

## Biochemical studies of Olympic athletes to continue in Nagano

In 1982, the IOC Medical Commission, under the chairmanship of Prince Alexandre de Merode, established a subcommission for biomechanics and sports physiology. One of its goals was to conduct scientific studies during the Olympic Games in order to document performances of Olympic athletes in competition and establish an archive for scientific and historical purposes. The first project was conducted during the Games of the XXIII Olympiad in 1984 in Los Angeles, during which films were taken of athletes in gymnastics, track and field and weight lifting. These studies, which were conducted in collaboration with the three International Federations, proved that biomechanical research could be carried out without disrupting the competitions. During the XV Olympic Winter Games in Calgary in 1988, biomechanical studies were completed in cross country skiing, ski jumping, bobsleigh, speed skating and freestyle aerobics. Similar important research studies have been conducted during each of the succeeding Olympic Games, the most recent being the Games of the XXVI Olympiad, the Centennial Games, in Atlanta in 1996. In addition to their scientific merit, these projects have produced films, video tapes, and published documents of exceptional historical value. A conservative estimate of the number of actual performances which have been recorded and analyzed is over 43,500, allowing for multiple trials by individuals. Furthermore, more than 350 biomechanists from countries around the world have donated their time while participating in these biomechanical studies.

The established tradition of conducting biomechanical studies during the Olympic Games will be continued in Nagano under the direction of Professor Kazuhiko Watanabe of Hiroshima University. A total of nine investigations will be carried out by researchers represent-

by **Richard C. Nelson\***

ing eight countries. The projects will be directed by internationally recognized biochemists, each of whom will be supported by five to seven assistants. In addition, members of the subcommission will provide professional support and assist with project coordination. The projects and their respective leaders are as follows: freestyle skiing - Dr. Peter Schaff (Germany); speed skating, long distance - Professor Gerald Smith (USA); speed skating, short distance - Dr. Michiyoshi Ae (Japan); short track skating - Dr. Young-Hoo Kwon (Korea); alpine skiing - Jiping Shih (China); alpine skiing, slalom - Tet-suo Fukunaga (Japan); ski jumping, take-off - Professor Paavo Komi (Finland) and Professor Peter Bruggeman (Germany); ski jumping, flight - Professor Kazuhiko Watanabe (Japan), and figure skating, jumps - Katsumi Asano and Yasuo Ikegami (Japan).

In addition to these biomechanical studies two unique educational projects have been developed by Professor Watanabe and his colleagues. The first involves a series of 25 sport science posters which have been distributed to elementary and secondary schools in the Nagano region. Examples of the topics include: sports



*Ski jumper executing takeoff during the XV Olympic Winter Games in Calgary in 1988. Forces under the skis were recorded via force plates imbedded in takeoff apron.*

injuries, exercise and fitness, ice hockey, mental training, structure of bone and muscle, and other related subjects. These informative posters will be moved to various locations at the venues to be viewed by the spectators attending the events. A second unique programme involves production of nine video films describing the scientific aspects of selected winter sports. Included are the science of bobsleigh, ski jumping, speed skating, snowboarding, biathlon, cross country skiing, luge, alpine skiing and high altitude training. These ten-minute videos have been shown in junior and senior high schools in many parts of Japan and will be seen by spectators at the Olympic venues. There are also plans for production of English versions of these video programmes, which will be available for international distribution.

In summary, the biomechanical studies to be conducted during the XVIII Olympic Winter Games in Nagano represent a continuation and expansion of those which began in Los Angeles in 1984. It is anticipated that the results of these studies will provide valuable practical information for trainers and coaches as well as significant scientific information regarding the biomechanics of Olympic sportsmen and -women. Meanwhile, the creative educational programmes (posters and videos) highlight the importance of sport science in the training of elite athletes as well as in developing healthy lifestyles among the general public.

Financial and administrative support for these activities is being provided by the Nagano Olympic Organizing Committee (NAOC), Hiroshima University, the Japanese government, Nagano Prefecture, local sponsors and by a private gift (40% of total cost).

\*Member of the IOC Biomechanics and Sport Physiology subcommission.