

CURRICULUM VITAE

BENNO M. NIGG

August 2005

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Faculty of Kinesiology
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NAME: Benno M. NIGG
DATE OF BIRTH: April 10th, 1938
PLACE OF BIRTH: Walenstadt, St. Gallen, Switzerland
NATIONALITY: Swiss and Canadian
STATUS: Married
 Wife: Margareta
 Children: Andreas (1966)
 Reto (1969)
 Claudio (1970)
 Sandro (1972)

PERSONAL AND PROFESSIONAL HISTORY:

1945 - 1950 Primary School in Zürich.
 1950 - 1958 Humanistic Gymnasium in Einsiedeln.
 Final Examination: "Maturität A".
 1958 - 1959 Military service.
 1959 - 1965 Study of Physics at the Technical University of Zürich (ETH), Switzerland, and the Technical University, Hannover, West Germany.
 Final Examination: "Diploma in Experimental Physics" at the ETH Zürich, Switzerland.
 1965 - 1971 Instructor for Physics and Mathematics at the Lyceum Alpinum Zuoz, Switzerland.
 1971 - 1976 Research Director at the Biomechanics Laboratory of the ETH Zürich.
 1975 Dr.sc.nat. at the ETH Zürich.
 1976 Visiting Fellow at The Pennsylvania State University, U.S.A.
 1976 - 1981 Director of the Biomechanics Laboratory of the ETH Zürich (heading a fifteen scientist laboratory at the end of this period).
 1981 - ongoing Professor of Biomechanics at The University of Calgary. Joint appointment in the Faculties of Kinesiology, Engineering, and Medicine.
 1981 - ongoing Director of the Human Performance Laboratory at the University of Calgary.
 1987 - 1994 Associate Dean (Research).

AWARDS AND SPECIAL ACHIEVEMENTS:

1963	Exchange scholarship award from ETH Zürich, Switzerland.
1976	Ken Petak Memorial Lecture, Penn State University, Pennsylvania, USA.
1979 - 1987	Council Member of the International Society of Biomechanics, ISB.
1983 ongoing	Corresponding Fellow of the AAPHE.
1983 - 85	President of International Society of Biomechanics, ISB.
1984	Sports Medicine - All Star Team, Runner's World.
1984 ongoing	Appointed member of the IOC Medical Commission, Subcommission Biomech. and Physiology.
1986	Michael Jäger Award German-Austrian-Swiss Soc. Orth. & Sports Traumatology, GOTS, Munich.
1989	Wartenweiler Memorial Lecturer at the ISB Congress, UCLA, Los Angeles, USA.
1989	The Clin. Biom. Award, ISB Congr., UCLA, Los Angeles, USA: (Morlock and Nigg).
1991	Winner of the Novel Award, Vienna, Austria. (Nigg and Cole).
1992	Nathaniel Gould Foot and Ankle Lecturer. University of Vermont, Burlington, Vermont.
1993	Winner of the Alberta Science and Technology (ASTech) Award.
1993 ongoing	Appointed member of "The Club of Cologne".
1993	Distinguished Service Award United States Tennis Court and Track Builders Association.
1994 ongoing	Chair: Selection Committee IOC-Olympic Prize, a 500,000 \$US research award.
1995	The Clin. Biom. Award, ISB Conf. Jyväskylä, Finland (Cole, Nigg, Gerritsen, van den Bogert).
1997	Teaching Excellence Award, Faculty of Kinesiology.
1997	Plenary Session Lecturer. World Congress of Biomechanics, Sapporo, Japan.
1998	Fellow of the International Academy for Medical and Biological Engineering.
1998	Charter Member and co-chair: Olympic Academy of Science
1998	Teaching Excellence Award, Faculty of Kinesiology (Honourable Mention).
1999	Guest of Honour German-Austrian-Swiss Soc. Orth. & Sports Traumatology, GOTS, Munich.
1999	The Wood Distinguished Lecturer in Joint Injury Research, Calgary, Canada
2000	Novel Millenium Awards, Munich (Nurse & Nigg)
2000	VP Research Award, University of Calgary
2002	Elected Fellow: Canadian Society for Biomechanics
2002	Career Award: Canadian Society for Biomechanics
2002	Honorary Member, Canadian Chiropractic Association
2003	Award of Excellence in Research, Faculty of Kinesiology, University of Calgary
2003	University Professorship Award, University of Calgary
2003	Distinguished Faculty Achievement Award, University of Calgary
2003	Special Achievement Award – Health and Wellness, University of Calgary
2003	Elected Corresponding Fellow: The Swiss Academy of Medical Science
2004	Geoffrey Dyson Award, International Society of Biomechanics in Sports
2004	Awarded an Honorary Doctorate degree (Dr.h.c) from the University of Salzburg
2005	Honorary Fellowship ISBS

MEMBERSHIP AND FUNCTIONS IN NATIONAL AND INTERNATIONAL RESEARCH GROUPS:

1971 ongoing	Member of the International Society of Biomechanics, ISB.
1974	Member of the Organising Committee of the 2 nd Int. Symp. on Biotelemetry, Davos, Switzerland.
1974	Chairman of the Organising Committee of the Int. Biomech. Symposium, ETH Zürich.
1976	Chairman of the Organising Committee of the Int. Biomech. Symposium, ETH Zürich.
1976 - 1981	Member of the Research Council of the Swiss Ski Federation (SSV).
1978	Chairman of the Organising Committee of the 1 st Int. Symp. on Sport Surfaces, ETH Zürich.
1978 - 1979	Scientific Board of the International Symposium "Man Under Vibration", Udine, Italy.
1978 - 1981	Chairman of the Research Council of the Swiss Ski Federation.

1979 - 1987	Council Member of the International Society of Biomechanics.
1980	Chairman of the Organising Committee of the 2 nd Int. Symp. on Sport Surfaces, ETH Zürich.
1981 - 1983	President-elect of the International Society of Biomechanics.
1982 ongoing	Member of the Canadian Society of Biomechanics.
1982 ongoing	Member of the American Society of Biomechanics.
1982 - 1983	Advisory Board 9th International Congress of Biomechanics, Waterloo, Canada, 1983.
1982 ongoing	Member of the American College of Sports Medicine.
1982 - 1985	Grant Review Committee - Health and Welfare Canada.
1982 ongoing	Member of the Board of the Helmholtz Institute for Biomed. Eng., TH Aachen, West Germany.
1982 - 1984	Advisory Board 4th European Congress of Biomech., ESB, Davos, Switzerland, 1984.
1983	Chairman of the International Symposium of Sport Shoes and Playing Surfaces, Calgary, 1983.
1983 - 1989	Member of CASS.
1983 - 1985	Advisory Board 10th Int. Congress of Biomechanics, Sweden, 1985, Umeå, Sweden.
1987	Chairman of the International Symposium on Sport Surfaces, Calgary, 1987.
1987 - 1989	Organising Committee 1 st IOC World Congress on Sport Sciences, Colorado, USA, 1989.
1987 - 1990	Steering Committee 1 st World Congress on Biomechanics in San Diego, USA, 1990.
1987 - 1988	Chairman of the International Symposium on Sport Surfaces, Calgary, 1988.
1988 ongoing	Member of the Orthopaedic Research Society.
1990 - 1991	Organising Committee 2nd IOC World Congress on Sport Sciences, Barcelona, 1991.
1990 - 1994	Steering Committee of 2nd World Congress on Biomech., Amsterdam, The Netherlands, 1994.
1992 - 1993	Chairman of the International Symposium on Sport Surfaces, Calgary, 1993.
1992 - 1994	Organising Committee Congress Canadian Society of Biomechanics, Calgary, 1994.
1991 - 1995	Organising Committee 3rd IOC World Congress on Sport Sciences, Atlanta, 1995.
1994 - 1998	International Advisory Committee of 3rd World Congress of Biomechanics, Sapporo, Japan, 1998.
1996 - 1999	Chair: 17 th Congress of the International Society of Biomechanics, 1999, Calgary, Canada.
1997 - 2002	Chair: 4 th World Congress of Biomechanics, 2002, Calgary, Canada.
1998 - 2002	Member of Canadian Chiropractic Association Research Committee (CCA).

EDITORIAL BOARDS

1983 - 1989	Editorial Board of the <i>International Journal of Sports Biomechanics</i> .
1986 - 1994	Editorial Board of Advisors, <i>Rebus</i> , Inc., New York.
1988 ongoing	Editorial Board, <i>J. Biomechanics</i> .
1990 - 1996	Editorial Board, <i>Clinical Journal of Sports Medicine</i> .
1994 ongoing	Co-editor in chief for the Journal <i>Sportschaden-Sportverletzung</i> .
1995 ongoing	Editorial Board, <i>Clinical Biomechanics</i> .
1995 ongoing	Editorial Board (Mitglied des Redaktionskollegiums), <i>Leistungssport</i> .
1996-2005	Advisory Board, <i>Journal of Sports Sciences</i> .
2000 ongoing	Editorial Board, <i>Int. J. Applied Sports Sciences</i>
2000 ongoing	Editorial Board, <i>Brazilian J. Biomechanics</i>
2000 - 2003	Editorial Board, <i>J. of the Am. Podiatric Medical Association, JAPMA</i>
2005 ongoing	Editorial Board, <i>Orthopädische Zeitschriften</i>

REFEREE FOR JOURNAL PAPERS AND GRANT APPLICATIONS:

J1	Journal of Biomechanics
J2	Journal of Biomechanical Engineering
J3	Journal of Biomedical Engineering
J4	Journal of Biomechanics of Sports
J5	Medicine and Science in Sports and Exercise

J6	Journal Clinical Biomechanics
J7	Research Quarterly for Exercise and Sport
J8	Canadian Journal of Applied Sport Science
J9	Sportwissenschaft
J10	Leistungssport
J11	Jugend und Sport
J12	Sports Medicine
J13	Journal of Applied Biomechanics
J14	Journal of Orthopaedic Research
J15	Acta Physiologica Scandinavica
J16	Journal of Orthopaedic Research
J17	British Journal of Sports Medicine
G1	MRC Medical Research Council of Canada
G2	NSERC Natural Science and Engineering Research Council Canada
G3	AHFMR Alberta Heritage Foundation for Medical Research
G4	Health and Welfare Canada
G5	Swiss National Foundation for Research
G6	Austrian Centennial Funds
G7	Fitness and Lifestyle Canada

VISITING RESEARCHERS AND SCHOLARS (1 month or more):

1971	Nelson, R.C. Pennsylvania State University, USA.
1975	Komi, P. University of Jyväskylä, Finland.
1978	Abrantes, J. University of Lissabon, Portugal.
1978	Hay, J.G. University of Iowa, USA.
1978	Komor, A. University of Warschau, Poland.
1978	Koerndle, H. University of Oldenburg, West Germany.
1978	Robson, K.W. State College, Victoria, Australia.
1979	Kaufmann, D. University of Florida, USA.
1979	Morawski, J. University of Warschau, Poland.
1979	Kulig, K. University of Wroclaw, Poland.
1983	Grant, M. University of Western Australia, Perth, Australia.
1983	Unold, E. ETH, Zürich, Switzerland.
1984	Miyashita, M. University of Tokyo, Japan.
1985	Miyashita, M. University of Tokyo, Japan.
1987	Yoshihuku, Y. Chubu University, Japan.
1988	Schamhardt, H. Utrecht University, The Netherlands.
1990	Yeadon, M.R. University of Loughborough, UK.
1990	Nachbauer, W. University of Innsbruck.
1990	Zatsiorsky, V. Central Institute of Physical Culture, Moscow.
1990	Yeadon, M.R. University of Loughborough, UK.
1991	Oakes, B. University of Melbourne, Australia.
1992	Hintermann, B. University of Basel, Switzerland.
1993-94	Sasaki, R. Keio University, Yokohama, Japan.
1995-96	Müller, C. Spital Bruderholz, Basel, Switzerland.
1997-99	von Tschamer, V. Swiss National Foundation, Bern, Switzerland.
1997	Siegler, S. Drexler Univ. Philadelphia, USA.
1998	Schöllhorn, W., Univ. Leipzig, Germany.
1998-99	Schwameder, H. Univ. Salzburg, Austria.

1999	Wilson, A. University of London, UK.
1999	Müller, E. University of Salzburg, Austria.
2000	O'Connor, J. Oxford University, UK.
2001	Valdarabano, V. University of Basel, Switzerland
2001	Kornecki, S. Academy of Phys. Ed. Poland
2001-2002	Won, YD. Chosun University, South Korea
2002-2003	Tak, Gye-Rae, South Korea

SUPERVISION OF POST DOCTORAL FELLOWS:

(1)	1976-1979	Denoth, J.	The influence of the effective mass on the magnitude of impact forces in the tibia-femoral joint. Currently: Dozent (Associate Professor) for Biomechanics at the ETH Zürich, Switzerland.
(2)	1979-1981	Neukomm, P.A.	Development of an 8-channel telemetry system for biomechanical measurement. 1981-1990 VP Research at Neukomm AG, Switzerland. Currently: Dozent (Associate Professor) for Biotelemetry at the ETH Zürich, Switzerland.
(3)	1979-1980	Schneider, E.	Computer supported diagnosis system for on line analysis of performance in rowing. Currently: Director, AO-Institute, Davos, Switzerland and Professor for Biomechanics, University of Basel, Switzerland.
(4)	1980-1981	Proctor, P.	Assessment of the effect of specific drugs on changes in the gait pattern of subjects with partial rupture of the lateral-collateral ligaments of the ankle. Currently: VP Research and Development at Howmedica International, Pfizer Hospital Products Ltd. Staines, Middlesex, U.K.
(5)	1980-1981	Kunz, H.R.	Long-term effect of training programmes on the performance of decathlonists. Currently: Director, national coaching program of Switzerland.
(6)	1985-1987	Herzog, W.	The use of biomechanical gait analysis to quantify effects of conservative treatment of injuries. Currently: Professor for Biomechanics, Co-Director Human Performance Laboratory and Associate Dean Research at the University of Calgary, Calgary, Canada.
(7)	1986-1988	de Boer, R.	Biomechanical analysis of speed-skating. Currently: Research associate, Phillips Medical Systems, Da Best, Netherlands.
(8)	1987-1988	Skarvan, G.	The influence of the ligaments of the AJC on the movement between foot and leg. Currently: Orthopaedic Surgeon, Oberarzt, Kantonsspital Basel, Switzerland.
(9)	1988-1990	Bobbert, M.	Development of a mathematical model for the quantification of forces acting on the tibia. Currently: Associate Professor for Biomechanics, Free University of Amsterdam, The Netherlands.
(10)	1989-1990	Grimston, S.	Effect of physical activity on bone morphology. Currently: Principal of Grimston research, St. Louis, USA.

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| (11) | 1989-1990 | Pitkin, M. | Shoe and foot biomechanics.
Currently: Founder and president of Poly-Orth International, Sharon, MA, USA. |
| (12) | 1990-1991 | Vithal, I. | Energy consideration in sport shoes.
Currently: Research Consultant AMBULATORY FOOTWEAR, Hamilton, Ontario, Canada |
| (13) | 1990-1991 | Nachbauer, W. | Movement transfer between foot and leg during running.
Currently: University Professor and Dean, University of Innsbruck, Austria. |
| (14) | 1991-1993 | van den Bogert, T. | Modeling and simulation of internal forces in the lower extremities during physical activities.
Currently: Professor for Biomechanics, Cleveland Foundation, Cleveland Clinic, USA. |
| (15) | 1991-1993 | de Koning, J. | Lower extremity impact forces.
Currently: Professor for Biomechanics at the Free University of Amsterdam, The Netherlands. |
| (16) | 1991-1992 | Hintermann, B. | Movement transfer between foot and leg in vitro.
Currently: PD and Chief Orthopaedic Surgeon, Kantonsspital Basel, Switzerland. |
| (17) | 1991-1992 | Sommer, Ch. | The influence of ligaments on the movement transfer between foot and leg.
Currently: Orthopaedic Surgeon, Luzern, Switzerland. |
| (18) | 1994-1994 | Hume, P. | The influence of foot morphology on the movement transfer between foot and ankle in vivo.
Currently: Ross Fellow - Knox College, University of Otago, New Zealand. |
| (19) | 1994-1996 | Kim, S.J. | The influence of ankle ligaments on the movement transfer between foot and leg in vivo.
Currently: Assistant Professor in Biomechanics, Hanseo University, South Korea. |
| (20) | 1994-1995 | Stähelin, T. | Ankle joint morphology and function under special consideration of ligaments and muscle tendon units.
Currently: Orthopaedic Resident, Hospital Ilanz, Switzerland. |
| (21) | 1995-1995 | Schöllhorn, W. | Integral movement characterization using neural input.
Currently: Full Professor (C4) at the University of Münster, Germany. |
| (22) | 1995-1996 | Müller, C. | Ankle joint integrity with and without ligaments.
Currently: Oberarzt (Chief Orthop. Surgeon) at the provincial hospital Bruderholz: Prof Müller in Basel, Switzerland. |
| (23) | 1995-1996 | Cole, G. | A simulation model for the human foot and shoe.
Currently: Adjunct Assistant Professor, Human Performance Laboratory, Univ. of Calgary, Canada. |
| (24) | 1996-1997 | Stefanyshyn, D. | Mechanical energy contribution of the lower extremity joints to athletic performance.
Currently: Associate Professor, University of Calgary, Canada. |
| (25) | 1996-1997 | Sasse, M. | Effect of fibular reconstruction on movement and movement coupling in the ankle joint complex, an in vitro study.
Currently: Orthopaedic Surgeon, Kantonsspital Basel, Switzerland. |
| (26) | 1996-1999 | Liu, W. | Stability of the ankle joint complex.
Currently: Research Associate, Boston University, USA. |
| (27) | 1998-1998 | Dixon, S. | Shoe inserts and anthropometrical, anatomical, functional and senso- |

			motoric characteristics. Currently: Lecturer for Biomechanics, UK.
(28)	1998-1999	Schwameder, H.	Joint loading with and without hicking poles. Currently: Associate Professor, University of Salzburg, Austria.
(29)	1998-2000	Baroud, G.	Finite element modeling of foot, shoe and playing surface. Currently: Assistant Professor, McGill University, Montreal.
(30)	1999-2000	Merian, M.	Control of the ankle joint complex. Currently: Orthopaedic Surgeon. University Hospital Basel, Switzerland.
(31)	1999-2003	Wakeling, J.	Impact forces, soft tissue vibrations and muscle tuning. Currently, Assistant Professor, Imperial College, London, UK
(32)	2000-2000	Valderrabano, V.	Validation of the functional characteristics of a new ankle joint replacement. Currently: Orthopaedic Resident. University Hospital Basel, Switzerland.
(33)	2003-2004	Reed Ferber	Knee joint loading for various shoe intervention. Currently: President, Running Clinic, Calgary, Canada.
(34)	2003-	Gwyneth, de Vries	Foot orthotics for acquired symptomatic flat foot condition.
(35)	2005-2005	Marina Barandun	EMG analysis of rehabilitation. Currently: Orthopaedic MD, Triemli Spital, Zurich, Switzerland

SUPERVISION OF PH.D. STUDENTS:

(principal supervisor, co-supervisions are not listed)

@ These graduate students were recipients of a research award at international conferences and/or recipients of a research grant.

(1)	1976-1979	@Neukomm, P.A.	Body-mounted antennas. The effect of the human body on the RF transmission of small body-mounted biotelemetry and portable radio antennas in the frequency range 10 - 1000 MHz and safety considerations. Currently: Dozent (Associate Professor) for Biotelemetry at the ETH Zürich, Switzerland.
(2)	1975-1979	@Schneider, E.	Biomechanische Analyse der Leistung im Zweier ohne Steuermann durch telemetrische Messungen während des Ruderns. (Biomechanical analysis of the performance in the pair rowing with the help of telemetric measurements). Currently: Professor University of Basel, Germany and Director of the Research Institute AO in Davos, Switzerland.
(3)	1976-1980	Kunz, H.R.	Leistungsbestimmende Faktoren im Zehnkampf (limiting factors in decathlon). Currently: Director: National coaching program of Switzerland.
(4)	1979-1983	Luethi, S.M.	Biomechanical analysis of short term pain and injuries in tennis. Currently: President, i-generator, consulting company, Portland Oregon, U.S.A.
(5)	1981-1986	@Schläpfer, F.	The application of the clinically used external spine fixator for the quantification of internal forces and moments. Currently: Senior Research Associate with Stratec-Medical, Switzerland.
(6)	1982-1988	@Bahlsen, A.H.	Etiology of running injuries, a longitudinal prospective study. Currently: President, Bahlsen air-services, Nanton, Alberta, Canada.
(7)	1983-1989	Vermeulen, S.	3-D computer models for the biomechanical analysis of surface shapes.

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| (8) | 1986-1989 | @@Morlock M. | Currently: President of Vermeulen-Software, Calgary, Canada.
A generalized 3-D six-segment model of the ankle and the foot. |
| (9) | 1988-1994 | @@@Ronsky, J. | Currently: Professor, University of Hamburg, Germany.
In vivo quantification of patello-femoral joint contact characteristics. |
| (10) | 1989-1995 | @Cole, G. | Currently: Professor in the Department of Mechanical Engineering at the University of Calgary. Recipient of an NSERC Woman's Fellowship.
The effect of muscular activation on impact loading during locomotion - a simulation approach. |
| (11) | 1991-1996 | @Reinschmidt, C. | Currently: Adjunct Assistant Professor, Human Performance Laboratory, Univ. of Calgary, Canada.
Lower extremity kinematics during walking and running assessed with skin and bone mounted markers. |
| (12) | 1993-1996 | @Stefanyshyn, D. | Currently: Research Associate with Sulzer Medica, Winterthur, Switzerland.
Mechanical energy contribution of the lower extremity joints to athletic performance. |
| (13) | 1991-1996 | Hamilton, G. | Currently: Associate Professor, Faculty of Kinesiology, The University of Calgary, Canada.
Joint congruity and the congruous range of motion applied to displaced intra-articular calcaneal fractures. |
| (14) | 1993-1997 | @@Gerritsen, K. | Currently: Co-owner of Games, a company developing and producing computer games.
Neuro-motor control of gait - a simulation model. |
| (15) | 1994-1998 | @Stacoff, A. | Currently: President, Semper Consulting, Calgary, Canada.
Influence of shoe sole geometry and selected orthotics on movement coupling between foot and leg in running, an <i>in vivo</i> study. |
| (16) | 1995-1998 | @Wright, I. | Currently: Oberassistent (Associate Professor) ETH Zürich, Switzerland.
3-D dynamic modelling of ground contact in heel toe running. |
| (17) | 1999- 2002 | @Hau, A. | Currently: Senior Research Engineer, Taylor Made, San Diego, USA.
Shoe inserts/orthotics and subject specific characteristics |
| (18) | 1998-2003 | @Nurse, M. | Currently: Post Doctoral Fellow, Stanford University, USA
The influence of foot sensitivity and sensory feedback on the control of locomotion. |
| (19) | 1997-2003 | @Miller-Young, J. | Currently: Senior Researcher, Nike Research Laboratory, Portland, Oregon, USA
Foot, insert and shoe characteristics and their influence on locomotion. |
| (20) | 2002- | Boyer, K. | Currently: Instructor, Mount Royal College, Calgary, Canada.
Impact forces, soft tissue vibrations and muscle tuning. |
| (21) | 2003- | @Valderrabano, V. | Effects of ankle joint replacement on function and rehabilitation, a prospective study. |

SUPERVISION OF 'DIPLOMARBEIT' IN ZÜRICH AND MASTER'S THESES IN CALGARY:

ETH Zürich, Switzerland

A "Diplomarbeit" consisted of a research project of the duration of 6-12 months. The titles are a literal translation from German.

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|-----|------|------------|---|
| (1) | 1972 | Gerber, V. | Effect of a specific velocity training on the variation of the timing in dancing. |
| (2) | 1972 | Bucher, W. | The effect of arm and leg movement on the velocity in free-style swimming. |
| (3) | 1972 | Hegner, J. | The use of the board vibrations in diving. Experimental study with |

- various divers.
- (4) 1972 Röthlin, K. Correlation between velocity, angle of attack and length of a throw in javelin.
- (5) 1973 Neeser, K. Correlation between two fitness tests and competition results in free-style swimming.
- (6) 1973 Schneebeli, W. Description of various assessment methods in diving from a biomechanical point of view.
- (7) 1973 Schamaun, W. Experimental analysis of long jump.
- (8) 1973 Unold, E. The effect of different surfaces and shoes on the acceleration on the human body in walking and running.
- (9) 1973 Bless, U. Biomechanical analysis in hurdling.
- (10) 1973 Sturzenegger, H. Limiting factors in gymnastics.
- (11) 1973 Windmüller, R. Acceleration measurements and assessment of impact forces in downhill skiing.
- (12) 1974 Keller, R. Biomechanical long jump analysis.
- (13) 1974 Keller, P. Biomechanical investigation of pole vaulting.
- (14) 1974 Biber, T. Limiting factors in high jump.
- (15) 1974 Spirig, J. Acceleration measurements in gymnastics.
- (16) 1974 Gisler, E. Biomechanical analysis of ski jumping.
- (17) 1974 Juri, T. Acceleration measurements in gymnastics and their connection with film analytic results.
- (18) 1974 Dändliker, F. Frequency analysis of the acceleration curves measured during human movement.
- (19) 1974 Clematide Acceleration measurements in horse riding.
- (20) 1975 Grossmann, O. Acceleration measurements during trampoline exercises.
- (21) 1975 Kobach, M. Development of a method to quantify the psychological and physiological preparation for competition.
- (22) 1975 Ghelfi, P. Correlation between the human microvibrations and the academic performance in different fields of learning.
- (23) 1975 Aeschlimann, Biomechanical analysis of rotation during jumps in gymnastics.
- (24) 1975 Bühler, M. Acceleration measurements and the arm in connection with different tennis racquets.
- (25) 1975 Wyss, C. and Stocker, R. Long and short term reliability of human microvibration measurements.
- (26) 1975 Brandt, J.D. Biomechanical analysis of rowing.
- (27) 1976 Eberle, G., Frey, D. Biomechanical analysis of the effect of shoe inserts on the kinetic and kinematic variables during running.
- (28) 1976 Altdorfer, R. Biomechanical analysis of the bully in ice hockey.
- (29) 1976 Nuttli, P. Human microvibrations and stutterers.
- (30) 1976 Angst, F. Biomechanics of rowing.
- (31) 1977 Weber, B. Gait analysis of middle and long distance runners.
- (32) 1977 Meier, K. Biomechanical analysis of ski-jumping with special consideration of construction of ski-jumping hills.
- (33) 1977 Richoz, P. The effect of tennis court surfaces on selected movement parameters and movement variables in tennis.
- (34) 1977 Morell, F. Selection criteria in rowing.
- (35) 1978 Baumann, K. Acceleration measurements during impact at heel landing on different hiking trails.
- (36) 1978 Kalt, F. Biomechanical analysis of movement pattern in connection with pain and injuries on the locomotive system.
- (37) 1978 von Mentlen, R. Test battery for limiting factors in ice hockey.

(38)	1978	Herzog, W.	The influence of velocity and playing surfaces on the load on the human body in running.
(39)	1979	Kälin, X.	Development of a biomechanical method to predict the performance in a somersault.
(40)	1979	Stricker, R.	Use of video methods to assess the quality of a somersault.
(41)	1979	Ferretti, J.	Effect of different training programs on the performance in somersault for various age groups.
(42)	1979	Zürcher, O.	Effect of taping on gait pattern of athletes.
(43)	1979	Guidon, H.W.	Kinetic analysis of the effect of sport shoe correction.
(44)	1979	Schneider, A.	Kinematic analysis of the effect of sport shoe corrections.
(45)	1979	Troxler, G.	Development of a force measuring system underneath the take-off in ski jumping.
(46)	1979	Rüegg, P.	Measurements of take-off forces in ski-jumping.
(47)	1979	Cassis, B.	Biomechanical analysis of movements in gymnastics.
(48)	1979	Rufener, V.	The influence of a selected training method on the performance in slalom.
(49)	1979	Lemm, R.	Impact forces and the effective mass during movement.
(50)	1979	Frey, E.	Human microvibration and social variables.
(51)	1980	Gossweiler, S.	The influence of footwear and injuries on the movement variables in walking.
(52)	1980	Spiess, U.	Pain and injuries in the lower extremities in tennis.
(53)	1980	Hasenfratz, U.	Pain and injuries in the upper extremities in tennis.
(54)	1980	Fisher, F.	Biomechanical analysis of different techniques at the beginning of a rowing stroke.
(55)	1980	Aeschlimann, S.	The influence of footwear and injuries on kinematic variables in walking and running.
(56)	1980	Bräm, H.	Force measurements in long jump.
(57)	1980	Furrer, S.	Kinetic variables and performance in the long jump.

University of Calgary, Canada

(58)	1993	Chen, H.	Plantar pressure and shoe comfort.
(59)	1993-96	Stergiou, P.	Kinematic and kinetic variables associated with the onset of patello-femoral pain syndrome.
(60)	1995-97	Lee, S.	Forefoot movement during locomotion.
(61)	2002-	Rozitis, A.	Muscle vibrations and muscle fiber type recruitment.
(62)	2001-2004	Toyoda, Y.	Functional Foot Orthotics for Patellofemoral Pain Syndrome.

PROFESSIONAL ASSISTANTS:

(1)	1976-76	Brandt, D.	Film Analysis
(2)	1976-80	Friedrich, R.	Electronics, computer
(3)	1976-79	Luethi, S.	Film analysis, shoe research
(4)	1976-78	Stacoff, A.	Film analysis, shoe research
(5)	1976-76	Stocker, R.	Force analysis
(6)	1976-81	Unold, E.	Computer, film analysis
(7)	1976-77	Vollers, B.	Electronics
(8)	1976-81	Waser, J.	Film analysis
(9)	1977-78	Morell, F.	Film analysis
(10)	1977-78	Unold, W.	Computer

(11)	1978-81	Sägesser, A.	Electronics
(12)	1979-81	Gerber, H.	System specialist, computer
(13)	1979-80	Jetzer, M.	Film analysis
(14)	1979-81	Tiegermann, V.	Electromyography, force analysis
(15)	1980-81	Kälin, X.	Film analysis, shoe research
(16)	1980-80	Siebenmann, D.	Gait simulation
(17)	1980-81	Sudan, J.	Electronics, computer
(18)	1981-99	Fisher, V.	Chief technician, film analysis
(19)	1981-85	Beauchamp, L.	Exercise physiology, film analysis
(20)	1981-81	Eugster, G.	Computer
(21)	1982-85	Burrett, J.	Computer, electronics
(22)	1982-85	Neil, R.	Film analysis, shoe research
(23)	1982-	Tory, B.	Computer
(24)	1982-82	Polishuk, D.	Computer
(25)	1985-86	Beatty, R.	Electronics, computer
(26)	1985-89	Sklyryk, B.	Computer, biomechanics
(27)	1986-	McNeil, G.	Computer, biomechanics
(28)	1987-	Stano, A.	Electronics
(29)	1987-88	Abrahamse, S.	Biomechanics
(30)	1987-88	Flanagan, C.	Pressure distribution
(31)	1987-90	Nilsen, K.	Biomechanics
(32)	1987-89	Yeadon, L.	Library
(33)	1988-96	Seifert, K.	Computer
(34)	1989-94	Oldham, D.	Audio-visual
(35)	1990-94	Read, L.	Biomechanics
(36)	1992-93	Fraser, M.	Editing of publications
(37)	1993-98	Turnbull, K.	Editorial functions
(38)	1994-95	Kahn, A.	Biomechanics
(39)	1995-95	Slotboom, A.	Computer, software
(40)	1996-97	O'Flynn, B.	Experimental locomotion analysis
(41)	1996-97	Hiebert, J.	Experimental locomotion analysis
(42)	1997-01	Stergiou, P.	Experimental locomotion analysis
(43)	1997-99	Frank, R.	General research assistant
(44)	1998-99	Woepfel, D.	Graphic artist
(45)	1998-99	Pittman, S.	Computer programmer
(46)	1999-	Palafox, J.	Graphic artist
(47)	2000-01	Goepfert, B.	Biomechanics
(48)	2000-01	Pascual, S.	EMG
(49)	2001-03	Rozitis, A.	Biomechanics
(50)	2002-	Boyer, K.	Vibrations
(51)	2002-	Anderson, B.	Research assistant
(52)	2003-2003	Smith, Clark	Research assistant
(53)	2004-	Fried, A.	Research assistant
(54)	2004-	Gormely, T.	Research assistant
(55)	2004-	McDougall, D.	Research assistant
(56)	2004-	Roeke, C.	Graphic artist

SUMMER STUDENTS:

(1)	1983	Brown, H.	AHFMR
(2)	1983	Bahlsen, B.	NSERC
(3)	1983	Grant, M.	Industry
(4)	1984	Bahlsen, B.	NSERC
(5)	1984	Doige, L.	Industry
(6)	1984	Stokes, S.	NSERC
(7)	1984	White, L.	Industry
(8)	1985	Glover, R.	NSERC
(9)	1985	Flanagan, C.	Industry
(10)	1985	Volway, D.	Industry
(11)	1986	Read, L.	AHFMR
(12)	1986	Woo, H.	AHFMR
(13)	1987	Flanagan, C.	Industry
(14)	1988	Voyol, X.	NSERC
(15)	1988	Will, C.	Industry
(16)	1989	Fisher, C.	Industry
(17)	1989	Niven, J.	Industry
(18)	1990	Fisher, C.	STEP
(19)	1990	Rempel, D.	NSERC
(20)	1990	Graf, S.	Industry
(21)	1991	Fisher, C.	STEP
(22)	1992	Smith, G.	NSERC
(23)	1993	Smith, G.	NSERC
(24)	1993	Telang, L.	NSERC
(25)	1994	Vontobel, S.	Industry
(26)	1996	Harrigan, M.	Industry
(27)	1996	Bourgeois, S.	Industry
(28)	1996	Murphy, J.	Industry
(29)	1997	Nurse, M	Industry
(30)	1998	Strudsholm, R.	Industry
(31)	2000	Rozitis, A.	NSERC
(32)	2001	Anderson, B.	Industry
(33)	2001	Burnham, L.	Industry
(34)	2002	Shane, J.	NSERC
(35)	2003	McDougall	Markin-Flanagan
(36)	2003	Noonan, K.	Industry
(37)	2003	Sargent, A.	Industry
(38)	2003	Weber, Ch.	Industry

FINANCIAL SUPPORT:

The following list includes primarily research grants and industry support for applications and/or contracts where B. M. Nigg was the *principal applicant*.

1976 - 1981 (ETH Zürich)

Swiss National Foundation for Research
 Swiss Sport Research Foundation
 University Research Foundation (ETH)
 Adidas (Sport Shoe Company)
 Ciba Geigy (Chemical drugs)
 Hoffman-La Roche (Chemical Company)
 Nordika (Ski boots Company)
 Sandoz (Bioscience Company)

Total Sum (1976-1981)	\$Can	960,000
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The calculation from Swiss Francs to \$Can was done using an exchange rate of 1.00 \$Can = 1.70 SFr. which was about the average exchange rate in 1980.

1981 - 1991 (Calgary)

AHFMR Alberta Heritage Foundation for Medical Research
 Adidas (Sport Shoe Company)
 Chiropractic Foundation for Spinal Research
 Fitness Canada
 International Olympic Committee
 MRC Medical Research Council
 NIKE (Sport Shoe Company)
 NSERC National Science & Engineering Research Council
 Physical Education (new building equipment grant)
 Porplastic (Sport Surfaces Company)
 Spartan (Sport Surfaces interest)
 Swiss National Foundation for Research
 Several small Industry contracts

Total Sum (1981 - 1991)	\$ Can	2,668,100
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1992	Support: Adidas, NSERC, SGO, IOC endowment, MAC, Victoria Games, Robbins Sport Surfaces, Grad. student and Post Doctoral support		
	Total sum for 1992	\$ Can	496,660

1993	Adidas, NSERC, SGO, IOC endowment, MAC operating, Bauerfeind, Grad. Stud. support, Rollerblade, Summer students		
	Total sum for 1993	\$ Can	450,700

1994	NSERC, SGO, Can. Fitness and Lifestyle Inst., IOC endowment, MAC operating, MAC equipment, Bauerfeind, Olympic Oval Fund, Adidas, Grad. Stud. support,		
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	Post Doc. support, RJJA surface testing McGill, NSERC summer studentship, Going global, AHFMR Total sum for 1994		\$ Can	457,500
1995	NSERC, Can. Fitness and Lifestyle Inst., IOC endowment, MAC operating, MAC equipment, Olympic Oval Fund, Adidas, Grad. Stud. support, Post Doc. support, RJJA surface testing Total sum for 1995		\$ Can	220,000
1996	NSERC, IOC endowment, MAC operating, Adidas, Grad. Stud. support, Post Doc. support, Decathlon, Shering-Plough, Cenalta, Head, Mondo, Joh. Jakob Foundation		\$ Can	360,000
1997	Grants: NSERC, Dept. Defence Canada, Swiss National Foundation, Johann Jakob Foundation, Industry: Adidas, Decathlon, Motion Analysis, Head, Endowment: IOC Endowment, Da Vinci (Engineered Air Donation)		\$ Can	1,717,300
1998	Grants: NSERC, Dept. Defence Canada, Swiss National Foundation, Johann Jakob Foundation, Industry: Adidas, Decathlon, Motion Analysis, Head, Mondo Int., Wiley&Sons Endowment: IOC Endowment, Da Vinci (Engineered Air Donation)		\$ Can	1,467,400
1999	Grants: NSERC, Dept. Defence Canada, SNF, Joh. Jakob Foundation Industry: Adidas, Mizuno, Motion Analysis, Precam Endowment: IOC Endowment, Da Vinci (Engineered Air Donation)		\$ Can	1,625,700
2000	Grants: NSERC, Dept. Defence Canada Industry: Adidas, Mizuno, Mondo, MAC, Taylor Made, Vanier Endowment: IOC Endowment, Da Vinci (Engineered Air Donation)		\$ Can	535,050
2001	Grants: Dept. Defence Canada Industry: Adidas, Mondo, MAC, Taylor Made, 713254 Alberta Ltd. Endowment: IOC Endowment, Da Vinci (Engineered Air Donation)		\$ Can	472,000
2002	Grants: Dept. Defence Canada Industry: Adidas, MAC, Taylor Made, Endowment: da Vinci		\$ Can	412,500
2003	Grants: Dept. Defence, University Professorship, Am. Academy Pod. Sports Med. Industry: Adidas, MAC, BRI, Sport Court, Taylor Made Endowment: da Vinci		\$Can	326,242
2004	Grants: Univ. Professorship, Am. Academy Pod. Sports Med. Industry: Taylor Made, Adidas, MAC, BRI, Gerflor, EMA, Robins, Nike, Masai Endowment: da Vinci Donations: Philanthropists (for building and da Vinci)		\$Can \$Can	500,219 2,600,000
Total since 1976			\$Can	16,200,071

INVITED LECTURES (INTERNATIONAL AND IMPORTANT NATIONAL):

In this section only the most important invited and keynote lectures are listed.

- 1974 Invited Lecture, University of Heidelberg, West Germany.
- 1975 Invited Lecture, IAKS - Conference, Köln, West Germany.
- 1976 K.L. Petak Memorial Lecture, The Pennsylvania State University, State College, Pennsylvania, U.S.A.
- 1977 Invited Lecture, International Academy for Leisure Time Sport Courts, Freiburg, West Germany.
- 1978 Lecture, Congress of the South German Society of Orthopaedics, Baden-Baden, West Germany.
- 1979 Keynote Lecture, 66th Annual Meeting of the West German Society of Orthopaedics, Basel, Switzerland.
Keynote Lecture, 7th International Congress on Biomechanics, Warsaw, Poland.
Keynote Lecture, Third International Symposium on Orthopaedics, Heidelberg, West Germany.
- 1980 Keynote Lecture, Annual Meeting of the West German Society of Sports Medicine, Kiel, West Germany.
Invited Lecture, Int. Symposium on "The Child and the High Performance Sport," Magglingen, Switzerland.
Keynote Lecture, Int. Gymnastic Society, Tübingen, Germany.
- 1981 Keynote Lecture, 8th International Congress on Biomechanics, Nagoya, Japan.
Australian Sport Biom. Lecture Tour, 14 lectures in Perth, Melbourne, Sydney, Brisbane, Wollongong.
Keynote Lecture. 5th Annual Conference of the American Society of Biomechanics, Cleveland, Ohio.
- 1982 Keynote Lecture, 3rd Meeting of the European Society of Biomechanics, Nijmegen, The Netherlands.
Keynote Lecture, Symposium on Biom. Prop. Sport Shoes & Playing Surfaces, Nijmegen, The Netherlands.
Keynote Lecture, Int. Congress on Biomechanics and Medicine in Swimming, Amsterdam, The Netherlands.
Keynote Lecture, Biannual Conference of the Canadian Society of Biomechanics, Kingston, Ontario.
Keynote Lecture, CASS Meeting, Victoria, British Columbia.
- 1983 Distinguished visitor with guest lecture, Simon Fraser University, Burnaby, British Columbia.
Invited Lecture, Symposium of the Vancouver International Marathon, Vancouver, British Columbia.
Keynote Lecture, Int. Symp. on Sport shoes and Playing Surfaces, University of Calgary, Calgary, Alberta.
Keynote Lecture, 9th International Congress of Biomechanics, Waterloo, Ontario, Canada.
Invited Lecture, 4th World Congress of the Int. Society for Prosthetics and Orthotics, London, England.
- 1984 Invited Lecture, 29th Annual Sc. Assembly, Alberta Chapter Col. Family Phys. of Canada, Banff, Alberta.
Invited Lecture, Olympic Colloquium, UCLA, Los Angeles, California.
Invited Lecture, Third Biannual Conference of the Canadian Society for Biomechanics, Winnipeg, Manitoba.
Invited Lecture, 37th Annual Conference on Engineering in Medicine and Biology, Los Angeles, California.
Invited Lecture, International Congress "The Shoe in Sports Activities", Munich, Germany.
- 1985 Lecture, Neuromuscular Optimization of Human Movement. An International Workshop, Zuoz, Switzerland.
Invited Lecture, Fifth Annual Sports Medicine Ski Seminar, Whistler, British Columbia.
Invited Lecture, International Symposium in Sports Medicine, St. Anton, Austria.
Keynote Speaker, 2nd Congress for Orthopaedics in Sports, Berlin, West Germany.
Keynote Speaker, 10th Congress of the International Society for Biomechanics, Umeå, Sweden.
Keynote Speaker, Congress: Applications of Biomechanics, Linköping, Sweden.
- 1986 Invited Speaker, Gatorade Symposium, Phoenix, Arizona.
Invited Speaker, International Symposium in Sports Medicine, St. Christoph, Austria.
Invited Speaker, Nordic Conference in Sports Traumatology, Turku, Finland.
Keynote Speaker, International Conference on Sports Traumatology, Munich, West Germany.
Invited Speaker, Free University of Amsterdam, The Netherlands.
- 1987 Invited Speaker, International Symposium on Sports Medicine, St. Christoph, Austria.
Invited Speaker, ISPO, Munich, Germany.
Invited Speaker, Institute for Biomedical Engineering, Aachen, Germany.
Invited Speaker, ASME Conference, Boston, Mass.
- 1988 Invited Speaker, OEISS-Symposium, Vienna, Austria.
Invited Speaker, Int. Symposium for Sports Medicine, St. Christoph, Austria.
Keynote Speaker, Seoul Olympic Scientific Congress, Cheonan, South Korea.

- Invited Speaker, ASTM, Symposium, Phoenix, Arizona, USA.
- 1989 Keynote Speaker, International Symposium in Sports Medicine, Jerusalem, Israel.
Invited Speaker, Int. Symposium for Sports Medicine, St. Christoph, Austria.
Invited Speaker, Karolinska Institute, University of Stockholm, Sweden.
Wartenweiler Memorial Lecture, International Society of Biomechanics, Congress, Los Angeles, U.S.A.
- 1990 Invited Speaker, The Royal College of Physicians & Surgeons of Canada, Edmonton, Alberta.
Invited Speaker, Colloquium of CTC Lyon, France.
Keynote Speaker, 24th FIMS World Congress on Sports Medicine, Amsterdam, The Netherlands.
Keynote Speaker, International Conference on Athletics, Cologne, FRG.
Invited Symposium Speaker, 1st World Congress on Biomechanics, San Diego, U.S.A.
- 1991 Invited Speaker, International Symposium for Sports Medicine, St. Christoph, Austria.
Keynote Speaker, European Congress on Sport Shoes, Luzern, Switzerland.
- 1992 Invited Speaker, 2nd IOC World Congress on Sport Sciences, Barcelona, Spain.
Nathaniel Gould Foot and Ankle Lecture Series. University of Vermont, Burlington, Vermont, U.S.A.
Invited Speaker. Pre Olympic Congress, IOC Medical Commission, Lerida, Spain.
Keynote Speaker. Annual Sport Science Meeting, Magglingen, Switzerland.
Invited Speaker. University of Innsbruck, Austria.
- 1993 Invited Speaker. German, Austrian and Swiss Orthop. Congress, Munich, Germany.
Invited Speaker. Neuro-Muscular Research Centre. Boston University, Boston, U.S.A.
Keynote Speaker. US Tennis Court and Track Builders Association, Annual Meeting, Chicago, U.S.A.
- 1994 Invited Speaker. NIH Conference on "Contributions of Biomed. Eng. to Biol. and Med.". Washington, U.S.A.
Keynote Lecturer. XXVth FIMS World Congress of Sports Medicine, Athens, Greece.
Invited Speaker. International Symposium: The Shoe in Sports. Linz, Austria.
Keynote Lecturer. Annual Meeting of the Swiss Ass. for Sports Medicine, La Chaux-de-Fonds, Switzerland.
Invited Speaker. 2nd World Congress on Biomechanics. Amsterdam, The Netherlands.
- 1996 Keynote Lecturer. Science in Wintersport. St. Christoph, Austria.
- 1997 Keynote Lecturer. Fourth IOC World Congress on Sport Sciences, Monte Carlo, Monaco.
Keynote Lecturer. The Am. Academy of Podiatric Sports Med. Annual Meeting, Seattle, Washington, US.
Keynote Lecturer. The British Assoc. of Sport & Exercise Sciences, Annual Meeting, York, UK.
Invited Speaker. International Symposium for Sports Medicine, St. Christoph, Austria.
Invited Speaker. Conference of the European College of Sports Medicine, Copenhagen, Denmark.
Invited Speaker. Symposium on running. ACSM, Denver, Colorado.
- 1998 Keynote Lecturer. 3rd World Congress of Biomechanics. Sapporo, Japan.
Keynote Lecturer. Homecoming: Western States Chiropractic College. Portland, USA.
Keynote Lecturer. Sporting Goods Retailer World Summit. Munich, Germany.
Invited Speaker. North American Conference on Biomechanics. Waterloo, Canada.
- 1999 Keynote Lecturer. Central Japan Orthop.c Surgery and Traumatology, 92nd Annual Meeting, Kyoto, Japan.
Keynote Lecturer. GOTS Annual Meeting, Munich, Germany.
Invited Symposium Keynote. Sportwissenschaftlicher Hochschultag, Heidelberg, Germany.
Invited Lecturer. Fifth IOC World Congress on Sport Sciences, Sydney, Australia.
Invited Lecturer. Pro Motio, Instructional Course on Biomechanics, Pontresina, Switzerland.
- 2000 Keynote Lecturer. 2nd International Congress on Skiing and Science. Arlberg, Austria.
Keynote Lecturer. Europ. Foot & Ankle Society, Stockholm, Sweden.
Keynote Lecturer. Insert & Orthotic Symposium, Munich, Germany
- 2001 Keynote Lecturer: ISB Congress, Zürich, Switzerland
Keynote Lecturer: ECSS Congress, Cologne, Germany
Keynote Lecturer: PFOA Congress, Miami, USA
- 2002 Invited Lecturer: 4th World Congress of Biomechanics, Calgary
- 2003 The Mark L. Zivot Lecture in Podiatric Surgery, Banff, Canada
Congress Opening Keynote Lecture: ECSS Congress, Salzburg, Austria

2004 Keynote Lecturer: IOC World Congress, Athens, Greece.
Keynote Lecture: The Swiss Orthop. Ass. Instructional Course in Biomechanics, Pontresina, Switzerland.
Keynote Lecture 1: Joint Meeting Swiss Foot & Ankle Soc. and Swiss Soc Sports Med. Locarno, Switzerland.
Keynote Lecture 2: Joint Meeting Swiss Foot & Ankle Soc. and Swiss Soc Sports Med. Locarno, Switzerland.
Keynote Lecture: Geoffrey Dyson Award Lecture, Annual Congr. Int. Soc. of Biomechanics in Sports, Ottawa.

PUBLICATIONS

Symbols used in the list of references

R	=	refereed journals
C	=	refereed conference proceedings
K	=	keynote in refereed conference proceedings
B	=	books
E	=	editor of a book
P	=	chapters in books
N	=	non-refereed publications
D	=	dissertation (Ph.D. Thesis)

The translations of the French and German titles is attempting to represent the meaning of the title.

1971

- (1) R Nigg, B.M. Über die Wirkung der Eigenrotation (Effet) bei fliegenden Bällen (On the effect of spin in flying balls). *Jugend und Sport*, 6: 284-285, 1971.
- (2) R Nigg, B.M. Reflexions sur l'angle optimal du depart au lancer du poids (On the angle of release in shot put). *Kinanthropologie*, 3/4: 257-264, 1971.

1972

- (3) R Nigg, B.M. and Waser, J. Überlegungen und Experimente zu verschiedenen Hochsprungtests (Theoretical considerations and experiments with various high jump tests). *Jugend und Sport*, 11: 383-386, 1972.

1973

- (4) R Nigg, B.M., Neukomm, P.A., and Waser, J. Messungen im Weitsprung an Weltklassempringern (Experimental results on high performance athletes in long jump). *Jugend und Sport*, 2: 62-66, 1973.
- (5) R Nigg, B.M., Neukomm, P.A. and Waser, J. Messungen im Weitsprung an Weltklassempringern (Measurements with world class athletes in long jump). *Leistungssport*, 4: 265-271, 1973.
- (6) R Hoerler, E. and Nigg, B.M. Überlegungen zum Aufsatzsprung beim Wasserspringen (On the take-off bounce in diving). *Leistungssport*, 4: 272-279, 1973.
- (7) R Nigg, B.M., Hegner, J. and Wartenweiler, J. Experimentelle biomechanische Untersuchungen über den Aufsatzsprung beim Wasserspringen (Experimental biomechanical study on the take-off bounce in diving). *Jugend und Sport*, 11: 385-386, 1973.
- (8) R Nigg, B.M. and Neukomm, P.A. Erschütterungsmessungen beim Skifahren (Impact acceleration measurements in alpine skiing). *Med. Welt*, 11: 1883-1885, 1973.
- (9) B Nigg, B.M. Biomechanik, ausgewählte Kapitel (Selected topics in biomechanics). ETH Zürich, 1973.
- (10) N Nigg, B.M., Neukomm, P.A. and Waser, J. Messungen im Weitsprung an Weltklassempringern (Experimental assessment of high performance long jumpers). *Die Körpererziehung*, 9: 1973.
- (11) N Nigg, B.M. and Neukomm, P.A. Erschütterungsmessungen im Skifahren (Load analysis in alpine skiing). *Proceedings of the Int. Conference "Skifahren und Sicherheit, Davos, Switzerland, 1973.*

1974

- (12) R Nigg, B.M., Neukomm, P.A. and Unold, E. Biomechanik und Sport (Biomechanics and sport). *Orthopäde*, 3: 140-147, 1974.
- (13) R Waser, J., Neeser, K., Nigg, B.M. and Wartenweiler, J. Test zur Klassifizierung der Schwimmer (Test for classification of swimmers). *Jugend und Sport*, 6: 215-217, 1974.
- (14) R Nigg, B.M., Röthlin, K. and Wartenweiler, J. Biomechanische Messungen beim Speerwerfen (Biomechanical measurements in javelin throwing). *Jugend und Sport*, 6: 218-220, 1974.
- (15) R Waser, J. and Nigg, B.M. Hochsprung-Filmanalyse (Film analysis in high jumping). *Leistungssport*, 4: 259-267, 1974.
- (16) C Nigg, B.M. Analysis of twisting and turning movements. In: *Biomechanics IV*. R.C. Nelson and C.A. Morehouse (eds). University Park Press, Baltimore: 279-283, 1974.
- (17) C Neukomm, P.A. and Nigg, B.M. Instrumentation in Ski Research. In: *Biomechanics IV*. R.C. Nelson and C.A.

- Morehouse (eds). University Park Press, Baltimore: 231-235, 1974.
- (18) B Nigg, B.M. Sprung - Springen - Sprünge (Jump - jumping - jumps). Juris Verlag, Zürich, 1974.
- (19) N Nigg, B.M., Neukomm, P.A., Spirig, J. and Unold, E. Die Belastung des menschlichen Bewegungsapparates bei sportlicher Betätigung (Load on the musculo-skeletal system in various sport activities). NZZ, Forschung und Technik, 466: 79-82, 1974.
- 1975**
- (20) D Nigg, B.M. Untersuchung über das menschliche Gleichgewichtsverhalten (Analysis of the human behaviour in the quasi-static equilibrium). Diss. ETH Zürich. Nr. 5630, 1975.
- (21) R Nigg, B.M., Neukomm, P.A. and Unold, E. Erschütterungsmessungen beim Skifahren, Kunstturnen, Gehen und Laufen (Impact accelerations in alpine skiing, gymnastics, walking and running). Medizinische Welt 16: 765-770, 1975.
- (22) R Nigg, B.M., Neukomm, P.A., and Luethi, S. La charge d'appareil loco-moteur humain lors de la pratique du ski (Load of the musculo-skeletal system in skiing). Med. et Hyg., 6: 978-981, 1975.
- (23) C Neukomm, P.A., Dux, A., Nigg, B.M. and Wartenweiler, J. Biomechanische Messmethoden für Ganganalysen (Biomechanical methods for gait analysis). In: Ergometrie und Ergotherapie bei arteriellen Durchblutungsstörungen. A. Bolliger and A. Grüntzig (eds). Huber Verlag, Bern: 39-46, 1975.
- (24) N Nigg, B.M. Quantifizierte Messungen des quasistatischen Gleichgewichtsverhaltens (Quantification of the ground reaction force in a quasi-static standing position). Hospitalis, 45: 733, 1975.
- 1976**
- (25) R Nigg, B.M. and Spirig, J. Erschütterungsmessungen beim Kunstturnen (Impact acceleration measurements in gymnastics). Leistungssport 2: 91-96, 1976.
- (26) N Nigg, B.M. Biomechanik und Schulturnen (Biomechanics in school sport). Schweiz. Turnlehrer Bulletin, 3: 39-44, 1976.
- (27) C Nigg, B.M. and Neukomm, P.A. Behaviour in quasi-static balance. In: Biomechanics V-B. P. Komi (ed). University Park Press, Baltimore: 476-484, 1976.
- (28) N Nigg, B.M. Biomechanische Messungen an Bodenbelägen für Leichtathletik und Spiele. (Biom.I analysis of sport surfaces for track and field and games). Sportstättenbau und Bäderanlagen 4: 81, 1976.
- (29) C Nigg, B.M. Menschliche Mikrovibrationen (Human Microvibrations). Proceedings of Int. Biomechanics Symposium, Zürich: 19-31, 1976.
- (30) C Nigg, B.M., Eberle, G., Frei, D. and Segesser, B. Schuheinlagen (Shoe inserts). Proceedings of Int. Biomechanics Symposium, Zürich: 85-98, 1976.
- 1977**
- (31) R Nigg, B.M., Eberle, G., Frei, D., Segesser, B. and Weber, B. Bewegungsanalyse für Schuhkorrekturen (Movement analysis for shoe corrections). Medita, 9a: 160-163, 1977.
- (32) R Nigg, B.M., Eberle, G., Frei, D. and Segesser, B. Biomechanische Analyse von Fussinsuffizienzen (Biomechanical analysis of foot insufficiencies). Med. Orth. Techn., 6: 178-180, 1977.
- (33) C Nigg, B.M., Neukomm, P.A. and Luethi, S. Die Belastung des menschlichen Bewegungsapparates beim Skifahren (Load on the musculo-skeletal system in alpine skiing). In: Zur Biomechanik des Schilaufts. F. Fetz (ed). Inn Verlag, Innsbruck: 80-89, 1977.
- (34) C Gisler, E., Nigg, B.M. and Waser, J. Biomechanische Untersuchungen im Skispringen (Biom.I analysis of ski jumping). In: Zur Biomechanik des Schilaufts. F. Fetz (ed.) Inn Verlag, Innsbruck: 98-107, 1977.
- (35) B Nigg, B.M. Menschliche Mikrovibrationen (Human microvibrations). Birkhäuser Verlag, Basel, 1977.
- (36) B Nigg, B.M. Biomechanik (Biomechanics). Juris Verlag, Zurich, 1977.
- (37) P Nigg, B.M. Elektronische Methoden der Biomechanik (Electronic measuring methods in biomechanics). In: Grundkurs Datenerhebung I. K. Willimczik (ed). Limpert Verlag, Bad Homburg: 39-67, 1977.
- (38) N Nigg, B.M. Some clinical applications for force platforms in the ETH Biomechanics Laboratory of Zurich. ISB force platform group newsletter 3: 21-25, 1977.
- (39) N Nigg, B.M. and Denoth, J. Belastung des Körpers durch moderne Sportplatzbeläge (Load on the human body on new playing surfaces). NZZ, Forschung und Technik, October: 61, 1977.
- 1978**

- (40) R Nigg, B.M., Unold, E., Bachmann, E. and Schöni, B. Motorische Faktoren (Motor factors). *Jugend und Sport*, 2: 53-57, 1978.
- (41) C Nigg, B.M., Eberle, G., Frey, D., Luethi, S., Segesser, B., and Weber, B. Gait analysis and sport shoe construction. In: *Biomechanics VI-A*. E. Asmussen and K. Jörgensen (eds). University Park Press, Baltimore: 303-309, 1978.
- (42) R Bircher, M., Kohl, J., Nigg, B.M. and Killer, E.A. The microvibrations of the body, an index for examination stress. *Eur. J. Appl. Physiol.*, 39: 99-109, 1978.
- (43) R Nigg, B.M. and Segesser, B. Biomechanische Aspekte zu Sportschuhkorrekturen (Biomechanical aspects on sport shoe corrections). *Orthop. Praxis*, 11: 831-833, 1978.
- (44) R Segesser, B., Ruepp, R., and Nigg, B.M. Indikation, Technik und Fehlermöglichkeiten einer Sportschuhkorrektur (Indication, technique and error possibilities in sport shoe correction). *Orthop. Praxis*, 11: 834-837, 1978.
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- R Boyer, K.A. and Nigg, B.M. Soft tissue vibrations within one soft tissue compartment. Accepted *J. Biomechanics*.

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- R Toyoda, Y., Nigg, B.M., Wiley, P and Humble, R.N. The effects of custom-made foot orthoses on pain and lower extremity kinematics and kinetics for runners with patello-femoral pain syndrome. Submitted to *Clin. Biomechanics*.
- R Toyoda, Y., Nigg, B.M., Wiley, P.J. and Humble, N.R. The effects of foot orthoses on pain and lower extremity kinematics for runners with abnormal pronation and patello-femoral pain syndrome. Submitted to: *Journal of Orthopaedic & Sports Physical Therapy*.

CO-OPERATION WITH INDUSTRY:

Adidas: Co-operation in the development and testing of new sport shoe concepts. Results were implemented in new sport shoe concepts. Ongoing co-operation since 1975.

Bauerfeind Germany: Development and testing of a new concept of ankle braces. The resulting new ankle brace should go into production in 1996. Co-operation 1993-1996.

Cenalta, Calgary: Assessment of safety in the working environment. Co-operation 1996-1998.

Chiropractic Foundation for Spinal Research: Co-operation with the purpose of understanding the physiological, neurological and mechanical effects of chiropractic treatment. Co-operation 1985-2003.

Ciba Geigy Switzerland: Assessment of the effect of drugs for the treatment of ligaments injuries on changes in gait and locomotion. Co-operation 1978-1981.

Decathlon France: Development of shoes which allow forefoot ab-adduction during locomotion. Ongoing co-operation since 1995.

Department of National Defence and Defence and Civil Institute of Environmental Medicine: Development of more comfortable military boots. Co-operation 1998-2004.

Energy Management Athletics: Product development catapult shoe. Ongoing co-operation since 2004.

Gerflor: Application of the concept of muscle tuning to point-elastic sport and industrial surfaces. Ongoing co-operation since 2003.

Head International: Development and testing of new tennis shoe concepts. Co-operation since 1996-1998.

Hoffman-La Roche: Development of a telemetry system to quantify mechanical and physiological variables during real activities. Co-operation from 1976-1980.

I-generator: Co-operation in product development. Ongoing co-operation since 1996.

International Olympic Committee: Co-operation for research during the Olympic Games. Additionally, development of the IOC-Olympic Prize, and award of \$US 500,000 for outstanding research findings relating to movement, exercise and sport. Ongoing co-operation since 1984.

Kaufman Canada: Development of functional ski boots. Co-operation 1995-1996.

Kolon: Development of hiking boots. Ongoing co-operation since 2003.

Mars: Co-operation to develop and sponsor the IOC-Olympic Prize. Co-operation 1990-1993.

Masai: Co-operation to develop a new shoe concept using instability as the guiding principle. Ongoing co-operation

since 2003.

Mizuno: Co-operation for new product testing. Co-operation 1998-2000.

Mondo International: Development of sport surfaces for high performance sport. Ongoing co-operation since 1992.

Motion Analysis Corporation, MAC: Development of software to analyse human and animal movement. The software package developed by the Human Performance Laboratory (KINTRAK) is sold world wide by MAC and is considered the leading software program for motion analysis worldwide. Ongoing co-operation since 1987.

Nike: Co-operation in the development and testing of new sport shoe concepts. Results were implemented in new sport shoe concepts for tennis and court shoes. Co-operation between 1981 and 1984 and ongoing since 2002.

Nordika: Development and testing of new ski boot concepts (Nordica Polaris). Co-operation 1975-1978.

Novel GmbH: Development of criteria for shoe insert/orthotic assessment. Co-operation 2000-2005.

Parke-Davis: Co-operation to develop and sponsor the IOC-Olympic Prize. Co-operation 1993-1999.

Pfizer: Co-operation to develop and sponsor the IOC-Olympic Prize. Co-operation 1999-2003.

Porplastic: Development and testing of new point-elastic sport surface concepts. The product developed through this co-operation was used in the sport surfaces installed at the University of Calgary. Co-operation 1983-1990.

Robbins Sport Surfaces: Development and testing of new area-elastic sport surface concepts. These concepts are now implemented in new indoor sport surface products sold internationally. Co-operation 1990-1993 and ongoing since 2004.

RJJA: Development and testing of sport surfaces. Ongoing co-operation since 1987.

Shering-Plough (Dr. Scholl): Co-operation to develop shoe inserts which increase the mobility of elderly people. Development of concepts and testing of prototypes. Co-operation 1994-1996.

Taylor Made: Co-operation to optimize club development and subject specific club selection. Ongoing co-operation since 2000.

3-M: Co-operation to develop and sponsor the IOC-Olympic Prize. Co-operation between 1989-1992.

INDUSTRY PROJECTS WITH REPORTS:

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- (2) Nigg, B.M. and Luethi, S.M. Load analysis in vivo during various sports activities on selected surfaces. Report for RACOM, Sports Surface Company, 1977.
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- (132) Nigg, B.M., Price, G., and Rigonalli, S. Shoe Insert Construction based on Pressure and/or Shape. Fitpat, 2005.
- (133) Hettinga, B., Nigg, B.M., and Stefanyshyn, D.J. Oxygen Consumption and Muscle Activity with the Energy Management Athletics Full Suspension Composite Shoe Design. Energy Management Athletics (EMA), 2005.

Court Cases with Dr. Nigg as a witness (Underline indicates client represented by Dr. Nigg)		
CASE	YEAR	COMMENTS
<u>Avia</u> vs. Nike	1991	<i>Paul McDermott Hale and Dorr</i> ➤ Patent infringement
<u>Peel Board of Education</u> vs. Jack Riley, Adele Riley	1991	<i>Richard H. Shaban Borden & Elliot</i> ➤ Rugby Injury, Shoe & Surface were claimed to have caused the injury
Festian (Graves) vs. <u>Nike</u>	1992	<i>Allan D. Sobel Rubenstein, Isaacs, Haroutunian and Sobel</i> ➤ Hip injury during tennis. Shoe was claimed to have caused the injury
Mehl vs <u>Monsanto</u>	1992	<i>Mark H. Daaleman Pitney, Hardin, Kip & Szuch</i> ➤ Anterior cruciate ligament rupture during football without contact with opponent. Injury was claimed to have occurred because of shoe-surface friction.
<u>TEVA Sports Sandals</u>	1993	<i>Robert Litowitz Finnegan, Henderson, Farabow, Garrett & Dunner (Washington DC)</i> ➤ Litigation before International Trade Commission
<u>Rollerblade</u> vs many	1993	<i>Albert L. Underhill Merchant & Gould (Mineapolis)</i> ➤ Patent infringement. Rollerblade claimed that their ventilation concept was used by other products
Bauer vs. <u>Rollerblade</u>	1996	<i>Albert L. Underhill Merchant & Gould (Mineapolis)</i> ➤ Patent infringement. Bauer claimed that Rollerblade used one of their patents.

SynTennico, Inc. vs. <u>Southwest Recr. Ind.</u>	1999	<i>John West, Greenbaum Doll & McDonald PLLC</i> ➤ Patent infringement. Syn Tennico claimed that Southwest used one of their patented surfaces.
Chesnokov vs	2001	<i>Samuel Pace, Jr. Dugan, Brinkmann, MagInnis and Pace</i> ➤ Tennis injury during an ATP Tournament with claim that loose surface seams were the reason.