ISB

International Society of Biomechanics Newsletter

ISSUE Number 90
December 2003

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AFFILIATE SOCIETIES OF ISB:

American Society of Biomechanics; Australian and New Zealand Society of Biomechanics; British Association of Sport and Exercise Sciences; Bulgarian Society of Biomechanics; Canadian Society of Biomechanics/Société canadienne de biomécanique; Chinese Society of Sports Biomechanics; Comisia de Biomecanica Inginerie si Informatica (Romania); Czech Society of Biomechanics; Taiwanese Society of Biomechanics,Japanese Society of Biomechanics; Korean Society of Sport Biomechanics; Polish Society of Biomechanics; Russian Society of Biomechanics; Société de biomécanique (France).

Note from the President

As we end one calendar year and head into the next, it's natural to take some time to review the past and consider the present--all while looking forward to the future.

So first, let's consider some of our recent past as well as some present news…

I am pleased to report that the International Society of Biomechanics (ISB) Council is hard at work on a variety of initiatives. At the ISB conference in July, each of the council members was assigned duties and responsibilities. Now, I am looking forward to each person following through with his or her projects because their efforts, I'm sure, will yield great results. Know that we will be sure to keep you up-to-date about their progress and the continued benefits to ISB.

Who's doing what? For starters, Ewald Hennig takes over the Technical Groups Portfolio; Senshi Fukashiro is still in charge of oversight of Asian sponsorship and Bob Gregor continues doing great in providing updates as the Constitution and Codes Officer. (The latest vote on constitutional changes will be included in the next newsletter.)

As the new Informatics Officer, Joe Hamill has updated the ISB Web site and worked with Graeme Wood to provide Web membership registration. In addition, he is developing easier ways to do the job and resume--as well as other types of--listings.

Maarten Bobbert will remain the head of the Awards Portfolio. Motoshi Taya will set up the elections for the student representative this coming spring.

With regard to the 2005 ISB conference in Cleveland, Walter Herzog will continue to oversee the tutorials.

As Secretary General, Julie Steele continues to provide excellent minutes and continuity, keeping everyone focused on their action items. After many years in leadership roles, Graeme Wood is serving his last term as Treasurer and Membership Officer. Graeme provides much of the institutional memory for ISB, so we are working with him to ensure that his successor will be able to persevere in this crucial role. Furthermore, he is working with Joe Hamill to transfer many of the membership-related activities to the ISB Web site.

As President-elect, Brian Davis is in charge of soliciting proposals for the 2007 ISB conference. At the same time, he is 2005 conference organizer along with Ton van den Bogert. (Perhaps we should start calling him Superman!)

As Past President, Sandra Olney will be lining up the nominations for the next elections.

The ISB archives continue under the guidance of John Challis, who provides an overview in this newsletter (see page 7). Speaking of the newsletter, Karen Sogaard has done a fantastic job as the new ISB newsletter editor.

Jill McNitt-Gray will continue the Developing Countries and Affiliated Societies Portfolio (see page 16). In this issue, we will have a description of our newest affiliate, Australia and New Zealand. This kind of articles provide a unique opportunity to get to know how biomechanics is promoted in very different parts of the world. This insight into the different societies and their activities is one of the ways we get to know each other and facilitate international networking.

Now for a sad "goodbye." Benno Nigg, who has served ISB for many years as the liaison to the Journal of Biomechanics editorial board, is stepping down from this position. Benno leaves behind a tradition of excellence in biomechanics for those who follow him. I thank him for his service; we appreciate all of his hard work and dedication. He will be missed.

Not Taking Things for Grant(ed)

In the beginning of my note to you, I mentioned thinking about the future. That's exactly what we do when we award ISB grants to students.

ISB student grants are extremely important. For a time, I was on the Student Grant Committee; at one point, I headed it, and now I am back to being a member. And over the years, I've seen firsthand how these grants make a tremendous difference in young people's lives. When we award these grants, we are not just funding present-day research or a one-time project. We are providing intelligent men and women with the needed funds, and thus, the opportunity to excel and succeed. By doing this, we are fostering up-and-coming biomechanists, while at the same time ensuring that the future of the biomechanics field will be a great one.

As the Education Officer, Alex Stacoff continues to do an excellent job overseeing the ISB student grants. In fact, announcements for the next round of grants are in this newsletter (see Page 6) along with reports from past grant recipients. But we can't continue to fund these grants without more money. In this vein, Mark Grabiner is heading up a new drive for ISB sponsorship. To gather additional sponsors, he will be soliciting contributions from the corporate world. So if you know a business that would be a prime candidate to target for sponsorship, we would really like to know.

Please feel free to contact Mark via e-mail at grabiner@uic.edu.

Changes are happening all the time in the ISB. And, although it's human nature to be fearful or want to avoid change, as you can see from all the positive happenings here, change can also be quite good.

Happy New Year! See you next issue.

Sincerely,

Dr. Mary Rodgers

ISB Student Dissertation Award Report
Thomas Ward, University of Oxford

Research Topic: In Vivo Mechanics of Knee Replacements

The ISB generously provided me with $2000 to assist with my research into modelling the kinetics and kinematics of Total Knee Replacements. These funds were used to construct a step and a calibration frame and to pay for other items such as tools for adjusting the step.

The purpose of this research is to investigate the relationships between knee joint mechanics, knee replacement design, and patient satisfaction. The novelty of the study is its simultaneous assessment of patellofemoral kinematics and kinetics *in vivo* using a combination of non-invasive measurement and theoretical modeling. It is hoped that the results of the investigation will lead to improved TKR designs and surgical techniques.

After eighteen months into my D.Phil. at the University of Oxford, the data collection phase of the project has been completed, with 110 patients in three centres having been studied. The different knee replacement designs tested included : AGC (Biomet), Scorpio (Stryker), Sigma (DePuy) and the Oxford Unicompartmental Knee (Biomet).

Each patient performed a step-up onto a custom made step in view of a fluoroscope. A calibration frame was used to map the image coordinates to the forceplate coordinate system. The images were corrected for distortion and calibrated using an image of the calibration frame.

The kinematics of the knee replacements were characterised by finding the Knee Flexion Angle, the Patellar Tendon Angle and Patellar Flexion angle.

The kinetics of the knee replacements were characterised by comparing the ground reaction forces of the designs. A patellofemoral model is being used to compare the patellofemoral contact forces.

A cadaveric validation study of the patellofemoral model is being performed using asix degree of freedom patella force transducer.

I very much look forward to the XIXth ISB Congress in Dunedin, where I will present some preliminary results of my work. I would like to express my gratitude to the ISB for providing me with the funds which enabled me to make a confident start to my doctoral studies.

ISB Student Travel Award Report
Christopher Plaskos

Development and validation of a generalized parametric model of the knee for use in 'CT-free' surgical navigation and preoperative planning

Firstly, I would like to thank the ISB scholarship committee for awarding me an international travel grant for my trip to southern United States in June 2002. The purpose of my visit was two-fold: 1) to gain valuable experience in the area of parametric knee models at the established *Institute for Orthopedic Research and Education* in Houston Texas, and 2) to meet with other international scientists, surgeons and students who develop and use these models at the third international conference on *Computer Assisted Orthopaedic Surgery (CAOS)* in Santa Fe, New Mexico.

Upon my arrival at Houston's *Baylor College of Medicine*, I was cordially greeted by Dr. Philip Noble and Dr. Michael Conditt, directors of the *Center for Advanced Technology in Orthopedics*, and introduced to their diverse team of skilled researches. The laboratory concentrates on the experimental and virtual simulation of joint function and is actively involved in the development and validation of computer-assisted surgical (CAS) technology, so I was particularly excited to meet and work with the group. During my ten day visit, I had several opportunities to observe and participate in the many exciting talks and projects going on there. I also had a few days to work on my proposed investigation, which involved developing and validating a generalized parametric model of the knee for use in the pre-operative and intra-operative stages of 'CT-free' CAS.

Over the course of my stay, I learned a great deal about the formulation of statistical shape models, which basically entails the following stages; first a set of three-dimensional training shapes are acquired, for instance, by direct digitization of saw-bones, or from a CT data-base of femoral and tibial surface models; next the shapes are aligned and a mean shape is constructed; lastly principle component analysis is used to derive a modal representation of the shapes, giving us a way of expressing how individual points tend to move together in three-dimensional space as the overall shape varies. Although it was unfortunately not possible for me to complete all the components of my proposed project during my short stay, I did learn how to take coronal and sagittal radiographs of a femur, scan these films into a digital image format from which we could segment the two-dimensional bone profile projections, and create a three-dimensional envelope that a generalized parametric or statistically-based knee model could be scaled to. This would allow us to generate three-dimensional bone models for use in both the pre-operative planning and intra-operative navigation stages of knee surgery using only ordinary X-ray images.

After my visit at the institute, we traveled to the *CAOS* conference in the nearby state of New Mexico, where Dr. Conditt and Dr. Noble presented some of their research on using navigation systems to quantify skill level and to train surgeons in the art of knee replacement surgery. I also presented some of my Master's thesis work at the conference, which reported on the development and validation of a mathematical model for predicting forces and accuracy in bone milling operations, with applications to computer-assisted knee replacement surgery.

At the *CAOS* meeting, I had several opportunities to interact with many internationally renowned scientists and surgeons, and to discuss with them the various clinical challenges and research projects currently active in our field. Interestingly, it was here that I first meet Dr. Philippe Cinquin and Dr. Stephané Lavellée from the TIMC laboratory (*Techniques de l'Imagerie, de la Modélisation, et de la Cognition*) and the company PRAXIM, who are now co-supervising my Ph.D. at the *Université Joseph Fourier* in Grenoble France. Other interesting aspects of the meeting included several workshops and demonstrations of a number of commercially available CAOS systems, and an awards ceremony that was held at a western style movie studio ranch in the desert.

In summary, my trip was an enlightening educational experience for me, and I strongly encourage my fellow ISB members and students to apply and take advantage of this wonderful opportunity. I would like to once again express my gratitude to the International Society of Biomechanics for providing me with a travel grant for this trip, which would not have been possible otherwise. In addition, I would like to thank Dr. Michael Conditt and all the lab members at the institute in Houston for their warm hospitality during my visit, and I also thank my Master's degree supervisor Dr. Antony Hodgson, who is now also co-supervising my Ph.D. degree.

Australian and New Zealand Society of Biomechanics

At the recent ISB General Assembly Meeting the Australian and New Zealand Society of Biomechanics (ANZSB) was approved as an Affiliated Society of ISB. This article is included to provide ISB members with further information about the ANZSB.

The ANZSB was created as a result of the First Australasian Biomechanics Conference (ABC1) hosted by the Division of Biomechanics of The University of Sydney in February 1996. The mission of the society is: *To promote the scientific study of biomechanics and the application of biomechanical theory within Australia and New Zealand.* One of the main aims of forming this society was to be inclusive of all areas of biomechanics research, and to provide a comprehensive focus of activities undertaken by people from a range of professional groups.

Membership of the society is open to persons who have an interest in the study and/or practice of biomechanics. The society now has approximately 100 members from across Australia and New Zealand. One of the major activities of the society is the biennial Australasian Biomechanics Conference, of which four have been held to date. The conferences have been highly successful in facilitating interaction with members and non-members alike, typically reflecting a local focus from the host institution, and enabling participants to gain knowledge from local expertise in the form of invited lectures. Student participation is a strong feature of all such conferences, with a number of prizes awarded for outstanding presentations. In this way, the next generation of biomechanists are able to participate in such events in a friendly, informal and supportive environment. The next conference, ABC5, is currently in the planning stages, and will aim to be held in late 2004/early 2005.

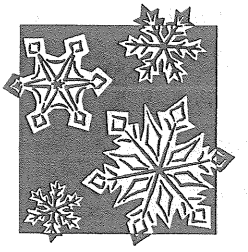
The society has recently achieved formal representation on the Editorial board of the Journal of Biomechanics, in the form of Dr.

David Lloyd (University of Western Australia) and Professor Peter Hunter (University of Auckland). The ANZSB is also a Participating Organisation in the Bone and Joint Decade 2000-2010, and has contributed to regional promotional and government lobbying activities via the National Action Network of the Bone and Joint Decade (Australia).

Current activities of the ANZSB Executive include a recent revision of the Constitution, and investigating innovative ways in which the student members of the society can be supported in enhancing their skills as developing biomechanists.

Further information about the Australian and New Zealand Society of Biomechanics can be obtained from the society's website: http://www.anzsb.asn.au/

Tim Barker, PhD
ANZSB President



International Society of Biomechanics (ISB)
Student Grant Guidelines 2004

Student members of ISB are eligible for the following two grants. A number of competitive grants will be awarded each year. All grant amounts are shown in US dollars.

1) The Matching Dissertation Grant Program:

There will be several competitive grants of $2000 made for doctoral dissertation research. A condition is that the applicant will have a commitment from her/his institution or another source to provide a further matching $2000. This program is applicable to those who are doctoral candidates and are seeking assistance with costs of their dissertation research. Applications should include the following:

- a three page summary which includes the purpose, hypotheses, reference to key related literature, study design, methods, timetable for the measurements and budget;
- a CV of the applicant: 2-3 pages in length (including list of publications, current grade point average, results of any standardized tests that the applicant has taken (i.e. GRE));
- a document from her/his institution or other source which ensures provision of the matching $2000;
- a one page recommendation from the dissertation advisor who must also be an ISB member at the time of application.

Applications are to be received by January 23, 2004. Notification to applicants will be by March 26, 2004. Recipients will present results at the next ISB Congress in 2005 and acknowledge ISB support in any publications. A report to the ISB Council and the ISB Newsletter will include accounting of how funds were spent. Recipients will be encouraged to publish their work in one of the ISB-affiliated journals.

2) The International Travel Grant Program:

In order to allow student members to travel abroad to experience science in other cultures, we will offer several grants of $2000 for travel related to biomechanics research. A report on the accomplishments during the trip will be expected by the committee. Applications should include:a three page proposal which includes the purpose of the visit, timetable, activities to be involved in, the total budget for the visit (including other financial assistance, etc.);

- a CV of the applicant: 2-3 pages in length (including list of publications, current grade point average, results of any standardized tests that the applicant has taken (i.e. GRE));
- a document from the host institution verifying support for the visit;
- a recommendation letter of support for the travel from the applicant's supervisor who must also be an ISB member at the time of application.

Applications are to be received by January 23, 2004. Notification to applicants will be by March 26, 2004. A report to the ISB Council and the ISB Newsletter will include accounting of how funds were spent. Recipients will be encouraged to publish their work in one of the ISB-affiliated journals.

Final notes:
Please be aware that applications can only be accepted from FINANCIAL member applicants and supervisors, so please pay the fees in time.
Provide the ISB membership number in your application. It can be obtained from treasurer Graeme Wood under: gwood@cygnus.uwa.edu.au (For full details see the council contact list in this issue)

ISB student grants do not cover indirect costs.
ISB student grants are intended for students only, not post-docs.
First time applicants are preferred, but others can be considered if the funds allow.
The evaluation committee is authorized to limit the number of applications per institution.

Grant applications (email and airmail) and reports (email) should be mailed to:

Dr. A. Stacoff
Laboratory for Biomechanics,
Department of Materials
ETH Zürich,
Wagistrasse 4
8092 Zürich
SWITZERLAND
Tel: ++41 1 633 62 18. Fax: ++41 1 633 11 24
Email: stacoff@biomech.mat.ethz.ch

International Society of Biomechanics (ISB)
NOTES FROM THE ARCHIVES

The ISB has an archive of its important materials, kept at Penn. State University. Along with the constitution the archive contains a wealth of information about the society, including the minutes of executive council meetings, finance records, meeting proceedings, and other materials. Here are a few snippets from the ISB archive that you may find interesting.

The ISB was formed in 1973 and has held a conference every odd year since (that's every year not exactly divisible by two using the Gregorian calendar, not years that are particularly unusual!). The ISB have held 15 or 16 congresses (depending on where you start counting), but the most recent conference in Dunedin (New Zealand) the 19th congress. This is because biomechanics congresses have been held since 1967, before the ISB was formed. The list of conferences and their geographical locations are given below.

Conference Number	Year	Location
I	1967	Zurich, Switzerland
II	1969	Eindhoven, Netherlands
III	1971	Rome, Italy
IV	1973	State College, USA
V	1975	Jyvaskyla, Finland
VI	1977	Copenhagen, Denmark
VII	1979	Warsaw, Poland
VIII	1981	Nagoya, Japan
IX	1983	Waterloo, Canada
X	1985	Umea, Sweden
XI	1987	Amsterdam, Netherlands
XII	1989	Los Angeles, USA
XIII	1991	Perth, Australia
XIV	1993	Paris, France
XV	1995	Jyvaskyla, Finland
XVI	1997	Toyko, Japan
XVII	1999	Calgary, Canada
XVIII	2001	Zurich, Switzerland
XIX	2003	Dunedin, New Zealand

The size of the congress has grown substantially, from 62 papers, with a total of 78 authors (ratio – 1.26) in 1967, to 850 papers and 1956 authors (ratio – 2.30) in 2001.

[*If you have any materials you think should be in the archive, and you would consider donating them to the archive please contact John Challis (jhc10@psu.edu).]*

Obituary: Professor Carmelo Bosco

Professor Carmelo Bosco has died last night in Italy after a long battle with cancer. We are stunned by this great loss for the science of biomechanics.

Carmelo Bosco was born in Militello Val Catania (Italy) the 4th of July 1943. He received a Bachelor of Science in the ISEF of Torino in 1968, his Msc. in Jyvaskyla (Finland) in 1975, his PhD in exercise physiology and biomechanics in Jyvaskyla (Finland) in 1982. In 1992 he received another doctoral degree (D.U.) in sport biomechanics in the University of St. Etienne (France). Finally, in 1994 received an honorary doctorate from the Hungarian University of Physical Education in Budapest (Hungary).

He was known as a meritorious, outstanding scientist and stimulating personality from many students and scientists around the World. He published over 150 scientific works, including monographs and handbooks, and patented several unique equipments and methods of testing athletic performance. Was invited speaker in many countries and was scientific consultant for prestigious sport clubs, sport organizations and industries.

Carmelo produced great research work on the stretch-shortening cycle, training methodology, resistance exercise and finally vibration. His masterpieces on those topics will always keep him alive and will help many generations to understand the biophysical phenomena related to neuromuscular performance.

I was blessed to work with him before and during my Ph.D. (Semmelweis University). Carmelo was definitively an intense personality to work with, extremely passionate, unbelievably knowledgeable and incredibly stimulating. Working with him was at times conflictual but definitively stimulating, challenging and rewarding. I will always remember his advice, his passion about research and knowledge and his easy going personality. I will never forget the long days of work talking about science and life in front of a good glass of wine and with Mozart music in the background and the common excitement in analysing research data and writing scientific reports.

I believe that Carmelo touched many people with his knowledge and passion for biomechanics and his creative and innovative applications to physical training. That's why I'm sure I speak for many others in the biomechanics community when I say our thoughts are with Carmelo's family. We, too, will miss a valued colleague and a good friend.

Marco Cardinale, Nov. 24, 2003

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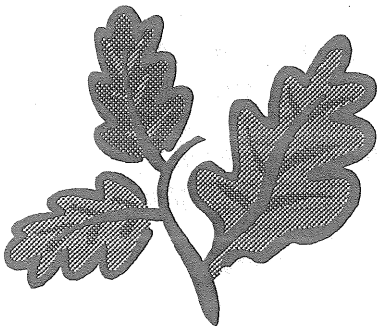


CALL FOR PROPOSALS FOR:

THE XXIth CONGRESS OF THE INTERNATIONAL SOCIETY OF BIOMECHANICS (2007)

Persons or groups interested in organizing an International Congress on Biomechanics are invited to prepare and submit a formal proposal to the ISB Executive Council through the President-Elect. Included in the proposal should be detailed information about the following aspects:

1. *Organizer*
Describe research interests and activities of the proposed organizer(s) and explain, why you desire to organize the Congress. Provide a description of your institution or department with its principal areas of research.
2. *Dates*
Indicate the exact dates proposed for the Congress. Careful consideration should be given to university vacation periods in major countries, and the attractiveness of visiting your part of the world at that time of the year.
3. *Support*
Outline your sources of financial support such as government, university, institutes, industry, sports organizations, etc. If possible enclose a letter of support from the chairman of your Department, Institute Director, President of the University or a similar official. Add a list of professional organizations willing to sponsor the Congress.
4. *Personnel*
Provide evidence of the availability of organizational personnel such as secretaries, housing co-ordinators, business managers, etc.
5. *Budget*
Submit a provisional budget including the major financial arrangements. Indicate the estimated congress fee for participation of members and non-members and list the activities included by this fee.
6. *Facilities*
Provide details of the following:
Housing. Type and approximate cost of accommodation, proximity to Congress meeting place.
Meals. Location and cost.
Meeting rooms. Number of meeting rooms available for the congress, audio-visual systems, capacity of rooms, etc.
Recreational facilities available to participants. Sport fields, swimming pool, running track, exercise room, gymnasium, etc.
Book and equipment exhibit area(s). Possibilities for book and equipment exhibitions.
Research laboratories, planned tours, demonstrations, etc.
7. *Travel arrangements*
Outline the different ways to travel to the Congress, by air, train, bus, boat, private car, etc. Name candidates for official travel agency and airline, if appropriate. Make provision for travel assistance to participants during the congress
8. *Advertisements*
Detail your plans for promoting and advertising the Congress.
9. *Reviewing*
Describe your plans for the reviewing of submitted abstracts and the preparation of the Book of Abstracts.*10. Publication*
Indicate your plans for editing of manuscripts and for publication of the key-note and award-winning papers. *11. Activities*
Mention the historical and cultural activities available to participants during or after the conference. Also include your plans for special programs for accompanying persons.
12. *Climate*
Describe the climate to be expected in the area and for the period of the proposed Congress.

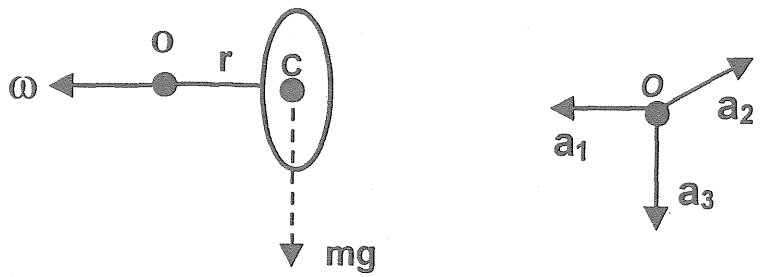
Two copies of the proposal should be submitted by **Feb 1, 2004** to:

Brian L. Davis, Ph.D.
Dept. Biomedical Engineering (ND20)
Cleveland Clinic Foundation
9500 Euclid Ave
Cleveland, Ohio 44195
USA

Tel: (216) 444-1055
Fax: (216) 444-9198
Email: davis@bme.ri.ccf.org

Descriptive brochures and other helpful information material should be included. Each proposal will be reviewed and compared to other proposals by members of the Executive Council of ISB. The final decision will be made by the Council of ISB.

SOLUTION TO LAST MONTH PUZZLE
GYROSCOPE PROBLEM



The gyroscope is released with an angular velocity ω about its axis of symmetry a_1 but with zero velocity of this axis.

Case 1: The system has one additional degree of freedom about a vertical axis through O
Although the weight exerts a torque mgr about O there will be a reaction torque at O on release that is equal and opposite in order to maintain the axis horizontal. The net torque on the system will therefore be zero and there will not be a tendency to precess. In this case the three questions have no relevance.

Case 2: The system has two additional degrees of freedom about O
For a rigid body with one point fixed, if the angular momentum L is measured in the frame of the rotating body

$\frac{d\mathbf{L}}{dt} + \boldsymbol{\omega} \times \mathbf{L} = \boldsymbol{\tau}$, where $\boldsymbol{\omega}$ is the angular velocity vector and $\boldsymbol{\tau}$ is the torque.

Euler's Equations express this in the form:

$$I_1\dot{\omega}_1 - \omega_2\omega_3(I_2 - I_3) = \tau_1 \qquad (1)$$

$$I_2\dot{\omega}_2 - \omega_3\omega_1(I_3 - I_1) = \tau_2 \qquad (2)$$

$$I_3\dot{\omega}_3 - \omega_1\omega_2(I_1 - I_2) = \tau_3, \qquad (3)$$

where I_i are the principal moments of inertia about the body axes a_1, a_2, a_3 which may be defined so that a_3 always lies in the plane containing a_1 and the vertical through O.

In this example $I_2 = I_3$ and $\tau_1 = 0$ so that $\omega = \omega_1$ is a constant of the motion. Note that the component of angular velocity ω_1 about the axis of symmetry a_1 is not the same as the rate of change of the Eulerian angle defining orientation about this axis.

Initially the gravitational torque mgr will cause the mass centre C to fall vertically, rotating about a_2 so that ω_2 will increase from zero. Equation (3) implies that ω_3 will increase from its initial value of zero. Thus the system will have gained a precessional velocity about a vertical axis through O.

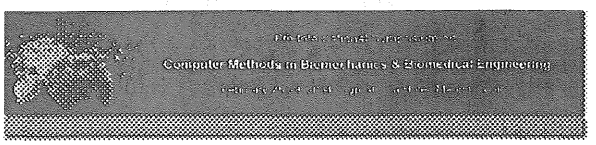
Note that this will not be steady precession but will comprise a series of cusps in which the mass centre C falls and rises. At the lowest point of this cycle C will be moving horizontally ($\omega_2 = 0$) and the additional kinetic energy will be equal to the work done by gravity in falling to a lower level.

In this case the answers to the three questions are:
1) The increase in kinetic energy comes from the work done by gravity in attaining the lower position. However there is no overall increase in the energy of the system.
2) The precessional energy arises from a loss in gravitational potential energy.
3) A centripetal force is needed in the point of support since Newton's Second Law still applies. The path of the mass centre lies on the surface of a sphere rather than on a circle.

Fred Yeadon

Upcoming Meetings, Workshops

2004



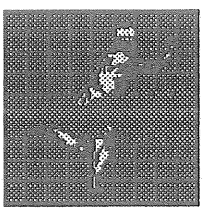
6th International Symposium on Computer Methods in Biomechanics & Biomedical Engineering
Dates: February 25-28, 2004,
Venue: Tryp Atocha Hotel, Madrid, Spain
Information:
See website:http://www.uwcm.ac.uk/biomadrid/

AP Biomech 2004
First Asian Pacific Conf. on Biomechanics
Dates: March 25-28, 2004
Venue:
Osaka University, Osaka, Japan;
Mechanical and Bioengineering Systems Lab.
Information:
E-mail: apbiomech@me.es.osaka-u.ac.jp
See website: http://apbiomech.me.es.osaka-u.ac.jp/

GCMAS IX

Gait and Clinical Movement Analysis Society Annual Meeting
Dates: April 21-24, 2004
Venue:
Hyatt Regency and Lexington Convention Center, Lexington, Kentucky, USA
Information:
See website: http://www.amrinc.net/gcma/index.cfm

ISEK XV
International Society of Electrophysiology and Kinesiology



Dates: 18-21 June 2004
Venue:
"An Invitation to Innovation"
Boston University, Boston, MA, USA
Information:
E-mail: Dr. Serge Roy, sroy@bu.edu
See website: http://isek2004.bu.edu/

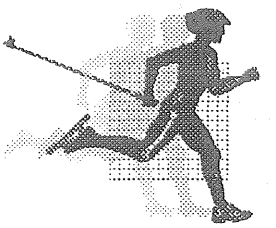
ESB 2004
The 14th European Society of Biomechanics conference
Dates: 4-7 July 2004
Venue:'s-Hertogenbosch
Eindhoven University of Technology
Department of Biomedical Engineering,
P.O. Box 513, 5600 MB Eindhoven, The Netherlands
Tel: + 31 40 24 72 851
Fax: + 31 40 24 47 355
Information:
E-mail:esb2004@tue.nl
See website: http://www.esb2004.tue.nl

ICVPB 2004 Marseille

International Conference on Voice Physiology and Biomechanics
Dates: August 18-20, 2004
Venue: Marseille (France)
Information:
E-mail: agiovann@ap-hm.fr
See website: http://icv2004.free.fr

CSB XIII
Canadian Society for Biomechanics / Société canadienne de biomécanique
Dates: 4-8 August 2004
Venue:
Westin Hotel, Halifax
Information:
Contact: Dr. Cheryl Kozey, Dalhousie University, Halifax, clk@dal.ca
See website: http://www.csb2004.ca

ISBS XXII
International Society of Biomechanics in Sports



Dates: 9-12 August 2004
Venue:
University of Ottawa
Ottawa, Ontario, Canada
Information:
E-mail: ISBS2004@uottawa.ca
See website: http://www.health.uottawa.ca/isbs2004/

American Society of Biomechanics, Annual Meeting
Dates: 8-11 September 2004
Venue:
The Lloyd Center Ballroom
Doubletree Lloyd Center Hotel
Portland, Oregon
Information:
Email: Dr. Michael Bootlang, mbootlang@lhs.org
See website:
http://www.legacyhealth.org/healthcare/research/asbconf.ssi

5th Conference on Engineering of Sport
Dates: 13-16 September 2004
Venue:
University of California, Davis
Sponsored by International Sports Engineering Association and Bioengineering. Division of ASME
Information:
Se website: http://conferences.ucdavis.edu/sportengr

Third International Workshop on Virtual Rehabilitation
Dates: 16 and 17 September 2004
Venue:
EPFL, Lausanne Switzerland,
Information
Email: Daniel Thalmann and Greg Burdea, Cochairs, 2004@iwvr.org
Se website: http://www.iwvr.org

2005

ISB XX
International Society of Biomechanics Congress
Dates: 1-5 August 2005
Venue:
Cleveland, Ohio, USA
Information:
E-mail: info@isb2005.org
See website:
http://www.ISB2005.org

ISPGR XV

International Society for Postural and Gait Research
Dates: tba
Venue:
Marseille, France.
Conference Hotel: tba
Information:
Dr. C. Assisante

2006

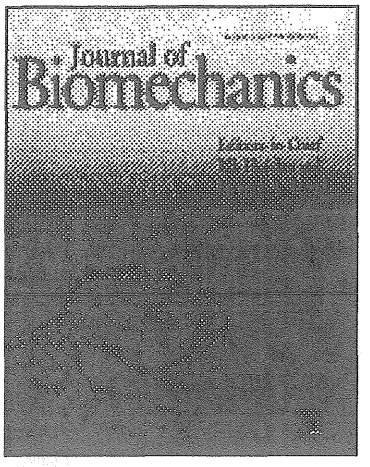
5th World Congress of Biomechanics
Dates:, 29 July – 4 August 2006.
Venue: Munich, Germany
Information:
Email: Prof. Dr.-Ing. habil. Dieter Liepsch, info@WCB2006.org
See website:
http://www.wcb2006.org/

Editors notes and requests:

Many thanks to Fred Yeadon who responded to the puzzle in the last Newsletter. As this was the only suggestion for a solution the choice was simple. New puzzles are welcomed for the coming issues!.
Another feature that helps keeping the Newsletter dynamic is the description of the associated societies and their current activities. This is in this issue started with the description of ANZSB, but more are in the pipeline for the spring Newsletter.
Further the historic aspect is started with some information from the archives. But probably among the ISB members additional factual as well as anecdotic information of the ISB history exist. Any contributions in this area are welcomed and also suggestions of people who may be able to tell a good story in an interview. Please send your contribution in electronic form in any form of English to ks@ami.dk

Karen Søgaard , Newsletter Editor

Journal of Biomechanics



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R. Huiskes and F. Guilak
ISSN: 0021 929 0

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From The Treasurer – Dr Graeme A Wood:
Membership Renewals

Enclosed with this Newsletter is your "invoice" for 2004 Membership Dues and Journal Subscriptions. Please return this form by fax or mail, or visit the Society's website (www.isbweb.org), to renew for next year. We are currently updating the website process so that you will be able to make changes to your personal details as well as make payments. The new process will be password protected – just follow the prompts and have your membership number on hand. I strongly encourage you to renew *via* the website – it saves both of us some time!

Note from the Affiliated Societies & Developing Countries Officer: Jill McNitt-Gray

Affiliated Societies

The ISB society is interested in promoting and stimulating international collaboration between national and international biomechanics societies. Biomechanics societies currently affiliated with the ISB include Romania, Poland, China, Czech, Slovak, Bulgaria, USA, Canada, Japan, Britain, France, Korea, Australia and New Zealand. ISB would like to expand their affiliation with other international and national societies of biomechanics. If you know of national or international biomechanics societies that are interested in becoming affiliated with ISB, please contact Jill McNitt-Gray at mcnitt@usc.edu.

Promotion of Biomechanics in Economically Developing Countries

ISB is interested in stimulating biomechanics related research and promoting international collaboration in economically developing countries. ISB would like to invite all ISB Affiliated Societies in economically developing countries to submit a two page proposal outlining their current needs and ways ISB can facilitate their efforts related to biomechanics related education, research, and communication. This may include support for education and training of students, biomechanics related research, technical training, or travel of speakers to regional or national conferences economically developing countries.

If you are interested in assisting the ISB Executive Committee in undertaking actions approved by the ISB council by facilitating communication between ISB and an Affiliated Society, please contact Jill McNitt-Gray at mcnitt@usc.edu

Modelling in biomechanics

A thematic issue compiled and edited by J van Leeuwen and P Aerts
Published September 2003

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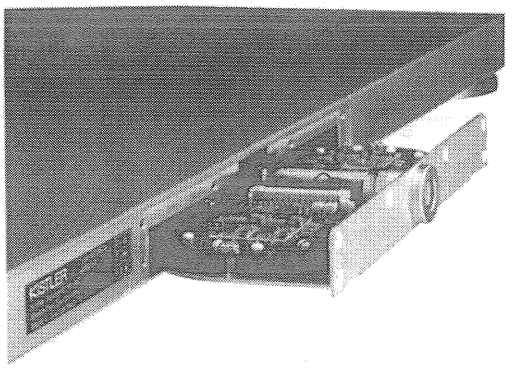

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