University of Colorado
Colorado Springs

Graduate Executive Committee
September 11, 2015
Minutes

Attendees: Molly Maxfield, Ron Koch, Jeff Spicher, Margaret Harris, Sylvia Martinez, Don Klingner, Ian Smith, Emily Skop, Mandi Elder, Cindy Zomchek, Wang Chao, Jose Mora, Steve Miller, Craig Elder, Karen Livesey, Sandy Berry-Lowe, Sudhanshu Semwal, Chris Bell, Michael Calvisi, Anna Kosloski, Chris DuVal, Nanna Mayer, Kelli Klebe, KrisAnn McBroom

Announcements

Fall 2015 GEC Meetings (10:00-11:30; All Fall meetings are in UC 124): Oct 9; Nov 13, Dec 11

Spring 2016 GEC Meeting (10:00-11:30): Feb 12 (UC 124), Mar 11 (Dwire 204), April 8 (Dwire 204), May 13 (Dwire 204)—scheduled but same day as Graduation; we'll need to determine a plan

Upcoming Events:

- Graduation Paperwork work sessions for students (In AOB 101):
  September 15th 12:00 pm - 3:00 pm OR September 16th 9:00 am - 12:00 pm

  This is not required, but is an opportunity for your students to get their paperwork completed and ask questions as they fill it out. They can stop in any time during the designated hours below.

- Understanding the IRB Process for Faculty and Graduate Students
  Date: September 25, 2015
  Location: Library (EPC) Room 239
  Session 1: Purpose, Process and Review 1:00-2:30pm
  Session 2: Working Session 2:30-4:00pm (you may leave when you are done)

- Graduate School Fair: For UCCS students and community members
  October 13th 11am-1pm: Berger Hall
  Similar to last year, other universities will be present as well
  Please contact Sarah Elsey (selsey@uccs.edu) if you have any questions.

Business

- **Welcome Back**: Thanks for your service to graduate students.
- **Clinical Doctoral Capstone**: Due to program accreditation requests clarifications were unanimously approved to be changed in the Policies and Procedures Manual. The word "Project" will be added to areas where "Capstone" is discussed in the manual to ensure inclusion of program specific requirements. Sections below were approved. GEC members unanimously approved these clarifications.

Clinical Doctorate Capstone

- **Check throughout policies to make clinical doctorate capstone more general**
- **Change Section on Clinical Doctorate Advisory Committee**

Strike out indicates removal; underline indicates addition

Clinical Doctorate ~~Capstone~~ Advisory Committee: This committee shall consist of a ~~capstone~~ chair and two other committee members of the graduate faculty. One member of the committee may be from another institution, provided the committee member has been granted Special membership on the graduate faculty. Upon the recommendation of the ~~capstone~~ advisory committee chair, the committee is appointed by the program director with the approval of the college/school dean and forwarded to the Graduate School.

Section E: Examinations

1. Master's Degree Examinations….

2. Doctoral Degree Examinations…

   a. 5. Dissertation Defense. After the dissertation has been accepted by the student's dissertation advisor, a final examination of the dissertation and related topics will be conducted by the Dissertation Advisory Committee. The examination is open to anyone who wishes to attend. A successful candidate must receive the affirmative vote of a majority of the members of the dissertation committee. In case of failure, the examination may be attempted once more after a period of time determined by the committee. A student must be registered for at least 1 dissertation credit or candidate for degree status during the semester (or summer session) in which the dissertation defense is held. The Graduate School must be notified of the dissertation defense at least two weeks in advance of the scheduled date of the defense, which must be no later than 18 days before the final day of the semester of graduation.

   b. Clinical Doctorate Degree
      1. *Capstone/Project Proposal.* An examination to determine the preparedness of the student and the appropriateness of the topic, prior to commencing work on the project.
      2. *Capstone/Project Defense.* After the capstone is completed, a final examination will be conducted by the ~~Capstone~~ Advisory Committee. The examination is open to anyone who wishes to attend. A successful candidate must receive the affirmative vote of a majority of the members of the capstone committee. In case of failure, the examination may be attempted one time after additional requirements determined by the committee are completed. A student must be registered for at least ~~3~~ 1 credit hour or as candidate for degree during the semester in which the capstone defense is held. The Graduate School must be notified of the capstone defense at least two weeks in advance of the scheduled date of the defense, which must be no later than 18 days before the final day of the semester of graduation.

Section G: Thesis/Dissertation Requirements

Doctoral Capstone/Project

Students pursuing clinical doctoral degrees are required to complete a capstone or culminating project in partial fulfillment of the requirements for a clinical doctorate at the University of Colorado Colorado Springs. The capstone/project courses shall represent 10 semester credit hours of work. Style requirements and format for the capstone/project are determined by the department.

- **Dissertation/Thesis/Capstone Credits:** A discussion around the role and use of dissertation credits at UCCS took place. Faculty gave ideas of best practices in their departments. Some departments have grades given at milestones to ensure that work is being completed, others like the freedom of giving grades at the end, while maintaining connection with the students during the work. Programs recommended that for thesis and dissertation courses, a cap of 6 or 30 (respectively) be placed so that a student must have special permission to take more than the required number of credits.

Dean Klebe made the following comments

- Dissertation/thesis/capstone (not associated with a class) are credits students take while they are working on their projects. They are using university resources so need to pay tuition. Enrollment in these credits also allow students to be eligible for financial aid and indicate the student is attending full-time, which students use to verify health insurance as well as deferring student federal and private loans while working on the program requirements of thesis and dissertation work.
- How the Financial Aid Office determines student ***satisfactory academic progress for*** eligibility for financial aid:
  - Students are enrolled in courses and receive a grade (A, B, C, D, F) which allows for computation of completion of attempted credits and GPA.
  - Receiving a grade provides information about whether a student is making satisfactory progress.
  - IP grades in dissertation/thesis credits imply a student is active and making progress. Financial Aid staff and Records staff have maintained student active status and enrollment with the premise that if a faculty assigns an IP grade then student is making satisfactory progress on the thesis/dissertation. The student is also kept as an active student in the records area of the student information system (SIS).
- Thesis/dissertation credits should not be used as a place holder for students in a program or to remain as an active student in the academic program or as a way to allow students to receive financial aid.
- Misuse of dissertation/thesis may lead to potential allegation of financial aid fraud and investigations of campus, program and/or student. This could stop all financial aid to a campus.
- Once students completes all other course work, a program can request student to be continually enrolled in dissertation/thesis or candidate for degree but the program needs to ensure that students are actually conducting work and finishing dissertation/thesis in timely fashion.

- The graduate school will be exploring:
  - An enrollment status that allows students to stay enrolled for a nominal fee while on stop-out status. Other universities have demonstrated some connection with the university and increases likelihood of student to return to the program.
  - A coded for enrolling in dissertation credit hours. This requires that students will at least need to let someone in the department know they are registering for credit hours and there can be a check to make sure student is active.

If you have questions or concerns, please feel free to contact me (Kelli Klebe, kklebe@uccs.edu)

- **Satisfactory Academic Progress**: Each department needs procedures for determining if a student is making satisfactory academic program. Each department needs to submit a written copy of its procedures to the Graduate School so we have them on file. Must submit by end of fall term (December 18th, 2015). Best practices would suggest that you also communicate to students how they are doing in the program. Grades may be one consideration but the policy should also include other milestones or areas not reflected by grades (e.g., research milestones researched, professional development).

- **Thesis submission is moving to electronic** this Fall 2015 (see below): The Graduate School have the new forms out on their website for the submission procedures and will have the updated thesis and dissertation manual out soon. Ron Koch has offered to provide walk through training for staff and faculty who would like to see what the submission process is like for the student. Please contact Ron Koch (rkoch@uccs.edu) if you are interested.

- **Stop-out Policy**: The Graduate School has brought a draft stop out policy to the meeting. The faculty had questions about what the process would look like for the faculty and what types of forms would be needed. Some programs expressed a current set-up in their program to work with students who are wishing to stop-out of their program for a designated period of time. The Graduate School will work on the draft proposal as well as the processes and bring to a future meeting.

Draft Stop Out Policy

If a student needs to stop enrolling in courses or is not actively engaging in thesis/dissertation/capstone work for more than one semester, the student will need to request to stop out from the program. A stop-out may occur for up to two years (6 continuous semesters including summer). Programs may have shorter stop out periods. After two years the student will need to reapply to the program to determine if they are still eligible to return to the program. At readmission, a program may ask students to be held accountable to any new program requirements since original application. During the stop out period, the progression clock remains active. That is students will need to complete a master's degree within six years or a doctoral degree within seven years. The student and program may still request an extension as determined within the graduate school and program requirements. Once a stop out leave has been approved by the program, the program director should notify the graduate school. The graduate school will work with the appropriate campus offices to put a stop on enrollment and financial aid for that student, until the time they decide to come back. To remove the holds, the program will need to inform the graduate school that the student has restarted the program.

- **Nanna Meyer Sports Nutrition IOC transfer** credit agreement. (11:00 AM) (see attachments): Nanna Meyer presented on the program and emphasized the excellent quality and potential for recruitment with the connection to the IOC certificate. This agreement will be a first in its kind for graduate school, but the Transfer Credit office did inform that undergraduate have made similar agreements with companies before. The overall consensus is that this type of agreement is something that the graduate executive committee would be interested in pursuing, however we need verification of quality equivalence to UCCS, given that this is a company, rather than a higher education institution and the courses are graded as pass/fail. We did not vote on this agenda item and will bring forward at a future meeting with additional information from the program.

Thesis and Dissertation Submission Procedures

As of Fall 2015, both theses and dissertations are submitted electronically. Once your electronic submission has been accepted, you will need to print a hard copy and bring it to Ron Koch at Kraemer Family Library (room EPC310). The print copy will be bound and added to the permanent collection of the University Archives. Additional personal copies of the manuscript (no more than 10) may be submitted to the Library for binding at the current rate. For information on all fees, consult the list of submission fees (found on the Current Students page of the Graduate School website – **Thesis & Dissertation Submission Fees**). All copies must be submitted at the same time. The procedure for submitting a thesis or dissertation is as follows:

1. Be sure your document conforms to the formatting specified in the **UCCS Thesis and Dissertation Manual**. Note: Use only the version of the Manual found on the Graduate School website. If you Google the title, you are likely to get an outdated version which is no longer acceptable.

2. Following your defense, there are two forms that require signatures: the **Electronic Thesis/Dissertation Signature and Agreement Form** must be signed by all committee members; and the **Approval of Format Form** must be signed by the chair of your committee. Signatures on both forms must be either original signatures or authenticated digital signatures. You will upload these forms in step 8 below.

3. Once you have completed your defense and your committee and chair have signed the above forms (step 2), convert your final approved file to PDF format. Then you can proceed with the electronic submission. NOTE: Your PDF will contain a page listing your committee members' names without signatures.

4. To begin your electronic submission process, go to http://www.etdadmin.com and choose "submit my thesis/dissertation." If you have questions that are not answered by the instructions or the FAQ's on this site, call Ron Koch (719-255-3224; rkoch@uccs.edu) at the Library.

5. Select a country (United States) and then choose University of Colorado at Colorado Springs from the list of schools.

6. Log in and create your account. In your contact information, be sure to use an email address that you check daily. (If your email address changes before you have finished submission, you can update your contact information at any time.)

7. You can later log in at any time and work through the "submission steps" in the left hand column of the opening screen. Some of the choices you encounter will be optional-you will find instructions on the website as well as a helpful FAQ link. NOTE: Do not use the optional Supplementary Files or Notes tabs. Do not order hard copies from Proquest.

8. As you complete each step, it will automatically be checked off the list. Upload your Approval and Signature pages (from step 2 above) under Adminsitrative Documents Submission. SAVE YOUR PRINT COPIES OF THE FORMS TO TURN IN TO THE LIBRARY.

10. The final step, Submit, cannot be completed until all other required steps are completed.

11. After you complete your submission, your EDT administrator will review your document. At this point the content, style and format of your thesis or dissertation have already been approved by your committee—the administrator will review it only for consistency of format. Watch for an email from the ETD Administrator system: it will tell you if your dissertation has been accepted. If any changes are required, the email will list them and provide a direct link to the document where you need to make the required changes. Follow the link and make any requested changes. Once your document is in acceptable form, you will receive an email notifying you that it has been accepted and released to Proquest for publication.

12. When you receive the email that your document has been accepted, you can then print your hard copy. It is essential that the hard copy be an exact duplicate of the electronic copy, so we highly recommend that you print from the PDF version after it has been accepted. Again, one copy is required for University Archives, but up to ten additional personal copies of the manuscript may be submitted for binding at the current rate.

Note: the print copy must be single sided

13. Submit the printed copy along with the signed **Electronic Thesis/Dissertation Signature and Approval Form***, the signed **Approval of Format Form***, and a check or money order for the appropriate amount to Ron Koch (719-255-3224 or rkoch@uccs.edu) at the Library, EPC310. The check or money order should pay to the order of UCCS. AN APPOINTMENT IS REQUIRED for submission to insure Ron is available at the time you want to deliver your copy. The date you submit the paper copy and the forms will be the official date of receipt sent to the graduate school.

*The Library cannot accept a thesis or dissertation without the required signature form and the Approval of Format Form

14. You will receive a final email when Proquest has completed publication of your thesis or dissertation.

If you have questions please feel free to call or email Ron Koch
(719-255-3224; rkoch@uccs.edu)

Updated 9-10-15

Transfer Credit Justification for IOC Sport Nutrition Diploma
University of Colorado, Colorado Springs

The IOC Sport Nutrition Diploma is a postgraduate program conducted under the auspices of the International Olympic Committee (IOC) Medical Commission housed in Lausanne, Switzerland.

The IOC Medical Commission is highly recognized internationally as a global authority in sport science and medicine, publishing regularly Olympic sports research including scientific consensus statements in medicine, injury surveillance and prevention, health and safety in sport, nutrition, endocrinology, and youth sport participation, just to name a few. It is the leading international body that sets the stage for sport nutrition evidence and practice-based learning and applications for students, practitioners and scientists. Publications occur in high-impact journals and often have the greatest number of hits in the realm of sport science and medicine due to their credibility and up-to-date knowledge and state of the art advancement of scientific inquiry. Yet the IOC is also focused on best practice, and thus, integrates the world's most well-trained practitioners in consensus statement meetings, and subsequently, in publications.

The IOC Sport Nutrition Diploma is regulated under the IOC Medical Commission and has been in effect since 2011. The IOC Sport Nutrition Diploma is a post-graduate certification. The workload of the diploma is 1200 hours, which is one-third short of a master's degree. The lecture syllabus includes 59 lectures prepared specifically for the program by 42 internationally recognized academic faculty across the two years of the program. A further 34 lectures from the IOC and international federation consensus conferences are also added. These are highly specific and give the students exposure to scientific and best practice knowhow directly from the conferences.

The faculty of the IOC Sport Nutrition Diploma encompasses the most prestigious and well known, best published experts in the field of sport nutrition and many hold academic appointments at prestigious colleges and Universities around the world. Lectures and assignments are vigorous throughout the two-year program which comes to conclusion with a pass/fail score, of which 50% represents a passing score. Based

on the discussion with the IOC Sport Nutrition Diploma board, a passing score qualifies graduates to enter the workforce similarly to a graduate program that requires a B or higher to continue the program. While a B or higher is needed for our program, we expect our top students to graduate with a 4.0 GPA. In the IOC Sport Nutrition Diploma, a 75% score represents passing with *Distinction* which, according to the IOC Sport Nutrition Diploma Board, only few reach each year. Thus, a passing score of 50% is meeting the necessary criteria to graduate successfully from the program and enter the work force.

Knowing 1) the scientific vigor and 2) the student quality we get from the IOC Sport Nutrition Diploma we can only recommend to honor the passing score of the IOC Sport Nutrition Diploma for transfer credits at UCCS. While 6 credits was our minimum request we would prefer to be able to transfer 9 credits from this diploma towards our UCCS Sport Nutrition Graduate Program.

The IOC Sport Nutrition Diploma is valued so highly here at UCCS and the many other sport nutrition programs who have added an MSc conversion, that we rank our prospective students for admissions accordingly. The result is clear - the IOC Sport Nutrition students, who are also registered dietitians, are ranked top in our application process, while those without the diploma who are registered dietitians remain below those with the diploma. We highly value the diploma and wish to continue to use the diploma as a robust recruitment tool not only for well prepared graduate students but also as a tool for diversity, as it is almost exclusively through the diploma that we get international students.

IOC Sport Nutrition Diploma Modules in reference to UCCS

Part 1 and Part 2 of the IOC Sport Nutrition Diploma include 30-32 lectures (total of 62 lectures) with 8 assignments, two scientific paper, discussion boards, workshops, exams, and online and textbook readings. Throughout the 2 years, coursework is evaluated and combined with final exams. This would equate to at least three 3-credit course loads at UCCS, which was initially requested at the graduate meeting in February, 2009, with our introductory course (HSCI 5060 Advanced Sport Nutrition) and 1-2 electives transferred for the IOC

Sport Nutrition Diploma (total of at least 9 credits). The IOC Sport Nutrition Diploma is extremely detailed with great evidence-based lectures in energy balance, metabolism in sports and exercise, macro- and micronutrients, hydration, and body composition (to name a few) to practice-based courses (e.g., nutrition for endurance sports, environmental extremes and nutrition) taught by the world's leading practitioners. The course only lacks experiential learning in practicum settings and it there is no research project, but this is exactly where we are an invaluable addition to the diploma.

Other Universities that work with the IOC Sport Nutrition Diploma provide 7-12 credits or more for transfers, see the following examples:

- Texas Women's University: 12 credits are transferred (see letter attached and degree plan)
- University of Stirling, UK: all credits transferred for coursework. Only additional requirement is project over 6 or 12 months (see email attached).
- University of Hawaii: 7 credits transferred (2 of which are for research) (phone call arranged/will report at meeting)

sportsoracle limited
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Nanna L. Meyer, PhD, RD, CSSD
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University of Colorado
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21 August 2015

Dear Nanna,

IOC Diploma Program in Sports Nutrition

I am pleased to send some information on this program and will summarise some of the key points here.

The program operates under the auspices of the Medical Commission of the International Olympic Committee. The program was established by its three Directors: Prof Ron Maughan (UK), Prof Louise Burke (Australia) and Dr Susan Shirreffs (UK). Academic oversight of the program is provided by the ten members of the Academic Advisory Board, all of whom are recognised as leaders in the field of sport and exercise nutrition.

The method of delivery of the core materials (primarily in the form of web-based and cd-based lectures) allows the participation of an international faculty of the highest standard. All of the 47 faculty who contribute to the program are internationally recognised for their expertise: no single institution could assemble this array of knowledge and experience. All faculty members were selected for their outstanding contributions to academic research or to sports nutrition practice. All teaching materials are reviewed and updated on a regular basis.

This is a post-graduate program and a good first degree in a relevant subject is a pre-requisite. Assessment is by assignment and examination with all assessments quality assured by the Academic Advisory Board. The workload for the whole Diploma program has a nominal teaching and learning load of 1200 hours, spread over the two years of study. This corresponds to about two thirds of the workload normally required for completion of a University MSc program. Many of our faculty have commented that the standard set is higher than that typically expected in a Graduate School. This is, however, an Olympic program and the bar should be set at a high level: we do not apologise for that.

The program is now in its tenth year of operation and in that short time it has attracted students from 34 different countries. It has become recognised by many organisations as the

“industry standard” in the field of sport and exercise nutrition. Possession of the IOC Diploma has been identified as an essential or desirable qualification in the job specification for many positions in sports nutrition. It is recognised as the preferred qualification by the Department of Sports Nutrition of the Australian Institute of Sport and by the Performance Nutrition Program of the English Institute of Sport. Formal links have been established with the national sports nutrition/dietetics associations of Australia, the UK, USA, Canada, Mexico and South Africa, and similar links are being developed with other national organisations.

The program allows a unique opportunity for students to become part of an international network, allowing the sharing of experiences and expertise. Graduates of the program have continued to be involved in program activities.

Several Universities have recognised the Diploma by giving Prior Learning Credits to graduates who then continue to work towards an MS degree: these Universities include the University of Hawaii (USA), Texas Women’s University (USA), Sheffield Hallam University (UK), Stirling University (UK) and The University of the Sunshine Coast (Australia). Several other leading international institutions are currently progressing this option.

I hope that this letter, together with the email attachment, will give some idea of the program and of the standards that we have set.

Please let me know if any further information is required.

With best wishes

Professor Ron Maughan

The IOC Diploma program in Sports Nutrition

Background

The Medical Commission of the International Olympic Committee has recognised the important role that nutrition plays in maintaining good health and in the preparation of athletes for competition. Good dietary practices are a cornerstone of success in sport and are essential for the maintenance of good health throughout the lifespan. As part of its commitment to supporting the health and performance of athletes and to the continuing professional development of those who care for them, the IOC Medical Commission now offers a postgraduate-level program in Sport and Exercise Nutrition. The IOC Medical Commission has worked in partnership with sportsoracle limited to develop and administer this program. More details about the program can be found on the webpage of the IOC Diploma website (www.sportsoracle.com).

The program has built on existing programs offered by leading Universities, but embraces an international faculty to offer a program that is beyond the resources of any single institution. Academic oversight of the program is provided by the ten members of the Academic Advisory Board, who are recognised as leading international experts in the field. The program is focused on the nutritional implications of participation in structured sports activities at all levels of competition, but also considers the role of physical activity, nutrition and other lifestyle factors in promoting good health. Lecture content (Appendix 1) and faculty biographies (Appendix 2) are appended.

The program takes advantage of new technology to deliver an innovative program and to ensure that information is current, comprehensive, authoritative and accessible to people in full-time employment. Delivery of the course involves a variety of teaching methods, including audio-visual lectures in electronic format, web-based materials, paper-based reading, and residential workshops. These activities and the student learning commitment are outlined in this document. Details of the program content and of the faculty who deliver this content, and a sample of the module contents are appended. Further details of the program content and operating practices are included in the Program Handbooks, which are also available.

Scope of the Program

The goal of the IOC Diploma in Sports Nutrition is to provide a continuing education program to promote the development of professionals who can provide athletes with sound information about nutrition. We are working at a global level, in conjunction with the premier organisations in sport and with the input of an international group of experts in sports nutrition. Our aim is to work in harmony with academic institutions and professional bodies of nutrition and dietetics so that this opportunity can be placed within existing frameworks and help create new opportunities in sports nutrition.

The IOC Diploma in Sports Nutrition is a postgraduate program. It assumes a good basic knowledge of human nutrition and metabolism, and some understanding of sport and exercise. Successful applicants will have an undergraduate degree or equivalent learning experience in dietetics, nutrition, biological sciences, medicine, or a related subject area. The language of instruction is English, and students whose native language is not English are required to provide evidence of competence in English, eg TOEFL at 500 or above, ILET6 at 6 or above, GCSE or equivalent in English language.

The workload for the Diploma program has a nominal teaching and learning load of 1200 hours, spread over the two years of study (Table 1). This corresponds to about two thirds of

the workload normally required for completion of a University MSc program. The Lecture syllabus includes 59 lectures prepared specifically for the program by 42 internationally recognised faculty members across the two years of the program, plus a further 34 lectures from the IOC, FIFA and IAAF Consensus Conferences.

The time it takes to go through the e-lectures, to read the set literature, and to prepare assignments etc will vary greatly between individuals. It is obvious that some people can achieve a satisfactory performance with a considerably smaller investment of time, but others may need to – or may choose to - invest more.

There are some key dates by which assignments must be submitted throughout the program, but the program is designed to give students considerable flexibility as to how they choose to distribute the workload over the year.

Table 1. Overview of elements of the IOC Diploma in Sports Nutrition

	Element	**Activity**	**Comments**
Part 1	Modules 1.1-1.9	32 lectures on cd supported by guided reading material	See Appendix 3 for a sample Module overview. Each module is accompanied by a voluntary self-assessment or self-reflection task.
	Assignments 1.2, 1.4, 1.6 and 1.8	4 assignments covering • Preparation of an abstract for a scientific manuscript • Critique of a scientific manuscript • Preparation of an education handout for athletes and coaches • Preparation of a conference poster	Together these assignments contribute 30% of assessment for Part 1. See Appendix 4 for sample assignments.
	Assignment 10	5000 word essay involving point:countpoint examination of a controversial area of sports nutrition	This assignment contributes 20% of assessment for Part 1. See Appendix 4.
	Examination	Formal open-book examination.	Contributes 50% of final assessment for Part 1. See Appendix 4 for sample questions.
	Assigned texts and additional resources	• Text book 1: Clinical Sports Nutrition, 3rd edition, Burke and Deakin (eds), McGraw Hill, 2006 • Textbook 2: Food, Nutrition and Sports Performance II. Maughan et al (eds). Blackwell	These resources are provided as course material.

		Science (2004) • Electronic subscription to International Journal of Sport Nutrition and Exercise Metabolism • Lecture CD-rom and booklets from 2003 IOC consensus meeting on Nutrition for Sport	
	Workshop	4-day workshop, built around an existing conference program	Attendance is voluntary.
	Discussion board	Web-based forum offering students opportunities to discuss the course content, share information about topics in sports nutrition, and create an international network.	Participation is voluntary.
Part 2	Modules 2.1-2.9	30 lectures on cd supported by guided reading material	See Appendix 3 for a sample Module overview. Each module is also accompanied by a voluntary self-assessment or self-reflection task.
	Assignments 2.2, 2.4, 2.6 and 2.8	4 assignments covering • Preparation of an abstract for a scientific manuscript • Critique of a scientific manuscript • Preparation of an education handout for athletes and coaches • Preparation of a conference poster	Together these assignments contribute 30% of assessment for Part 2.
	Assignment 2.10	5000 word essay involving a review of the nutritional issues of a specific sport or sporting population	This assignment contributes 20% of assessment for Part 2.
	Examination	Formal open-book examination.	Contributes 50% of final assessment for Part 2.
	Assigned texts and additional resources	• Text book 1: Clinical Sports Nutrition, 3rd edition, Burke and Deakin (eds), McGraw Hill, 2006 • Textbook 2: Practical Sports Nutrition, Burke. Human Kinetics, 2007, • Electronic subscription to International Journal of Sport Nutrition and Exercise Metabolism • Lecture CD-rom and booklets	These resources are provided as course material.

		from 2005 FIFA consensus meeting on Nutrition for Football and 2007 IAAF consensus meeting on Nutrition for Athletics	
	Workshop	4-day workshop, built around an existing conference program	Attendance is voluntary.
	Discussion board	Web-based forum offering students opportunities to discuss the course content, share information about topics in sports nutrition, and create an international network.	Participation is voluntary.

Although the core elements of the program are accessible and suitable for students from around the world, some activities may not be equally available to all students for financial or other reasons. These activities are, therefore, offered as voluntary elements that are highly encouraged because of the value of the additional learning and networking opportunities. The annual 4-day workshop is built around an existing conference and includes elements of the conference program as well as additional sessions to allow students to discuss their work and studies, and to interact with Course Directors, and members of the Academic Board and faculty. The 2006 program was built around the Science and Medicine of the Marathon Conference held in conjunction with the Chicago Marathon, while the 2007 workshop was held in conjunction with the annual science and medicine conference of Sports Medicine Australia. Since attendance at the Annual Workshop is not a requirement for completion of the program, the time associated with preparation for and attendance at the Workshop is therefore additional to the workload figures quoted above. Contribution to the discussion areas of the website is also not a requirement for completion of the program, but represents an additional opportunity for learning and the creation of networks with other professionals in sports nutrition.

Program Assessment

The IOC Diploma in Sports Nutrition is awarded by the International Olympic Committee. The program operates under the academic oversight of an international Academic Advisory Board, who advise on and are responsible for all aspects of academic standards, including quality assurance of course content and moderation of student assessment.

Students are required to complete a number of formal assessments at intervals throughout the program, and these assignments are designed with the primary aim of enhancing the learning experience. All assignments are submitted electronically, and these contribute 50% to the final mark awarded. A further written paper, covering all aspects of the course, is completed under open-book examination conditions at the end of the course. This paper contributes one half to the final mark. Students who achieve a pass with a mark of at least 50% in both Parts of the program are eligible to graduate with the IOC Diploma in Sports Nutrition. Students who achieve a mark of 75% or more will graduate with Distinction.

A brief description of assignments is appended (Appendix 4). Full details of all assessments are contained in the Program Handbooks. Students are also required to complete a formal examination at the end of each year of study. This consists of a series of questions to which students must provide short essay-type answers within 24 hours (Appendix 4).

Graduates of the Program

The first cohort of students graduated from the IOC Diploma program in Sports Nutrition at a ceremony held at the IOC Offices at the Chateau de Vidy on Friday 7 December. Thirty three students, drawn from 15 different countries, graduated, with 21 attending the graduation ceremony in person to receive their Diploma certificates from Prof Arne Ljungqvist, Chair of the IOC Medical Commission. Students were welcomed to the IOC by Dr Patrick Schamasch, IOC Medical Director. The ceremony represented the culmination of two years of intensive study of sports nutrition for these students, five of whom graduated with Distinction.

Continuing Professional Development

The terms “certify” and “accredit” have different meanings in different countries. In some countries, professional organisations have been formed to guide the training and practice of sports nutritionists and sports dietitians. These bodies often recognised courses that may be used by their members to gain or enhance their professional knowledge. Other bodies recognise individuals who have undertaken certain types of training or experience to reach a desired level of competency. Where these programs exist, we will approach these professional organisations to see how the IOC Diploma in Sports Nutrition can be used to complement or enhance the program. We will also be happy to work with newly developing organisations or groups to allow the IOC Diploma in Sports Nutrition become part of a structure to promote the practice of sports nutrition.

We are also working with several universities to gain Prior Learning Recognition for the units of the IOC Diploma in Sports Nutrition, so that a student who has completed our program could enrol at the university to convert the Diploma qualification to a Masters Degree. The IOC Diploma is a post-graduate program, and the workload corresponds to about two thirds of that typically required for a Masters Degree.

Ron Maughan Louise Burke Susan Shirreffs

APPENDIX 1: LECTURE CONTENT

PART 1

Overview lecture: Overview of Sports Nutrition (RJ Maughan)

Module 1.1: Energy balance and body composition
Module tutor: RJ Maughan

Lecture 1	Energy requirements of athletes: methodologies of measuring energy expenditure; observations of energy requirements of athletes (Ron Maughan, UK)
Lecture 2	Measuring Energy Intake in Athletes and Active Individuals: Clinical and Research Perspectives (Melinda Manore, USA)
Lecture 3	Body composition for sport: methodologies, performance correlates and observations of the physique of athletes (Arthur Stewart, UK)

Module 1.2 Protein needs for exercise; eating for muscle gain
Module tutor: SM Shirreffs

Lecture 1	Methodologies of assessing protein needs (Joe Millward, UK)
Lecture 2	Protein metabolism and protein requirements of athletes (Peter Lemon, Canada)
Lecture 3	Protein requirements and recommendations for athletes: (Kevin Tipton, UK)
Lecture 4	Protein intake to maximise the response to training: the timing and amount of protein (Kevin Tipton, UK)

Module 1.3 Post-exercise recovery – competition and training
Module tutor: LM Burke

Lecture 1	Post Exercise Recovery (Louise Burke, Australia)
Lecture 2	Does a high carbohydrate diet enhance recovery and performance? (Louise Burke, Australia)
Lecture 3	Fluid needs for training and post-exercise rehydration (Susan Shirreffs, UK)
Lecture 4	Fat loading/adaptations for athletic performance (Louise Burke, Australia)
Lecture 5	Alcohol in sport (Ron Maughan, UK)

Module 1.4 Nutrition for competition preparation
Module tutor: RJ Maughan

Lecture 1	Exercise metabolism and the causes of fatigue during exercise and sport: nutritional implications (Lawrence Spriet, Canada)
Lecture 2	Carbohydrate loading and fuelling up for sport (Asker Jeukendrup, UK)
Lecture 3	The pre-event meal (Roy Jentjens, The Netherlands)

Module 1.5 Fluid and fuel intake during competition and training
Module tutor: SM Shirreffs

Lecture 1	Measuring your hydration status (Lawrence Armstrong, USA)
Lecture 2	Fluid and fuel intake during competition and training: Fluid and electrolyte needs during exercise (Susan Shirreffs, UK)
Lecture 3	The benefits of carbohydrate intake during exercise (Ed Coyle, USA)
Lecture 4	Exercise-associated hyponatraemia (Joseph Verbalis, USA)

Module 1.6 Weight loss and disordered eating
Module tutor: LM Burke

Lecture 1 Weight issues in sport: strategies for losing body fat (Helen O'Connor, Australia)
Lecture 2 Disordered Eating in Athletes (Kathie Beals, USA)
Lecture 3 The female athlete triad (Anne Loucks, USA)

Module 1.7 Vitamins, minerals, anti-oxidants and the athlete's health
Module tutor: SM Shirreffs

Lecture 1 Iron and the athlete: methodologies and observations (Vicki Deakin, Australia)
Lecture 2 Vitamin and mineral needs of the needs of the athlete: Methodologies and Observations (Ron Maughan, UK)
Lecture 3 Nutritional antioxidants and exercise (Scott Powers, USA)
Lecture 4 Nutrition for the immune system (Mike Gleeson, UK)

Module 1.8 Dietary supplements and ergogenic aids
Module tutor: RJ Maughan

Lecture 1 Uses and abuses of dietary supplements in sport (Ron Maughan, UK)
Lecture 2 Supplements and sports foods that may be of benefit to athletes: creatine (Paul Greenhaff, UK)
Lecture 3 Caffeine: an ergogenic aid that works (Lawrence Spriet, Canada)
Lecture 4 Bicarbonate and other muscle buffering agents (Ron Maughan, UK)

Module 1.9: Nutritional needs in special environments: cold, heat and altitude
Module tutor: SM Shirreffs

Lecture 1 Nutritional needs in special environments: altitude (Dave Martin, Australia)
Lecture 2 Nutritional needs in the cold and in the heat (Susan Shirreffs, UK)

Module 1.10: Special studies module: current controversies in sports nutrition
Module tutor: RJ Maughan

This module contains no lectures, but instead offers students an opportunity to select a topic of interest from a controversial area in sports nutrition, to identify appropriate information resources, and produce a referenced point/counterpoint consideration of this area. Topics available for study in 2007 were:

Fluid intake guidelines
High protein diets/supplements for muscle gain
Low carbohydrate diets for weight loss/training adaptation
Electrolyte supplementation during exercise
Glutamine supplementation and health/performance

PART 2

Module 2.1 Practical Sports Nutrition:
Module tutor: LM Burke

Lecture 1 Practical tips for assessing nutrition-related issues in athletes (Vicki Deakin, Australia)
Lecture 2 Sports Nutrition Servicing within a Multidisciplinary Team (Michelle Cort, Australia)
Lecture 3 Feeding the hungry athlete – organising team travel and catering (Liz Broad, Australia)

Module 2.2 Sport-specific strategies to enhance performance: endurance and endurance trained sports
Module tutor: RJ Maughan

Lecture 1 Nutrition for road cycling (Asker Jeukendrup, UK)
Lecture 2 Nutritional considerations for triathlon (Greg Cox, Australia)
Lecture 3 Nutrition for Middle Distance and Distance running (Louise Burke, Australia)
Lecture 4 Sports Nutrition Strategies for Rowing (Michelle Cort, Australia)
Lecture 5 Nutrition for swimming (Louise Burke, Australia)
Lecture 6 Sports Nutrition for Ultra Endurance and Extreme Events (Jenni Pearce, New Zealand)

Module 2.3 Sport-specific strategies to enhance performance: intermittent sports
Module tutor: LM Burke

Lecture 1 Nutrition for soccer (Nick Broad, UK)
Lecture 2 Nutrition for American Football (Lisa Sutherland, Australia)
Lecture 3 Nutrition for racquet sports (Michael Bergeron, USA)

Module 2.4 Sport-specific strategies to enhance performance: strength and power sports
Module tutor: LM Burke

Lecture 1 Nutrition for sprints (Kevin Tipton, UK)
Lecture 2 Nutrition for throwers, jumpers and combined even athletes (Linda Houtkooper, USA)
Lecture 3 Dietary protein for strength and power training: from requirements to metabolic advantage (Stuart Phillips, Canada)

Module 2.5 Sport-specific strategies to enhance performance: winter sports
Module tutor: SM Shirreffs

Lecture 1 Nutrition for Nordic and Sliding Sports (Susie Parker-Simmons, USA)
Lecture 2 Nutrition for Winter Sports: Skiing, Boarding, Skating (Nanna Meyer, USA)

Module 2.6 Sport-specific strategies to enhance performance: weight-restricted and weight-conscious sports
Module tutor: LM Burke

Lecture 1 Making Weight – Lightweight Rowing (Gary Slater, Australia)
Lecture 2 Nutrition for gymnastics (Dan Bernadot, USA)
Lecture 3 Nutritional Interests of Body Builders (Chris Mohr, USA)

Module 2.7: Nutrition, physical activity and health
Module tutor: SM Shirreffs

Lecture 1 Physical Inactivity: The Major Public Health of the 21st Century. (Steven Blair, USA)
Lecture 2 Promoting Physical Activity in a World of Diversity. (Victor Matsudo, Brasil)
Lecture 3 Exercise, Diet and the Metabolic Syndrome (John Hawley, Australia)

Module 2.8: Special populations
Module tutor: SM Shirreffs

Lecture 1 Nutrition for female athletes (Susan Bar, Canada)
Lecture 2 Nutrition for the child and adolescent athlete (Helen O'Connor, Australia)
Lecture 3 Nutrition for the Athlete with Special Needs (Liz Broad, Australia)
Lecture 4 Nutrition for the vegetarian athlete (Greg Cox, Australia)

Module 2.9: Design and conduct of experiments.
Module tutor: RJ Maughan

Lecture 1 The basic study design (Barry Braun, USA)
Lecture 2 Measurements of performance: Methods, pitfalls and limitations (Asker Jeukendrup, UK)
Lecture 3 Statistical Analysis and Data Interpretation: What is Important for the Athlete and Statistician (Will Hopkins, New Zealand)

Module 2.10: Special studies module: analysis and presentation of a sport-specific case study.
Module tutor: LM Burke

This module will contain no lectures, but instead will offer students an opportunity to select a sport of interest, to identify appropriate information resources, and produce a scientific overview aimed at sports nutritionists, with a practical communication aimed at athletes and coaches. While students are permitted to select a sport or sporting population of their own choosing, several topics will be selected each year for special commentary. Students who choose these topics can expect to receive more comprehensive feedback on their assignment, since examiners will be able to prepare some background material.

The sports available for study in 2007 were:

European Handball
Race Across America cycling race
Powerlifting for women

Appendix 2: Faculty Biographies

Program Directors

Professor Ron Maughan BSc, PhD
Ron Maughan obtained his BSc (Physiology) and PhD from the University of Aberdeen, and held a lecturing position in Liverpool before returning to Aberdeen where he was based for almost 25 years. He is now Professor of Sport and Exercise Nutrition at Loughborough University, England. His research interests are in the physiology, biochemistry and nutrition of exercise performance, with an interest in both the basic science of exercise and the applied aspects that relate to health and to performance in sport. He has published extensively in the scientific literature, and is on the Editorial Board of several international journals. He is a Fellow of the American College of Sports Medicine (he received that organisation's Citation Award in 2007) and a member of many scientific organisations. He chaired the Human and Exercise Physiology group of the Physiological Society for 10 years and was a member of the Council of that organisation. He is secretary of the Sports Nutrition Working Group established by the IOC Medical Commission in 2002.

Professor Louise M Burke, PhD, APD, FACSM
Professor Louise Burke has been head of Department of Sports Nutrition at the Australian Institute of Sport since 1990. She is a dietitian with 25 years experience in the education and counselling of elite athletes. She holds an Honorary Chair in Sports Nutrition, at Deakin University in Melbourne for contribution to research and post-graduate and undergraduate units in Sports Nutrition. Her role as the dietitian for the Australian Swimming Team over the past 16 years has provided extensive overseas experience with the organisation of team travel and dietary concerns of the travelling athlete. She was appointed Australian Olympic Dietitian for 1996 Atlanta Olympic Games, 2000 Sydney Olympic Games and 2004 Athens Olympic Games. Louise's publications include over 60 research papers in peer-reviewed journals, 30 book chapters, and the authorship or editorship of several textbooks on sports nutrition. She is on the editorial board of International Journal of Sport Nutrition and Exercise Metabolism, and Medicine and Science in Sports and Exercise. Her research interests include sports supplements and ergogenic aids, post-exercise recovery of muscle glycogen, carbohydrate intake before and during exercise, fat adaptation strategies for athletes, and fluid intake during training and competition. Louise is a Fellow of the American College of Sports Medicine and Sports Dietitians Australia and is a member of the Working Group on Nutrition of the International Olympic Committee, and the Medical and Anti-Doping Commission of the International Association of Athletic Federations.

Dr Susan M Shirreffs BSc, PhD, FACSM
Susan Shirreffs studied physiology at the University of Aberdeen, where she qualified with BSc and Ph D degrees. She has been undertaking research and teaching in the area of exercise physiology and nutrition for the past 12 years, and has been at Loughborough University, where she is now a Senior Lecturer, since 2001. She has published in both peer-reviewed journals and in physiology and nutrition textbooks. She is a member of the Editorial Board of International Journal of Sports Nutrition and Exercise Metabolism, Medicine and Science in Sports and Exercise, Journal of Sports Science and Asian Journal of Exercise and Sport Science. Susan is a member of the Meetings Committee of the Physiological Society, the Continuing Professional Development Committee of the Nutrition Society, and the International Relations Committee of the American College of Sports Medicine. Susan worked with the British Olympic squad preparing for the Sydney Olympics and has also worked with many elite athletes in various sports, including track and field, football and rugby.

Academic Advisory Board

Professor Mark Hargreaves, BSc, PhD, FACSM
University of Melbourne, Australia
Dr. Mark Hargreaves is at present Professor of Physiology in the Department of Physiology at The University of Melbourne, Australia. He gained his BSc degree in Physiology at The University of Melbourne in 1982 before completing his master's degree in the Human Performance Lab at Ball State University. He then returned to The University of Melbourne for his doctorate in Physiology, which was awarded in 1989. He was appointed to his Chair in Exercise Physiology at Deakin University in 1996 and was Head of the School of Health Sciences from 1999 to 2004. His research interests focus on the physiological and metabolic responses to acute and chronic exercise, with particular emphasis on the regulation of carbohydrate metabolism, and the metabolic bases of fatigue. He has published extensively in prestigious Journals and is an internationally recognised expert in muscle metabolism. He is an associate editor of the review journal Exercise & Sport Sciences Reviews and serves on the editorial boards of the Journal of Applied Physiology, Medicine & Science in Sports & Exercise and Journal of Sports Sciences.

Professor John A Hawley BSc, PhD, FACSM
RMIT University, Melbourne, Australia
John is currently Director of the Exercise Metabolism Research Group and Professor of Exercise Metabolism in the School of Medical Sciences at RMIT University, Melbourne, Australia. He has published over 125 peer-reviewed scientific papers, written over eighty articles for technical journals and has authored numerous chapters for sports medicine/exercise biochemistry texts. He co-authored (with Dr Louise Burke) a book on physiological and nutritional strategies for enhancing athletic performance, and recently edited a volume on the physiology, biochemistry and nutrition of running for the International Olympic Committee's Sports Medicine and Science series. A member of the American Physiological Society, the Australian Sports Medicine Association and the New Zealand Association for Sports Medicine, he became the first New Zealand researcher to be elected as a Fellow of the American College of Sports Medicine in 1994. His laboratory's current research interests include the regulation of carbohydrate and fat metabolism in skeletal muscle during exercise; the interaction of exercise and diet in the regulation of glucose metabolism in skeletal muscle (with special interest in type II diabetes); and the mitogenic and metabolic changes to intense exercise in previously well-trained humans.

Professor Asker Jeukendrup, PhD, FACSM
University of Birmingham, United Kingdom
Asker Jeukendrup was born in Roermond in the Netherlands in 1969 and after completing his PhD at Maastricht University he worked as a post doc at the University of Texas followed by a post doc period in Maastricht. In 1998 Asker accepted a post at the School of Sport and Exercise Sciences at the University of Birmingham and became the Director of the Human Performance Lab. Asker Jeukendrup is now a professor of Exercise Metabolism in the same School which has just moved into a brand new state of the art research facility. Asker has published extensively on the links between nutrition, exercise metabolism and performance using stable isotopic techniques and mass spectrometry. He has also written books on Sport Nutrition and High Performance Cycling, is the Editor of the European Journal of Sport Science and member of the editorial board of Medicine and Science in Sports and Exercise, the International Journal of Sports Medicine and the Journal of Sport Sciences. He was awarded the Otto Wolff von Amerongen prize for his achievements in 2003 and in 2005 he was awarded a Danone Chair in Nutrition at the Free University Brussels in Belgium. Beside this he has worked with many top athletes including track and field athletes of UK Athletics, Chelsea Football Club, and Tour de France cyclists. Asker is also an Ironman triathlete himself.

Dr Bente Kiens, PhD
University of Copenhagen, Denmark
Dr Bente Kiens is currently an Associate Professor at the Department of Human Physiology, Institute of Exercise and Sport Sciences, University of Copenhagen, Denmark. She gained her degrees of Dr Scient and PhD for her studies in human muscle metabolism. Her major research areas are in the study of nutrition, exercise training, metabolism and gender, and her excellence in teaching in these areas has been recognised by several awards. Dr Kiens is a partner in the European Research Consortium, supported by the European Union, clarifying the molecular mechanisms that underpin the health promoting effects of exercise. She is also Deputy Head of the Danish Fitness and Nutrition Council.

Dr Melinda Manore BS, PhD, FACSM
Oregon State University, USA
Dr Melinda Manore is chair and professor of the Department of Nutrition and Food Management at Oregon State University (OSU), where she has won numerous awards for excellence in research and teaching in the area of nutrition and exercise. She was previously a nutrition professor at Arizona State University and on the graduate faculty of the Exercise Science and Exercise and Wellness doctoral programs. Her research expertise is in the nutrient and energy balance needs of active people, especially active women across the lifecyle. Dr Manore has a master's degree in health education and community health from the University of Oregon and a doctorate in human nutrition and a minor in exercise physiology from Oregon State University. Dr Manore is a registered dietitian and is a member of the Sports, Cardiovascular and Wellness Nutritionists (SCAN) and Nutrition Research dietetic practice groups of the American Dietetic Association (ADA). She is the current chair of the Research Committee for ADA. Dr Manore is a member of the American Society of Nutritional Sciences, the American Society for Clinical Nutrition, North American Society for the Study of Obesity, and a Fellow of the American College of Sports Medicine (ACSM), where she is active in ACSM committees. In addition, she is a former member of the USA Gymnastics National Health Care Advisory Board and currently a member of Golf Magazine's Fitness Experts and the USA Swimming Performance Team on Nutrition. Dr Manore is an associate editor for ACSM's Health and Fitness Journal and writes the nutrition column for the journal. She is on the editorial boards of Medicine and Science in Sports and Exercise, the International Journal of Sports Nutrition and Exercise Metabolism, Journal of Physical Activity and Health, and the Journal of the American Dietetic Association. She has published widely and is the author of Sports Nutrition for Health and Performance published by Human Kinetics, Nutrition: An Applied Approach by Benjamin Cummings, and an author on the Position Paper on Nutrition and Athletic Performance published by the ACSM, ADA and Dietitians of Canada in 2000.

Dr Victor Matsudo, MD, PhD
CELAFISCS, Sao Paulo, Brasil
Victor Matsudo qualified with MD and PhD degrees from Santa Casa Medical School in Sao Paolo, Brasil, and is now a Full Professor of Medicine at University Gama Filho. He is President of the Physical Fitness Research Center of São Caetano do Sul (CELAFISCS), and is General Manager of Programa Agita São Paulo. He is a member of the International Consultative Group on Active Living of World Health Organization (WHO) and a member of Executive Board and Regional Director of the International Council of Sports Sciences and Physical Education ICSSPE/CIEPSS affiliated to UNESCO. He has won numerous international awards, including the International Prize of Sports Medicine in the Olympics (Barcelona,1992), the Philip Noël Baker prize for Sports Medicine (1995) and the International Prize Principe Faisal of the International Federation of Physical Education (1996). He is a member of the Talent Detection Commission of the International Olympic Committee and is also a member of numerous international organizations. He has published extensively in peer-reviewed international Journals and is a Member of Editorial Board of the European Physical Education Review Journal and of numerous Brazilian Journals.

Dr Scott Powers Bs, PhD, FACSM
University of Florida at Gainesville, USA
Dr Scott K. Powers is Director of the Center for Exercise Science at the University of Florida at Gainesville. He received his bachelor's degree in physical education from Carson Newman College, his master's degree in exercise physiology from the University of Georgia, and a doctorate in exercise physiology from the University of Tennessee, before earning a second doctoral degree in physiology from Louisiana State University. He has earned several awards for outstanding teaching. His teaching and research interests have focused on the role of dietary antioxidants in protection of cardiac and skeletal muscle from oxidative injury, cause and prevention of skeletal muscle atrophy, This research work has been funded by grants from the National Institutes of Health, American Heart Association-Florida, and American Lung Association-Florida, and has resulted in more than 100 peer-reviewed scientific papers and he has co-authored four college textbooks for use in exercise physiology and fitness courses. He is a member of the editorial board for the Journal of Applied Physiology, Medicine and Science in Sports and Exercise, International Journal of Sports Medicine, and the International Journal of Sport Nutrition and Exercise Metabolism.

Dr Chris Rosenbloom, RD, PhD
Georgia State University, Atlanta, GA, USA
Dr Chris Rosenbloom is associate dean for Academic Affairs in the College of Health and Human Sciences and a Professor in the Division of Nutrition at Georgia State University (GSU) in Atlanta, Ga. She has been a faculty member in the Division of Nutrition at GSU since 1980, teaching courses in sports nutrition, medical nutrition therapy, and geriatric nutrition. Dr. Rosenbloom has an adjunct faculty appointment with the School of Applied Physiology at the Georgia Institute of Technology. Dr. Rosenbloom has a bachelor's degree in foods and nutrition from Kent State University with a dietetic internship from the University of Minnesota, master's degree in nutrition education and a doctorate in sociology with a gerontology certificate from GSU. Dr Rosenbloom is a Registered Dietician and was a national media spokesperson for the American Dietetic Association (ADA) from 1992-2003. She is a registered dietitian and certified specialist in sports dietetics. She is the past chair of Sports, Cardiovascular, and Wellness Nutritionists (SCAN) and is the editor of the ADA publication, Sports Nutrition: Client Education Handouts (2005). Dr Rosenbloom was named Outstanding Dietitian for the State of Georgia by the Georgia Dietetic Association. Dr Rosenbloom was a member of the Olympic Medical Support Group for the 1996 Olympic Games and was the liaison to the food service contractors, feeding athletes, officials and volunteers during the Olympic Games. She was the nutrition consultant to the Georgia Tech Athletic Association from 1987-2003. She also is the sports dietitian to athletic teams at Georgia State University, and was the nutrition consultant to The Atlanta Beat, a WUSA team, and the Atlanta Hawks, an NBA team.

Professor Lawrence L Spriet, BS, PhD, FACSM
University of Guelph, Canada
Dr. Lawrence L. Spriet is a professor in the Department of Human Health and Nutritional Sciences at the University of Guelph in Guelph, Ontario, Canada. He has been an active researcher in a number of areas of exercise physiology, particularly skeletal muscle metabolism during aerobic and sprint exercise and also following exercise training. He examines the regulation of the key enzymes in the pathways of carbohydrate and fat metabolism, which provide the substrate for the production of energy during exercise in human skeletal muscle. His laboratory also examines the performance and metabolic effects of numerous compounds purported to be ergogenic aids. His research appears in numerous scientific journals, including *American Journal of Physiology, Journal of Applied Physiology, and Journal of Physiology.* Dr. Spriet is a member of the editorial board for the International Journal of Sports Medicine and the U.S. based Sports Medicine Review Board of the Gatorade Sports Science Institute. He is also the Chair of the Advisory Board of the

Canadian Gatorade Sports Science Institute. Dr. Spriet teaches senior undergraduate courses in the “Regulation of Skeletal Muscle Metabolism” and lecture and laboratory sections in “Human Cardio-Respiratory Physiology”. He also advises a number of undergraduate students in literature review courses and senior level research projects. At the graduate level, he teaches a course in “Skeletal Muscle Metabolism” and advises 3-5 Ph.D and M.Sc. students at any given time. He is an expert speaker on the regulation of skeletal muscle carbohydrate and fat metabolism during aerobic exercise and the provision of “anaerobic” energy during high intensity exercise. He also speaks on the effects of potential ergogenic aids on athletic performance, including blood doping, and the ingestion of caffeine, pyruvate, taurine and selected nutraceuticals. Dr. Spriet is an avid hockey player in the winter and runner and cyclist in the summer. He is married to Anne and together they have three very active children, Andrew (18 yr), Stephanie (17 yr), and Sarah (14 yr). The common winter theme is ice, as Anne has been a member of the local synchronized skating team, Andrew and Sarah are also hockey players, and Stephanie is a figure skater! In the summer the family spends 4-5 weeks at a cottage in Long Point of the shores of Lake Erie in Ontario, Canada.

Professor Clyde Williams, BSc, PhD
Loughborough University, United Kingdom

Professor Clyde Williams graduated in chemistry from the University of Wales in 1964 and then completed postgraduate work in exercise physiology at the Washington State University, USA. On returning to the UK he took up a lectureship in human physiology at the University of Aberdeen, where he taught for eight years. In 1978, Professor Williams moved to Loughborough to establish a Sports Science Research Group. In 1986, he was promoted to the first Chair in Sports Science in the UK. After eight years as Head of the Department of PE, Sports Science and Recreation Management he served as Pro-Vice Chancellor (Research) for the University. Professor Williams was the founding chairman of the British Association of Sports Sciences (now British Association of Sport and Exercise Sciences-BASES) and recently completed a second term as chair of the Association. He was formerly the programme secretary of the British Nutrition Society and chaired the working party to establish a register for professionals qualified in sport and exercise nutrition. His research interests include nutrition and performance with a particular interest in recovery from exercise.

Program Faculty

Lawrence Armstrong	Susan Barr	Kathie Beals
Mike Bergeron	Dan Bernadot	Steve Blair
Barry Braun	Liz Broad	Nick Broad
Louise Burke	Michelle Cort	Greg Cox
Ed Coyle	Vicki Deakin	Mike Gleeson
Paul Greenhaff	Will Hopkins	Linda Houtkooper
Roy Jentjens	Asker Jeukendrup	Bente Kiens
Peter Lemon	Anne Loucks	Melinda Manore
Dave Martin	Victor Matsudo	Ron Maughan
Nanna Meyer	Joe Millward	Chris Mohr
Helen O'Connor	Susie Parker-Simmons	Jeni Pearce
Stuart Phillips	Scott Powers	Susan Shirreffs
Gary Slater	Lawrence Spriet	Arthur Stewart
Lisa Sutherland	Kevin Tipton	Joe Verbalis

Professor Lawrence Armstrong, PhD, FACSM
University of Connecticut, USA
Lawrence E. Armstrong, Ph.D., FACSM has been a professor at the Human Performance Laboratory, University of Connecticut since 1990. Prior to that time, he served as a Research Physiologist at the U.S. Army Research Institute of Environmental Medicine, Natick MA for seven years. His research specialties include physiological responses to exercise, dietary intervention (i.e., glucose-electrolyte solutions, sport drinks, low salt diets), heat illness, pharmacologic influences on thermoregulation, and acclimatization to heat as they apply to athletes and military personnel. Professor Armstrong's field studies have focused on fluid-electrolyte balance in tennis players (Miami, FL), effects of flavouring on fluid consumption by soldiers (Fort Benning, GA), and cooling of heatstroke patients after a summer road race (Falmouth, MA). He is author of Performing in Extreme Environments (Human Kinetics, 2000) and editor of the book Exertional Heat Illnesses (Human Kinetics, 2003). He has been a member and Chair of ad hoc writing groups that produced Fluid Replacement position statements for the American College of Sports Medicine and the National Athletic Trainers Association. Professor Armstrong developed a widely-used urine colour chart that can be used as a field-expedient technique to monitor hydration status.

Dr Susan Barr
University of British Columbia,, Canada
Dr. Susan Barr is a Professor and Graduate Advisor for the Human Nutrition program at the University of British Columbia in Vancouver, Canada. She is a Fellow of the Dietitians of Canada and of the American College of Sports Medicine, and has received awards for teaching, research, and service. Susan's research interests focus on interrelationships among nutrition, physical activity and women's health, with a particular emphasis on bone health. She has published over 100 articles in peer-reviewed journals and has over 100 other publications (published abstracts, book chapters, articles in newsletters, etc.). She is currently an editorial board member of the *International Journal of Sport Nutrition and Exercise Metabolism*, *Nutrition Today*, and the *ACSM's Health and Fitness Journal.* She is also active in many scientific and professional organizations. Susan is an avid recreational athlete who particularly enjoys long-distance cycling. Highlights includes a trip through the Rockies from the Mexico-Texas border to Calgary, and trips in the French and Swiss Alps, climbing many of the mountain stages of the Tour de France.

Dr Katherine A. Beals
University of Utah, USA
Katherine A. Beals, PhD, RD, FACSM is the Nutrition Clinic Director and an Associate Professor (clinical) in the Division of Nutrition and Department of Family and Preventive

Medicine at the University of Utah. Prior to the University of Utah, she held an academic appointment as an Associate Professor in the Department of Family and Consumer Sciences at Ball State University in Muncie, IN. In addition to her academic work, Dr Beals provides scientific counsel in the area of nutrition to a number of commodity boards including the US Potato Board, The National Honey Board, The California Tree Fruit Agreement, and The Mango Board. She holds a PhD in Exercise Science and Physical Education from Arizona State University, is a Registered Dietitian , and a fellow of the American College of Sports Medicine. She has published over a dozen articles on disordered eating and the female athlete triad and recently published a book entitled Disordered Eating Among Athletes. Dr Beals is a competitive triathlete and, in her spare time, rescues and rehabilitates abused and abandoned dogs.

Dr Michael Bergeron
Medical College of Georgia, Augusta, GA
Michael F. Bergeron, Ph.D., FACSM is an applied physiologist and Director of the Environmental Physiology Laboratory at the Medical College of Georgia in Augusta, GA. His research includes studies on exercise, performance, and fitness with youth and adults, with an emphasis on the effects of exercise in the heat on fluid and mineral balance, as well as thermal and cardiovascular strain. He is also studying the effects of exercise and heat stress on erythrocyte sickling and inflammation in people with sickle cell trait. He has published and presented on these topics internationally. Dr. Bergeron is a Fellow of the American College of Sports Medicine (ACSM) and Chair of the College's E*nvironmental Physiology Special Interest Group*. He is also Chair of the ACSM *Strategic Health Initiative – Youth Sports and Health Committee*. Dr. Bergeron is an Editorial Board member for the *International Journal of Sport Nutrition and Exercise Metabolism* and *Journal of Athletic Training* and was a recent member of the *Sport Science Committee* for the United States Tennis Association for 10 years. He also serves as a clinical and scientific consultant to the WTA Tour Medical Services and has been a regular member of scientific review panels of the Congressionally Directed Peer Reviewed Medical Research Program for the American Institute of Biological Sciences and the United States Army Medical Research and Material Command in the areas of disease prevention and epidemiology, bone health, military medical readiness and military nutrition. Dr. Bergeron has worked with a number of junior, collegiate, and professional athletes on training and nutrition related to preparation, competition, and recovery strategies in the heat, with a particular emphasis on helping athletes to avoid muscle cramping.

Dan Benardot, PhD, RD, FACSM
Georgia State University, USA
Dr Dan Benardot is a tenured associate professor in the Division of Nutrition and in the Department of Kinesiology and Health at Georgia State University, where he co-directs the Laboratory for Elite Athlete Performance. He received his doctorate in human nutrition and health planning from Cornell University, and is a Registered/Licensed Dietitian as well as a Fellow of the American College of Sports Medicine. He has authored a number of books on sports nutrition, including "Nutrition for Serious Athletes" and "Advanced Sports Nutrition" and was editor in chief of the second edition of the American Dietitetic Association's "Sports Nutrition: a guide for the Professional Working with Active People". He was a co-author on the 1993 position paper of the American and Canadian Dietetic Associations position paper on "Physical Fitness and Athletic Performance for Adults". He was the first American appointed to the Medical Commission of the international governing body for gymnastics (FIG), and works with the USA Figrue Skating and USA Track and Field (marathon) and was a founding member of the Athlete Wellness Committee for USA Gymnastics. IN 1993 he received the ADA Sports and Cardiovascular Nutrition (SCAN) achievement award, in 1995 he was initiated into the Alumni Honor Roll for the State University System of New York, in 1996 he was presented by USA Gymnastics with the Outstanding Educator Award, and in 2002 he received a Doctor of Humane Letters, *honoris causa*, from Maryland University for his work in the area of sports nutrition. Dr Benardot was in charge of the nutritional health of

the gold-medal winning US Gymnastics team at the 1996 Atlanta Olympic Games, and was nutritionist for the medal-winning USA marathon runners at the 2004 Athens Olympic Games. He currently services as chair of the nutrition committee for the Performance Enhancement Team of USA Figure Skating and is on the Advisory Board of the National Centre for Human Performance.

Steve Blair
University of South Carolina, USA
Professor Steven Blair is a fellow in the American College of Epidemiology, Society for Behavioral Medicine, American College of Sports Medicine, American Heart Association, and American Academy of Kinesiology and Physical Education; and was elected to membership in the American Epidemiological Society. He is a past-president of the National Coalition for Promoting Physical Activity and the American Academy of Kinesiology and Physical Education. He has received awards from many professional associations, including a MERIT Award from the National Institutes of Health, ACSM Honor Award, Robert Levy Lecture Award from the American Heart Association, and is one of the few persons outside the U.S. Public Health Service to be awarded the Surgeon General's Medallion. He has delivered lectures to medical, scientific, and lay groups in 48 US states and 30 countries. His research focuses on the associations between lifestyle and health, with a specific emphasis on exercise, physical fitness, body composition, and chronic disease. He has published over 360 papers and chapters in the scientific literature, and was the senior scientific editor for the *U.S. Surgeon General's Report on Physical Activity and Health.* He also is the author, editor or co-editor of several books, including *Fitness After 50, Active Living Every Day, and Physical Activity and Health.*

Dr Barry Braun, BS, PhD
University of Massachusetts, Amherst, USA
Barry Braun received his Ph.D. in Nutrition from the University of California, Berkeley. He is currently Associate Professor of Kinesiology and Director of the Energy Metabolism Laboratory at the University of Massachusetts Amherst in the USA. He has received several awards for outstanding undergraduate teaching including a Lilly Teaching Fellowship. His research program is focused on the mechanisms by which exercise and energy balance oppose insulin resistance and delay or prevent development of Type 2 diabetes in humans. Dr. Braun has published over 50 peer-reviewed research articles in journals such as *American Journal of Physiology*, *Journal of Applied Physiology* and *Journal of Clinical Endocrinology and Metabolism*. He is a Fellow of the American College of Sports Medicine and is past chairperson of their Nutrition Interest Group. Dr. Braun also serves as an Assistant Editor for *Exercise and Sport Science Reviews.*

Liz Broad, PhD
Queensland, Australia
Liz has been a sports dietitian for 15 years, including 4 years at the AIS and 5 years in Scotland. Liz has worked with a wide range of sports, with her current caseload including Queensland Rugby Union, Queensland Roar football, QAS gymnastics, AIS sprint kayak, and the National Equestrian squads. She has travelled with teams domestically and internationally as both a sports dietitian and also as team manager. Her understanding of the complexities of feeding athletes when travelling abroad and the food culture of different countries is extensive. She has a special interest in athletes with disabilities, having completed her masters in that area and having worked with a number of athletes in Australia and Scotland.

Nick Broad, BSc, MSc
Chelsea Football Club, England
Nick Broad is a full-time sports nutritionist currently employed by Chelsea Football Club in England. Following the award of his Masters degree in Sports Nutrition from the University of

Aberdeen under the tutorship of Professor Ron Maughan he has worked continuously for a number of football clubs at various levels within the English leagues. He is also an invited speaker at various conferences held by FIFA, BASES and The Football Association.

Michelle Cort
AIS, Sydney, Australia
Michelle is a sports dietitian who has been a member of the Department of Sports Nutrition at the Australian Institute of Sport since 2003, and is now the Sydney based provider to AIS sports. She has worked with a variety of AIS programs including rowing and athletics, and is presently working with AIS and national teams including tennis, sailing, Australian Football and softball. Michelle has been the nutrition consultant to the Sydney Swans AFL Club for several years. Her move to Sydney has also allowed her to take up consulting roles to other teams in professional football codes. Her research interests at the AIS have been in the area of ergogenic aids.

Dr Greg Cox
AIS, Canberra, Australia
Greg has been part of the Sports Nutrition department at the Australian Institute of Sport in Canberra since 1998, having completed the AIS Berrivale Sports Nutrition Fellowship in 1995. He has a background in exercise physiology and nutrition, a perfect combination to deliver state-of-the-art nutrition programs to several AIS sports including triathlon, women's water polo and boxing. His research interests include nutrition strategies to enhance endurance exercise performance, ergogenic aids and fluid needs in sport. He has contributed to numerous sports nutrition resources, including the best-selling books *Survival for the Fittest* and *Survival from the Fittest* . Greg has a background in surf life saving and triathlon and is currently completing his PhD in nutrition-related issues for endurance athletes.

Prof Edward Coyle, PhD, FACSM
University of Texas at Austin, USA
Dr. Coyle is a Professor in the Department of Kinesiology and Health Education at the University of Texas at Austin where he directs the Human Performance Laboratory. Dr. Coyle investigates the physiological factors that limit human exercise performance. His research has focused upon the metabolic and cardiovascular factors that limit aerobic exercise performance. Furthermore, he teaches scientists, professional athletic trainers and industry how to best apply this knowledge to benefit sport and health. He received his PhD from The University of Arizona and is the recipient of number honours and awards including a Citation Award from the American College of Sports Medicine. He has written extensively and has published 100 peer-reviewed scientific articles in top journals, 28 educational review articles and has been invited to present 100 national/international lectures.

Dr Vicki Deakin
University of Sydney, Australia
Vicki is a Senior Lecturer at the University of Canberra and convenes the undergraduate course in Human Nutrition and post graduate course in Sports Nutrition and Dietetics. She is a member of the Population Health Research team at the GADI Research Centre and Sports Dietitian with the ACT Academy of Sport in Canberra. Her involvement with elite athletes dates back to her initiation of the nutrition services at the Australian Institute of Sport in 1985. She is passionate about enhancing professional education opportunities in sports nutrition for coaches and has developed a distance course for the Australian Coaching Council to facilitate this process. Her research interests include iron deficiency, dietary survey methods, and determining barriers and facilitators that affect food choice and physical activity behaviours in different population groups.

Prof Mike Gleeson, BSc, PhD

Loughborough University, United Kingdom
Professor Mike Gleeson graduated in Biochemistry from the University of Birmingham and then completed a PhD on the effects of diet and exercise on energy metabolism at the University of Central Lancashire. He then worked as a research fellow at Salford University and a lecturer in veterinary physiology at the University of Edinburgh, before moving to Aberdeen University in 1985. There he teamed up with Ron Maughan and Paul Greenhaff and worked on research projects investigating the effects of dietary manipulation on metabolism and performance in high intensity exercise. In 1987 Mike was appointed senior lecturer in human physiology at Coventry University where he became interested in the effects of exercise on immune function. In 1996 he was appointed as a senior lecturer in the School of Sport and Exercise Sciences at the University of Birmingham and in 1999 he was awarded a personal chair in exercise biochemistry. Mike moved to Loughborough University in October 2002 as the new Professor of Exercise Biochemistry. Over the past 20 years he has published over 150 papers on exercise physiology, biochemistry and immunology and sports nutrition. He is a member of the Physiological Society, Nutrition Society, International Society of Exercise and Immunology, American College of Sports Medicine and the British Association of Sport and Exercise Sciences (BASES) and he is a BASES accredited exercise physiologist. He is also an elected Fellow of the European College of Sport Science. He is a past editor of the Journal of Sports Sciences and is currently editor of Exercise Immunology Review; he is also a member of the advisory boards of several other journals including the European Journal of Applied Physiology and the Journal of Sports Sciences. He is a keen tennis player, a bit of a cinema buff, and an armchair football fan.

Professor Paul Greenhaff
Nottingham University, UK
Professor Paul Greenhaff obtained his Ph. D. in Medical Sciences from the University of Aberdeen in 1988, and conducted post-doctoral research in muscle metabolism through 1991, including research with Professor Eric Hultman in Sweden. In 1991 he was appointed to the position of Lecturer on Research in Muscle Metabolism in the Department of Physiology and Pharmacology of the Faculty of Medicine and Health Sciences at the Medical School of the Queen's Medical Centre of the University of Nottingham. He was later promoted to a personal Professorship and is now Director of the Centre for Integrated Systems Biology and Medicine at Nottingham University. He has published extensively on diverse areas of muscle metabolism and was one of the first scientists to publish in the area of creatine supplementation.

Prof Will Hopkins, PhD, FACSM
Auckland University of Technology, New Zealand
Will is professor of exercise science in the Division of Sport and Recreation as AUT University, Auckland NZ. He is a fellow of the American College of Sports Medicine and an associate editor for ACSM's main journal, Medicine and Science in Sports and Exercise. He is also the statistical consultant for that journal. He founded the Sportscience site in 1997 and the Sportscience email list several years before then. His interest in athletic performance enhancement has led to several projects with research students and colleagues on effects of diet and supplements. Two of his current PhD students are working with top athletes in the area of sport nutrition.

Linda Houtkooper, PhD, RD, FACSM
University of Arizona, Tucson, USA
Professor Houtkooper is the Head of the Department of Nutritional Sciences at the University of Arizona, in Tucson. Her research focuses on the development of the understanding of the interrelationships among dietary intake, body composition, and physical activity on the prevention of osteoporosis and promotion of healthy weight management in women. She has contributed to the field of body composition assessment by developing methods and models for accurate assessment of body

composition in children and elite female heptathletes. She has also directed studies that assess the nutritional status of elite track and field athletes. Her other contributions include: studies investigating the effects of school-based nutrition and physical activity curricula delivered through science, health and physical education classes on bone development, energy balance and body weight in elementary school and middle school boys and girls.

Dr Roy Jentjens BS, PhD
DSM Food Specialities, The Netherlands
In March 1999, Roy Jentjens received an MS degree in Human Movement Sciences from Maastricht University, The Netherlands. He then obtained a PhD from the University of Birmingham (UK). Following his PhD, Roy worked as a post-doctoral research fellow investigating the effect of different carbohydrate mixtures on energy metabolism during exercise. He received the third prize in the Young Investigators Award competition at the sixth annual congress of the European College of Sport Sciences (2001). In 2004, he moved to the Nutrition and Health Department at the Nestlé Research Centre, in Lausanne, Switzerland where he was appointed as research scientist sport nutrition. In 2006, Roy returned to the Netherlands where he is currently working as scientist at DSM food specialties in Delft. Roy has published over 20 scientific papers and abstracts in scholarly journals, including the Journal of Applied Physiology, Metabolism, Medicine & Science in Sport & Exercise and Sports Medicine. He is a member of the Nutrition Society, the British Association of Sport and Exercise Sciences (BASES) and the American College of Sports Medicine. Roy also regularly acts as a guest reviewer for several peer reviewed journals. He has been an invited speaker at international scientific meetings and major sports events. Since 1998 he is also active as an advisor in sports nutrition and training.

Dr Peter Lemon, Ph.D., FACSM
The University of Western Ontario, Canada
Dr. Lemon completed his graduate training at The University of Wisconsin-Madison, USA where his research focused on protein metabolism during exercise. He was a faculty member in the Applied Physiology Research Laboratory at Ohio's Kent State University for nearly 20 years before becoming the Weider Chair in Exercise Nutrition at The University of Western Ontario, London, Canada in 1998. His research interests include how exercise alters nutrient requirements and whether specific nutrient supplementation can enhance exercise performance. Dr. Lemon and his spouse (Mary Ellen) have two daughters (Kristina and Kimberly Ann).

Dr Anne B. Loucks, Ph.D.
Ohio University, USA
Anne Loucks is a professor of physiology in the Department of Biological Sciences at Ohio University. She received her doctoral degree in physiology from the Institute of Environmental Stress at the University of California at Santa Barbara, and post-doctoral training in reproductive endocrinology in the Department of Reproductive Medicine at the University of California at San Diego. At UCSB and UCSD, she characterized the endocrine status of female athletes. At OU, she investigates the physiological mechanisms by which diet andexercise can impair reproductive and skeletal health. Dr. Loucks is a co-author of the official position stands of the American College of Sports Medicine and the IOC on the Female Athlete Triad. She frequently speaks to national, foreign and international scientific, medical and sports organizations about the reproductive and skeletal disorders and nutritional needs of female athletes. In 2003, she participated in the IOC consensus conference on *Foods, Nutrition and Sports Performance*. In 2004, she received The Endocrine Society and the Pfizer, Inc. International Award for Excellence in Published Clinical Research. In 2005, she was selected by the U.S. National Institutes of Health to help identify future directions for research on human subjects investigating the regulation of the reproductive system.

Dr David T Martin, B Sci, MSci, PhD, CSCS
Australian Institute of Sport, Australia
David received his B.Sci. degree in Zoology from the College of Idaho, his M.Sci. degree in Exercise Physiology from Northern Michigan University and his Ph.D. in Physiology from the University of Wyoming. For 1.5 years prior to beginning doctoral studies, David worked as a research assistant at the United States Olympic Training Centre in Colorado Springs Colorado. Master's research focused on stability of the "Anaerobic Threshold" training intensity and doctoral research was aimed at better understanding peaking, tapering and overtraining in cyclists. David is currently a senior sports physiologist working within the Department of Physiology at the Australian Institute of Sport in Canberra and is also the sport science coordinator for Cycling Australia.

Nanna Meyer, PhD
University of Utah, Salt Lake City, USA
Nanna is a native of Switzerland and former member of the Swiss Alpine Ski Team. She received her Master's degree at Arizona State University and her Doctorate degree at the University of Utah in exercise physiology in 2003. Further, she continued in the Division of Nutrition as a graduate student to fulfill the requirements to become a registered dietitian. She currently works for The Orthopedic Specialty Hospital (TOSH Sport Science) as a research associate and sports dietitian. As part of her work at TOSH Sport Science, she specializes in nutrition for exercise and sport and covers areas of research, education, and community programs. Her research interest is focused on the female athlete. Since 1999, she has been the sports dietitian of US Speed Skating and has worked at both the 2002 Salt Lake City and 2006 Torino Olympics. She is also an adjunct faculty in the Division of Nutrition at the University of Utah. She directs the sports dietetics curriculum and supervises students who specialize in sports dietetics within the Coordinated Master's Program. Nanna is also a visiting faculty at the Institute for Sport Science in Salzburg, Austria, and is a leadership team member of Sports Dietetics-USA.

D Joe Millward BSc, PhD, DSc
University of Surrey, UK.
Professor Millward trained as a biochemist, and has taught nutrition and metabolism to under and post graduates at the London School of Hygiene and Tropical Medicine and at The University of Surrey for more than 35 years. His main research interest has been the regulation of protein metabolism in muscle and the whole body, and the metabolic basis and magnitude of protein and amino acid requirements. He is currently Co Chair of FAO/WHO expert consultation on protein requirements. Professor Millward has published more than 200 papers on muscle growth regulation by nutrition, hormones, stretch-induced hypertrophy, and on protein and amino acid requirements in children, adults the elderly and during exercise.

Dr Christopher R Mohr, PhD, RD, CSSD
MohrAResults, USA
Dr Mohr is the owner of Mohr AResults, Inc (www.MohrResults.com), a nutrition and fitness consulting company to a number of media outlets and corporations including the Discovery Health Channel, Clif Bar, Nordic Naturals and University of Louisville Athletics. Has appeared on the Montel Williams show as a nutrition expert, is a regular nutrition expert on radio and TV outlets in Louisville, Kentucky and has appeared on CBS, NBC, FOX and ABC affiliates throughout the USA. He was the nutrition consultant for the NY Times Bestselling book "LL Cool J's Platinum Workout" (Rodale Press 2006) and co-authored "Fitness Nutrition for Special Dietary Needs" (Human Kinetics 2007). Dr Mohr is the Sports Nutrition Advisor to *Men's Fitness Magazine* and has written more than 500 articles for consumer publications, newpapers and websites such as *Men's Health, Weight Watchers Magazine* and *Fitness Magazine.* Dr Mohr has a Bachelor and Master of Science degree in Nutrition from Penn State university and University of Massachusetts, respectively. He received his PhD in exercise physiology, with a focus on the treatment and prevention of overweight and obesity,

from the University of Pittsburgh. He is a registered dietitian (RD) and a board certified specialist in sports dietetics (CSSD).

Helen O'Connor BSc Dip ND PhD APD
University of Sydney, Australia
Helen has over 20 years experience as a dietitian, working initially in clinical dietetics then completing her PhD in the area of metabolism and obesity in the Department of Endocrinology at Royal Prince Alfred Hospital (Sydney). Helen now works in the School of Exercise and Sport Science at the University of Sydney where she teaches sports and public health nutrition to exercise and sport science students. Helen is an accrediting practicing Dietitian (APD) and a level 3 anthropometrist with the International Society of Kinanthropometry (ISAK). Helen has extensive experience as a sports dietitian, consulting to elite athletes at the NSW Institute of Sport and coordinating the sports nutrition provider network. She has also worked for over 15 years with professional Rugby League and Australian Rules Football players and in private practice at highly regarded sports medicine clinics in Sydney. Helen was the inaugural president of Sports Dietitians Australia (SDA) and was part of the team reviewing the menu for the 2000 Olympic games. She also helped to organise a nutrition information kiosk operating in the dining hall at the games. In 2005, Helen was awarded a fellowship with SDA. In addition to scientific papers and book chapters, Helen has published six lay books in sports nutrition.

Susie Parker-Simmons
USOC, Colorado Springs, USA
Susie Parker-Simmons is an Australian Sports Dietitian who works for the United States Olympic Committee (USOC). There she works within the strength and power sports folio which includes the following sports: track and field, swimming, weightlifting, BMX cycling, alpine skiing and sliding sports. From 2001-2006 Susie worked as the Sports Dietitian and Physiologist for the United States Ski and Snowboard Association (USSA) and assisted in the food service program at the 2002 and 2006 Olympic Games. Since 2002 Susie has been the nutrition advisor for the Women's Tennis Association (WTA). As a consultant she works within the sport science and medicine department which supports the professional women's tennis tour. Prior to 2001, Susie resided in Australia teaching Sports Science and Nutrition at RMIT University, she worked in private practice at Olympic Park Sports Medicine Center and was the sport dietitian for the Collingwood Football Club. Susie has worked at three Olympic Games and five World Championships.

Jeni Pearce, Dip HSc, MSc
English Institute of Sport, UK
Jeni Pearce has accumulated many professional qualifications, including Dip H.Sc. (Otago), Dip Sec. Tchg (Auckland), M.Sc (Iowa, USA). She is a Registered, Dietitian and an accredited sports nutritionist and dietician. She is well known nationally and internationally for her private clinics, books, public lectures and media commentary. She appears in many national network television documentaries and educational videos and is a regular media commentator on health, diet and fitness fads as well as nutritional issues. Jeni has been involved at the highest level of sport, and works closely with many of the country's elite athletes including All Blacks, Olympians, rugby league players, netballers, tennis players, body builders, boxers, swimmers, marathon runners, top triathletes, Trans Atlantic rowers, touch rugby, snowboarders and jet skiers. Jeni is contracted to provide sports nutrition services to elite carded NZ Academy of Sport Athletes. Jeni is recognised internationally for her work in nutrition and food provisions for world yacht racing events. Jeni was in private practice with her own clinics from 1985 to the end of 2006, when she departed for a position with the English Institute of Sport.

Stuart Phillips, PhD
McMaster University, Hamilton, Canada

Stuart Phillips graduated with an honours B.Sc. in biochemistry from McMaster University in 1989, obtained a M.Sc. in Human Nutritional Biochemistry in 1991, also from McMaster University. He then obtained a Ph.D. from the University of Waterloo in Human Physiology in 1995, where he received the University's Outstanding Graduate Thesis Award. He went on to work in Dr. Robert Wolfe's laboratory at the University of Texas Medical Branch in Galveston, Texas. Returning to McMaster University in 1999 he accepted a position as an Assistant Professor in the Department of Kinesiology with a cross-appointment in Medicine. He was subsequently promoted to Associate Professor in 2003. He has received awards from the Canadian Society for Exercise Physiology, being awarded their Graduate Student award in 1996 and their Young Investigator Award in 2003. His research is focused on the impact of nutrition and exercise on human protein turnover, specifically in skeletal muscle. He is also interested in how exercise affects the requirements for protein in humans. His research is funded by the Canadian Institutes for Health Research, the National Science and Engineering Council of Canada, the US National Dairy Council, and the Canadian Foundation for Innovation. Dr. Phillips is a New Investigator award recipient from the Canadian Institutes for Health Research and also a recipient of the Ontario Premier's Research Excellence Award. An enthusiastic and energetic group of graduate students are the true heart of Dr. Phillips' more than 70 publications and continuing enthusiasm for research.

Dr Gary Slater, PhD
Department of Sports Nutrition at the AIS
Dr Gary Slater began his career in sports nutrition as the 1996 Fellow in Sports Nutrition at the Australian Institute of Sport, and after further work in the Department he undertook research opportunities in the AIS Department of Physiology, culminating in the completion of a Masters degree in research (HMB and athletic performance) and a doctoral degree (strategies for making weight in lightweight rowing). He is an Accredited Practicing Dietitian and member of Sports Dietitians Australia, and is currently a senior dietitian in the Department of Sports Nutrition at the AIS where he works with track and field, rowing and tae kwon do. He has also worked for the Singapore Sports Council, both as a nutrition consultant and Deputy Director of the Sports Science Sports Medicine Division. He has had 12 years experience working with world class sport scientists, elite athletes and coaches within the Australian and Singapore systems, including professional sporting teams such as the Wallabies and Brumbies Rugby

Dr Arthur D Stewart BSc (Hons), BPE, M.Phil, PhD
Robert Gordon University, UK
Arthur Stewart graduated in science in Edinburgh University, and proceeded to study for a bachelor's degree in Physical Education in Calgary, Canada. He returned to Edinburgh University as a lecturer in Physical Education in 1984 while completing an M.Phil in Body Composition with the Department of Physiology. He later pursued his PhD with the Department of Medical Physics, using dual X-ray absorptiometry (DXA) scanning to quantify tissue mass in athletes. In 1999, he worked in the Osteoporosis Research Unit at the University of Aberdeen, before accepting a lectureship in Biomedical Sciences supporting the undergraduate sports degrees and postgraduate MSc in sports nutrition. He has been closely involved with the International Society for the Advancement of Kinanthropometry (ISAK) since 1995, has served on ISAK Executive since 2002, and received the award of Criterion Anthropometrist in 2003. He moved to The Robert Gordon University in 2005 as a senior lecturer in Health Sciences, leading the undergraduate Sports Science programme. His research interests include body composition and physique assessment, body image, and their relationships with sports performance and health.

Lisa Sutherland
Sports dietitian, Melbourne, Australia

Lisa is a Sports Dietitian and Fitness Consultant, with a passion for sports science and sports nutrition. Lisa works with a range of athletes and sporting organisations, including the Victorian Institute of Sport, Hawthorn Football Club (Australian Football), Melbourne Storm Rugby League Club and Lifecare Sports Medicine Centres. Lisa is a regular lecturer at Deakin University, and has contributed to a number of sports nutrition resources, including Clinical Sports Nutrition and Clinical Sports Medicine texts. Lisa is also an active board member of Sports Dietitians Australia.

Dr Kevin Tipton, BS, MS, PhD
University of Birmingham, UK
Kevin received his Bachelor's and Master's degrees in Zoology from the Univ. of Kentucky and the Univ of South Florida, respectively. He began his doctoral studies at the Florida State Univ. and transferred to Auburn Univ where he earned a PhD in Nutrition. He did his postdoctoral studies on the interaction of nutrition and exercise on muscle protein metabolism under the direction of Dr. Robert Wolfe at the Univ. of Texas Medical Branch in Galveston. Subsequently, he was appointed as an Assistant Professor, Dept of Surgery, University of Texas Medical Branch and on the Scientific Staff of the Metabolism Unit, Shriners Hospital for Children – Galveston. He continued his research on muscle protein metabolism, exercise and nutrition and served as the Director of the Exercise Metabolism Laboratory at the Shriner's Hospital. In spring 2005, Kevin began as Senior Lecturer in Exercise Metabolism in the School of Sport and Exercise Sciences, University of Birmingham. Kevin's research has been focused on exercise, nutrition and muscle metabolism in humans. The general goal of the research has been to examine means of increasing muscle anabolism in athletes and exercising individuals as well as those populations that suffer from muscle loss. The studies primarily utilize stable isotopic tracer methods to measure muscle protein synthesis, breakdown and net muscle protein balance in response to exercise and nutritional interventions, as well as the molecular mechanisms of the metabolic responses. He has published over 30 papers in peer-reviewed journals and book chapters and has been invited to speak at numerous international and national conferences. He is an Associate Editor for the Canadian Journal of Applied Physiology and on the Editorial Board of the International Journal of Sports Nutrition and Exercise Metabolism. In addition he is a member of the American College of Sports Medicine, American Physiological Society, American Society of Nutritional Sciences, National Strength and Conditioning Association and the American Diabetes Association. He recently served on the National Academy of Science's, Institute of Medicine, Committee for Military Nutrition Research. His interest in exercise science extends to the application of the science to athletic populations. He was the Sports Nutrition adviser for the Athletic Department at Auburn University and recently served as a Visiting Scientist at the Australian Institute of Sport in the Department of Sports Nutrition and for the International Olympic Committee on the IOC Sports Nutrition Consensus Conference committee. He also has coached and served as fitness and nutrition advisor for amateur soccer and rugby clubs. Whenever uninjured, he still trains for and plays soccer and rugby and runs road races and, with luck, triathlons.

Dr Joseph Verbalis, MD
Georgetown University, USA
Joseph Verbalis is Chair, and a Professor, of the Department of Medicine. He is also Chair of the Division of Endocrinology and Metabolism, Director of the General Clinical Research Center (GCRC), and Clinical Research Director of the Center for the Study of Sex Differences (CSD). His specialty is in the field of endocrinology and his special interests include pituitary diseases, disorders of water metabolism (DI, SIADH), and adrenal disorders. He specializes in pituitary function research, and specifically the posterior pituitary hormones vasopressin and oxytocin, and has published extensively in these areas. Dr Verbalis contributed to the First and the Second International Consensus meetings on Hyponatremia in Sport.

Appendix 3. Sample module overviews – Modules 1.1 and 2.2

PART ONE

MODULE ONE

Energy balance and body composition

Module tutor: Professor Ron Maughan

Lectures

1. Energy expenditure of athletes

2. Energy intakes of athletes

3. Body composition for sport

Essential Reading for this Module

Deakin V (2006). Measuring nutritional status of athletes: clinical and research perspectives. In: Burke and Deakin (eds). Clinical Sports Nutrition, 3rd ed. McGraw Hill: Sydney, pp 21-52.

Kerr D, Ackland T (2006) Kinanthropometry: physique assessment of the athlete. In: Burke and Deakin (Eds) Clinical Sports Nutrition, 3rd ed. McGraw Hill: Sydney, pp 53-72

Loucks A (2004) Energy balance in sports and exercise. In: Maughan et al (Eds) Foods, Nutrition and Sports Performance II. Routledge: London. pp 1-23

Manore M, Thompson J (2006) Energy requirements of the athlete: assessment and evidence of energy efficiency. In: Burke and Deakin V (Eds) Clinical Sports Nutrition, 3rd ed. McGraw Hill: Sydney, pp 113-134

Assignments

There is no written assignment for this module.

Learning outcomes

After completing this module and associated further reading students should:

1. Be aware of the methodologies used for assessment of energy intake and expenditure and body composition and be able to identify the limitations to the main methods
2. Be aware of the links between exercise and energy balance
3. Appreciate the energy demands of various forms of physical activity and sport
4. Be able to list the key regulators of short term and long term energy intake
5. Recognise the association between energy balance and body fat content
6. Recognise the association between body composition and sports performance

Lecture 1 Energy expenditure of athletes

Lecturer: Ron Maughan (UK)

Content: Components of energy expenditure; methods of expressing metabolic rate; exercise and energy expenditure; direct and indirect methods for measurement of energy expenditure; laboratory and field measures; sources of error; post-exercise metabolic rate; observations of energy requirements of athletes

Lecturer biography

Professor Ron Maughan

Ron Maughan obtained his BSc (Physiology) and PhD from the University of Aberdeen, and held a lecturing position in Liverpool before returning to Aberdeen where he was based for almost 25 years. He is now Professor of Sport and Exercise Nutrition at Loughborough University, England. His research interests are in the physiology, biochemistry and nutrition of exercise performance, with an interest in both the basic science of exercise and the applied aspects that relate to health and to performance in sport. He has published extensively in the scientific literature, and is on the Editorial Board of several international journals. Professor Maughan is a Fellow of the American College of Sports Medicine and a member of many scientific organisations. He chaired the Human and Exercise Physiology group of the Physiological Society for 10 years and is a member of the Council of that organisation. He is secretary of the Sports Nutrition Working Group established by the IOC Medical Commission in 2002.

Essential reading for this lecture

Deakin V (2006). Measuring nutritional status of athletes: clinical and research perspectives. In: Burke and Deakin (Eds). Clinical Sports Nutrition, 3rd ed. McGraw Hill: Sydney, pp 21-52.

Loucks A (2004) Energy balance in sports and exercise. In: Maughan, Burke and Coyle (Eds) Foods, Nutrition and Sports Performance II. Routledge, London. pp 1-23

Manore M, Thompson J (2006) Energy requirements of the athlete: assessment and evidence of energy efficiency. In: Burke and Deakin V (Eds) Clinical Sports Nutrition, 3rd ed. McGraw Hill: Sydney, pp 113-134

Further Reading

- *These papers are cited in the lecture
- **These papers are available in full, either through PubMed (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi) or via the online subscription to International Journal of Sport Nutrition and Exercise Metabolism**

Review papers

*Bahr R (1992) Excess post-exercise oxygen consumption. Acta Physiol Scand (Suppl) 605: 1-70

Burke LM (2001) Energy needs of athletes. Can J Appl Physiol 26(Suppl.):S202-S219

*Garrow J (1986) Effect of exercise on obesity. Acta Med Scand Suppl 711; 67-73

Fine EJ, Feinman RD (2004) Thermodynamics of weight loss diets. Nutr Metab (Lond*). 1: 15.

Hardman A (2000) Exercise, nutrition and health. In: Maughan (Ed) Nutrition in Sport. Blackwell: Oxford. pp 39-52

*Jequier E. (2002) Pathways to obesity. Int J Obes Relat Metab Disord 26, S12-17

Maughan RJ, Burke LM (2002) Exercise and energy demands. In: Sports Nutrition. Blackwell: Oxford. Pp 3-14

Montoye HJ (2000) Energy costs of exercise and sport. In: Maughan RJ (Ed) Nutrition in sport. Blackwell: Oxford. pp 53-72

Ravussin E, Lillioja S, Anderson TE, Christin L, Bogardus C. (1986) Determinants of 24-hour energy expenditure in man. Methods and results using a respiratory chamber. J Clin Invest 78: 1568-1578

Sims EA, Danforth E (1987) Expenditure and storage of energy in man. J Clin Invest 79: 1019-1025

Westerterp KR (2004) Diet induced thermogenesis. *Nutr Metab (Lond)* 1: 5

Original research

*Maughan RJ, Robertson JD, Bruce AC (1989) Dietary energy and carbohydrate intakes of runners in relation to training load. Proc Nutr Soc 48: 170A

*Saris WH, MA van Erp-Baart, F Brouns, KR Westerterp, F ten Hoor (1989) Study on food intake and energy expenditure during extreme sustained exercise: the Tour de France. Int J Sports Med 10, S26-S31

*Van Erp-Baart AMJ (1992) PhD thesis

Keywords for literature search

Energy expenditure; metabolic rate; energy balance; doubly labelled water; indirect calorimetry; exercise; sport;

Lecture 2 Energy intakes of athletes

Lecturer: Melinda Manore (USA)

Content: Measurement of energy intake; sources of error; observations of energy intakes of athletes; reasons for apparent energy imbalances; energy efficiency; regulation of energy intake and energy balance

Lecturer Biography

Professor Melinda Manore

Dr Melinda Manore is chair and professor of the Department of Nutrition and Food Management at Oregon State University (OSU), where she has won numerous awards for excellence in research and teaching in the area of nutrition and exercise. She was previously a nutrition professor at Arizona State University and on the graduate faculty of the Exercise Science and Exercise and Wellness doctoral programs. Her research expertise is in the nutrient and energy balance needs of active people, especially active women across the lifestyle. Dr Manore has a master's degree in health education and community health from the University of Oregon and a doctorate in human nutrition and a minor in exercise physiology from Oregon State University. Dr Manore is a registered dietitian and is a member of the Sports, Cardiovascular and Wellness Nutritionists (SCAN) and Nutrition Research dietetic practice groups of the American Dietetic Association (ADA). She is the current chair of the Research Committee for ADA. Dr Manore is a member of the American Society of Nutritional Sciences, the American Society for Clinical Nutrition, North American Society for the Study of Obesity, and a Fellow of the American College of Sports Medicine (ACSM), where she is active in ACSM committees. In addition, she is a former member of the USA Gymnastics National Health Care Advisory Board and currently a member of *Golf Magazine*'s Fitness Experts and the USA Swimming Performance Team on Nutrition. Dr Manore is an associate editor for ACSM's *Health and Fitness Journal* and writes the nutrition column for the journal. She is on the editorial boards of *Medicine and Science in Sports and Exercise*, the *International Journal of Sports Nutrition and Exercise Metabolism, Journal of Physical Activity and Health,* and the *Journal of the American Dietetic Association*. She has published widely and is the author of *Sports Nutrition for Health and Performance published by Human Kinetics, Nutrition: An Applied Approach by Benjamin Cummings,* and an author on the Position Paper on Nutrition and Athletic Performance published by the ACSM, ADA and Dietitians of Canada in 2000.

Essential reading for this lecture

Deakin V (2006). Measuring nutritional status of athletes: clinical and research perspectives. In: Burke and Deakin (eds). Clinical Sports Nutrition, 3rd ed. McGraw Hill: Sydney, pp 21-52.

Loucks A (2004) Energy balance in sports and exercise. In: Maughan et al (eds) Foods, Nutrition and Sports Performance II. Routledge, London. pp 1-23.

Manore M, Thompson J (2006) Energy requirements of the athlete: assessment and evidence of energy efficiency. In: Burke and Deakin V (eds) Clinical Sports Nutrition, 3rd ed. McGraw Hill: Sydney, pp 113-134

Further reading

- *These papers are cited in the lecture

- **These papers are available in full, either through PubMed (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi) or via the online subscription to International Journal of Sport Nutrition and Exercise Metabolism**

Review papers

Black AE, Prentice AM, Goldberg GR, Jebb SA, Bingham SA, Livingstone MB, Coward WA (1993) Measurements of total energy expenditure provide insights into the validity of dietary measurements of energy intake. J Am Diet Assoc 93, 572-579

Gibson RS (2005) Principles of Nutrition Assessment, 2nd Ed. Oxford Press.

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Murphy KG, SR Bloom (2004) Gut hormones in the control of appetite. Exp Physiol 89, 507-516

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Clark M, Reed DB, Crouse SF, Armstrong RB (2003) Pre- and post-season dietary intake, body composition, and performance indices of NCAA Division I female soccer players. Int J Sport Nutr Exerc Metab 13: 303-319

Cole CR, GF Salvaterra, JE Davis, Borja ME, Powell LM, Dubbs EC, Bordi PLet al (2005) Evaluation of dietary practices of National Collegiate Athletic Association Division 1 football players. J Strength Cond Ass 19, 490-494

Farajian P, Kavouras SA, Yannakoulia M, Sidossis LS (2004) Dietary intake and nutritional practices of elite Greek aquatic athletes. Int J Sport Nutr Exerc Metab 14: 574-585

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Hinton PS, Sanford TC, Davidson MM, Yakushko OF, Beck NC (2004) Nutrient intakes and dietary behaviors of male and female collegiate athletes. Int J Sport Nutr Exerc Metab 14: 389-405

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Martin MK, Martin DT, Collier GR, Burke LM (2002) Voluntary food intake by elite female cyclists during training and racing: effect of daily energy expenditure and body composition. Int J Sport Nutr Exerc Metab 12: 249-267

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Nogueira JAD, da Costa THM (2004) Nutrient intake and eating habits of triathletes on a Brazilian diet. Int J Sport Nutr Exerc Metab 14: 684-697

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Reeves S, Collins K (2003) The nutritional and anthropometric status of Gaelic football players. Int J Sport Nutr Exerc Metab 13:539-548

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Vogt S, L Heinrich, YO Schumacher (2005) Energy intake and energy expenditure of elite cyclists during preseason training. Int J Sports Med 26, 701-706

Ziegler PJ, Nelson JA, Tay C, Bruemmer B, Drewnowski A (2005). A comparison of three methods of determination of energy density of elite figure skaters. Int J Sport Nutr Exerc Metab 15: 537-549

Keywords for literature search

Energy intake; energy balance; doubly labelled water; exercise; sport

Lecture 3 Body composition for sport

Lecturer: Arthur Stewart (UK)

Content: Components of body composition; methodologies and sources of error; reasons for assessment; practicalities of measurement in sport; observations of the physique of athletes; performance correlates

Lecturer Biography

Arthur D Stewart, BSc (Hons), BPE, M.Phil, PhD

Arthur Stewart graduated in science in Edinburgh University, and proceeded to study for a bachelor's degree in Physical Education in Calgary, Canada. He returned to Edinburgh University as a lecturer in Physical Education in 1984 while completing an M.Phil in Body Composition with the Department of Physiology. He later pursued his PhD with the Department of Medical Physics, using dual X-ray absorptiometry (DXA) scanning to quantify tissue mass in athletes. In 1999, he worked in the Osteoporosis Research Unit at the University of Aberdeen, before accepting a lectureship in Biomedical Sciences supporting the undergraduate sports degrees and postgraduate MSc in sports nutrition. He has been closely involved with the International Society for the Advancement of Kinanthropometry (ISAK) since 1995, has served on ISAK Executive since 2002, and received the award of Criterion Anthropometrist in 2003. He moved to The Robert Gordon University in 2005 as a senior lecturer in Health Sciences, leading the undergraduate Sports Science programme. His research interests include body composition and physique assessment, body image, and their relationships with sports performance and health.

Essential reading for this lecture

Kerr D, Ackland T (2006) Kinanthropometry: physique assessment of the athlete. In: Burke and Deakin (eds) Clinical Sports Nutrition, 3rd ed. McGraw Hill: Sydney, pp 53-72

Further reading

- *These papers are cited in the lecture
- **These papers are available in full, either through PubMed (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi) or via the online subscription to International Journal of Sport Nutrition and Exercise Metabolism**

Review papers

*Cantu RC, Micheli LL (eds.) (1991) American College of Sports Medicine: Guidelines for the team physician. Lea & Febiger, Philidelphia, USA.

*Frisch RE, McArthur JW (1974) Menstrual cycles: fatness as a determinant of minimum weight for height necessary for their maintenance or onset. Science 185, 949–951

*Hawes MR, Sovak D (1994) Morphological prototypes, assessment and change in elite athletes. J Sports Sci 12, 235–242

Hawes MR, Martin AD (2001) Kinanthropometry and exercise physiology laboratory manual: tests, procedures and data. In: Eston and Reilly (Eds). Anthropometry Vol 1, 2nd ed. London: Routledge, pp 7-46.

Heymsfield SB, Lohman TG, Wang Z, Going SB (2005) Human Body Composition, 2nd ed. Champaign: Human Kinetics

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Lohman TG (1992) Advances in body composition assessment. Current issues in exercise science series monograph no.3. Champaign, IL. Human Kinetics

*Marfell-Jones M (2001) The value of the skinfold. Proc. Seoul Int Sp Sc Cong 313-323

*Mavroeidi A, Stewart AD (2003) Prediction of bone, lean and fat tissue mass using dual X-ray absorptiometry as the reference method. In: Reilly and Marfell-Jones (eds). Kinanthropometry VIII, Routledge: London. pp 29 – 38

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Norton K, Olds T (2001) Morphological evolution of athletes over the 20th century. Causes and Consequences. Sports Med 31, 763-783

*Siri WE (1956). Advances in biological and medical physics, Lawrence and Tobias (Eds), Academic Press Inc; London & New York,

*Stewart AD (2003) Mass fractionation in male and female athletes. In: Reilly and Marfell-Jones (Eds). Kinanthropometry VIII, Routledge: London, pp 203 – 209

Original research

*Adams J et al. (1982) Total body fat content in a group of professional football players. Can J Appl Sport Sci 7, 36–40

*Behnke AR, Feen BG, Welham WC (1942) The specific gravity of healthy men. J Am Med Assoc 118, 495-501

Duthie GM, DB Pyne, WG Hopkins, S Livingstone, SL Hooper (2006) Anthropometry profiles of elite rugby players. Br J Sports Med 40, 202-207

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Housh TJ, GO Johnson, DJ Housh et al (2004) Accuracy of near-infrared interactance instruments and population-specific equations for estimating body composition in young wrestlers. J Strength Cond Res 18, 556-560

*Martin AD, Spenst LF, Drinkwater DT, Clarys JP (1990) Anthropometric estimation of muscle mass in men. Med Sci Sports Exerc 22, 729–733

Nevill AM, AD Stewart, T Olds, R Holder (2006) Relation between adiposity and body size reveals limitations of BMI. Am J Phys Anthropol 129, 151-156

Meyer NL, JM Shaw, MM Manore, Dolan SH, Subudhi AW, Shultz BB, Walker JA (2004) Bone mineral density of Olympic-level female winter sports athletes. Med Sci Sports Exerc 36, 1594-1601

*Stewart AD, Hannan WJ (2000) Body composition prediction in male athletes using dual X-ray absorptiometry as the reference method J Sports Sci 18, 263-274

Stunkard AJ (2000) Factors in Obesity: Current Views. In: Pena and Bacallao (Eds) Obesity and Poverty, WHO, pp 23-28

Keywords for literature search

Body composition; body fat content; adiposity; anthropometry; exercise; sport

PART TWO

MODULE TWO

Sport-specific strategies to enhance performance: endurance and endurance trained sports

Module tutor: Ron Maughan

Lectures

Lecture 1	Nutrition for road cycling (Asker Jeukendrup)
Lecture 2	Nutrition for triathlon (Greg Cox)
Lecture 3	Nutrition for middle and distance running (Louise Burke)
Lecture 4	Nutrition for rowing (Michelle Cort)
Lecture 5	Nutrition for swimming (Louise Burke)
Lecture 6	Nutrition for extreme events and adventure racing (Jeni Pearce)

This module will examine nutrient needs and dietary habits across a range of different sports. The common theme is that all involve prolonged exercise, lasting from a few minutes up to many days. Some swimming events are of very short duration, and rowing races normally last only a few minutes, but both of these sports involve very prolonged training sessions.

In each of these sports, there is a distinct, and sometimes very different, culture. Combined with the requirements and restrictions imposed by the demands of training and the regulations that govern competition, this makes for very specific habits and needs. Any dietitian or nutritionist working in these sports needs to appreciate this culture, as well as understanding the nutritional needs of the sport itself.

Essential Reading for this Module

Burke L. Cycling and triathlon. In Practical Sports Nutrition, Champaign, Illinois: Human Kinetics, 2007, Chapter 4.

Burke L. Middle and distance running. In Practical Sports Nutrition, Champaign, Illinois: Human Kinetics, 2007, Chapter 5.

Burke L. Rowing and Swimming. In Practical Sports Nutrition, Champaign, Illinois: Human Kinetics, 2007, Chapter 6

Burke,L. Nutrition for Open Water Sailing: An interview with Jeni Pearce, Sports Dietitian. Int J Sport Nutr Exerc Metab. 13; 244-249, 2003.

Clark N, Coleman C, Figure K, Mailhot T and Zeigler J. Food for Trans-Atlantic Rowers: A menu planning model and case study. Int J Sports Nutr Exec Metab. 13: 227-242, 2003.

Further reading and self-directed study

Students should consider the material provided in this module to be a starting point for the development of their appreciation of sports specific nutrition. There is a variety of ways in which further reading and self-directed study can be undertaken to build up a deeper understanding of the issues involved in working with endurance sports. A variety of options is suggested, and in this Part of the course, students are encouraged to show greater initiative in choosing the pathways that are of greatest interest and opportunity.

Cited reading

The module overview will provide details of all studies and review papers cited in the individual lectures. Since the lectures can only provide a brief overview or a personal perspective of the results of sports-specific studies, students are encouraged to develop an interest in reading these materials in full.

Additional reading

Since the sports-specific chapters and review materials provided as essential reading for this module are extensively referenced, they can direct the reader to a variety of original studies and in-depth analyses of the characteristics of different endurance events and sports. We consider it unnecessary to duplicate these resources by preparing separate recommended reading lists for this module. Rather, students are encouraged to consult the bibliographies of the essential readings and follow up the studies and papers of their interest. Again, we stress

the value of going to the original source of ideas or knowledge, and of being a critical and objective reader of these papers to form your own opinion of the findings and their implications for sports nutrition practice.

Many of the readings identified in the reference lists can be located in full without cost or excessive difficulty. The online subscription to International Journal of Sport Nutrition and Exercise Metabolism provides students with access to at least a decade of issues of the journal. In addition, many journals provide free online access to articles from previous volumes. This will be indicated in the PubMed listing of the article.

Finally, students are encouraged to undertake their own literature searches to locate material on topics or events of their interest.

Assignments

There is one assignment for this module. Details are found at the end of this module overview and in the assignments section of the sportsoracle website for Part 2 of the course.

Learning outcomes

After completing this module and associated further reading, students should:

Understand the physiological requirements of training and performance in a variety of competitive sports that have a substantial endurance component or where a major part of the training regimen involves endurance activities. Have an appreciation of the range of specific factors that limit performance in the events that make up these sports

Appreciate the importance of developing an eating strategy that meets the nutrition needs of athletes in these sports and of the implications of this eating strategy

Understand the challenges imposed by the demands of the sport and the influence of these demands on the athlete’s training and dietary practices

Appreciate the cultural environment and belief systems of athletes involved in endurance sports to assist the development of education strategies and activities that will improve nutrition practices and allow athletes to meet their sports nutrition goals

Lecture 1 Nutrition for road cycling

Lecturer: Asker Jeukendrup (UK)

Content: Assessing the nutrition needs and behaviours of elite road cyclists

Lecturer biography

Professor Asker Jeukendrup

Asker has an M.Sc. in Human Movement Sciences at Maastricht University in the Netherlands and a Ph.D. in 1997 at the same University. After postdoctoral positions at the University of Texas at Austin, USA, and Maastricht University, he became a Lecturer at the University of Birmingham and is now Professor of Exercise Metabolism at the School of Sport and Exercise Sciences at the University of Birmingham. Asker is the Academic Director of the Human Performance Laboratory and manages the research in this lab for the School of Sport and Exercise Sciences. His research interests include the metabolic responses to exercise, regulation of carbohydrate and fat metabolism, sports nutrition, gastro-intestinal complaints during exercise, training and overtraining and he has published over 100 journal articles and book chapters. He is a Fellow of the American College of Sports Medicine, member of the New York Academy of Sciences, the Nutrition Society, the Physiological Society, the Biochemical Society, the American Diabetes Association and the European College of Sport Sciences. Asker is Editor in Chief of the Eur J Sport Sci and on the editorial board of Medicine and Science in Sports and Exercise, International Journal of Sports Medicine and J Sports Science. Recently Asker published a book called High Performance Cycling and a textbook on Sports Nutrition. Asker is also training and nutrition consultant to several top athletes in Europe, UK Athletics and to the Rabobank professional cycling team. In his spare time Asker tries to manage his training for Ironman distance triathlons.

Essential Reading

Burke L. Cycling and triathlon. In Practical Sports Nutrition, Champaign, Illinois: Human Kinetics, 2007, Chapter 4.

Cited reading

Carter J, Jeukendrup AE, Mann CH, and Jones DA. The effect of glucose infusion on 1h cycle time-trial performance. In review: 2004.

Carter J, Jeukendrup AE, Mundel T, and Jones DA. Carbohydrate supplementation improves moderate and high-intensity exercise in the heat. *Pflugers Arch* 446: 211-219, 2003.

Carter JM, Jeukendrup AE, and Jones DA. The effect of carbohydrate mouth rinse on 1-h cycle time trial performance. *Medicine and science in sports and exercise* 36: 2107-2111, 2004.

Garcia-Roves P, Terrados N, Fernandez S, and patterson A. Macronutrients intake of top level cyclists during continuous competition-change in the feeding pattern. *IntJSports Med* 19: 61-67, 1997.

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Jentjens RL, and Jeukendrup AE. High rates of exogenous carbohydrate oxidation from a mixture of glucose and fructose ingested during prolonged cycling exercise. *Br J Nutr* 93: 485-492, 2005.

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Jentjens RL, van Loon LJ, Mann CH, Wagenmakers AJ, and Jeukendrup AE. Addition of protein and amino acids to carbohydrates does not enhance postexercise muscle glycogen synthesis. *J Appl Physiol* 91: 839-846., 2001.

Jentjens RL, Venables MC, and Jeukendrup AE. Oxidation of exogenous glucose, sucrose, and maltose during prolonged cycling exercise. *J Appl Physiol* 96: 1285-1291, 2004.

Jentjens RL, Wagenmakers AJ, and Jeukendrup AE. Heat stress increases muscle glycogen use but reduces the oxidation of ingested carbohydrates during exercise. *J Appl Physiol* 92: 1562-1572, 2002.

Jentjens RLPG, Achten J, and Jeukendrup AE. High oxidation rates from a mixture of glucose, sucrose and fructose ingested during prolonged exercise. *Med Sci Sport Exerc* 5: In press, 2004.

Jeukendrup AE, Craig NP, and Hawley JA. The bioenergetics of World Class Cycling. *J Sci Med Sport* 3: 414-433, 2000.

Jeukendrup AE, and Martin J. Improving cycling performance how should we spend our time and money. *Sports Med* 31: 559-569, 2001.

Jeukendrup AE. Carbohydrate intake during exercise and performance. *Nutrition* 20: 669-677, 2004.

Jeukendrup AE, Jentjens RL, and Moseley L. Nutritional considerations in triathlon. *Sports Med* 35: 163-181, 2005.

Saris WHM, van Erp-Baart MA, Brouns F, Westerterp KR, and ten Hoor F. Study on food intake and energy expenditure during extreme sustained exercise: the Tour de France. *International journal of sports medicine* 10: S26-S31, 1989.

Lecture 2 Nutrition for triathlon

Lecturer: Greg Cox (Australia)

Content: Assessing the nutrition needs and behaviours of elite triathletes

Lecturer biography

Greg Cox

Greg has been part of the Department of Sports Nutrition at the Australian Institute of Sport in Canberra since 1998, having completed the AIS Berrivale Sports Nutrition Fellowship in 1995. He has a background in exercise physiology and nutrition/dietetics, which provides a perfect combination to deliver state-of-the-art nutrition programs to several AIS sports including triathlon, women's water polo and boxing. His research interests include nutrition strategies to enhance endurance exercise performance, ergogenic aids and fluid needs in sport. He has contributed to numerous sports nutrition resources, including the best-selling books *Survival for the Fittest* and *Survival from the Fittest* . Greg has a background in surf life saving and triathlon and is currently completing his PhD in nutrition-related issues for endurance athletes. He is a member of the Executive Board of Sports Dietitians Australia.

Essential Reading

Burke L. Cycling and triathlon. In Practical Sports Nutrition, Champaign, Illinois: Human Kinetics, 2007, Chapter 4.

Cited reading

Achten J, Halson SH, Moseley L, Rayson MP, Casey A, Jeukendrup AE. Higher dietary carbohydrate content during intensified running training results in better maintenance of performance and mood state. *J Appl Physiol*; 96: 1331-1340, 2004

American College of Sports Medicine. Position stand: exercise and fluid replacement. *Med Sci Sports Exerc*; 28: i-vii, 1996.

Burke LM, Cox GR, Cummings NK, Desbrow B. Guidelines for daily CHO intake: do athletes achieve them? *Sports Med*; 31: 267-299, 2001.

Burke LM, Gollan RA, Read RSD. Dietary intakes and food use of groups of elite Australian male athletes. *Int J Sport Nutr*; 1: 378-394, 1991.

Bussau VA, Fairchild TJ, Rao A, Steele PD, Fournier PA. Carbohydrate loading in human muscle: an improved 1 day protocol. *Eur J Appl Physiol*; 87: 290-295, 2002.

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Desbrow B, Leveritt M. Awareness and use of caffeine by athletes competing at the 2005 Ironman Triathlon World Championships. Int J Sport Nutr Exerc Metab. 16::545-58, 2006

DiGioacchino DeBate R, Wethington H, Sargent R. Sub-clinical eating disorder characteristics among male and female triathletes. *Eating and Weight Disorders*; 7: 210-220, 2003.

Frentsos JA, Baer JT. Increased energy and nutrient intake during training and competition improves elite triathletes' endurance performance. *Int J Sport Nutr*; 7: 61-71, 1997.

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Kimber NE, Ross JJ, Mason SL, Speedy DB. Energy balance during an Ironman triathlon in male and female triathletes. *Int J Sport Nutr Exerc Metab*; 12: 47-62, 2002.

Lamb DR, Snyder AC, Baur TS. Muscle glycogen loading with a liquid carbohydrate supplement. *Int J Sport Nutr*; 1: 52-60, 1991.

Landers GJ, Blanksby BA, Ackland TR,Smith D. Morphology and performance of world championship triathletes. *Ann Human Biol*; 27: 387-400, 2000

Laursen PB, Suriano R, Quod MJ, Lee H, Abbiss CR, Nosaka K, Martin DT, Bishop D. Core temperature and hydration status during an Ironman triathlon. *Br J Sports Med*; 40: 320-325, 2006.

Lindeman AK. Eating and training habits of triathletes: A balancing act. *J Am Diet Assoc*; 1990: 993-995, 1990.

Maughan RJ, Bethell LR, Leiper JB. Effects of ingested fluids on exercise capacity and on cardiovascular and metabolic responses to prolonged exercise in man. *Exp Physiol*; 81: 847-859, 1996.

Nieman DC, Henson DA, Garner EB, Butterworth DE, Warren BJ, Utter A, Davis JM, Fagoaga OR, Nehlsen-Cannarella SL. Carbohydrate affects natural killer cell redistribution but not activity after running. *Med Sci Sports Exerc*; 29: 1318-1324, 1997.

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Rehrer NJ**.** Aspects of dehydration and rehydration during exercise. In: *Advances in nutrition and top sport*, edited by F. Brouns. Basel: Karger, 1991, p. 128-146.

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Simonsen JC, Sherman WM, Lamb DR, Dernbach AR, Doyle JA, Strauss R. Dietary carbohydrate, muscle glycogen, and power output during rowing training. *J Appl Physiol*; 70: 1500-1505, 1991.

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Worme JD, Doubt TJ, Singh A, Ryan CJ, Moses FM, Deuster PA. Dietary patterns, gastrointestinal complaints, and nutritional knowledge of recreational triathletes. *Am J Clin Nutr*; 51: 690-697, 1990.

Lecture 3: Nutrition for middle and long distance running

Lecturer: Louise Burke (Australia)

Content: Assessing the nutrition needs and behaviours of elite middle and long distance runners

Lecturer biography

Professor Louise Burke

Dr Louise Burke has 27 years of experience as a sports dietitian, including the last 17 years as the Head of Department of Sports Nutrition at the Australian Institute of Sport. Her activities include clinical counselling, nutrition education, and preparation of education resources. She has written a number of textbooks and lay books on sports nutrition, as well as numerous peer-reviewed publications and book chapters. She has also contributed many articles to coaching and lay journals and magazines. Her research interests include carbohydrate metabolism and performance, fat adaptation strategies, supplements and nutritional ergogenic aids in sport, post-exercise recovery and hydration in sport. She is an Honorary Chair in Sports Nutrition at Deakin University in Melbourne where she is involved in the development and delivery of undergraduate and post-graduate units in sports nutrition. She was a founding Board member of Sports Dietitians Australia and was the team dietitian for the Australian Olympic Team for the Atlanta, Sydney and Athens Olympic Games. Louise is a member of the Nutrition Working Group of the International Olympic Committee, and is a Director of the IOC Diploma in Sports Nutrition program.

Essential Reading

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Ahlborg G, Bergstrom J, Brohult J. Human muscle glycogen content and capacity for prolonged exercise after difference diets. *Foersvarsmedicin*:85-99, 1967

Almond CSD, Shin AY, Fortescue EB, Mannix RC, Wypij D, Binstadt BA, Duncan CN, Olson DP, Salerno AE, Newburger JW, Greenes DS. Hyponatremia among runners in the Boston marathon. *N Engl J Med*; 352: 1550-1556, 2005.

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not enhance endurance exercise performance. *Acta Physiol Scand*; 149: 521-523, 1993.

Bergstrom J, Hultman E. Muscle glycogen synthesis after exercise: an enhancing factor localized to the muscle cells in man. *Nature* 210: 309-310, 1966

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Lecture 4 Nutrition for rowing

Lecturer: Michelle Cort (Australia)

Content: Assessing the nutrition needs and behaviours of elite rowers

Lecturer biography

Michelle Cort

Michelle is a sports dietitian who has been a member of the Department of Sports Nutrition at the Australian Institute of Sport since 2003, and is now the Sydney based provider to AIS sports. She has worked with a variety of AIS programs including rowing and athletics, and is presently working with AIS and national teams including tennis, sailing, Australian Football and softball. Michelle has been the nutrition consultant to the Sydney Swans AFL Club for several years. Her move to Sydney has also allowed her to take up consulting roles to other teams in professional football codes. Her research interests at the AIS have been in the area of ergogenic aids.

Essential Reading

Burke L. Rowing and Swimming. In Practical Sports Nutrition, Champaign, Illinois: Human Kinetics, 2007, Chapter 6

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Lecture 5: Nutrition for swimming

Lecturer: Louise Burke (Australia)

Content: Assessing the nutrition needs and behaviours of elite swimmers

Lecturer biography

Dr Louise Burke has 27 years of experience as a sports dietitian, including the last 17 years as the Head of Department of Sports Nutrition at the Australian Institute of Sport. Her activities include clinical counselling, nutrition education, and preparation of education resources. She has written a number of textbooks and lay books on sports nutrition, as well as numerous peer-reviewed publications and book chapters. She has also contributed many articles to coaching and lay journals and magazines. Her research interests include carbohydrate metabolism and performance, fat adaptation strategies, supplements and nutritional ergogenic aids in sport, post-exercise recovery and hydration in sport. She is an Honorary Chair in Sports Nutrition at Deakin University in Melbourne where she is involved in the development and delivery of undergraduate and post-graduate units in sports nutrition. She was a founding Board member of Sports Dietitians Australia and was the team dietitian for the Australian Olympic Team for the Atlanta, Sydney and Athens Olympic Games. Louise is a member of the Nutrition Working Group of the International Olympic Committee, and is a Director of the IOC Diploma in Sports Nutrition program.

Essential Reading

Burke L. Rowing and Swimming. In Practical Sports Nutrition, Champaign, Illinois: Human Kinetics, 2007, Chapter 6

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Smith GJ, Rhodes EC, Langill RH. The effect of pre-exercise glucose ingestion on performance during prolonged swimming. *Int J Sport Nutr Exerc Metab*; 12: 136-144, 2002.

Selsby JT, Beckett KD, Kern M, Devor ST. Swim performance following creatine supplementation in Division III athletes. *J Strength Cond Res*; 17: 421-424, 2003.

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Lecture 6: Nutrition for extreme events and adventure racing

Lecturer: Jeni Pearce (UK/New Zealand)

Content: Assessing the nutrition needs and behaviours of participants in extreme events, including especially round-the-world sailing

Lecturer biography

Jeni Pearce

Jeni Pearce has accumulated many professional qualifications, including Dip H.Sc. (Otago), Dip Sec. Tchg (Auckland), M.Sc (Iowa, USA). She is a Registered, Dietitian and an accredited sports nutritionist and dietician. She is well known in New Zealand and internationally for her private clinics, books, public lectures and media commentary. She has appeared in many national network television documentaries and educational videos and is a regular media commentator on health, diet and fitness fads as well as nutritional issues. Jeni has been involved at the highest level of sport, and has worked closely with many of the New Zealand's elite athletes including All Blacks, Olympians, rugby league players, netballers, tennis players, body builders, boxers, swimmers, marathon runners, top triathletes, Trans Atlantic rowers, touch rugby, snowboaders and jet skiers. Jeni is recognised internationally for her work in nutrition and food provisions for world yacht racing events. Jeni was in private practice in New Zealand from 1985 to the end of 2006, with contracts to provide sports nutrition services to elite carded NZ Academy of Sport. At the beginning of 2007, Jeni left New Zealand to take up a position with the English Institute of Sport.

Essential Reading

Burke,L. Nutrition for Open Water Sailing: An interview with Jeni Pearce, Sports Dietitian. Int J Sport Nutr Exe Metab. 13; 244-249, 2003.

Clark, N., Coleman, C., Figure, K., Mailhot, T., and Zeigler, J. Food for Trans-Atlantic Rowers: A menu planning model and case study. Int J Sports Nutr Exec Metab. 13: 227-242, 2003.

Further Reading

Branth S, Hambraeus L, Westerterp K, Andersson A, Edsgren R, Mustelin M, Nilsson R. Energy turnover in a sailing crew during offshore racing around the world. *Med Sci Sports Exerc*; 28: 1272-1276, 1996.

Part 2, Module 2 Assignment (Assignment 2.2)

There is a growing tendency to rely on the information provided in abstracts without reading the full paper. This is often a mistake, and may mean that the paper is substantially misunderstood and misrepresented. A well-written abstract, however, will communicate all of the essential information in a clear and unambiguous manner.

This assignment requires you to study a published abstract and to evaluate carefully the information presented there. The aim of this assignment is to encourage you to look critically at what you are reading and to think carefully about the information that is provided, rather than just accepting it without question.

The following is the abstract of an oral communication presented at the Annual meeting of the American College of Sports Medicine in 2007:

Medicine & Science in Sports & Exercise: Volume 39(5) Supplement May 2007p S15

Sweat Sodium and Total Sodium Losses in NFL players with EAMC during Training Camp versus Matched Non-crampers: 574: May 30 1:30 PM 1:45 PM

[B-13 Free Communication/Slide - Heat Stress and Fluid Balance in Sport: MAY 30, 2007 1:00 PM - 3:00 PM ROOM: 262]

Greene, Richard[1]; Godek, Sandra Fowkes[2]; Burkholder, Arthur R.[1]; Peduzzi, Chris[3] [1]Pennsylvania Hospital, Philadelphia, PA, [2]West Chester University, West Chester, PA, [3]Philadelphia Eagles, Philadelphia, PA.

Exercise associated muscle cramps (EAMC) are common in players in the National Football League (NFL). Sodium losses due to excessive sweating and dehydration have been implicated in EAMC.
PURPOSE: To compare sweat sodium (SwtNa+) content, total sweat sodium losses and dehydration in players who experience EAMC during training camp with those of matched non-crampers.
METHODS: Sweat samples were obtained from 9 players (age = 25.6 ± 2.8 y, mass = 112.6 ± 20 kg, height = 188.5 ± 6.7 cm and BSA = 2.38 ± 0.22 m2) who experienced EAMC during pre-season practices and compared with 9 controls (non-crampers) matched for race, body size and playing time during practices (age = 27 ± 2.6 y, mass = 117 ±26.8 kg, height = 186.5 ±8.5 cm and BSA = 2.4 ± 0.3 m2) from the same NFL team. Sweat patches secured with impermeable microfilm were applied to the upper forearm after the skin was washed with deionized water and dried with sterile gauze. The sweat samples were frozen and later analyzed for Na+ by flame photometry. During practice players drank fluids only from their pre-measured containers. Sweat loss was calculated as change in mass adjusted for fluids consumed and urine produced. All sweat data collection occurred during 2 h practices on the 6th, 7th and 8th days of camp.
RESULTS: WBGT on the field during the practices were not different on these 3 days and were 79.5 ±2.7 °F. There were no differences in SwtNa+ between the crampers (55.7 ± 20 mmol/l, range = 16.2 to 85 mmol/l) and non-crampers (44 ±18 mmol/l, range = 27 to 79 mmol/l). Sweat losses (4.25 ±1.2 versus 4.07 ± 1.4 L) and sweat sodium losses (248 ±138 versus 174 ± 79 mmol or 5.7 versus 4 g) were not different between crampers and non-crampers, respectively, nor were fluids consumed or % Dehy. Crampers consumed 3169 ± 1107 ml of fluid and were 1.02 ± 0.66% dehydrated compared to non-crampers (3028 ± 900 ml consumed and 0.94 ± 0.69% dehydrated).
CONCLUSIONS: Unlike previously reported data from a study with only 5 subjects per group we did not find significant differences in SwtNa+, gross sweat losses, total Na+ losses, fluid intake or %Dehy between NFL players who had documented episodes of EAMC with those of matched controls without EMAC. Of note is the large variability in SwtNa+ ranging from 16-85 mmol/l. Total sodium losses during 2 hours of football practice just in the players with EAMC ranged from 1.6g - 10.9 g.

Look at the information contained in the abstract and answer the following questions. Where you have made assumptions, or where you have used values obtained from the literature, these should be clearly stated and supported by references where necessary. Where calculations are involved you should make a clear statement as to whether or not the results of your calculations are realistic.

1. What are the primary limitations to the study?

2. What essential information is missing that prevents you from fully assessing the study?

3. What sources of error are, or might be, present in the measurements made?

4. From the data provided in the abstract, estimate the mean salt loss in grams, assuming that all sodium is lost as sodium chloride, for the two groups.

5. How does the estimated salt loss compare with recommended daily salt intakes? What factors need to be taken into account when making this comparison?

6. What additional information would you want to see to fully interpret this study?

7. What conclusions do you draw from this study?

Your responses should be brief and focussed: a discursive description of the fluid and electrolyte replacement strategies recommended for athletes is not what is wanted. To answer these questions, you may need to seek out some exercise physiology information from textbooks or from reputable web resources.

The following papers may be useful:

Maughan RJ, SM Shirreffs, JB Leiper (2007) Errors in the estimation of sweat loss and changes in hydration status from changes in body mass during exercise. J Sports Sci 25, 797-804

Patterson MJ, SD Galloway and MA Nimmo (2000) Variations in regional sweat composition in normal human males. Exp Physiol 85, 869-875

The total length of your submission should not exceed 1000 words. This assumes that you use the “word count” facility on Word.

Due Date: February 29

Please send completed assignments to assignment@sportsoracle.com as an electronic file that is given the title of your family name and assignment 2 (e.g. Burke assignment 2.doc). This should also be the title of the email subject line.

The marking schedule for this assignment is found on the Assignments webpage of Part 2 information on the sportsoracle website.

This assignment is worth 15% of the marks allocated to assignments for Part 2 of the IOC Diploma of Sports Nutrition.

APPENDIX 4: ASSIGNMENTS AND EXAMINATION

The assignments that students are required to complete as part of the program are designed to enhance student learning and to enhance various practical skills. All assignments are completed and submitted electronically.

Assignments: Part 1

Module 1.2 Protein needs for exercise; eating for muscle gain

Students are provided with the manuscript of a scientific paper from which the abstract has been removed. Their task is to write a short abstract to accompany the paper.

Module 1.4 Nutrition for competition preparation

Students are required to prepare a leaflet aimed at athletes to communicate practical information on s specific topic.

Module 1.6 Weight loss and disordered eating

Students are presented with a published paper on a relevant topic and are required to use this information to prepare a poster in a format that would be suitable for presentation at a scientific meeting.

Module 1.8 Dietary supplements and ergogenic aids

A constructive and critical analysis of a scientific paper based on a relevant topic.

Module 1.10 Special studies module: current controversies in sports nutrition

This assignment involves preparation of a point/counterpoint review of a topic that is currently controversial.

Topics available for study in 2007 were:

Fluid intake guidelines
High protein diets/supplements for muscle gain
Low carbohydrate diets for weight loss/training adaptation
Electrolyte supplementation during exercise
Glutamine supplementation and health/performance

Assignments: Part 2

Module 2.2 Sport-specific strategies to enhance performance: endurance and endurance trained sports

Students are provided with the manuscript of a scientific paper from which the abstract has been removed. Their task is to write a short abstract to accompany the paper.

Module 2.4 Sport-specific strategies to enhance performance: strength and power sports

Students are required to prepare a leaflet aimed at athletes to communicate practical information on s specific topic.

Module 2.6 Sport-specific strategies to enhance performance: weight-restricted and weight-conscious sports

Students are presented with a published paper on a relevant topic and are required to use this information to prepare a poster in a format that would be suitable for presentation at a scientific meeting.

Module 2.8 Special populations

A constructive and critical analysis of a scientific paper based on a relevant topic

Module 2.10 Special studies module: analysis and presentation of a sport-specific case study.

Students are required to prepare a comprehensive review of the nutritional demands and eating strategies relevant to a specific sport. This review should follow the guidelines for the preparation of a manuscript for the International Journal of Sport Nutrition and Exercise Metabolism.

The sports available for study in 2007 were:

European Handball
Race Across America cycling race
Powerlifting for women

Examinations

Students are required to undertake an open-book examination for each Part of the Course. The exam is posted electronically and students are given 24 hours to provide short essay answers to each of the 5 questions. The examination questions are set to reflect the interpretation and practice of the sports nutrition knowledge that has been covered over the previous year. Examples of questions from previous examinations are provided below:

Part 1 sample questions

1. You have conducted a dietary assessment (7-day weighed food intake) of a group of adolescent male football (soccer) players. When you process the food records using a computerised dietary analysis program, you find mean (SD) energy values of 2342 (454) kcal per day. Find three studies on similar groups of athletes from the literature that you might use for comparison with your data. Tabulate the values obtained and provide the bibliographic data, as well as a 150 word summary of how you should consider your data in light of this literature.

2. You are asked to prepare information for your national track and field federation about commercial sports drinks that might be suitable for agreeing to a sponsorship deal. Prepare a table that compares the composition of six sports drinks that might be suitable candidates, and identify the features that are of importance to exercise: Include a column that provides a sentence or two for each beverage of how the use of this drink might relate to good sports nutrition practice. Clearly identify any that might NOT be suitable.

Part 2 sample questions

1. The female athlete triad does not exist. Make an argument for OR against this statement.

2. A British triathlete with coeliac disease needs expert advice to assist him to undertake the Hawaii Ironman World Championship triathlon. What advice could you offer to assist him over the last week of training in Kona Hawaii, and his race day practices?

Texas Woman's University

Department of Nutrition and Food Sciences

M.S. in Exercise and Sports Nutrition

International Olympic Committee (IOC) Diploma in Sports Nutrition Option

Group I - Required Core Courses: (9 hours)

NFS 5363 Human Nutrition and Disease

KINS 5023 Methods of Research

KINS 5033 Applied Statistics

Group II - Additional Required Courses: (12 hours)

KINS 5553 Advanced Exercise Physiology

KINS 5613 Cardiovascular Response to Exercise

NFS 5681 Practicum in Exercise and Sports Nutrition

NFS 5331 Capstone Seminar

* *Students must take NFS 5681 three times in different semesters

Group III – Electives: (9 hours)

Students should select at least one course from the Department of Kinesiology and at least two courses from the Department of Nutrition and Food Sciences. Graduate elective courses will be chosen that complement the student's goals and meet the approval of the student's graduate advisory committee.

Total Program Hours: Minimum 30 hours plus IOC Diploma

NFS 5331 Capstone Seminar: Students take this seminar toward the end of the program. Minor: A minor of 9 graduate credit hours in an area of emphasis can be achieved within the total number of program hours or by taking additional coursework. If a minor is declared, a faculty member in that minor area of study must serve on the academic committee.

Minor: A minor of 9 graduate credit hours in an area of emphasis can be achieved within the total number of program hours or by taking additional coursework. If a minor is

declared, a faculty member in that minor area of study must serve on the academic committee

TEXAS WOMAN'S UNIVERSITY
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Nanna Meyer, PhD, RDN, CSSD
Associate Professor
Helen and Arthur E. Johnson Beth-El College of Nursing and Health Sciences
Health Sciences UHAL 308
Colorado Springs, Colorado

RE: Justification for IOC partnership with University of Colorado, Colorado Springs

Dear Dr. Meyer,

Many nations of the world do not provide sports nutrition education so the purpose of this option for graduate study is to enable foreign students who have received some education in sports nutrition at a post baccalaureate level to complete a master's degree in exercise and sports nutrition. "To continue its commitment to improving the knowledge and practice of sports nutrition, worldwide, the Medical Commission of the International Olympic Committee (IOC) now offers a postgraduate-level online program in Sport and Exercise Nutrition. This program is aimed at sports nutrition professionals who work closely with athletes and coaches to enhance their nutrition."

The IOC Diploma in Sports Nutrition has built on existing programs offered by leading Universities, but embraces an international faculty to offer a program that is beyond the resources of any single institution. The program focuses on the nutritional implications of participation in structured sports activities, but also considers the role of physical activity, nutrition and other lifestyle factors in promoting good health. The course takes advantage of new technologies and delivers an innovative program to ensure that information is current, comprehensive, authoritative and accessible. Sports Nutrition experts in the study and practice of sports nutrition from around the world are involved in the provision of material to the course, and are available to students via "online chats" and residential workshops.

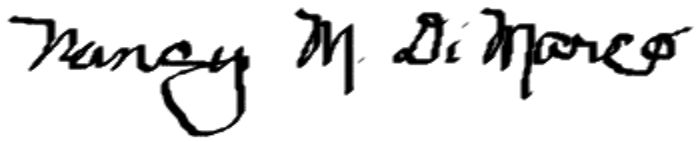
The Diploma course is offered by Distance Learning on a part-time basis, and takes ~ two years to complete. In addition to the coursework contained in modules, students have the opportunity to participate in residential courses consisting of laboratory practical work, seminars and tutorials. Upon successful completion of all elements of the program, students are eligible to graduate with an IOC Diploma in Sports Nutrition.
http://www.sportsoracle.com/Nutrition/Home/, accessed September 2, 2015.

The Exercise and Sports Nutrition advisory committee at Texas Woman's' University, working in conjunction with the originators of the IOC diploma, Ron Maughn, PhD, Loughborough University, UK and Louise Burke, PhD, Australian Institute of Sport, AU, and the dean of the

graduate school at the University of Hawaii, have determined that the diploma provides 12 hours of graduate level credit toward the completion of the master's degree in Exercise and Sports Nutrition at Texas Woman's University (TWU). The remaining 30 hours are completed at TWU for a total of 42 hours of graduate instruction. This option has proven attractive to foreign students and enhances the learning and exchange of ideas for both potential students and faculty and students of Texas Woman's University. This option was approved by our Graduate Council in 2009 and since that time, we have admitted 5 international students who have each completed their master's degrees at TWU.

It is in the spirit of cooperation and need for the expansion of Sports Nutrition, both nationally and internationally, that I recommend the acceptance of the proposal of the University of Colorado at Colorado Springs for inclusion of the IOC diploma as credit toward the master's degree in sports nutrition. I have also included the degree plan approved by the Department of Nutrition and Food Sciences for students entering the master's program with the IOC diploma. If you have any questions, please contact me.

Sincerely Yours,



Nancy M. DiMarco, PhD, RDN, CSSD, FACSM
Professor and Director

From: **Stuart Galloway** s.d.r.galloway@stir.ac.uk
Subject: RE: URGENT - IOC Sport Nutrition Diploma Request
Date: August 24, 2015 at 3:51 AM
To: Nanna Meyer nannalmeyer@gmail.com

Hi Nanna,

Apologies for the delay replying.

We admit students to our MSc programme with 120 credits for their IOC postgraduate diploma. They then take a 60 credit project only module either full-time (6 months on site) or part-time (12 months distance learning based).

Regarding grading – all our postgrad programmes are pass or fail. We admit students as passing all the 120 credits if they successfully complete the IOC diploma. However, due to only awarding 60 credits in Stirling we cannot award an MSc with merit or distinction (so it is just pass or fail too). However, we do award a prize each year to the best overall student in recognition of their achievement.

We did meet some resistance to this when trying to set it up. But I think that now it is running and we have had several students graduate they like the multicultural / international links that we are developing from it (students from Sri Lanka, Malta, Qatar, Canada, England, Holland, Mexico, Venezuela etc). We also aim for students to work towards publishing their work once they have graduated. Of course this will not happen in all cases but we have obtained applied sport nutrition publications from this route that help to raise the profile of the programme, as well as presentations at conferences.

The IOC graduates that we have taken on through our MSc have all been good with the majority being excellent.

The one downside (if you call it that) is that we have to do a lot of preparatory work with the students prior to entry into our programme because our programme duration is only 6 months full-time. By this I mean that we work with the student to develop their research proposal and gain ethics approval for the work prior to their enrolment so that they can hit the ground running on recruitment and data collection when they arrive.

Do you need a formal letter to outline these thoughts/comments (on headed paper?)?

Regards,

Stuart.

Dr. Stuart D.R. Galloway
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