology  
ul. Nowowiejska 24  
00-66B Warsaw, Poland

*Leaders:* M. Dietrich, A. Morecki, K. Kedzior, J. Maryniak, K. Jaworek, R. Maronski

*Staff:* 10 persons, including 4 professors and 3 doctors

*Teaching activities:*

courses on Foundations of Biomechanics and Bionics for individual students (approximately 10 students)

per year, M.Sc. and Ph.D. supervising - approximately 2-3 per year)

*Research activities:*

Theoretical and experimental investigations of human neuromusculoskeletal systems: applications in medicine, sports, ergonomics and robotics. Optimal control methods in biomechanics.

*Selected publications:*

Dietrich, M., Kedzior, K. and Zagrajek, T. (1991) A biomechanical model of the human spinal system. Proc. Inst. Mech. Engrs Vol. 205, Part H: J. of Engineering in Medicine, pp. 19-26.

Dietrich, M., Kedzior, K. and Zagrajek, T. (1992) Non-linear finite element analysis of formation and treatment of intervertebral disc herniae. Proc. Inst. Mech. Engrs Vol. 206, Part H: J. of Engineering in Medicine, pp. 225-231.

Maronski, R. (1990) On optimal running downhill on skis. J. of Biomechanics 23, pp. 435-439.

Maronski, R. (1991) Optimal distance from the implement to the axis of rotation in hammer and discus throws. J. of Biomechanics 24, pp. 999-1005.

Maronski, R. (1994) On optimal velocity during cycling. J. of Biomechanics 27, pp. 205-213.

*Original, own constructions:*

Testing stand for measuring of torques developed by human muscle groups in the main joints in static and dynamic conditions.

Electrogoniometer system for recording and assessing of the human gait.

Center:

Department of Biomechanics  
Institute of Sport  
ul. Trylogii 2/16  
01-892 Warszawa, Poland

*Leaders:* A. Wit

*Staff:* 5 persons, including 1 professor and 1 doctor

*Research activities:*

- Biomechanics of sport.

*Selected publications:*

Wit, A., et al. (1993) Peak torque-velocity and power-velocity relationships during the knee joint motion in male and female judoists. Biology of Sport, Vol. 10, No. 4, pp. 257-266.

*Original, own constructions:*

Set of computerized measurement and exercise devices.

Center:

Rehabilitation Center  
Medical Academy in Warsaw  
ul. Wierzejskiego 12  
05-510 Konstancin, Poland

*Leaders:* J. Kiwerski, R. Pasniczek

*Staff:* 6 persons, including 1 professor and 2 doctors

*Teaching activities:*

- 18 students per semester

*Research activities:*

- Functional electrical simulation of muscles and nerves.

- Rehabilitation biomechanics

*Original, own constructions:*

Implanted stimulators.

Center:

Laboratory for Orthopaedic Diagnosis  
Rehabilitation Center  
Child's Health Center  
al. Dzieci Polskich 20  
04-736 Warsaw, Poland

*Leader:* M. Syczewska

*Staff:* 5 persons, including 2 doctors

*Teaching activities:*

- Rehabilitation biomechanics of children.

*Selected publications:*

Kalinowska M., Zienkiewicz-Syczewska M. (1993) Reference force data in natural walking of healthy 6-8 old children - Technology and Health Care, Official Journal of Eur. Soc. for Engineering and Medicine, Conference Issue, pp. 109-110

Graff K., Kalinowska M., Zienkiewicz-Syczewska M., Lebedowska M.K. (1993) The maximal torques of knee extensors and flexors in healthy children - The Ergonomics of Manual Work, Marras W.S. in. (wyd.), Taylor and Francis, London, Washington DC, pp. 187-189

Zienkiewicz-Syczewska M., Kalinowska M. (1993) Evaluation of variations of dynamic and temporal gait parameters - The Ergonomics of Manual Work, Marras W.S. in. (wyd.), Taylor and Francis, London, Washington DC, pp. 195-197.

# Announcements

CALL FOR PAPERS  
MODELING LIFE PROCESSES AND HEALTH  
1995 INTERNATIONAL MEETING OF ASAE  
June 18-23  
Chicago, Illinois, USA

Papers are solicited which describe mathematical models, animal models or computer simulations that are used to study biological function and health. ASAE, The Society For Engineering in Biological, Food and Agricultural Systems, invites you to share your expertise at 1995 Annual Scientific meeting. As in past years, the Environmental Physiology Technical Committee will sponsor a session, Modeling Life Processes, with particular emphasis placed on human and animal health. Non-members are always welcome to make presentations at ASAE meetings.

*Contact:*

Timothy L. Foutz, Ph.D.  
Biological and Agricultural Engineering  
Driftmier Engineering Center  
The University of Georgia  
Athens, GA 30602  
E-mail: TFOUTZ@GAMMA.BAE.UGA.EDU  
Tel: 706-542-0868 Fax: 706-542-8806

BIOMED '95: THIRD INTERNATIONAL  
CONFERENCE, SIMULATIONS IN BIOMEDICINE  
Organized by the Wessex Institute of Technology

21-23 June 1995  
Palazzo delle Stelline, Milan, Italy

*Conference Chairmen*

Prof. C.A. Brebbia, Wessex Instit. of Technol., UK  
Prof. R.T. Hart, Tulane University, USA  
Dr. H. Power, Wessex Institute of Technology, UK

*Time Schedule:*

Submit abstract (300 words) by 22 August 1994  
Submit final paper by 17 February 1995 (to be published in a hardback book by Computational Mechanics Publications)  
Final Acceptance 6 March 1995  
Meeting: 21-23 June 1995

*Objectives:*

The objective of this Third International Conference in Computers in Biomedicine is to bring together different scientists who work on the application of computers to simulate biomedical phenomena, as well as to develop numerical algorithms to analyze, manage, and visualize data.

Bioengineering applies the methods of engineering, applied mathematics and physics to the study of biological phenomena and the use of their concepts to describe these phenomena. The advantages of this approach are numerous, particularly in the area of biomedicine where this treatment has been very successful in understanding the mechanic of physiological processes.

Numerical analysis, a topic common to the fields of engineering, applied mathematics and physics, has been helpful to the understanding of biomedical phenomena by means of their computer simulation. Another major contribution brought to the medical community by computational facilities and numerical techniques is the ability to visualize numerical data.

This conference is specifically aimed at scientists throughout the world working on the application of computers to simulate and analyze biomedical phenomena but may not be fully aware of each others development.

*Conference Secretariat:*

Jane Evans  
Wessex Institute of Technology  
Ashurst Lodge, Ashurst  
Southampton, SO40 7AA UK  
Tel: 44 (0)703 293223  
Fax: 44 (0)703 292853  
E-mail: CMI@ib.rl.ac.uk

SECOND RUSSIAN CONFERENCE ON  
BIOMECHANICS (in memory of N.A.Bernstein)  
November 22-25, 1994, Nizhny Novgorod, Russia

*Conference Topics*

Section 1. N.A.Bernstein's heritage in science  
Chair: B.S.Farber

Section 2. General biomechanics: General problems, cellular mechanics and cellular mobility, rheology of biological liquids and tissues, tissues and tissue contraction, mechanics of internal organs and systems, organisms's motions and their control, strength of tissues and organs, mechanics of growth and adaptation processes, etc. Chair: S.A.Regirer

Section 3. Medical biomechanics: Biomechanical aspects of medical diagnosis, medical treatment, surgical operations, and rehabilitation; maintenance of the attitude; man's motions and gait in pathology; biomechanics of a spinal column; biomechanical problems of making prosthetic appliances and servicing of invalids, etc. Chair: A.P.Yefimov

Section 4. Sporting Biomechanics: Biomechanical principles of the synthesis and optimization of athletic motions, simulators and other sporting facilities, phycomotorics. Chair: S.V.Dmitriyev

Section 5. Engineering biomechanics: Mathematical and physical simulation in biomechanics, man's protective means, robots, anthropomorphic and zoomorphic systems, software and hardware complexes in biomechanics, medical equipment, simulators, means for movement and rehabilitation of invalids. Chair: V.A. Antonets

#### *Submission of Reports*

The reports can be submitted in the form of posters or tutorials. The reports should contain only complete and unpublished original results. The abstract in Russian or in English, in triplicate, should be submitted to the Organizing Committee. Your abstract and registration form should enter the Organizing Committee before September 1, 1994. In any case, delays should be coordinated with the Organizing Committee.

Advertisement of your products can be placed in the Abstracts Book (price: US\$ 60 for 1 page).

The abstract (2 pages or less) should be typed double space in standard letters, maximum 28 lines on the page and 56 characters in the line, including the title of the report and the names of the authors. Figures or drawings are not allowed.

#### *Conference Language*

Official languages of the Conference are Russian and English.

#### *Finances*

The registration fee for the participants:

US\$ 30 for the FSU countries  
US\$ 75 for the Western Europe and China  
US\$ 150 for all other countries  
and US\$ 20 for the cocktail party

The registration fee in rouble equivalent (at official exchange rate at the time of payment) should be transmitted to:

Account No. 600467170 with the "NIZHNY NOVGOROD" Bank in Nizhny Novgorod. MFO 116013 Code 755. Correspondence Account No. 700161955 MFO 116002 Code 755.

Please write: "Registration fee for the Conference" on your payment order (receipt or cheque).

#### *Place of the Conference*

Nizhny Novgorod is one of the largest scientific, industrial, cultural and historical centre of Russia. Its population totals 1.5 mln. Air temperature in November might range from -3 to +7 C, occasional rain and wet snow.

#### *Address of the Organizing Committee*

Anatoly P. Yefimov,  
Co-chairman of the Organizing Committee  
Medical Institute  
10/1 Minin Square, 603005 Nizhny Novgorod, Russia  
FAX: (8312) 365745  
E-mail: bimech@hydro.nnov.su  
or:

Georgy V. Smirnov  
Co-scientific secretary of the  
Organizing Committee  
Lab. of Biomechanics  
Res. Inst. of Traumatology & Orthopaedics  
V. Volzhskaya Nab. 18  
Nizhny Novgorod  
RUSSIA 603155  
Tel. (831-2) 36-80-07  
Fax. (831-2) 36-05-91  
E-mail : SMIRNOV@GITO.NNOV.SU.

#### *You may also contact:*

Boris S. Farber,  
Co-chairman of the Organizing Committee  
tel: 007-095-905-41-04  
(or Nickolay G. Nikitin,  
Co-scientific secretary of the  
Organizing Committee, tel: 007-095-906-04-49)  
Institute for Prosthetic Appliance Making  
and Prosthetic Appliance Building  
3 Susanin St., Moscow, Russia

#### **22ND INTERNATIONAL WORKSHOP ON HUMAN SUBJECTS FOR BIOMECHANICAL RESEARCH.**

The twenty-second International Workshop on Human Subjects for Biomechanical Research will commence at 9:00 AM on Sunday, October 30, 1994 in Fort Lauderdale, Florida at the Fort Lauderdale Marina Marriott. This is a call for papers that are suitable for presentation at this workshop. We are looking for topics related to recent innovations or difficulties in human cadaver transducer installation and human cadaver impact testing methodology. Any paper about mathematical simulations or dummy tests must be oriented toward preparing for biomechanical tests with human cadavers or examining the ramifications of previous human cadaver experiments. Should you wish to make a presentation, please submit a title and short abstract on or before September 30th to:

Mr. Richard Morgan  
National Highway Traffic Safety Administration  
Code NRD-12, 400 Seventh Street, S.W.  
Washington, DC 20590, U.S.A.  
Tel: (202) 366 - 4717  
Fax: (202) 366 - 5670

INTERNATIONAL COMPARISON MEETING ON  
MOTION MEASURING SYSTEM '95

First Announcement

Clinical Gait Analysis Forum of Japan

The forum will be holding "International Comparison Meeting on 3D Motion Measuring System: and Satellite Show on Gait Analysis Systems" as indicated below. The aim of the meeting is to provide the prospective users of such systems in various related fields a chance to understand the features of each motion measuring system, and compare the performance of each system on the same ground. We wish to welcome guests from abroad so that this meeting will be really international.

*Date:* 4th (Saturday) and 5th (Sunday), March, 1995

*Place:* AMADA FORUM 246 Concourse

350, Ishida, Isehara-City, Kanagawa-Prefecture  
JAPAN

Fax: 81-463-96-3707

Ishida is approximately 50 km from Tokyo (one hour train ride). Accommodation is available within the FORUM 246.

*Admission:* Free

*Participating Companies and their Systems:*

(to be finalised)

Advanced Systems Co. Ltd.	OPTOTRACK/3020
Anima Co. Ltd	Video Locus
Fitness Apollo Japan	Ariel Performance Analysis System
Japan Chattanooga Corp.	PEAK
Kyowa Electr. Instr. Co. Ltd.	Force Plate
Marubeni Kikai Boeki Co. Ltd.	ELITE System
MP Japan Co. Ltd.	KINEMETRIX 3D
NAC Inc.	VICON 370
Nozaki Sangyou Co. Ltd.	Expert Vision
Ouyou Keisoku Kenkyusho	Quick Mag
Shin Oosaka Shoukai Co. Ltd.	Dynas 3D/h

*Program:*

March 4th

13:00-14:00	Special Lecture (Rehabilitation related Specialist from EU)
14:00-18:00	System Comparison (performance check etc.) with parallel demo.

March 5th

9:00-12:00	System Comparison (performance check etc.) with parallel demo.
13:00-14:00	Special Lecture (Japanese Specialist in Sports Biomechanics)
14:00-14:30	Oral Report on Comparison Results
14:30-18:00	Demonstration Show

A Final Report will be published.

*Inquiries:*

Secretary General

International Comparison Meeting '95

Tokyo Prosthetic and Orthotic Research Institute

3-17-3, Toyama

Shinjuku-ku, Tokyo 162

JAPAN

Fax: 81-33203-3576

**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.

## PENNSYLVANIA COLLEGE OF PODIATRIC MEDICINE

The Department of Surgery at the Pennsylvania College of Podiatric Medicine (PCPM) is seeking a Ph.D. in either Biomaterials, Biomedical Engineering, Bioengineering, Biomechanics, or a closely related discipline.

The candidate should have expertise in Biomaterial modeling and testing of orthopedic specimens. PCPM desires for this applicant to have experience and/or interest in advancing the state-of-the-art in foot and ankle surgery, which may include studies of osseous, tendinous, ligamentous, and fat pad structures as well as internal and external surgical fixators. This position entails a faculty appointment in the Department of Surgery at PCPM and is tenure tractable. The ability to teach and advise medical students, engineering/science graduate students, and collaborate with scientific and clinical colleagues is important. Salary and academic rank are commensurate with experience. PCPM is an equal opportunity employer. Candidates should send their curriculum vitae and the names of three references to: Howard J. Hillstrom, Ph.D., Director of the Gait Study Center, Pennsylvania College of Podiatric Medicine, 8th and Race Streets, Philadelphia, PA 19107, (215) 629-0300, ext 352, (215) 629-1622 (fax).

## UNIVERSITY OF VERMONT

Opportunities exist at the University of Vermont (UVM) to join my National Institutes of Health (NIH) funded research project directed at roles of muscles in the stability of the lumbar spine. The project includes detailed anatomical studies, analytical modeling of muscle behavior and of muscle recruitment strategies, instability analyses, and verification studies with human subjects.

1. A graduate student stipend is available immediately to support someone pursuing a degree in Biomedical Engineering (MSc.) or Mechanical Engineering (PhD), or related fields. This person will be expected to work 50% of their time on the funded project.
2. A Post-Doctoral Fellowship (National Institutes of Health funded) in the Department of Orthopaedics and Rehabilitation is expected to be available in September 1995. This position requires a PhD Degree, and US Citizenship or permanent resident status. It is a one or two year commitment.

Please post or forward this information to potential applicants. I shall be available to meet interested persons at the ASB meeting in Columbus Ohio, October 1994.

UVM is an Equal Opportunity and Affirmative Action Employer.

For further information contact:

Ian Stokes <stokes@med.uvm.edu>  
Department of Orthopaedics and Rehabilitation,  
University of Vermont, Burlington, VT 05405-0084,  
USA  
Tel: (+1) 802 656 4249 Fax: (+1) 802 656 4247

## VICTORIA UNIVERSITY OF TECHNOLOGY JACK REFSHAUGE CHAIR OF MOVEMENT SCIENCES

The Faculty of Human Development wishes to appoint a senior academic to the new Jack Refshauge Chair of Movement Sciences. The naming of the Jack Refshauge Chair is a joint initiative of Sport and Recreation Victoria and Victoria University of Technology in recognition of the outstanding achievements of Jack Refshauge in sport and education within Victoria.

The person appointed will be Director of the Centre for Rehabilitation, Exercise and Sport Science (CRESS). CRESS is a new University Research Centre located in the Faculty. It undertakes research and consultancy work aimed to enhance physical performance, health and wellbeing in and through physical activity. Major contributions currently come from the disciplines of exercise physiology and metabolism, biomechanics and sport and exercise psychology.

The person appointed will be expected to provide research leadership in rehabilitation, exercise and sport science. This will include identification of major research directions and oversight of research funding strategies and applications and the development of consultancy work. The person appointed will manage the Centre, including coordination of around 20 academic staff and more than 60 research students currently associated with it.

A PhD and a strong research record in the field are essential. The person appointed will have relevant academic and professional experience in the rehabilitation, exercise and sport science field. Substantial experience of attracting and managing research and consultancy funds will be a distinct advantage.

The Jack Refshauge Chair of Movement Sciences is an established position in the Faculty of Human Development at Victoria University of Technology. The appointment will be made on a tenurable basis. The person appointed will have available an initial research grant of up to \$20,000 for personal research and will also be able to access a Centre car. Superannuation, travel and

removal allowance and temporary housing assistance are available. Salary : \$78,991 per annum (Level E).

Further information regarding the position may be obtained from Professor David Lawson by telephone on (03) 688 4085 or by fax on (03) 688 4803.

A position description may be obtained from Personnel Services by telephone on (03) 688 4993 or by fax on (03) 688 4965. Forward written applications quoting reference number F/HD05, personal details, qualifications, experience and the names, addresses, telephone and confidential facsimile numbers (where available) of three referees to the Manager, Personnel Services, Footscray Campus, Victoria University of Technology, PO Box 14428, MMC, Melbourne, Victoria 3000 by 21 October 1994. Equality of employment opportunity is University policy.

**POSTDOCTORAL POSITION  
DEPARTMENT OF BIOMEDICAL ENGINEERING  
TULANE UNIVERSITY, NEW ORLEANS,  
LOUISIANA**

A new postdoctoral position is now available to be filled by January 1, 1995. Funding for the position comes from an ONR grant in conjunction with the Naval Biodynamics Laboratory in New Orleans to perform a computational study of the head-neck due to impact accelerations, such as experienced by pilots during an ejection from moving aircraft. An earned and completed Ph.D. degree in Mechanical Engineering, Aerospace Engineering or Biomedical Engineering with demonstrated expertise in musculoskeletal biomechanics is required. The ideal candidate will be one with expertise doing large deformation dynamic finite element modeling using ABAQUS. Prior use of CRAY Supercomputers is a plus. The project is funded for three years with support for 2 faculty PI's (R.C. Anderson and R.T. Hart) and provides funding for one postdoctoral position and support of a graduate student (who has already been selected). Salary is \$35,000 annually.

Computations will be performed using the Department's CRAY Y- MP/EL-94 computer system, a dedicated DEC Alpha processor and PowerMacintosh workstations running X-windows. Send CV and names of three references not later than October 31, 1994 in order to receive full consideration. The position will be filled by January 1, 1995. Contact:

Dr. Ronald C. Anderson  
Department of Biomedical Engineering  
Boggs Center, Suite 500  
Tulane University  
New Orleans, LA 70118-5674  
E-mail: rca@bmen.tulane.edu  
Tel: (504)865-5867

Tulane University is an Equal Opportunity / Affirmative Action employer.

**RESEARCH ASSISTANTSHIP  
WEST VIRGINIA UNIVERSITY**

A research assistantship is available in the area of bone biomechanics at West Virginia University, Department of Orthopedics and Department of Mechanical and Aerospace Engineering. The applicant should have a strong desire to pursue solid mechanics research in this area. The position requires experimentation and analysis to measure bone fracture behavior and will also involve biochemical and morphologic analysis of bone. The position includes a monthly stipend and full tuition waiver. Expected start date is late fall semester or by January, 1995. Seeking Ph.D. level students.

Interested persons should forward resume and a brief statement of your research experience and interests to:

Dr. Timothy L. Norman  
Orthopedics Research Laboratory  
P.O. Box 9196  
Health Sciences Center South  
West Virginia University  
Morgantown, WV 26506-9196

E-mail: norman@faculty.coe.wvu.edu  
Tel: (304) 293-1072  
Fax: (304) 293-7070

**RESEARCH ASSISTANT  
UNIVERSITY OF TEXAS MEDICAL BRANCH**

The Orthopaedic Biomechanics Lab of the University of Texas Medical Branch is seeking two Research Assistants to work in a multidisciplinary team environment. Job elements include fabrication of measurement systems for the study of joint mechanics, conducting biomechanics and laboratory research experiments, data analysis using spreadsheet and database software, and assisting in technical writing for research grant proposals and medical/technical publications. Each position serves as primary assistant for one or more projects with orthopaedic surgeons who serve as project medical directors. Minimum requirement is a bachelor of science in a basic science field or equivalent.

Interested candidates contact:

William L. Buford, Jr., PhD.  
Director, Orthopaedic Biomechanics Lab  
University of Texas Medical Branch  
Galveston TX 77553-0353  
wlbuford@beach.utmb.edu

# Thesis abstracts

## THE EFFECT OF RUNNING SHOES AND OXFORDS ON PLANTAR PRESSURES IN DIABETIC PATIENTS

Julie. E. Perry

Master of Science thesis  
The Center for Locomotion Study  
Penn State University, USA  
December 1992

Adviser: Peter R. Cavanagh

This study examined the effect of two types of normal, unmodified footwear, an Oxford and a running shoe, on the in-shoe plantar pressures of 13 individuals with diabetic neuropathy who were matched, on a number of criteria, with 13 non-neuropathic diabetic individuals and 13 control subjects. The Oxford was chosen because it represented a shoe that is typically worn by diabetic individuals (SM Soulier, Journal of the American Podiatric Medical Association, 1986, 76, 395-400); the running shoe because it is often recommended to diabetic patients due to its cushioning properties. The role of socks in alleviating plantar pressures was also investigated through a direct comparison of barefoot and sock walking.

Pressures during barefoot and sock walking were collected with a NOVEL SF/2 pressure platform and the in-shoe pressures were acquired with a micro-EMED pressure sensing insole. Correction was made for the effect of different element sizes between the two devices used. Barefoot and sock measurements were based on a method of first-step collect; the in-shoe pressures on a mid-gait collection. Five trials were conducted in each of the four conditions and the individuals walked at a self-selected, medium-paced speed. For analysis, the peak pressures were determined for nine anatomically based regions of the foot.

When walking in socks, although the differences were not significant ( $p > 0.05$ ), there was a trend for pressures under the metatarsal heads and first toe to be reduced by 10% relative to the barefoot condition. Relative to the no-shoe condition, pressures in the Oxfords were significantly increased in these same regions by 20%, except in the region of the second metatarsal head which showed an 8% reduction. The running shoe significantly reduced pressures by 20%, with the greatest decreases in pressure occurring in those individuals who experienced the highest pressures in the no-shoe condition. In a direct comparison of the two shoes, the running shoe resulted in a 30% reduction ( $p = 0.0001$ ) in forefoot pressures relative to the Oxford.

The effects of the footwear were similar across all three subject groups.

From this study it was concluded that shoes can affect the pressures experienced on the plantar surface of the foot. Since high pressures are of concern for individuals with diabetes the running shoe should be the preferred choice in unmodified non-therapeutic footwear because it provides better protection for the foot, in terms of minimizing plantar pressures.

## THE EFFECTS OF MOLDED INSOLES ON IN-SHOE PLANTAR PRESSURES IN ROCKERED FOOTWEAR

Francis G. Hewitt

Master of Science thesis  
The Center for Locomotion Study  
Penn State University, USA  
September 1993

Adviser: Peter R. Cavanagh

Molded insoles are frequently prescribed in extra depth footwear to reduce peak plantar pressures in diabetes patients at risk for plantar ulcers. The effectiveness of this intervention has previously been evaluated empirically, according to whether or not the patient ulcerates during the period that they are wearing the insoles. To quantify the effects of molded insoles on in-shoe plantar pressures, the difference between plantar pressures measured in the shoe during walking in molded insoles and walking in flat insoles was tested using a paired t-test. Fourteen subjects with diabetes and resulting peripheral neuropathy who were considered at risk for plantar ulcers and were regular users of rocker shoes with molded insoles participated in the study.

First step pressures for barefoot and sock conditions were measured using the Novel EMED/SF pressure platform. In-shoe pressures for molded and flat insole conditions were collected with the Novel micro-EMED instrumented insole while subjects walked at the self-selected medium speed. A correction factor was used to account for the difference in element size between the two devices and allow comparison of the pressures recorded with them. Mean peak pressures were calculated and analyzed for each of 10 regions of interest on the plantar surface of the foot. The difference in mean peak pressures between the four conditions was tested using a paired t-test.

Pressures taken while walking in shoes were



significantly reduced at the heel, metatarsal heads and first toe by a mean of 48% (p value < .05) relative to pressures taken without shoes. In-shoe heel pressures for the molded insole condition were lower for all of the tested subjects by a mean of 21% (p value < .001) when compared with the flat insoles. Pressures under the metatarsal heads and great toe were reduced for molded insoles in only 55% and 27% of the subjects respectively, with several subjects experiencing increased pressures at these regions.

From the results of this study it was concluded that these particular molded insoles were very effective at reducing peak heel pressures while producing mixed results at the metatarsal heads and 1st toe. Both shoe conditions produced substantial reductions in heel, metatarsal head and 1st toe regions relative to no-shoe conditions. This indicates that rockered footwear is consistently effective at reducing plantar pressures at the regions most affected by ulcers. Molded insoles should be considered for use in situations where reductions in heel pressures are important, while their effectiveness in reducing forefoot pressures should be evaluated on an individual basis.

### **SOME BIOMECHANICAL ASPECTS OF UNILATERAL OSTEOARTHRITIC KNEE SUBJECTS DURING STANCE**

Robyn Heather Grote

Thesis submitted for the degree of Doctor of  
Philosophy

(Centre for Biomechanical Engineering)

The University of New South Wales 1993

Supervisor: Noel L Svensson

Through the use of gait analysis, this study attempted to characterise gait of osteoarthritic (OA) subjects in order to quantify the abnormal loading patterns, vacillation and reduced shock attenuation which had been clinically reported. Gait analysis on nineteen unilateral OA knee subjects and eighteen age, sex and affected leg matched normal subjects included measurement of kinetic and kinematic variables. Somatotype data were also collected in order to objectively describe the OA body type.

Several new descriptors of gait were developed and found to be sensitive in detecting OA gait in stance. New standards for OA knee subjects and middle-aged to elderly normal controls, have been provided for gait and somatotype.

It is anticipated that future work will develop these descriptors into a performance index that will be appropriate for OA knee subjects.

## **Calendar of events**

*September 21-24, 1994*

**Second International Symposium on Computer Methods in Biomechanics & Biomedical Engineering**, Marriott Hotel Swansea, U.K. Contact: John Middleton, Biomechanics & Biomedical Eng. Cntr., Engineering Building, University College of Swansea, Singleton Park, Swansea SA2 8PP, Wales, UK. Tel: (0792) 295517; Fax: (0792) 295514.

*September 26-29, 1994*

**2nd International Symposium on Three-Dimensional Scoliotic Deformities**, Pescara, Italy. Contacts: Drs. M. D'Amico & A. Merolli, CERBITEB, Fond. Paolo VI, L.re Giovanni XXIII, I-65126 Pescara, Italy. Fax: 39-85-4213969.

*October 3-7, 1994*

**Twelfth International Symposium on Posture and Gait**, Matsumoto, Japan. Symposium Secretariat: World Meeting Corporation, 1-29-16-201 Shinjuku, Shinjuku-ku, Tokyo 160, Japan. Tel: 81-3-3350-0363; Fax: 81-3-3341-1830.

*October 13-15, 1994*

**Annual meeting of the American Society of Biomechanics (ASB)**, Ohio State University, Columbus, Ohio. Contact: Alan S. Litsky, M.D., Sc.D. Meeting Chairperson, American Society of Biomechanics, Orthopaedic Biomeaterials Laboratory, The Ohio State University, 834 Northbridge, Worthington, Ohio, 43235.

*November 10-13, 1994*

**International Symposium on the Neural and Neuromuscular Aspects of Muscle Fatigue**, University of Miami School of Medicine, Miami, Florida, USA. (a symposium to honour the contributions of Brenda Bigland-Ritchie to the field of muscle fatigue). Contact: Chris Thomas (cthomas@ummpcp.msmail.miami.edu).

*November 22-25, 1994*

**Second Russian Conference on Biomechanics** (in memory of N.A. Bernstein), Nijnii Novgorod, Russia. Secretariat: 603005, Russia, Nijnii Novgorod, Minin place, 10/1, Medical Institute. Tel: +7 (8312) 39 00 91; Fax: +7 (8312)365745; E-mail: bimech@hydro.nnov.su.

*April 26 - 30, 1995*

**Second National Conference on Sports Medicine and Science in Tennis**, Sonesta Beach Hotel, Key Biscane, Florida. Contact: USTA, Sports Science Department, 7310 Crandon Blvd., Key Biscane, FL 33149, USA. Tel: (305) 365-8710.

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.

November 9-12, 1995

2nd Interdisciplinary World Congress on Low Back Pain: The Integrated Function of the Lumbar Spine and Sacroiliac Joints, La Jolla, USA. Contact: UCSD, Office of Continuing Medical Education, UC San Diego School of Medicine, La Jolla, CA 92093-0617, USA.

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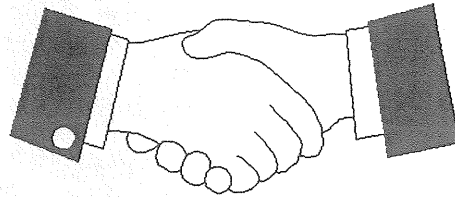
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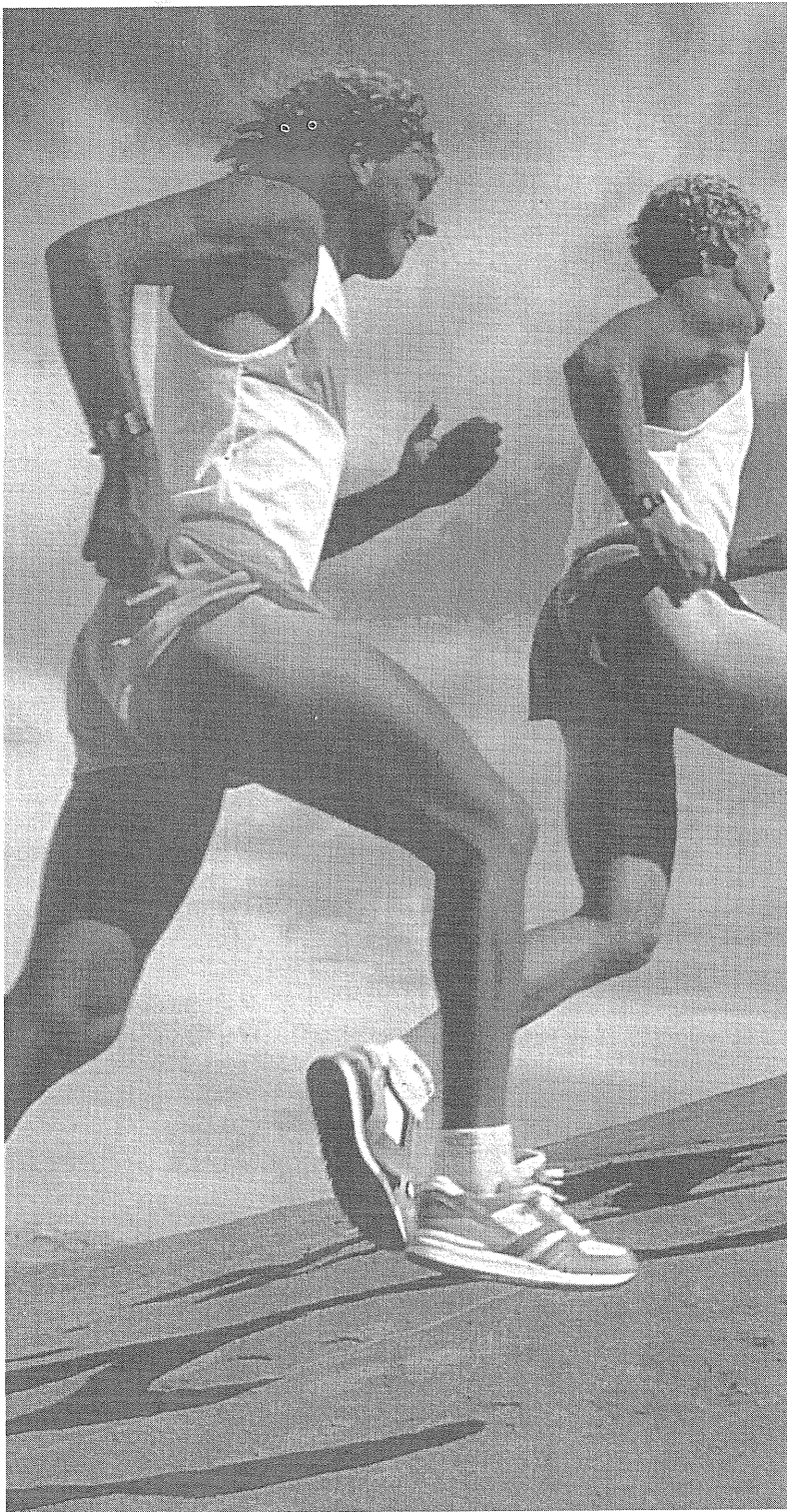
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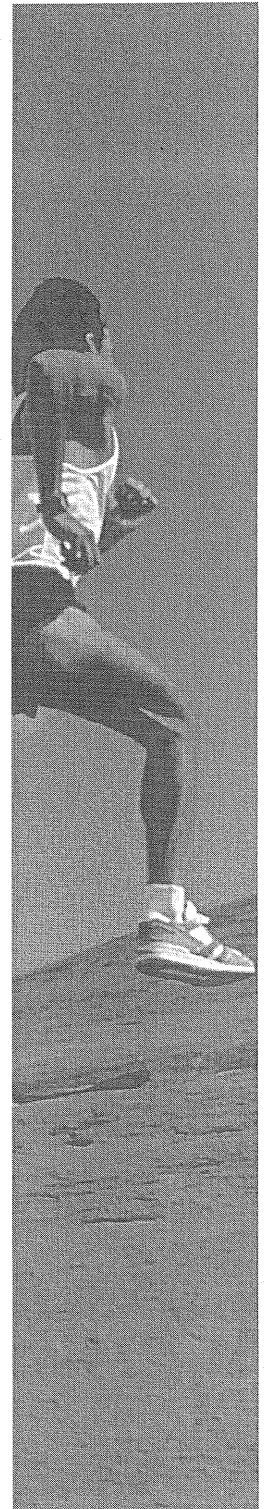


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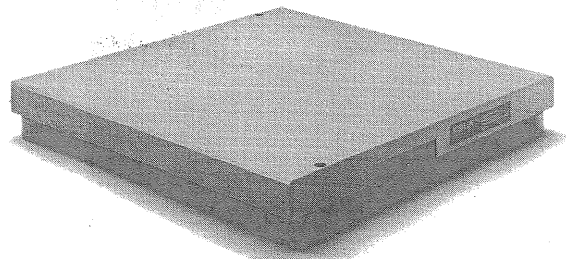
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