Curriculum Vitae: Richard Wells
May 2008

Degrees Received

Ph.D.	Applied Mechanics, Mechanical Eng. University of Manchester (UMIST) Manchester, England *Dissertation Topic: Kinematic and Kinetic Aspects of Normal Gait and Swing-Through Crutch Gait*	1974-1977
M. Eng.	Dept. of Mechanical Engineering McMaster University Hamilton, Ontario, Canada *Thesis Topic: Identification and Communication of User Needs to the Designer*	1972-1974
B.Sc.	Department of Mechanical Engineering University of Manchester (UMIST) Manchester, England *Senior Project: Acceleration Experienced by the Head in Boxing*	1969-1972

Employment History

2003 - present	Director	Centre of Research Expertise for Prevention of Work-Related Musculoskeletal Disorders, University of Waterloo
2001 - present	Professor	Department of Kinesiology University of Waterloo
2001 - present	Director	Ergonomics and Safety Consulting Service, University of Waterloo
Oct 1999-March 2000	Visiting Scientist	National Institute for Working Life West, Gothenburg, Sweden
1998-present	Adjunct Scientist	Institute for Work and Health Toronto, Ontario
1991 - 1995	Director	Resource Centre for Occupational Health and Safety, University of Waterloo
1990 - 1996	Associate Dean Computing and Special Projects	Faculty of Applied Health Sciences, University of Waterloo
1988	Visiting Associate Professor	Centre for Ergonomics University of Michigan
1987 - present	Associate Professor	Department of Kinesiology University of Waterloo
1978 - 1987	Assistant Professor	Department of Kinesiology University of Waterloo
1977 - 1978	Research Assistant	Department of Kinesiology University of Waterloo

Curriculum Vitae: Richard Wells

Scholarly and Professional Activities

Professional Activities
Director of the Ergonomics and Safety Consulting Service, at the University of Waterloo, 2001- present
Expert Witness for Occupational and Safety and Health Administration, USA, 2000
Member of a scientific panel of the Physical Agents Committee of the American Congress of Governmental, Industrial Hygienists, 2000.
Chair of the Membership Committee of the Human Factors Association of Canada, 1995 - 2000
Chair of the Education Committee for Certification; Human Factors Association of Canada, 1996 - present Member of the Executive Committee of the Human Factors Association of Canada, 1991 - 1993
Director of the Resource Centre for Occupational Health and Safety at the University of Waterloo (an information dissemination and consulting Centre), 1991 - 1995.
Member of the Scientific Panel for Development of Canadian Guidelines for Repetitive Strain Injuries of the National Research Council of Canada/Quebec Institute for Occupational Health and Safety (IRSST), 1991 - 1994
Co-Chair, Human Factors Association of Canada Annual Conference, Waterloo, 1996
Co-Chair, North American Congress of Biomechanics, NACOB, 1992

Reviewing
Natural Sciences and Engineering Council Of Canada (NSERC)
Medical Research Council of Canada (MRC)
Workers' Compensation Board of British Columbia
Sport Canada
National Institute of Occupational Safety and Health (NIOSH), USA
Scandinavian Journal of Work Environment and Health
Medicine and Science in Sports and Exercise
Journal of Biomechanics
Journal of Electromyography and Kinesiology
International Journal of Sport Biomechanics
Canadian Journal of Applied Sport Science
Applied Ergonomics
Ergonomics
Human Factors
Journal of Motor Behavior
Acta Anatomica

Consulting
Occupational Health and Safety Administration (OSHA), USA
Workers' Compensation Board of British Columbia
Canadian Industrial Innovation Centre
Crown Attorney
Ontario Retail Accident Prevention Association/IAPA
Industrial, business, and government clients

Curriculum Vitae: Richard Wells
Scholarly Activity
Peer-reviewed Journals

1. Johnson, J., Skorecki, J., and Wells, R.P.* Peak Accelerations of the Head Experience in Boxing. Medical and Biological Engineering, 1975, (13):396-403.

2. Wells, R.P. The Kinematics and Energy Variations of Swing Through Crutch Gait, Journal of Biomechanics, 1979, 12:579-585.

3. Wells, R.P. The Projection of the Ground Reaction Force as a Predictor of Joint Moments. Bulletin Prosthetic Research, 1981, 18(1):10-35.

4. Winter, D.A., Wells, R.P., and Orr, G*. Errors in the Use of Isokinetic Dynamometers, European Journal of Applied Physiology, 1981, 46:397-407.

5. Hubley, C.L*., and Wells, R.P. A Work Energy Approach to Determine Individual Joint Contributions to Vertical Jump Performance, European Journal of Applied Physiology, 1983, 50:247-254.

6. Bishop, P., Norman, R., Wells, R., Ranney, D., and Skleryk, B. Changes in the Centre of Mass and Moment of Inertia of a Headform Induced by a Hockey Helmet and Face Shield, Canadian Journal of Applied Sport Science, 1983, 8:19-25.

7. Smith, A*., Bishop, P., and Wells R. Alterations in Head Dynamics with the Addition of a Hockey Helmet and Face Shield under Inertial Loading. Medicine and Science in Sport, 1984, 10(2): 68-74.

8. Wells, R. and Ranney, D.A. An Experimental Approach Simulating Lumbrical Function in the Cadaver Hand. Journal of Hand Surgery, 1986, 11A: 574-577.

9. Wells, R.P., Norman, R.W., Bishop, P., and Ranney, D.A. Assessment of the Static Fit of Automobile Lap Belt Systems on Front Seat Passengers. Ergonomics, 1986, 29(8):955-976.

10. Wells, R.P., Morrissey, M.*, and Hughson, R. Internal Work and Physiological Responses During Concentric and Eccentric Ergometry. European Journal of Applied Physiology and Occupational Physiology, 1986, 55:295-301.

11. Ranney, D.A., Wells, R.P., and Dowling, J*. Lumbrical Function: The interaction of lumbrical contraction with the elasticity of the extrinsic finger muscles and its effect on metacarpophalangeal equilibrium. Journal of Hand Surgery, 1987, 12A (4):566-75.

12. Wells, R.P., Bishop, P.J., and Stephens, M. Neck Loads During Head First Collisions in Ice Hockey: Experimental and Simulation Results. International Journal of Sport Biomechanics, 1987, 3(4): 432-443.

13. Wells, R.P., and Evans, N.E*. Functions and Recruitment Patterns of Two-Joint Muscles. Human Movement Science. 1987, 6:349-372.

14. Wells, R.P. Mechanical Energy Costs of Human Movement: An Approach to Evaluating the Transfer Possibilities of Two Joint Muscles. Journal of Biomechanics, 1988, 12(11): 955-964.

15. Ranney, D.A., and Wells, R.P. Lumbrical Functions Revealed By a New and Physiological Approach. Anatomical Record, 1988, 222:110-114.

16. Yang, J.*, Winter, D.A., and Wells, R.P. Postural Dynamics in Humans: Part 1 - A Computer Simulation Model. Biological Cybernetics, 1990, 62(4):309-320.

17. Yang, J.*, Winter, D.A., and Wells, R.P. Postural Dynamics in Humans: Part II Computer Simulations and Experimental Results. Biological Cybernetics, 1990, 62(4):321-330.

18. Bishop, P.J., and Wells, R.P. The Inappropriateness Of Helmet Drop Tests In Assessing Neck Protection In Head-first Impacts. American Journal of Sports Medicine, 1990, 18(2):210-205.

19. Moore, A.*, Wells, R., and Ranney, D. Quantifying Exposure In Occupational Manual Tasks With Cumulative Trauma Disorder Potential. Ergonomics, 1991, 34(12):1433-1453.

20. Cholewicki, J*., McGill, S.M., Wells, R.P. and Vernon, H. Method For Measuring Vertebral Kinematics From Videofluoroscopy. Clinical Biomechanics, 1991, 6:73-78.

21. Wells, R., Moore, A.*, Potvin, J*., and Norman R. Assessment of Risk Factors for Development of Work-related Musculoskeletal Disorders. Applied Ergonomics, 1994, 25(3):157-164.

22. Ranney, D., Wells, R., and Moore, A.* The Anatomical Location Of Work-related Chronic Musculoskeletal Disorders in Selected Industries Characterized by Repetitive Upper Limb Activity. Ergonomics, 1995, 38(7):1408-23.

23. Keir, P.*, Wells, R., and Ranney, D. Passive Stiffness Of The Forearm Musculature and Functional Implications. Clinical Biomechanics, 1996, 11(7):401-409.

24. Andrews, D*., Norman, R. and Wells, R. Accuracy and Repeatability of Low Back Spine Compression Force Estimated from Self Reports of Body Posture During Load Handling, International Journal of Industrial Ergonomics, 1996 ,18:251-260.

25. Frank, J., Brooker, A-S., DeMaio, S., Kerr, M., Maetzel, A., Shannon, H., Sullivan, T., Norman, R., and Wells, R. Disability Due to Occupational Low Back Pain: What do we Know About Primary Prevention? Spine, 1996, 21(24):2908-2917.

26. Frank, J., Brooker, A-S., DeMaio, S., Kerr, M., Maetzel, A., Shannon, H., Sullivan, T., Norman, R., and Wells, R. Disability Due to Occupational Low Back Pain: What do we Know About Secondary Prevention? Spine, 1996, 21(24):2918-2929.

27. Wells, R., Norman, R., Neumann, P*., Andrews, D*., Frank, J., Shannon, H. and Kerr, M*. Assessment of Physical Work Load in Epidemiologic Studies: Common Measurement Metrics for Exposure. Ergonomics, 1997, 40(1): 51-62.

28. Andrews, D*., Norman, R., Wells, R. and Neumann, P. The Accuracy of Self Report and Expert Observer Methods for Obtaining Estimates of Peak Low Back Information During Industrial Work. International Journal of Industrial Ergonomics, 1997, 19:445-455.

29. Keir, P.J.* Wells, R., Ranney, D., and Lavery, W.* The Effects of Tendon Load and Posture on Carpal Tunnel Pressure. Journal of Hand Surgery., 1997, 22A(4):628-634.

30. Polanyi, M*., Cole, D., Beaton, D., Chung, J*., Wells, R., Abdolell, M., Beech-Hawley, L*., Ferrier, S., Mondlock, M.., Sheilds, S., Smith. J. and Shannon, H. Upper-limb Work Related Musculoskeletal Disorders Among Newspaper Employees: Cross-sectional Survey Results. American Journal of Industrial Medicine, (32):620-628, 1997.

31. Norman, R., Wells, R., Neumann, P*., Frank, J., Shannon, H. and Kerr, M. A Comparison of Peak vs Cumulative Physical Loading Factors for Reported Low Back Pain in the Automobile Industry, Clinical Biomechanics, 13(8): 561-573, 1998.

32. Mientjes, M*., Norman, R., McGill, S., and Wells, R. Assessment of An EMG-based Method for Continuous Estimates of Low Back Compression During Three Dimensional Occupational Tasks and Jobs, Ergonomics 42(6): 868-879, 1999.

33. Keir, P*. and Wells , R**.** Changes in the geometry of the carpal tunnel contents due to wrist posture and tendon load: An MRI study on normal wrist, Clinical Biomechanics, 14(9): 635-645, 1999.

34. Andrews*, D.M., Norman, R.W., Wells, R.P., and Neumann, P.* Comparison of self-report and observer methods for repetitive posture and load assessment. Occupational Ergonomics, 1(3):211-222, 1998.

35. Neumann, P*., Wells, R., Norman, R., Andrews, D*., Frank, J., Shannon, H. and Kerr, M. Peak Spinal Loading as a Risk Factor for Reported Low Back Pain in the Automobile Industry: An Inter-method Comparison of a Common Metric, Scandinavian Journal of Work, Environment and Health, 25(5):404-409, 1999.

36. Neumann, W.P.* Wells, R.P., Norman, R.W., Kerr, M.S., Frank , J.S. Shannon, H.S., and the OUBPS Working Group. Trunk Posture: Reliability, Accuracy, and Risk Relationship of a Video Based Method for Physical Exposure Assessment from Trunk Posture. International Journal of Industrial Ergonomics, 28:355-365, 2001.

37. Neumann, P*., Wells, R., Norman, R., Frank, J., Shannon, H. and the OUBPS Group., A posture and load sampling approach to determining low back injury risk in occupational settings: methods and results, International Journal of Industrial Ergonomics, 27:65-77, 2001.

38. Kerr, M.S., Frank, S.W., Shannon, H.S., Norman, R.W., Wells, R.P., Neumann, W.P., and Bombardier, C. and the OUBPS group. Biomechanical and psychosocial risk factors for low-back pain at work. American Journal of Public Health, 91:1069-1075, 2001.

39. Daynard, D*., Yassi, A., Cooper, J., Tate, R., Norman, R., and Wells, R. Biomechanical analysis of peak and cumulative spinal loads during simulated patient handling: A sub-study of a randomized controlled trial of measures to prevent lift and transfer injury to health care workers. Applied Ergonomics, 32:199-214, 2001.

40. Neumann, P*., Wells, R., Norman, R., Kerr, M., Frank, J., Shannon, H. and the OUBPS Group, Trunk posture: reliability, accuracy and risk estimates for low back pain from a video based assessment, International Journal of Industrial Ergonomics, 28:355-365, 2001.

41. Wells, R. and Greig, M. Characterising human hand prehensile capabilities by force and moment wrench, Ergonomics, 15;44(15):1392-402, 2001.

42. Keir, P.J. and Wells, R. The effect of typing posture on wrist extensor muscle loading, Human Factors, 44(3):392-403, 2002.

43. Cole, D.C., Wells, R.P., The Worksite Upper Extremity Research Group, Interventions for Musculoskeletal Disorders in Computer-Intense Office Work: A Framework for Evaluation, Work and Stress, 16(2):95-106, 2002.

44. Frazer, M., Norman, R., Wells, R. and Neumann, P. (2003) The Effects Of Job Rotation On The Risk Of Reporting Low Back Pain, Ergonomics, 46, 904- 919.

45. Greig, M. and Wells, R. (2004) Measurement Of Prehensile Grasp Capabilities By A Force And Moment Wrench: Methodological Development And Assessment Of Manual Workers, Ergonomics, 47(1); 41-58.

46. Cole, D, Wells, R, Kerr, M., Laing, A. & the Ergonomic Intervention Evaluation Research Group (2003), Methodological Issues In Evaluating Workplace Interventions To Reduce Work-Related Musculoskeletal Disorders Through Mechanical Exposure Reduction, Scandinavian Journal of Work, Environment & Health, 29(5):396-405.

47. Wells R., Van Eerd D. and Hagg G., (2004) Mechanical exposure concepts using force as the agent, Scandinavian Journal of Work, Environment & Health, 30(3):179-190.

48. Morose, T., Greig, M., and Wells, R. (2004) Utility of using a force and moment wrench to describe hand demand, Occupational Ergonomics, 4:1-10.

49. Beech-Hawley L, Wells R, Cole DC, and Worksite Upper Extremity Group. (2004) A Multi-method Approach to Deadlines, Workload and WMSD Risk in Newspaper Workers. Work, 23(1):43-58.

50. Laing, A.C., Frazer, M.B., Cole, D.C., Kerr, M.S., Wells, R.P., Norman, R.W. (2005) Study of the effectiveness of a participatory ergonomics intervention in reducing worker pain severity through physical exposure pathways. Ergonomics, 48:2:150-170.

51. Kramer, D.M. & Wells, R.P. Achieving buy-in: Building networks to facilitate knowledge transfer, Science Communication, 26(4):428-444.

52. Moore, A.E. and Wells, R. (2005) Psychophysically determined acceptable torques for in-line screw running: Effect of cycle time and duty cycle, Ergonomics, 48(7):859-874.

53. Kopellar, E. and Wells, R. (2005) Comparison of measurement methods for quantifying hand force, Ergonomics, 48(8): 983-1007.

54. Loisel P, Cote P, Durand MJ, Franche RL, Sullivan MJ, Baril R, Gagnon D, Lacroix A, Lariviere C, Marchand S, Bombardier C, Cole D, Guzman J, Hogg-Johnson S, Arsenault B, Dutil E, Berthelette D, Lippel K, Vezina N, Brun JP, Dionne C, Moffet H, Cooper J, Imbeau D, Wells R, Yassi A. (2005) Training the next generation of researchers in work disability prevention: the Canadian Work Disability Prevention CIHR Strategic Training Program., J Occup Rehabil. Sep;15(3):273-84.

55. Cole, D., Hogg-Johnson, S., Manno, M., Ferrier, S. Wells, R. (2006) Reducing musculoskeletal burden through ergonomic program implementation in a large newspaper, Int Arch Occup Environ Health, 80:98-108.

56. Rivilis, I., Cole, D.,Frazer, M., Kerr, M., Wells, R., Ibrahim, S., (2006) Evaluation of a Participatory Ergonomic Intervention Aimed at Improving Musculoskeletal Health American Journal Of Industrial Medicine 49:801–810.

57. Krajcarski, S.* and Wells, R. (2008) The time history of low back load as a risk factor for reporting low back pain, Theoretical Issues in Ergonomic Science, 9:1, 45 – 71.

58. Pascual, S., Frazer, M., Wells, R., and Cole, D., (2007) Mechanical Exposure and Musculoskeletal Disorder Risk at the Production System Level, Human Factors and Ergonomics in Manufacturing, 18(4), in press.

59. R., Wells, S-E. Mathiassen, L. Medbo, J. Winkel. (2007) Time - a key issue for musculoskeletal health and manufacturing,, Applied Ergonomics, 38, 733-744.

60. Laing, A*. Theberge, N., Frazer, M., Cole, D., Kerr, M., Wells, R. (2007) Effectiveness of a participatory ergonomics intervention in improving communication and psychosocial exposures, Ergonomics, 50(7):1092-109.

61. Moore, A.E*. and Wells, R.. Relationships between psychophysically determined acceptable levels and biomechanical variables for a highly repetitive task, accepted in Ergonomics, Jan 2007

62. Griffith, L., Wells, R., Shannon, H., Walter, S., Cole, D., Hogg-Johnson, S., .Developing common metrics of mechanical exposures across etiologic studies of low back pain in working populations for use in meta-analysis, in press, Occupational and Environmental Medicine., Nov 2007.

63. Greig, M.* and Wells, R , A systematic exploration of electromyographic activity and perceived exertion during the performance of external forces and moments., in press Ergonomics.

Curriculum Vitae: Richard Wells

Papers in Review

1. Frazer, M.B.., Cole, D., Laing, A.C, Wells' R.P, Norman, R.W., Kerr, M and Smith, M, An evaluation of the effects of a production line redesign on physical exposure, discomfort and workers' perceptions, submitted to Ergonomics, June 2008

2. Wells, R., Laing, A., Cole, D. Rivilis, I, Characterizing the intensity of ergonomics interventions for the prevention of musculoskeletal disorders, in review, Work April 2008

3. Van Eerd, D.,Hogg-Johnson, S., Mazumder, A Cole, D. Wells, R. Moore, A. Task exposures in an office environment: a comparison of methods, in review Ergonomics May 2008

4. Wells, R., McFall, K. and Dickerson, C. Task selection for increased mechanical exposure variation: Relevance to job rotation, in review Ergonomics June 2008

5. Cole D. Theberge, N. Dixon, S., Rivilis, I.,Neumann, P., Wells, R. Reflecting on a program of participatory ergonomics interventions: A multiple case study, in review, Work April 2008

6. Mazumder, A Van Eerd, A., Hogg-Johnson, S.,Wells, R., Cole, D., Moore, A,.Comparison of occupational exposure methods relevant to musculoskeletal disorders: worker-workstation interaction in an office environment, submitted to Scandinavian Journal of Work, Environment & Health, June, 2008.

Manuscripts in Preparation

1. Wells, R., S Bao, R. Norman, H. Shannon, D. Cole, and H. Woo, Measurement of work exposure in the upper limbs of VDT operators using electromyography: electrode sites, normalization and within and between day reliability,

2. Wells, R. , R. Norman, H. Shannon, D. Cole, H. Woo and S. Bao, Measurement of work exposure in the upper limbs of VDT operators using electromyography: responsiveness to different tasks and recommendations,

3. Wells, R., Maracle, S., Hurley, K and Rosati, P. Effects of heavy electrical gloves on effort and dexterity II , for submission to Applied Ergonomics

4. Wells, R., Maracle, S., Rosati, P.,and Hurley, K. Effects of heavy electrical gloves on effort and dexterity I, for submission to Int J Ind Erg

5. Willms, K*., Wells, R. and Carnahan, H. Determinants of force decrement in gloved power grip, for submission to Human Factors.

6. Natale, J, Naqvi, S., Kerr, M., Frazer, M., Subrata, P., Ferrier, S., Frumin, E., Wells, R. Effects of workstation modifications on physical and psychosocial factors in clothing plants, to be resubmitted to Applied Ergonomics

Book Chapters

1. **Wells, R.**, Ranney, D., and Keeler, A. The Interaction of Muscular and Elastic Forces During Unloaded Finger Movements: A Computer Graphics Model, in: S.M. Perren and E. Schneider (eds.) Biomechanics: Current Interdisciplinary Research, Martinus Nijhof Publishers, Dortrecht, Netherlands, pp743-748, 1985.

2. Bishop, P.J., and **Wells, R. P.** The Hybrid III Anthropometric Neck in the Evaluation of Head First Collisions, in: Passenger, Comfort, Convenience and Safety: Test Tools and Procedures, P174, 860201, Society of Automotive Engineers, Warrendale, PA., pp131-140, 1986.

3. **Wells, R. P.**, and Bishop, B.J. Cervical Spine Loading In Head First Collisions, in: Biomechanics and Sport, The Institution of Mechanical Engineers, London, pp59-64, 1988.

4. **Wells, R. P.**, Moore, A*., and Ranney, D. Evaluation of Hand Intensive Tasks Using Biomechanical Load Factors, in: Haslegrave, C., Wilson, J., Corlett, N. And Manenica, I. (eds), Work Design in Practice, Taylor and Francis, London, pp 67-73, 1990.

5. **Wells, R**., Moore, A*., and Cholewicki, J*. Evaluation of Upper Limb Stresses Using Musculoskeletal Loads During a Rotating Light Assembly Task, in: Das, B. (ed), Advances in Industrial Ergonomics and Safety II, Taylor and Francis, pp183-190, 1990.

6. Li, Y*., Bishop, P.J., **Wells, R. P.**, and McGill, S.N. A Quasi-Static Analytical Sagittal Plane Model of the Cervical Spine in Extension and Compression, in: Proceedings of the Thirty -Fifth Stapp Car Crash Conference, SAE, Warrendale, PA., pp419-433, 1991.

7. **Wells, R**., and Moore, A.E*. A Framework For Computer Assisted Approaches To The Prevention Of Work-related Musculoskeletal Disorders Involving Workplace Design And Modifications, in: Mattila, M., Karwowski, W. (eds), Computer Applications in Ergonomics Occupational Safety and Health, North Holland, Amsterdam, pp55-62, 1992.

8. **Wells, R**., and Moore, A.E*. Towards A Definition Of Repetitiveness In Manual Tasks, in: Mattila, M., Karwowski, W. (eds), Computer Applications in Ergonomics Occupational Safety and Health, North Holland, Amsterdam, pp401-408, 1992.

9. Keir, P*., and **Wells, R. P.** MRI Of The Carpal Tunnel: Implications For Carpal Tunnel Syndrome, in: Kumar, S.,(ed), Advances in Industrial Ergonomics and Safety III, Taylor and Francis, pp753-760, 1992.

10. **Wells, R**., Ranney, D., and Keir, P*. Passive Force Length Properties Of The Human Forearm Musculature, in: Schuind, F, An, K.N., Cooney III, W.P. and Garcia-Elias, M.(eds) NATO ASI Series: Advances in the Biomechanics of the Hand and Wrist, Plenum Press, pp31-41,1994.

11. **Wells, R.,** Keir, P.J. and Moore, A.E, Applications of Biomechanical Hand and Wrist Models to Work-Related Musculoskeletal Disorders of the Upper Extremity, in Gordon, S.L., Blair, S.J and Fine, L.J.(eds) Repetitive Motion Disorders of the Upper Extremity, American Academy of Orthopaedic Surgeons, Rosemont, IL, pp111-122,1995.

12. Wells, R ., The Hand and Forearm, in: Chaffin, D, Delleman, N. and Haslegrave, C. (eds) Working Posures, Taylor and Francis, pp297-310, 2004.

13. Neumann, P., **Wells, R**. Exposure Prediction and Assessment Tools, in: Kumar, S. (ed) Biomechanics in Ergonomics, (Taylor and Francis) in press, 2007.

Short Reports and Abstracts

1. Winter, D. A., and **Wells, R. P.** Proper Sampling and Filter Frequencies in the Kinematics of Human Gait, in: Engineering for Health, 7th Canadian Medical and Biological Conference, Vancouver, B.C., pp139-141, August, 1978.
2. **Wells, R. P.**, and Winter, D. A. Assessment of Signal and Noise in the Kinematics of Normal Pathological and Sporting Gaits, Proceedings of the First Biannual Conference of the Canadian Society of Biomechanics, Locomotion I, London, Ontario, pp92-93, 1980.
3. Arsenault, B*., Winter, D. A., and **Wells, R. P.** Repeatability of EMG Activity During Gait, in: Proceedings of the First Biannual Conference of the Canadian Society of Biomechanics, Locomotion I, London, Ontario, pp22-23, 1980.
4. **Wells, R. P.**, Winter, D. A., and Onyshko, S. SIMU - An Interactive Computer Graphics Simulation of Human Gait, in: Huiskes, R., VanCampen, D., and De Win, J. (eds.), Biomechanics: Principles and Applications, Nijhoff, The Hauge, pp129-134, 1982.

5. **Wells, R. P.**, and Caldwell, G*. The Effect of Body Markers and Image Size on Cine Film Digitization Noise, in: Proceedings of the Second Biannual Conference of the Canadian Society for Biomechanics, Human

Locomotion II, Kingston, Ontario, pp## 1982.

6. **Wells, R**., Norman, R., Bishop, P., and Ranney, D. The Effect of Passenger Behaviour on the Fit of Automobile Lap Belt Systems, in: Proceedings of the 16th Human Factors Association of Canada Meeting, Hamilton, Ontario, pp80-84, 1983.

7. Morrissey, M*., **Wells, R**., Norman, R., and Hughson, R. Internal Mechanical and Total Mechanical Work During Concentric and Eccentric Cycle Ergometry, in: Winter, D. A., Norman, R. W., Wells, R. P., Hays, K.C., and Patla, A. (eds.) Biomechanics IXB, Human Kinetics Publishers, Champaign, IL., pp549-555, 1985.

8. Bishop, P., Norman, R., and **Wells, R**. A Study of Selected Mechanical Factors Involved in Neck Injuries in Ice Hockey, in Winter, D. A., Norman, R. W., Wells, R. P., Hays, K.C., and Patla, A. (eds.) Biomechanics IXB, Human Kinetics Publishers, Champaign, IL., pp167-172, 1985.

9. Bishop, P.J., and **Wells, R. P.** Cervical Spine Injuries in Ice Hockey, in: Proceedings of the 4th International Congress of Sport Science, Halifax, June, pp## , 1986.

10. Bishop, P.J., and **Wells, R. P.** Problems Related To Determining Injury Potential From Axial Compressive Loading Of The Cervical Spine, in: Proceedings of the 4th International Congress of Sport Science, Halifax, pp## , 1986.

11. Stuber, N*., and **Wells, R. P.** Electromyography of the Iliopsoas, in: Proceedings of the North American Congress on Biomechanics, Montreal (Quebec), pp61-62, 1986.

12. **Wells, R. P.**, and Stuber N*. Electromyographic Responses of the Lower Limb Musculature in Simulated Postural and Locomotor Activities, in: Proceedings of the North American Congress on Biomechanics, Montreal (Quebec), pp75-76, 1986.

13. Yang, J.F., Winter, D. A., and **Wells, R. P.** A Mechanical Model For The Prediction of Upright Balance Strategies In Humans, in: Society Neuroscience Abstracts, 12, Part 2, pp301, 1986.

14. Yang, J.F., Winter, D. A., and **Wells, R. P.** Biomechanical Strategies For Postural Control In Humans, in: Society of Neuroscience Abstracts, 1987.

15. **Wells, R. P.** The Influence Of Wrist Flexion And Extension on Pinch Strength; A Comparison of Experimental and Computer Simulation Results, in: Proceedings of the Fifth Biennial Conference of the Canadian Society for Biomechanics, Spodym Publishers, London, Ontario, pp168-169, 1988.

16. Miller, M., and **Wells, R. P.** The Influence of Wrist Flexion, Wrist Deviation and Forearm Pronation on Pinch and Power Grasp Strength, in: Proceedings of the Fifth Biennial Conference of the Canadian Society for Biomechanics, Spodym Publishers, London, Ontario, pp112-113, 1988.

17. **Wells, R. P.** Measurement of Pole Loads During Nordic Skiing, in: Proceedings of the Fifth Biennial Conference of the Canadian Society for Biomechanics, Spodym Publishers, London, Ontario, pp166-167, 1988.

18. Yack, H.J., Winter, D. A., and **Wells, R**. Economy Of Two-joint Muscles, in: Proceedings of the Fifth Biennial Conference of the Canadian Society for Biomechanics, Spodym Publishers, London, Ontario, pp180-181, 1988.

19. **Wells, R. P.**, Moore, A.E*., and Ranney, D. A. Development of a System for Recording Occupational Hand and Wrist Movement, in: Proceedings of the Human Factors Association of Canada, Edmonton, Alberta, pp101-104, 1988.

20. Frazer, M., and **Wells, R**. Measurement of Low Back Strength in Torsion, in: Proceedings of the Human

Factors Association of Canada, Edmonton, Alberta, pp179-182, 1988.

21. Buchholz, B*., **Wells, R**., and Armstrong, T. The Influence of Object Size On Grasp Strength: Results of a Computer Simulation Of Cylindrical Grasp, in: Proceedings of the American Society of Biomechanics Meeting, pp##, 1988.

22. Smith, T.A., Bishop, P.J., and **Wells, R. P.** Three Dimensional Analysis of Linear and Angular Accelerations of the Head Experienced in Boxing, in: Proceedings of the 1988 IRCOBI Conference on the Biomechanics of Impacts, Bergisch Gladbach (FRG), 1988.

23. Li, Y*., **Wells, R. P.**, Ranney, D., and Moore, A. Prediction of The Pinch And Grasp Force Exerted by the Hand Using Surface and Fine Wire Electromyography, in: Proceedings of the XII Congress of the International Society of Biomechanics, Los Angeles, pp223, 1989.

24. Moore, A.E*., **Wells, R. P.**, and Ranney, D. A System To Predict Internal Factors Related To The Development Of Cumulative Trauma Disorders Of The Carpal Tunnel And Extrinsic Flexor Musculature, in: Proceedings of the XII Congress of the International Society of Biomechanics, Los Angeles, pp257, 1989.

25. Moore, A.E*., and **Wells, R. P.** Response Of Biomechanical Correlates Of Cumulative Trauma Disorders In The Carpal Tunnel And Extrinsic Flexor Musculature To Simulated Working Conditions, in: Proceedings of the XII Congress of the International Society of Biomechanics, Los Angeles, pp256, 1989.

26. Sirin, A*., **Wells, R. P.**, and Patla, A.E. Bilateral Power Analysis Of Cycle Ergometry, in: Proceedings of the 13th Annual Meeting of the American Society of Biomechanics, Burlington, Vermont, pp170-171, 1989.

27. **Wells, R**., Moore, A.E*., and Ranney, D. Musculoskeletal Stresses In Light Assembly, in: Proceedings of the 22nd Annual Conference of the Human Factors Association of Canada, Toronto, Canada, pp167-172, 1989.

28. **Wells, R**., and Ranney, D. Chronic Musculoskeletal Disorders in the Workplace: Where are We?, in: Proceedings of the 22nd Annual Conference of the Human Factors Association of Canada, Toronto, Canada, pp11-19, 1989. **Invited Address**

29. **Wells, R**., Moore, A*., and Cholewicki, J. The Utility of a Deformable Ski Pole for Nordic Skiing: Results of a Simulation Study, in: Proceedings of the Sixth Biennial Conference of the Canadian Society for Biomechanics, Quebec City, pp 101-102, 1990.

30. Sirin, A.V*., Patla, A.E., and **Wells, R. P.** Bilateral Joint Contribution to Total Work During Exhaustive Cycling, in: Proceedings of the Sixth Biennial Conference of the Canadian Society for Biomechanics, Quebec City, pp165-166, 1990.

31. Cholewicki, J, McGill, S., **Wells, R**. and Vernon, H. A Method for Measuring Vertebral Kinematics from Fluoroscopy, in: Proceedings of the Sixth Biennial Conference of the Canadian Society for Biomechanics, Quebec City, pp69-70, 1990.

32. Potvin, J*., Norman, R. W., **Wells, R. P.**, and McGill, S. A Field Method for Continuous Estimation of Compressive Force on the L4/L5 Disc During Performance of Repetitive Industrial Tasks, in: Proceedings of the 23rd Annual Congress of the Human Factors Association of Canada, pp51-56 , 1990.

33. Village, J., **Wells, R**., and Moore, A*. Methods For Reducing Hand-arm Disorders During Roe-popping Procedures at Fish Processing Plants - A Case Study, in: Proceedings of the 23rd Annual Congress of the Human Factors Association of Canada, pp185-190, 1990.

34. Norman, R., and **Wells, R**., Biomechanical Aspects of Occupational Injury, in: Proceedings of the 23rd Annual Congress of the Human Factors Association of Canada, pp109-118 , 1990. **Invited Address**.

35. **Wells, R**., and Moore, A*. Assessment Of Risk Factors For Cumulative Trauma Disorders (CTD) Using A Video/computer Graphics Approach, in: Proceedings of the American Society of Biomechanics, pp242-243, 1991.

36. **Wells, R**., Orr, S*., and Moore, A. Selection of Jobs for a Job Rotation Program., in: Hagberg, M. and Kilbom, A. (eds.) Proceedings: International Scientific Conference on Prevention of Work-Related Musculoskeletal Disorders, (PREMUS), Arbets Miljo Instituet (National Institute of Occupational Health), Stockholm, pp327-329, 1992.

37. **Wells,** R., Ranney, D., Moore, A*., and Gentleman, R. Relationship Between Chronic Musculoskeletal Disorders And Work Exposures: Results From Repetitive Manual Tasks, in: Hagberg, M. and Kilbom, A. (eds.) Proceedings: International Scientific Conference on Prevention of Work-Related Musculoskeletal Disorders, (PREMUS), Arbets Miljo Instituet (National Institute of Occupational Health), Stockholm,, pp324-326, 1992.

38. Ranney, D., **Wells, R**., and Moore, A*. Forearm Muscle Strains: The Forgotten Work-related Musculoskeletal Disorder, in: Hagberg, M. and Kilbom, A. (eds.) Proceedings: International Scientific Conference on Prevention of Work-Related Musculoskeletal Disorders, (PREMUS), Arbets Miljo Instituet (National Institute of Occupational Health), Stockholm, pp240-241, 1992.

39. Ranney, D., **Wells, R.**, and Moore, A*. Should Tennis Elbow Be Considered A Work-related Problem? In: Proceedings of the Fifth International Congress on Hand Surgeries, pp 289, 1992.

40. Ranney, D., **Wells, R.**, and Moore, A*. Prevalence of Occupational Musculoskeletal Disorders of the Forearm and Hand in Selected High-risk Industries, in: Proceedings of the IFSSH Post-Congress Meeting, Budapest, Abstract #1, 1992.

41. Moore, A*., Cholewicki, J*., Orr, S.*, Chen, G., and **Wells, R.** Considerations In Predicting Hand Loads From EMG Using Statistical And Neural Network Methods, in: Proceedings of NACOB II, Second North American Congress on Biomechanics, pp179-180, 1992.

42. Keir, P.J*., and **Wells, R. P.** Normal Forces On Wrist Structures Transmitted By The Finger Flexor Tendons, in: Proceedings of NACOB II, Second North American Congress on Biomechanics, pp35-36, 1992.

43. Xiao, L*., and **Wells, R**. The Interaction Of Muscular Forces During Unloaded Finger Movement: A Forward Dynamic Model, in: Proceedings of NACOB II, Second North American Congress on Biomechanics, pp453-454, 1992.

44. Moore, A*., Potvin, J*., Norman, R., and **Wells, R**. Quantifying Musculoskeletal Stress In Jobs With Long Cycle Times For Ergonomic Change, in: Proceedings of the 25th Human Factors Association of Canada Conference, pp271-276, 1992.

45. Norman, R., **Wells, R**., Moore, A*., and Potvin, J. Towards the Assessment of Costs and Benefits of Ergonomic Modifications to Jobs: A Case Study, in: Proceedings of the 25th Annual Conference of the Human Factors Association of Canada Conference, pp101-110, 1992. **Keynote Address**

46. Grills, P*., and **Wells, R**. Effectiveness of a Electromyographic Biofeedback Training Program to Introduce Relaxation Pauses into Data Entry Work, in: Proceedings of the 25th Annual Conference of the Human Factors Association of Canada Conference, pp27-33, 1992.

47. Grogan, D*., **Wells, R**., and Dalton, J. Health Effects Of Whole Body Vibration On Overhead Crane Operators, in: Proceedings of the 25th Annual Conference of Human Factors Association of Canada Conference, pp277-282, 1992. **Winner of the Best Undergraduate Paper Award**

48. Xiao, L*., and **Wells, R**. Development and Validation of a 3-Dimensional Dynamic Simulation of Human

Finger Movement, in: Proceedings of the 14th International Society of Biomechanics: Satellite Conference of the Technical Group on Computer Simulation, Paris, ppBMR-14, 1993.

49. Moore, A*., **Wells, R**., and Ranney, D. The Relationship Between Pain and Tenderness and Electromyographic Measures in the Forearms of Workers Performing Repetitive Manual Tasks., in: Proceedings of the International Society of Biomechanics, Paris, pp 898-899, 1993.

50. Keir, P*., **Wells, R**., and Ranney, D. Passive Stiffness and Estimated L_o of Forearm Musculature, in: Proceedings of the International Society of Biomechanics, Paris, pp672-673, 1993.

51. **Wells, R**., Norman, R., Neuman, P., Frank, J., Shannon, H., and Kerr, M. Exposure Assessment for Epidemiologic Study of Reported Low Back Pain, in: Proceedings of the 26th Annual Conference of the Human Factors Association of Canada, Fredericton, 1993.

52. Keir, P*., and **Wells, R**. The Effect of Typing Posture on Wrist Extensor Loading., in: Proceedings of the Canadian Society for Biomechanics, pp172-174. 1994.

53. Orr, S*., and **Wells, R**. The Effect of Work Pace and Task Precision on Perceived Exertion and Muscle Activation in the Arms and Shoulders, in: Proceedings of the 12th Triennial Congress of the International Ergonomics Association, Volume 5, pp318-320, 1994.

54. **Wells, R**., Bérubé, D., and Moore, A*. Hand, Arm and Shoulder Loads and Physical Characteristics of MIG Welding Guns. In Proceedings of the 12th Triennial Congress of the International Ergonomics Association, Volume 2, Toronto, pp75-78, 1994.

55. Shannon, H.S., Kerr, M.S., Neumann, P., Frank, J., **Wells, R. P.,** and Norman, R. A Comprehensive Case-Control Study of Risk Factors for Work-Related Soft Tissues Injuries. In Proceedings of the 12th Triennial Congress of the International Ergonomics Association, Volume 2, pp120-122, Toronto, August. 1994.

56. Grills, P.M*., Mientjes, M*., **Wells, R.**, Norman, R., Neumann, P., Frank, J., and Shannon, H. The Reliability and Variability of Low Back Physical Exposure Measures. In Proceedings of the 12th Triennial Congress of the International Ergonomics Association, Volume 2, pp135-137, Toronto, August, 1994.

57. Andrew, D*., Norman, R., **Wells, R**., Frank, J., Shannon, H., and Kerr, M. The Validity of Low Back and Shoulder Load Estimates from Self-Reports of Body Postures During Load Handling, in: Proceedings of the 12th Triennial Congress of the International Ergonomics Association, Volume 2, Toronto, pp144-146, 1994.

58. **Wells, R**., Norman, R., and Neumann, P*. Long-Term Monitoring of Low Back Physical Exposures, in: Proceedings of the 12th Triennial Congress of the International Ergonomics Association, Volume 2, Toronto, pp150-152, 1994.

59. Frazer, M*., Moore, A*., Norman, R., and **Wells, R**. Quantitative Assessment of Ergonomic Interventions, in: Proceedings of the 12th Triennial Congress of the International Ergonomics Association, Volume 2, Toronto, pp153-155, 1994.

60. Andrews, D., Norman, R. W., **Wells, R. P.**, Frank, J. and Shannon, H. The Validity and Reliability of Low Back Estimates from Self-Reports of Body Posture During Load Handling, in: Proceedings of the Eighth Biennial Conference and Symposium Canadian Society for Biomechanics, Calgary, pp150-151, 1994.

61. Grills, P.M*., **Wells, R. P.**, and Norman, R. W. Variability of Low Back Loads from a Biomechanical Model, in: Proceedings of the Eighth Biennial Conference and Symposium Canadian Society for Biomechanics, Calgary, pp198-199, 1994.

62. **Wells, R**., Moore, A.E*., Norman, R., Neumann, P*. and Andrews, D*. Development and Implementation of SAM, A Pen Based Computer System For Work Sampling, in: Proceedings of Scientific Conference on

Prevention of Work-Related Musculoskeletal Disorders (PREMUS), pp317-319, 1995.

63. **Wells, R.**, Causal Mechanisms of Work -Related Musculoskeletal Disorders, **Keynote Address**, Proceedings of Scientific Conference on Prevention of Work-Related Musculoskeletal Disorders (PREMUS) , pp16-20, 1995.

64. Neumann, P*, Norman, R, **Wells R**., Normalization of Low Back Electromyograms for Exposure Assessment, in: Proceedings of the International Society of Biomechanics, Jyvaskyla, pp670-671, 1995.

65. Mylet, J*. and **Wells, R**. The Effect Of Arm Supports In Alleviating Upper Body Musculoskeletal Stress While Working In Fume Hoods, in: Proceedings of the 27th Annual Conference of the Human Factors Association of Canada, pp215-220, 1995, **Winner of the Best Undergraduate Paper Award** .

66. **Wells, R.** , Norman, R., Neumann, P*., Frank , J.,. Shannon, H. and Kerr, M. , A Toolbox Approach to Evaluation of Injury Risk in Occupational Settings**,** Proceedings of the 27th Annual Conference of the Human Factors Association of Canada, pp233-238, 1995.

67. Keir, P.J*. and **Wells R**. The Effect Of Tendon Loading And Wrist Posture On Carpal Tunnel Pressure In Cadavers, in: Proceedings of the 19th Annual Meeting of the American Society of Biomechanics, Stanford University, pp129-130, 1995.

68. Keir, P.J*., and **Wells, R. P.** Forearm Flexor Tendon Radii Of Curvature As Determined From . Magnetic Resonance Imaging (MRI), Second Triennial International Hand and Wrist Biomechanics Symposium, San Francisco, 1995.

69. **Wells, R**. Biomechanics In The Workplace: Contributions To Assessment Of Upper Limb And Low Back Disorders, in: Proceedings of the 9th Biennial Conference of the Canadian Society for Biomechanics, Vancouver, pp54-55, 1996. **Invited presentation**.

70. Neumann, P*. **Wells, R**., Norman, R.W and Jeans B*. Reliability And Accuracy Of A Video Based Workplace Posture Assessment System, in: Proceedings of the 9th Biennial Conference of the Canadian Society for Biomechanics, Vancouver, pp80-81, 1996.

71. Andrew, D*., Norman, R. W., **Wells, R.,** and Neumann, P*. Accuracy Of Self Report And Trained Observer Methods For Estimating Peak Loads During Industrial Work, in: Proceedings of the 9th Biennial Conference of the Canadian Society for Biomechanics, Vancouver, pp320-21, 1996.

72. **Wells, R**., Norman, R., Andrews, D*. and Neumann, P*., A Comparison Of Continuous vs Categorized Posture And Load Data On The Estimation Of Spinal Loads In Occupational Settings, in: Proceedings of the 28th Annual Conference of the Human Factors Association of Canada, Waterloo, pp85-90, 1996.

73. Vi, P* and **Wells, R**. Quantifying Occupational And Non-occupational Activities Using The Experience Sampling Methods, in: Proceedings of the 28th Annual Conference of the Human Factors Association of Canada, Waterloo, pp125-130, 1996.

74. Zavitz, B*. and **Wells R**. Utility Of Ergonomic Surveillance Methods To Distinguish Between High And Low Risk Jobs In An Automotive Plant, in: Proceedings of the 28th Annual Conference of the Human Factors Association of Canada, Waterloo, pp137-142, 1996.

75. Edmonstone, M-E*. Neumann, P*, **Wells, R**. and Norman, R. Inter Observer Reliability In Work Sampling: A Measurement System For Back Posture And Spinal Loading, in: Proceedings of the 28th Annual Conference of the Human Factors Association of Canada, Waterloo, pp79-84, 1996.

76. **Wells, R**., Woo, H., Norman, R., Cole, D., Shannon, H., and Bao, S., EMG of the Forearm and Hand as an Exposure Method for Epidemiologic Studies of WMSD in Office Environments, in: Seppala, P., et al., (eds),

Proceedings of the 13th Triennial Congress of the International Ergonomics Association, Tampere, pp234-236, 1997.

77. Neumann, P.,* **Wells, R**., Norman, R., Andrews, D.,* Kerr, M., Shannon, H.,Frank, J., Comparison of Four Methods of Determining Peak Spinal Load in a Study of Occupational Low-Back Pain, in: Seppala, P., et. al., (eds), Proceedings of the 13th Triennial Congress of the International Ergonomics Association, Tampere, pp204-205, 1997.

78. Kerr, M., Shannon, H., Frank, J., Norman, R., and **Wells, R.** The Relative Importance of Biomechanical and Psychosocial Risk Factors in a Case Control Study of Occupational Low-Back Pain, in: Seppala, P., et al., (eds), Proceedings of the 13th Triennial Congress of the International Ergonomics Association, Tampere, pp64-65, 1997.

79. **Wells, R**, Lee, I.H. and Bao, S. Investigations of Upper Limb Support Conditions for Mouse Use, in Proceedings of the 29th Annual Conference of the Human Factors Association Of Canada, Winnipeg, pp1-6, 1997.

80. Brodie, D.* and Wells R. An evaluation of the Utility of Three Ergonomics Checklists for Predicting Health Outcomes in a Car Manufacturing Environment, , in Proceedings of the 29th Annual Conference of the Human Factors Association Of Canada, Winnipeg, pp45-52, 1997.

81. Norman, R. **Wells, R**. Neumann, P., Frank, J., Shannon, H. And Kerr, M. A comparison of Peak vs Cumulative Physical Work Exposure Risk Factors for the Reporting of Low Back Pain in the Automotive Industry, in Proceedings of the International Society of Biomechanics, Japan. **Winner of the Clinical Biomechanics Award for Best Paper**.

82. Beech-Hawley L, Wells R, Cole DC and the Worksite Upper Extremity Group. Deadlines and WMSD Risk in Newspaper Workers. Human Factors Association of Canada Annual Conference.

83. Wells, R., Norman, R., Shannon, H., Cole, D.C. Woo, H. and Bao, S. Exposure Assessment in the Upper Limbs of VDT Operators Using Electromyography: Responsiveness to Different Tasks, PREMUS-ISEOH=98 Meeting, Helsinki, pp119, 1998.

84. Wells, R., Norman, R., Shannon, H., Cole, D.C. Woo, H. and Bao, S. Exposure Assessment in the Upper Limbs of VDT Operators Using Electromyography: Reliability Within and Between Days, PREMUS-ISEOH=98 Meeting, Helsinki, pp49, 1998.

85. Beech-Hawley L, Wells R, Cole DC and the Worksite Upper Extremity Group. The experience sampling method: an approach to the study of deadlines in newspaper workers, 1998 PREMUS-ISEOH Meeting, Helsinki, pp177, 1998.

86. Wells, R. Precision and Recording Time in Occupational Electromyography, in: Rempel, D. (ed) Estimating Muscle Load Using Surface EMG Amplitude, Proceedings of the Marconi Research Conference 1998, pp104-105.

87. Kerr, M.S., Shannon, H.S., Frank, J.W., Norman, R.W.K., Wells, R.P., Neumann, P., and the OUBPS Group (1998). Levels of Agreement For Biomechanical And Psychosocial Exposures Between Cases And Job-Matched Controls in A Study of Reported Occupational Low-Back Pain. Third International Scientific Conference on Prevention of Work-Related Musculoskeletal Disorders. (PREMUS >98) Helsinki.

88. McGill, S.M., Norman, R.W., Yingling, V.R., Wells, R.P., Neumann, P. (1998). Shear Happens! Suggested guidelines for ergonomics to reduce the risk of low back injury from shear loading. Proceedings of the 30th Annual Conference of the human Factors Association of Canada (HFAC >98).

89. Mientjes, M., Norman, R., Wells, R., McGill, S. (1998). Evaluation of a continuous estimation technique of

low back compression during simulated occupational jobs. Proceedings of the 30th Annual Conference of the Human Factors Association of Canada (HFAC >98).

90. Mientjes, M., Norman, R., Wells, R., Neumann, P. (1998). The Variation in Electromyographic Measures Obtained from the Erector Spinae Muscles During Simulations of Workplace Tasks. (ISEK-XII 98). Proceedings of the Twelfth Congress of the International Society of Electrophysiology and Kinesiology. Montréal, Québec, Canada.

91. Moore, A., Wells, R. (1998). Frequency Content of Wrist Angular Acceleration. The Third North American Congress on Biomechanics, Waterloo, Canada. (NACOB '98), pp237-238.

92. Neumann, P., Wells, R.P., Norman, R.W. (1998). A Participative Field Study of the Inter-rated Reliability of a Risk Factor Assessment Checklist Used by Manufacturing Plant Personnel. In Proceedings of Advances in Occupational Ergonomics and Safety.

93. Neumann, P., Norman, R.W., Wells, R.P., Frank, J., Shannon, H., Kerr, M. (1998). Findings and Implications of A study of the Biomechanical, Psychophysical, and Psychosocial Risk Factors for Low Back Reporting. Proceedings of the 30th Annual Conference of the Human Factors Association of Canada.

94. Trainor, T., Wells, R. A Calibration Technique for a Tri-Planer Wrist Goniometer System: Correcting for Cross Talk (1998). Proceedings of NACOB '98. The Third North American Congress on Biomechanics, Waterloo, Canada. (NACOB '98), pp195-196.

95. R. Wells and A. Moore, How Epidemiologic, Biomechanical, Physiological and Psychophysical Methods Interact in the Setting of Thresholds for Upper Limb Musculoskeletal Disorder Exposure: A Discussion Paper. In, Proceedings of Ergonomics TLVs: Scientific basis for preventing upper extremity musculoskeletal disorders, ACGIH, April 15-17, 1999, Los Angeles, CA.

96. Moore, A. And Wells, R., Effect of Cycle Time on Muscular Fatigue during a Psychophysical Study of Screw Running. In: Proceedings of the XVIIth Congress of the International Society of Biomechanics, Calgary, Aug. 1999.

97. R. Wells , R. Norman, P. Neumann, J. Frank, H. Shannon, and M. Kerr and the OUBPS Working Group, Can the Biomechanical Exposure to the Spine Be Estimated in Epidemiologic Studies Using Post-injury Measurements? In: Proceedings of the XVIIth Congress of the International Society of Biomechanics, Calgary, Aug. 1999.

98. Keir, P. Wells, R., Cole, D., Manno, M. and Sundelin, G. Does *post-hoc* EMG analysis Correlate with Clinical Diagnosis? In: Proceedings of the XVIIth Congress of the International Society of Biomechanics, Calgary, Aug. 1999

99. Neumann, W.P*., **Wells, R.P**., Norman, R.W. (1999) 4DWATBAK: Adapting research tools and epidemiological findings to software for easy application by industrial personnel. Proceedings of the International Conference on Computer-Aided Ergonomics and Safety, Barcelona, Spain.

100. Kerr*, M.S., Shannon, H.S., Frank, J.W., Norman, R.W.K., Wells, R.P., Neumann*, W.P. Relating Psychological Job Demands with Measured and Self-Reported Physical Demands. Proceedings of the American Psychological Association Conference. , (1999).

101. Kerr*, M.S., Shannon, H.S., Frank, J.W., Norman, R.W.K., Wells, R.P., Neumann*, W.P. A Case Control Study of Biomechanical and Psychosocial Demands with Measured and Self-Reported Physical Demands. Proceedings of the American Psychological Association/NIOSH Conference on Work Stress and Health, Baltimore, Maryland, U.S.A., (1999).

102. Neumann, W.P*., **Wells, R.P**., Norman R.W., Frazer, M.B.F., Cole, D., Shannon, H., Kerr, M.S. (1999). A

Workplace Exposure Assessment Tool to Simulate Ergonomic Interventions in the Workplace: An Interactive Demonstration. 4th Annual Health Evidence Application and Linkage Network (HEALNet) Conference, Calgary, Alberta, Canada, 24. *Winner of the Masters/Doctoral Level and People's Choice Best Poster Awards.

103. Frazer, M.B.*, Norman, R.W**., Wells, R.P.,** Neumann, W.P., Cole, D., Kerr, M.S., Shannon, H., Brawley, L.R. and Kerton, R. Evidence Based Ergonomic Changes. 5th Annual Health Evidence Application and Linkage Network (HEALNet) Conference, Toronto, Ontario, 2000. *Winner of the Researcher Category Best Poster Award

104. Neumann, W.P., Wells, R.P., Norman, R.W., Kerr, M.S., Shannon, H.S. and Frank, J. Development and Risk-validation of a Digital Video Analysis System for the Assessment of Low Back Pain Risk due to Trunk Kinematic Variables. Proceedings of the International Ergonomics Association Congress, San Diego, Aug. 2000.

105. Neumann, W.P., Wells, R.P., Norman, R.W., Kerr, M.S., Shannon, H.S. and Frank, J. Measuring Exposure to Low Back Pain Risk Factors in Occupational Settings Using a Work and Posture Sampling Method. Proceeding of the International Ergonomics Association Congress, San Diego, Aug. 2000.

106. Neumann, W.P., Frazer, M.B., Cole, D.C., Wells, R.P., Kerr, M.S., Kerton, R., Brawley, L, and Norman, R.W. A Pilot Project for the Study of Ergonomic Interventions in Manufacturing Environments. Proceeding of the International Ergonomics Association Congress, San Diego, Aug. 2000.

107. Moore, A.* and Wells, R. Effect of Cycle Time and Duty Cycle on Muscle Activity During a Repetitive Manual Task, Proceeding of the International Ergonomics Association Congress, San Diego, Aug. 2000.

108. Wells, R. and van Eerd, D. (2001) Force as an agent: exposure analysis in ergonomic epidemiology, in: Proceedings of: "X2001, Exposure Assessment in Epidemiology and Practice", June 10-13, 2001, National Institute for Working Life, pp.

109. Kerr, M., Frank, J., Shannon, H., Norman, W., Wells, R., Neuamnn, P., Bombardier, C and the OUBPS Group, A case control study of risk factors for low back pain, in: Proceedings of the 4th Prevention of Musculoskeletal Disorders Conference (PREMUS), Oct 2001, Amsterdam, pp 80

110. Cole, D., Polanyi, M., Wells, R. and the Worksite Upper Extremity Group, Workplace interventions: program implementation or policy change, in: Proceedings of the 4th Prevention of Musculoskeletal Disorders Conference (PREMUS), Oct 2001, Amsterdam, pp 113

111. Wells R. and Greig, M. Characterizing hand prehension by force and moment wrench, in: Proceedings of the 4th Prevention of Musculoskeletal Disorders Conference (PREMUS), Oct 2001, Amsterdam, pp 126.

112. Krajcarski, S. and Wells, R. The time history of low back load as a risk factor for reporting low back pain, in: Proceedings of the 4th Prevention of Musculoskeletal Disorders Conference (PREMUS), Oct 2001, Amsterdam, pp 203.

113. Wells, R., Mathiassen, S-E, Medbo, L., and Winkel, J., Time as a key issue for enhanced cooperation between engineering and ergonomics, in: Proceedings of the 4th Prevention of Musculoskeletal Disorders Conference (PREMUS), Oct 2001, Amsterdam, pp 238.

114. Theberge, N. Granzow, K., Neumann, P., Brawley, L., Frazer, M., Norman, R., **Wells, R**., Kerton, R., Greco, L. and Cole, C. Participatory ergonomics: Assessing the impact of different forms of involvement on reported outcomes, in: Proceedings of the SELF-ACE 2001 Conference- Ergonomics for a Changing World , Volume 4, pp270-275.

115. Cole DC, Beaton DE, Ferrier SE, Hepburn G, Hogg-Johnson S, Kerr MS, Kramer, D, Polanyi MF, Robson LS,

Shannon HS, Swift M, Wells RP, Frazer M, Norman R, Theberge N, Moore A. Workplace interventions to reduce the burden of work-related morbidity: A program of research on evaluating implementation and effectiveness, in: Proceedings of the 1st National Symposium: Canadian Association for Research on Work and Health (CARWH). Toronto. 18 Nov 2001.

116. Frazer, M., Wells, R., Norman, R., Theberge, N., Cole, D., Kerr, M., Laing, A., Brawley, L. Kerton, R. Evidence-Based Ergonomic Decisions: Assessment of the Effectiveness of Evidence-Based Ergonomic Decision in Workplaces for Prevention of Work-Related Musculoskeltal Disorders (WMSD), in: Proceedings of the 1st National Symposium: Canadian Association for Research on Work and Health (CARWH). Toronto. 18 Nov 2001.

117. R.P. Wells, S.E. Mathiassen, J. Winkel, L. Medbo, Risk factors for musculoskeletal disorders in industry- a changing pattern? in: Caldenfors, D. Eklund, J and Kililoog, L. (eds) Proceedings of the 34th Nordic Ergonomics Society, Kolmården, Sweden October, 2002, 811-816.

118. Mathiassen SE, Wells RP, Winkel, J., Forsman, M. Tools for integrated engineering and ergonomic assessment of time aspects in industrial production, in: Caldenfors, D. Eklund, J and Kililoog, L. (eds) Proceedings of the 34th Nordic Ergonomics Society, Kolmården, Sweden October, 2002, 579-584.

119. Neumann, W.P, Forsman, M., Kihlberg, S., Mathiassen , S.E, Wells, R.P, Norman, R.W., Frazer, M.B, Cole, D., Winkel, J., Initiating an ergonomics process - tips, tricks and traps. commentary from focus groups and case studies, in: Caldenfors, D. Eklund, J and Kililoog, L. (eds) Proceedings of the 34th Nordic Ergonomics Society, Kolmården, Sweden October, 2002, 597-602.

120. Theberge, N., Cole, D., Granzow, K., Frazer, M., Laing, A., Norman, R., Wells, R., Negotiating ergonomics: an analysis of the evolution of a participatory ergonomic process in an industrial setting, in: Proceedings of the 34th Annual Conference of the Association of Canadian Ergonomists, Banff, October, 2002.

121. Wells R.P Frazer M. B. And Laing A. C., Participatory ergonomics in an industrial setting facilitates proactive design, in: Proceedings of the 34th Annual Conference of the Association of Canadian Ergonomists, Banff, October, 2002.

122. Frazer, M., Wells, R. P., Laing, A. C., Norman, R. W. Cole, D. C., Kerr, M. S. Evaluation of the effects of a proactive ergonomic design on physical exposure and workers' perceptions, in: Proceedings of the 34th Annual Conference of the Association of Canadian Ergonomists, Banff, October, 2002.

123. Natale, J., Gunning, J., Eaton J., Wells, R., Frumin, E., Ferrier, S., Kerr M., Naqvi, S., Implementation of a participatory ergonomics program in small businesses in the Ontario clothing industry, in: Proceedings of the 34th Annual Conference of the Association of Canadian Ergonomists, Banff, October, 2002.

124. Moore, A., Wells, R., Van Eerd, D., Krajcarski, S., Banina, M., Cole, D., and Hogg-Johnson, S. Separation and summation of EMG recordings by task using video records, in: Proceedings of the International Society of Biomechanics XIXth Congress , Dunedin, New Zealand, 6-12 July 2003.

125. Reid, M.J., Enns, J., Frazer, M., Wells, R. (2003) A case study on the impact of an ergonomic change to the mall delivery trailer and redesign of a mall cart used for delivery in the transportation sector, in: Proceedings of the 35th Annual Conference of the Association of Canadian Ergonomists, London, ON, October.

126. Reid, M.J., Frazer, M., Cole, D., Wells, R., (2003) A case study on the impact of reducing belt speed in the warehouse of a company in the transportation sector, in: Proceedings of the 35th Annual Conference of the Association of Canadian Ergonomists, London, ON, October.

127. Kopellar, E. and Wells, R. Comparison of Measurement Methods for Quantifying Hand Force, in; Proceedings of the Fifth International Scientific Conference on Prevention of Work-related Musculoskeletal

Disorders, Zurich Switzerland July 11-15, 2004, pp381-2.

128. S. Pascual M. Frazer, R. Wells & D. Cole, A Conceptual Framework of the Impact of Ergonomic Changes on Low Back Injury at the Production System Level, in; Proceedings of the Fifth International Scientific Conference on Prevention of Work-related Musculoskeletal Disorders, Zurich Switzerland July 11-15, 2004, pp515-6.

129. Natale, J., Wells, R. Frazer, M. Kerr, M. Ferrier, S., Naqvi, S., Subrata, P. The Effects of Ergonomic Workstation Changes on Physical and Psychosocial Factors in Apparel Manufacturing in; Proceedings of the Fifth International Scientific Conference on Prevention of Work-related Musculoskeletal Disorders, Zurich Switzerland July 11-15, 2004, pp507-8.

130. van Eerd, D., Mazunder, A., Hogg-Johnson, S., Wells, R., Moore, A., and Cole, D. Relationship between task recoeding methods in an office environment, Manufacturing in; Proceedings of the Fifth International Scientific Conference on Prevention of Work-related Musculoskeletal Disorders, Zurich Switzerland July 11-15, 2004, pp 267-8.

131. Griffith L., Shannon, H., Cole, D., Hogg-Johnson, S., Walter, S. The use of individual participant data (IPD) for examining heterogeneity in a meta-analysis of biomechanical workplace risk factors and low back pain, Manufacturing in; Proceedings of the Fifth International Scientific Conference on Prevention of Work-related Musculoskeletal Disorders, Zurich Switzerland July 11-15, 2004, pp337-8.

132. Cole, D., Manno,M., Hogg-Johnson, S., Ferrier, S. Wells, R., Swift, M., Moore, A., Polanyi, M., van Eerd, D., Kennedy, C., Ibrahim, S., Lee, H., Subrata, P., Beaton, D. Shannon, H., Changes in WMSD risk factors and burden with implementation of an ergonomics policy, Manufacturing in; Proceedings of the Fifth International Scientific Conference on Prevention of Work-related Musculoskeletal Disorders, Zurich Switzerland July 11-15, 2004, pp543-4.

133. van Eerd, D., Mazumder, A., Hogg-Johnson, S., Wells, R., and Cole D. Relationship between EMG and workstation setup, Manufacturing in; Proceedings of the Fifth International Scientific Conference on Prevention of Work-related Musculoskeletal Disorders, Zurich Switzerland July 11-15, 2004, pp547-8.

134. Haines, T., C. Levis, K. Nekoda, R. Wells, S. Walter, C Goldsmith, E. Hylton, J. Kane, M. Maudire, A. Thoma, G. Liss, S. Stock, C. Rook, (2004) Test Retest Reliability for a Hand Exposure Questionnaire on Vibration and Manual Work, in: 6th International Work Congress on Prevention, Compensation and Rehabilitation meeting, Rome, Italy, Nov. 30th - Dec. 3rd.

135. Dixon SM, Theberge N, Cole DC, Wells RP, Frazer M, Morose T, Rivilis I. (2004) They have the connections: the influence of bureaucratic processes on a participatory ergonomic intervention, in: Proceedings of the 36th Annual Conference of the Association of Canadian Ergonomists, Windsor. October.

136. Dixon, S., M., Theberge, N., and Cole, D. (2005) The ergonomist has left the building: sustaining a participatory ergonomic program. Paper presented at the annual meetings of the Association of Canadian Ergonomists. Halifax, Nova Scotia. August 15-18, 2005.

137. Willms, K*. and Wells, R. Determinants of force decrement in gloved power grip, IEA. 2006. Winner of Best Poster Award.

138. Wells, R. , Greig, M. and Ishac, M. Predicting Distal Arm Demand from Task Requirements Digital Human Modeling Conference, SAE Paper 2007-01-2509, Washington, June, 2007.

139. Fischer, S., Wells, R. Dickerson, C, (2007) Effect of added degrees of freedom and handle type on upper limb muscle activity, In: *Proceedings of the 38th Annual Conference of the Association for Canadian Ergonomists (ACE)*, Toronto, Oct 14-17. ***Winner, PhD Award.***

140. Laring, J., Neumann, W.P., Nagdee, T., Wells, R., Theberge, N. (2007) Human Factors Tool Use Among Swedish Ergonomists - An Interview Study. In: *Proceedings of the 38th Annual Conference of the Association for Canadian Ergonomists (ACE)*, Toronto, Oct 14-17.

141. Neumann, W.P., Zolfaghari, S., Nagdee, T., Scrivens, D., Wells, R., Laring, J. (2007) In: *Proceedings of the 38th Annual Conference of the Association for Canadian Ergonomists (ACE)*, Toronto, Oct 14-17.

142. Human Factors Tools for Work System Design - What is out there? In: *Proceedings of the 38th Annual Conference of the Association for Canadian Ergonomists (ACE)*, Toronto, Oct 14-17.

143. Wells, R. , Greig, M. and Ishac, M. (2007) Assessing distal arm loading without grip strength measurement, In: *Proceedings of the 38th Annual Conference of the Association for Canadian Ergonomists (ACE)*, Toronto, Oct 14-17.

144. McFall, K., and Wells, R. (2007) Effectiveness of job rotation intervals in reducing Discomfort in cyclic assembly work, In: *Proceedings of the 38th Annual Conference of the Association for Canadian Ergonomists (ACE)*, Toronto, Oct 14-17.

145. Marshall, J., and Wells, R. (2007) Investigation of the possible benefits of task rotation during hand intensive work, In: *Proceedings of the 38th Annual Conference of the Association for Canadian Ergonomists (ACE)*, Toronto, Oct 14-17.

146. Vi, P., Wells, R. Pilot Study Investigating Manual Material Handling Of Ladders From Construction Service Vans, In: *Proceedings of the 38th Annual Conference of the Association for Canadian Ergonomists (ACE)*, Toronto, Oct 14-17.

147. Kramer, D. Wells, R. (2007) Spreading New Ideas in the Construction Sector: A Vehicle for the Diffusion of Innovation, In: *Proceedings of the 38th Annual Conference of the Association for Canadian Ergonomists (ACE)*, Toronto, Oct 14-17.

148. Hogan, K., Kramer, D., and Wells, R.P. (2007) Launching a research study on MSD prevention in the transportation sector, In: *Proceedings of the 38th Annual Conference of the Association for Canadian Ergonomists (ACE)*, Toronto, Oct 14-17.

149. Wells R, Maracle S, Hurley K, Rosati P Assessment of distal arm loading while wearing insulated rubber gloves, in: *Proceedings of the Sixth International Scientific Conference on Prevention of Work-Related Musculoskeletal Disorders*, PREMUS 2007, Boston, USA, 27–30 August 2007.

150. Wells R, Laing A, Cole D Intensity of interventions for the prevention of musculoskeletal disorders, in: *Proceedings of the Sixth International Scientific Conference on Prevention of Work-Related Musculoskeletal Disorders*, PREMUS 2007, Boston, USA, 27–30 August 2007.

151. McFall K, Wells R The effectiveness of working rests in different hand grips with implications for job rotation, in: *Proceedings of the Sixth International Scientific Conference on Prevention of Work-Related Musculoskeletal Disorders*, PREMUS 2007, Boston, USA, 27–30 August 2007.

152. Griffith LE, Wells RP, Shannon HS, Walter SD, Cole DC, Hogg-Johnson S Mechanical exposure information available in studies assessing the relationship between workplace factors and low back pain, in: *Proceedings of the Sixth International Scientific Conference on Prevention of Work-Related Musculoskeletal Disorders*, PREMUS 2007, Boston, USA, 27–30 August 2007.

153. Van Eerd D, Chen C, Cole D, Hogg-Johnson S, Wells R, Moore A, Mazumder A., Changes in mechanical exposures among office workers, in: *Proceedings of the Sixth International Scientific Conference on Prevention of Work-Related Musculoskeletal Disorders*, PREMUS 2007, Boston, USA, 27–30 August 2007..

Curriculum Vitae: Richard Wells

Books and Invited Book Chapters

1. Hagberg, M., Silverstein, B., **Wells, R.,** Smith, R., Carayon, P., Hendrick, H., Perusse, M., and Kourinka, I. and Forcier, L. (eds). Work-related Musculoskeletal Disorders (WMSD): A Handbook for Prevention, Taylor and Francis, London, 1995.

2. Hagberg, M., Silverstein, B., **Wells, R**., Smith, R., Carayon, P., Hendrick, H., Perusse,. M., and Kourinka, I. and Forcier, L. (eds). LATR: Les lesions attribuables au travail repetitif, Editions MultiMondes, 1995, 510 pages. (A French version of the book above was released in Quebec and France).

3. Wells, R., Keir, P.J. and Moore, A.E, Applications of Biomechanical Hand and Wrist Models to Work-Related Musculoskeletal Disorders of the Upper Extremity, in Gordon, S.L., Blair, S.J and Fine, L.J.(eds) Repetitive Motion Disorders of the Upper Extremity, American Academy of Orthopaedic Surgeons, Rosemont, IL, 1995.

4. **Wells, R**. Work-relatedness of Musculoskeletal Disorders, in: Ranney, D. (ed), Chronic Musculoskeletal Injuries in the Workplace, W. Saunders and Co, 1996.

5. **Wells, R**. Task analysis, in: Ranney, D. (ed), Chronic Musculoskeletal Injuries in the Workplace, W. Saunders and Co, 1996.

6. **Wells, R**. Integrated Analysis of Upper Extremity Disorders, in: Karwowski, W. and Marras, W. (eds), Handbook of Occupational Ergonomics, CRC Press, Boca Raton, FL., 1998, pp775-795.

7. **Wells R.** Upper Limb Musculoskeletal Disorders: Biomechanical Factors, in Griffiths, A. & Cox, T. (eds), A Handbook Of Work-related Upper Limb Disorders, Taylor & Francis, London , 1998.

8. **Wells R**. And Keir, P. Work and Activity-Related Musculoskeletal Disorders of the Upper Extremity, in Kumar S. (Ed), Biomechanics in Ergonomics, Taylor & Francis, London, 1999, pp165-177.

9. Norman R. and **Wells R.** Ergonomic Interventions, in Sullivan T. (ed) Injury and the New World of Work, University British Columbia Press, Vancouver, BC. , 2000, pp115-139

10. Wells, R., Review and Comparison of Tools for Risk Assessment of Work Related Musculoskeletal Disorders, in Karwowski, W. (ed), Encyclopedia of Human Factors, 2001.

11. Wells R, Cole D and the Worksite Upper Extremity Research Group. (2001). Intervention in computer intense work. In Sandsjö L, Kadefors R (eds), 2001. Prevention of Muscle Disorders in Computer Users: Scientific Basis and Recommendations. The 2nd PROCID (Prevention of muscle disorders in operation of Computer Input Devices) Symposium. 8-10 March 2001. (National Institute for Working Life/West, Göteborg, Sweden). 199-125.

12. Wells, R., Forearm and Wrist, in: Delleman, N., Haslegrave, C. and Chaffin, D. (eds), Working Postures & Movements - Tools for Evaluation and Engineering, Taylor and Francis, 2004.

Technical and Consulting Reports

1. Bishop, P., Norman, R., **Wells, R**., and Ranney, D. Changes in the Location of the Centre of Mass and in the Mass Moment of Inertia of the Head in Response to the Addition of a Helmet and a Face Shield. Hockey Ontario Development Committee, April, 1982, 28 pages.

2. **Wells, R**., Norman, R., Bishop, P., and Ranney, S. Abdominal Injuries to Restrained Front Seat Occupants in Frontal Collisions: Belt Deployment Analysis. Biokinetics and Associates, September, 1982, 120 pages.

3. **Wells, R**. Abdominal Injuries to Restrained Front Seat Occupants in Frontal Collisions: Vehicle Geometry Assessment. Biokinetics and Associates, May, 1983, 20 pages.

4. **Wells, R**. Abdominal Injuries to Restrained Front Seat Occupants in Frontal Collisions: BELTFIT Program Assessment. Biokinetics and Associates, May, 1983, 25 pages.

5. Bishop, P., Norman, R., **Wells, R**., and Ranney, D. A Study of Selected Mechanical Factors Involved in Neck Injuries in Ice Hockey. Hockey Ontario Development Committee, July, 1983, 30 pages.

6. Bishop, P., and **Wells, R.P.** Cervical Element Loading in Head First Collisions in Ice Hockey: The Development and Use of a System to Examine the Effects of Helmets on Neck Loads. Report to Sport Canada, May, 1986, 57 pages.

7. **Wells, R.P.** The Development and Testing of a Deformable Pole for Nordic Skiing. Report to Sport Canada, July, 1988, 29 pages.

8. **Wells, R.**, Ranney, D., and Norman, B., Brawley, L., and Orr, S. Ergonomics of the Supermarket Cashiers' Environment. Contract report submitted to the Ontario Retail Accident Prevention Association (ORAPA), July, 1990, 250 pages.

9. **Wells, R**., Ranney, D., and Moore, A.E. Repetitive Strain Injuries: Measurement and Identification of Predictive Factors. Workplace Health and Safety Agency, March, 1990.

10. **Wells, R**., Ranney, D., and Moore, A. Repetitive strain injuries: Measurement and Identification of Predictive Factors. Final report to the Ontario Workplace Health and Safety Agency/Ontario Ministry of Labour for project #224/R. February, 1992, 200 pages.

11. Norman, R., **Wells, R**., Moore, A., Potvin, J., Bennett, G., Gibson, E., Husted, J., Ranney, D., and Sharratt, M. The feasibility of assessing whether job modifications are cost effective in reducing work site injuries. Final report to the Ontario Workplace Health and Safety Agency, April, 1992, 90 pages.

12. **Wells, R**., and Ranney, D. Repetitive strain injuries: Measures to Evaluate of Ergonomic Interventions. Final report to the Ontario Workplace Health and Safety Agency for project #254/R. April, 1994, 85 pages.

13. **Wells, R.**, Norman, R., and McGill, S. Review of the Proposed Province of British Columbia Code of Practice for Physical Handling. Contract report submitted to the Workers= Compensation Board of British Columbia, December, 1993, 22 pages.

14. Frank, J., Brooker, A-S., DeMaio, S., Kerr, M., Maetzel, A., Shannon, H., Sullivan, T., Norman, R., and **Wells, R**. , Disability Due to Occupational low Back Pain: What do we Know About its Prevention? Review comissioned by Liberty Mutual, 1995.

15. Wells, R. Lee. I., Bao, S. And Trainor, T., Investigations of Musculoskeletal Strain during Mouse and Pen Use at a VDT Terminal. Project Report to Communication Intelligence Corporation, Redwood Shores, CA, 1997.

16. Wells, R. Shannon, H., Cole, D. and Norman, R. Electromyographic Protocols for Measurement of Exposure in VDT Operators, Final Report to Center for VDT and Health Research, Johns Hopkins University, March 15th, 1998.

17. **Wells, R**., Norman R., Brawley, L., Cole, D., Frazer, M., Greco, L., Kerr, M., Kerton, R., Laing, A., Neumann, P., and Theberge, N. 2001a Summary: Implementation and Evaluation of a Participatory Ergonomic Change Process at the Woodbridge Group-Tilbury Plant, Report to Enerflex Division, The Woodbridge Foam Corporation, Jan 2001(a).

18. **Wells, R,** Norman, R, Frazer, M., and Laing, A. Ergonomics Program Implementation Blueprint, Ergonomics and Safety Consulting Services, University of Waterloo, Jan 2001(b).

    Whilst I was Academic Director of the Centre for Occupation Health and Safety I was involved in a few dozen short contract reports for clients.

Other Publications

1. **Wells, R.** Planiversal Piano, A Symposium on Two Dimensional Science and Technology, (ed.) A.K. Dewdney, University of Western Ontario, Canada, pp. 224-225, May, 1981.

2. Winter, D.A., and **Wells, R.P.** Letter to the Editor, Journal of Bone and Joint Surgery, 63A, 1350, 1981.

3. **Wells, R.P.**, and Ranney, D.A. Lumbrical Length Changes in Finger Movement; A new Method of Study in Fresh Cadaver Hands. In Dobyns, J., Chase, R., and Amadio P. (eds.) The Yearbook of Hand Surgery, Year Book Medical Publishers, Chicago, pp. 263-264, 1988.

4. **Wells, R.P.** So you think a supermarket cashier has an easy job? Centre for Applied Health Research (CAHR) Newsletter 5, pp. 2, October, 1988.

5. **Wells, R.P.** Occupational Repetitive Strain Injuries: A Research Perspective in Occupational Repetitive Strain Injuries: A workshop. Document P88-17E, Canadian Centre for Occupational Health and Safety, pp. 7-18, November, 1988.

6. **Wells, R**., Moore, A*.and Ranney, D., Cumulative Trauma Disorders: Measurement and Identification of Predictive Factors, International Conference on Occupational Disorders of the Upper Extremities. Ann Arbor, Michigan: University of Michigan Center for Occupational Health and Safety Engineering,1990.

7. **Wells, R.P.** Current Stage of Knowledge and Research in Repetitive Strain Injuries. Canadian Centre for Occupational Health and Safety, p. 92-1E., 1992.

8. **Wells, R**. Design in Motion, Occupational Health and Safety Canada, Buyers Guide, pp92-97, 1992

9. Ranney, D., **Wells, R**., and Moore, A*. Forearm Muscle Pain And Tenderness And Work Exposures, in: Armstrong T., (ed) Proceedings of the International Conference on Occupational Disorders of the Upper Extremities. Ann Arbor, Michigan: University of Michigan Center for Occupational Health and Safety Engineering, (no page numbers), 1992.

10. **Wells, R.**, Ranney, D., and Moore, A*. Relationship Between Forearm Muscle Pain/tenderness And Work Exposures: Results From Repetitive Manual Tasks in: Armstrong T., (ed) Proceedings of the International Conference on Occupational Disorders of the Upper Extremities. Ann Arbor, Michigan: University of Michigan Center for Occupational Health and Safety Engineering, (no page numbers), 1992.

11. **Wells, R**., and Moore, A*. Biomechanical Models and Cumulative Trauma Disorders, in: Rempel, D. and Armstrong T., (eds) Marconi Keyboard Research Conference, San Francisco,(no page numbers), 1994.

12. Ranney, D., **Wells, R.P.**, and Moore, A. If it isn't tennis elbow, what might it be? Canadian Journal Of Surgery, December, 1993 (abstract).

13. **Wells, R**. And Kourinka, I. Developing Guidelines for Prevention , Occupational Health and Safety Canada, Jan/Feb, pp68-81, 1994.

14. **Wells, R. P.**, Keir, P.J*., Moore, A.E*. and Ranney, D. A. Muscle Activity in the Hand and Forearm using a Traditional and a Chording Keyboard, in: Rempel, D. and Armstrong T., (eds) Proceedings of the 2nd Marconi

Keyboard Research Conference, San Francisco, (no page numbers), 1996.

15. **Wells, R**. Checkout Challenge, Occupational Health and Safety Canada, July/August, pp62-64, 1995.

16. **Wells, R**. Advice on Mice, Occupational Health and Safety Canada, July/August, pp50-52, 1996.

17. **Wells, R**., Woo, H., Norman, R., Cole, D., Shannon, H., Bao,S. Electromyography of the Forearm as an Exposure Method in Epidemiologic Studies of WMSD and Computer Use, in: Rempel, D. and Armstrong T., (eds) Proceedings of the 3rd Marconi Research Conference, San Francisco, (no page numbers), 1997.

18. **Wells, R**., Lee, I.,*Bao, S., Investigations of Optimal Upper Limb Support Conditions for Mouse Use, in: Rempel, D., and Armstrong T., (eds) Proceedings of the 3rd Marconi Research Conference, San Francisco, (no page numbers), 1997.

Presentations to Scholarly Groups (# = Reported also in Proceedings)

1. Ranney, D., and **Wells, R.P.** Computer Simulation of Finger Movement. Presented at the International Society of Hand Surgery Conference, Colorado, USA, August, 1985.

2. Ranney, D.A., and **Wells, R.P.** Integration of Contractile and Elastic Forces in the Control of Finger Movement. presented at the International Conference of Clinical Kinesiology on Biomechanics and Clinical Kinesiology of Hand and Foot, Madras, India, December 16-18, 1985. **Keynote Address**

3. Bishop, P.J., and **Wells, R.P.** Cervical Spine Injuries in Ice Hockey. Presented at the 4th International Sport Science Conference, Halifax, June, 1986.

4. **Wells, R.P.** Problems in Hand Biomechanics. Presented to the Centre for Ergonomics, University of Michigan, Ann Arbor, Michigan, April 21, 1987.

5. Bishop, P.J., and **Wells, R.P.** Future Directions in Impact Biomechanics: Cervical Spine Injury due to Axial Compression. Presented to Society of Automotive Engineering Conference on the Future of Impact Biomechanics, Washington, May 18, 1987.

6. Ranney, D.A., and **Wells, R.P.** Function of the Lumbrical. Presented at the Paul Brand International Symposium on Hand Surgery - The 13th International Rocky Mountain Hand Symposium, Denver, Colorado, August 3-5, 1987.

7. **Wells, R.P.** Repetitive Strain Injuries: Causes and Solutions. Presented at the IAPA, Wentworth Division, November 15, 1988.

8. **Wells, R.,** and Ranney, D. Chronic Musculoskeletal Disorders in the Workplace: Where are We?, **Invited Address** at the 22nd Annual Conference of the Human Factors Association of Canada, Toronto, Canada, 1989.

9. Bishop, P.J., and **Wells, R.P.** A Computer Simulation Model for Studying Cervical Spine Injury Prevention. AGARD 67th Aerospace Medical Panel Meeting on Neck Injury in Advanced Military Aircraft Environments, Munich, Germany, April, 1989.

10. **Wells, R**., and Keir, P*. Changes in the geometry of the carpal tunnel contents due to wrist posture and tendon load: An MRI study on normal wrist. Presented at Conference on Advances in the Biomechanics of the Hand and Wrist, Belgium,1992.

11. **Wells, R**. Multimedia for Dynamic Visualization, Presented at Learning Technologies '94, TRACE Colloquium on Technology in Education, University of Waterloo, March 31st , 1994.

12. **Wells, R.** Exposure Measurements in Office Environments, **Invited Presentation** to an Workshop on Exposure Measurement, Centre for VDT and Health Research, San Francisco, December 3rd, 1994.

13. **Wells, R.**, Causal Mechanisms of Work -Related Musculoskeletal Disorders, **Keynote Address** to 2nd Scientific Conference on Prevention of Work-Related Musculoskeletal Disorders (PREMUS), Montreal, September, 1995.

14. Kerr, M, Bombardier, C. Frank, J, Shannon,H. Neumann, P., **Wells, R.,** Norman, R. et al., Summary of self-reported clinical measures in a case control study of occupational low back pain, Presented at the ICOH Conference, September 1996.

15. **Wells, R.** Causation and Prevention of Musculoskeletal Disorders: Neck and Upper Extremities, Panel Member, State-of-the-Art-Conference, American College of Occupational and Environmental Medicine, Toronto, October 27-31, 1996.

16. Frank, J. Shannon, H. Kerr, M. Norman, R. **Wells, R**. and Neumann, P. A study of biomechanical and psychosocial risk factors for low-back pain. Presented at: "Work, Stress & Health '99: Organization of Work in a Global Economy" sponsored by the American Psychological Association and NIOSH. 1999, Mar 11-13. Baltimore.

17. Kerr M. Shannon, H., Frank, J., Norman, R. **Wells, R**. and Neumann, P Relating psychological demands with measured and self reported physical demands. Presented at: "Work, Stress & Health '99: Organization of Work in a Global Economy" sponsored by the American Psychological Association and NIOSH. 1999, Mar 11-13. Baltimore.

18. Theberge, N, Granzow, K, Cole, D., Neumann, P., Frazer, M., Laing, A., **Wells, R**., "Participatory Processes in Worker Health and Safety: An Analysis of an Intervention in an Industrial Setting." Presentation at annual meetings of the North Central Sociological Association, Windsor, Ontario, April 18-21, 2002.

Invited Presentations to Professional, Business and Industry Groups

1. The Static Fit of Automobile Lap Belt Systems on Front Seat Passengers. Presented to General Motors Biomedical Research Laboratories, Warren, Michigan, February 28, 1987.

2. Occupational Repetitive Strain Injuries: A Research Perspective., Conference on Repetitive Strain Injuries, Canadian Centre for Occupational Health and Safety, March, 1988. **Keynote Speaker.**

3. Cumulative Trauma Disorders: Measurement and Identification of Predictive Factors, International Conference on Occupational Disorders of the Upper Extremities. Ann Arbor, Michigan: University of Michigan Center for Occupational Health and Safety Engineering,1990.

4. Chronic Musculoskeletal Injuries, Presented to McMaster Occupational Health, Hygeine and Toxicology , February 13th, 1991.

5. Musculoskeletal Disorders, Presented to Toronto Workers= Health and Safety Legal Clinic, Toronto, April 30th, 1991.

6. Methods for Design and Modification of Workstations, Presented to Canadian Society for Safety Engineering,

7. Ergonomics: a Problem of Productivity, Presented to Canadian Society for Industrial Engineering, Kitchener, October 30th, 1991.

8. Regulation of RSI, Winnipeg Community Advisory Panel of the Canadian Standards Association, December 3rd, 1991.

9. Current Stage of Knowledge and Research in Repetitive Strain Injuries. Conference by Canadian Centre for Occupational Health and Safety, 1992. **Keynote Speaker**

10. Relationship Between Forearm Muscle Pain/tenderness And Work Exposures: Results From Repetitive Manual Tasks International Conference on Occupational Disorders of the Upper Extremities. Ann Arbor, Michigan: University of Michigan Center for Occupational Health and Safety Engineering, 1992.

11. Repetitive Strain Injuries: Guidelines and Standards**,** Annual Occupational Health and Safety Conference , Toronto, October, 1993.

12. Biomechanical Models and Cumulative Trauma Disorders, Marconi Keyboard Research Conference, San Francisco, Feb, 1994.

13. Legislation and Guidelines for the Prevention of Work-Related Musculoskeletal Disorders, Invited Presentation to the British Columbia Federation of Labour Annual Conference, Vancouver, September 6th, 1994.

14. Are We Ready for Ergonomic Legislation? Lunchtime Talk at @Ergonomics@, Canadian Institute, Toronto, November 14th, 1994.

15. Causation of Cumulative Trauma Disorders, International Conference on Occupational Disorders of the Upper Extremities. University of Michigan Center for Occupational Health and Safety Engineering, San Francisco, December 2nd, 1994.

16. Understanding Soft Tissue Injuries, Presentation to New Challenges in Work and Health: Reducing Disability Associated with Soft Tissue injuries, Institute for Work and Health, Toronto, April 18th, 1995.

17. Update on Repetitive Strain Risk Factors, OSH=95, Annual Occupational Health and Safety Conference, Toronto, October 3rd, 1995

18. State-of-the-Art in Ergonomics, International Symposium on Global Rehabilitation Trends, Toronto, January 18th, 1997. **Keynote Speaker**

19. Ergonomics and RSI, Presentation to the Rehabilitation Staff of the Ontario Workers Compensation Board, April 24, 1997.

20. Electromyography of the Forearm as an Exposure Method in Epidemiologic Studies of WMSD and Computer Use, Presentation to 3rd Marconi Research Conference, San Francisco, April, 1997.

21. Investigations of Optimal Upper Limb Support Conditions for Mouse Use, Presentation to 3rd Marconi Research Conference, San Francisco, April, 1997.

22. Experience with the Use of EMG in a Case Control Study in the Automotive Industry, Presentation to Muscle Fatigue Workshop Ergonomic Task Group, American Automobile Manufacturers Association, Detroit, July 22-23, 1997.

23. Work-Related Musculoskeletal Disorders(WMSD) of the Upper Limbs and Back: Tools for the Assessment of Risk and Intervention Priority. Invited workshop at the HFAC Annual Conference, Winnipeg, September 1997.

24. Assessment of Biomechanical Exposures in Occupational Research. Invited one day workshop given at August Krogh Institute, Copenhagen, Denmark for the SOUND Network, October 13-15, 1997.

25. Research into Work-Related Musculoskeletal Disorders, Invited one day workshop for the Nordic Institute for Advanced Training in Occupational Health, Copenhagen, October 5-10, 1997.

26. Ergonomic Issues in Repetitive Strain Injuries, Invited keynote and seminars at Work Related Musculo Skeletal Disorders, Foothills Hospital, Calgary, Alberta, March 28, 1998.

27. The Ontario Universities Low Back Pain Study, Invited presentation to Managing Ergonomics, Las Vegas, April 29, 1998.

28. The Effects of Deadlines on Workload, Behavior and Muscle Activity in Newspaper Work, Invited Presentation to International Conference on Occupational Disorders of the Upper Extremities, San Francisco, December 10-11, 1998.

Invited Scientific Workshop/Panel Participation

1. Exposure Assessment for Upper Limb Cumulative Trauma Disorders. Ad-Hoc Exposure Committee, National Institute of Occupational Safety and Health (NIOSH), Cinncinati, January 6-7th, 1993.

2. Exposure Measures for a Case-Control Study of Low Back Pain, Presentation to a Special Workshop on Exposure Measures in Occupational Epidemiology, Karolinska Institute, Stockholm, August 26-7th, 1993.

3. Exposure Assessment**,** Workshop on Exposure Assessment for Ergonomic Studies of Workers Using Keyboards, Centre for VDT and Health Research, San Francisco**,** CA, December 3rd, 1994.

4. Exposure Assessment, Workshop on Exposure Assessment for Ergonomic Studies of Workers Using Keyboards or Other Data Input Devices, Centre for VDT and Health Research, Annapolis, MA, April 6-7, 1998.

5. Biomechanics and Injury Tolerance, NACOB Panel on Injury and Tolerance, North American Congress on Biomechanics, Waterloo, August 1998**.**

6. Work Factors: Musculoskeletal Loading and WMSD, Presentation at the National Academy of Sciences Workshop on Work-Related Musculoskeletal Injuries: Examining the Research Base, Washington, Aug 21-22, 1998.

7. Precision and Recording Time in Occupational EMG, Chair of Panel at 4rd Marconi Research Conference, San Francisco, December 12-13, 1998.

8. How Epidemiologic, Biomechanical, Physiological and Psychophysical Methods Interact in the Setting of Thresholds for Upper Limb Musculoskeletal Disorder Exposure: A Discussion Paper. Ergonomics TLVs: Scientific basis for preventing upper extremity musculoskeletal disorders, ACGIH, April 15-17, Los Angeles, CA., 1999.

Media and Other Appearances

1. Interview on CBC Radio Morningside concerning Repetitive Strain Injuries, February 22nd, 1994.

2. Presentation to the Public Hearings on the Draft Ergonomics Legislation of the Workers Compensation Board of British Columbia, Campbell River, BC, September 7th, 1994.

3. Interview on CBC 6pm News concerning Repetitive Strain Injuries, Jan 18th 1997.

4. Expert witness presentation for Occupationa Safety and Health Administration (OSHA), USA on the Proposed Ergonomic Program Standard, Washington DC, March 16, 2000.

Invited Workshop and Course Preparation for Professional, Business and Industry Groups

1. Wells, R. Repetitive Strain Injury, 2 hour course segment at *Ergonomics 88*, University of Waterloo, June, 1988.

2. Wells, R.P. Occupational Repetitive Strain Injuries: Causes, Treatment and Prevention. *Centre for Occupational Health and Safety Course on Ergonomics, Health and Productivity*, Toronto, November 18, 1988.

3. Wells, R. Repetitive Strain Injury: Causes and Preventative Strategies, 2 hour course segment at *Ergonomics >89*, University of Waterloo, June, 1989.

4. Wells, R. Repetitive Strain Injury: Causes and Preventative Strategies, 2 hour course segment at *Ergonomics >90*, University of Waterloo, June, 1990.

5. Wells, R. and Harrington, G. Work Related Musculoskeletal Disorders, 2 hour course segment at *Ergonomics '91*, University of Waterloo, June, 1991.

6. Wells, R. and Harrington, G. Work Related Musculoskeletal Disorders, 2 hour course segment at *Ergonomics '92*, University of Waterloo, June, 1992.

7. Wells, R. and Harrington, G. Work Related Musculoskeletal Disorders, 2 hour course segment at *Ergonomics '93*, University of Waterloo, June, 1993.

8. Wells, R. and Harrington, G. Work Related Musculoskeletal Disorders, 2 hour course segment at *Ergonomics '94*, University of Waterloo, June, 1994.

9. Wells, R. Canadian Standards in RSI, 1 hour course segment at *Ergonomics >94,* University of Waterloo, June, 1994.

10. Wells, R. and Moore, A. Office Ergonomics, 2 hour course segment at Ergonomics >95, University of Waterloo, June, 1995.

11. Wells, R. Biomechanical Analysis of Work, 4 hour course segment presented to General Motors Advanced Ergonomic Training Course, Warren MI, October 6th, 1995.

12. Wells, R. and Moore, A. Office Ergonomics, 2 hour course segment at Ergonomics >96, University of Waterloo, June, 1996.

13. Wells, R., Saari, J., and Norman, R. Opportunities for Improvement, A 2 day course delivered to supervisory personnel at General Motors of Canada, Oshawa, June20-21st, 1995.

14. Ergonomics: Epidemiology and Pathophysiology of Upper Limb Work-Related Musculoskeletal Disorders, Postgraduate Seminar Presented at the State-of-the-Art-Conference, American College of Occupational and Environmental Medicine, Toronto, October 27-31, 1996.

15. Ergonomic Issues in Repetitive Strain Injuries, Seminar, Work Related Musculo Skeletal Disorders, Foothills Hospital, Calgary, Alberta, March 28, 1998.

16. Repetition, One day Workshop for Ontario Chapter of the Human Factors Association of Canada, November 1998.

17. Task Analysis: From Traditional to Object-Oriented, One day Workshop for Human Factors Association of Canada Conference, September, 1998 (with Dr. C. MacGregor).

Curriculum Vitae: Richard Wells
Research Grants and Contracts

Researcher(s)	Agency	Amount per yr.	Tenure	Title
Wells, R.	University Research Committee	$1, 675	1978	Internal Mechanical Work in Crutch Walking
Wells, R.	Fitness & Amateur Sport	$1,925	1981	Examination of Situps
Bishop, P. Norman, R. Wells, R. Ranney, D.	Ontario Hockey Foundation	$3,500	1981	Investigation of Neck Injuries in Hockey
Wells, R. Norman, R. Bishop, P. Ranney, D.	Biokinetics and Associates	$30,000	1982	Lap Belt Deployment Analysis
Bishop, P. Norman, R. Wells, R. Ranney, D.	Ontario Hockey Foundation	$13,500	1982	Investigation of Neck Injuries in Hockey
Wells, R.	Biokinetics and Associates Ottawa	$1,940	1983	Vehicle Geometry Assessment
Wells, R.	NSERC	$5,800	1984-85	Mechanical Work and Energy Transfer in Human Movement
Wells, R.	Canadian Industrial Innovation Centre	$7,500	1985-86	Home Gym Consulting
Wells, R. Norman, R.	Sport Canada	$11,516	1986	Development of Deformable Ski Pole
Bishop, P. Wells, R. Tator, C.	Sport Canada	$15,000	1986-88	Cervical Injury in Head First Collisions
Wells, R. Ranney, D.	NSERC	$15,000/yr	1987-90	Musculoskeletal Loading During Movement with Application to Repetitive Strain Injury
Wells, R.P. Norman R.W.	Sport Canada	$10,500	1987-88	Development and Test of a Deformable Ski Pole
Wells, R.P. Ranney, D.A.	Ministry of Labour	$51,000/yr	1987-90	Repetitive Strain Injuries: Measurement and Identification of Predictive

				Factors
Bishop, P. Wells, R.P.	Sport Canada	$18,000	1988-89	An Examination of Methods of Reducing Compressive Loads on the Cervical Spine Using a Computer Simulation Model
Wells, R., Brawley, L. Prkachin, K. Ranney, D. Norman, R. McDonald, H.	IAPA/URIF	$98,000	1988-89	Repetitive Strain Injuries to Supermarket Cashiers in Ontario
Wells, R. Ranney, D.	NSERC	$30,000/yr	1990-93	Musculoskeletal Loads During Hand Function Anthropometry and Modeling
Wells, R. Ranney, D.	Ontario Ministry of Labour	$80,000/yr	1990-93	Repetitive Strain Injury Measures to Evaluate Ergonomic Intervention
Norman, R. Brawley, L. Ranney, D. Wells, R.	Ontario Ministry of Labour	$30,000	1990-91	An Evaluation of Ergonomic Interventions in Ontario Workplaces: Feasibility Study
Norman, R. Wells, R.	Ontario Workers Compensation Institute	$1,073,263	1992-97	Quantification of Ergonomic Stressors: A Case Control Study
Wells, R.	NSERC	$3,000	1991-92	Clinical Gait and Posture Conference
Wells, R. Norman, R.	Ontario Workers Compensation Institute	$29,000	1992-93	Quantification of Ergonomic Stressors: Case Control Study of Etiology and Prognosis Upper Limb Disorders; Pilot Study
Norman, R. Wells, R.	General Motors of Canada, AG Simpson, The Woodbridge Group	$1,000,000	1994-99	Chair in Workplace Injury and Illness Prevention
Wells, R., Shannon, H., Cole, D. and Norman, R.	Centre for VDT and Health Research, Johns Hopkins University	$67,500.	1995-96	Electromyographic Protocols for Measurement of Exposure in VDT Operators

Wells, R. Norman, R., Saari, J and Kuorinka, I.	Healnet Theme Research Competition	$45, 000/yr	1995-98	Development of Workplace Risk Assessment and Control Software
Wells, R.	Communication Intelligence Corporation, California	$2,200	Oct 1995-June 1996	Evaluation of the CIC Handwriter
Wells, R. Lee, I.H.	The Office Ergonomics Research Committee, USA	$6, 900	Dec 1996-July 1997	Investigation Of The Optimal Upper Limb Posture To Perform Mouse Operations
Wells, R	The Office Ergonomics Research Committee, USA	$10,200	Jan-July 1998	Systems Design Approach to VDT Workstations
Wells, R. Norman, R. Cole D. Shannon, H. and Kerr, M	Healnet Theme Research Competition	$55, 000	1998-9	Evaluation of Ergonomic Interventions
Wells, R., Shannon, H., Cole, D., Norman, R., and Hogg-Johnson, S.	Centre for VDT and Health Research, Johns Hopkins University	$68,000/yr	1999-01	Precision and Responsiveness of Physical Exposure Measures in an Office Environment
Wells, R., Norman, R. , Frazer, M. Cole, D., Shannon, H., Kerr, M., Brawley, L. and Kerton, R.	Workplace Safety and Insurance Board	$149,000/yr	1999-01	Evaluation of Participatory Ergonomic Interventions in Large and Small Industries
Norman, R. Wells, R., Frazer, M. Cole, D., Shannon, H., Kerr, M., Brawley, L. Kerton, R., Stock, S., Cooper, J., Yassi, A. and Ostry, A	Heal*Net*	$74,995	1999-02	Assessment of the Effectiveness of Evidence-Based Ergonomic Decisions in Workplaces on Prevention of Work-Related Musculoskeletal Disorders
Cole, D.,				Evaluating Interventions

Hogg-Johnson, S. Shannon, H., Hyatt, D., Beaton, D., Ferrier, S., Robson, L., Polanyi, M., Smith, J., Manno, M., and Wells, R.	NIOSH/NIH	$396,354	2000-03	among Office Workers
Wells, R., Norman, R. , Frazer, M. Cole, D., Shannon, H., Kerr, M., Brawley, L. and Kerton, R.	Workplace Safety and Insurance Board	$147,000/yr	2001-03	Costs and Benefits of Ergonomic Interventions
Wells, R, Eaton, J.,n Kerr, M., Ferrier, S., Polanyi, M., King, A., Frumin, E., Gunning, J., Naqvi, S.	Workplace Safety and Insurance Board	$131,000/yr	2001-03	Prevention of WMSD in the Ontario Clothing Industry: A focus on small business
Wells, R. Frazer, M. and Norman, R.	HEAL*Net*	$38, 145	2001-2002	Commercialization Of Workplace Research: Development Of New Modules For Upper Limb And Extensions To The Low Back Module Of ERGOWATCH
Theberge, N, Cole, D., Frazer, M., Wells, R.	CIHR-UW seed grant	$6000	October, 2002-2003	Workplace Interventions to Reduce Occupational Injuries
R. Wells, S. McGill, M. Frazer, H. Green, N. Theberge, D Ranney, J Medley, C. MacGregor, D. Cole, P. Keir, A. Moore, J. Callaghan, T. Haines, M. Kerr, S. Naqvi, J. Potvin	Workplace Safety and Insurance Board	$400 000/ year	2003-2008	A Proposal to set up Centre of Research Expertise Entitled: Action Centre for the Prevention of Work-Related Musculoskeletal Disorders
Wells, R., Cole, D., Frazer, M., Kramer, D. Theberge, N., Naqvi, S., Tompa, E.	Workplace Safety and Insurance Board: Solutions for Workplace Change	$270 059	2004-2005	Ergonomic Interventions for Prevention of WMSDs: Evaluation and Sustainability
Wells, R., Frazer., Maracle, S.,* Dunk, W.,* Carnahan, H.	Workplace Safety and Insurance Board:	$29, 000	2005-2006	Powerline maintainer's gloves; approaches to reducing hand loading

	Solutions for Workplace Change			improving performance and reducing injury risk factors
Shannon, H., Hogg-Johnson,S., Walters, S., Cole Wells, R	CIHR	$67,000/ yr	2004-2006	The use of Individual Participant Data (IPD) for examining heterogeneity in meta-analysis of observational studies: An application to biomechanical workplace risk factors and low back pain
Wells, R., Potvin, J., Keir, P., Moore, A., Carnahan, H., Frazer, M., Dickerson, C.	Workplace Safety and Insurance Board: Solutions for Workplace Change	$28,695	2006-2007	Multi-task Jobs and Job Rotation
Mijatovic, D.,* Wells, R., Cole., Naqvi, S.*	Workplace Safety and Insurance Board: Bridging the Gap	$36,650	2006	Evaluation of the impact of a participatory ergonomics intervention in a medium size facility.
Bigelow, P., Garritano, E Wells, R., Vi, P.	Workplace Safety and Insurance Board: Bridging the Gap	$59,777	2006	Barriers & Facilitators to Adoption of Ergonomic Innovations in Construction
Wells, R., Kramer, D., Bart, C., Dickerson, C. Clarke, W.	Workplace Safety and Insurance Board: Bridging the Gap	$39, 928	2006-2007	Developing a tool for engineering design that will predict the effort required by the hand and wrist during manual work
Boyle E., Steenstra, I., Hayden, J., Cassidy, JD., Wells, R., Wyeld, S.	Workplace Safety and Insurance Board: Bridging the Gap	$29, 966	2006-2007	What Workplace Characteristics Have an Impact on an Injured Worker's Return to Work? A Qualitative Study
Wells, R., Diacur, M., Kramer, D., Bigelow, P.	Workplace Safety and Insurance Board	$307, 465 (Total)	2006-2008	Ergonomics in the Transportation Sector: The development of best practices in MSD-reduction strategies
Moore, A.E., Vi, P., Wells, R.	Workplace Safety and Insurance Board: Bridging the Gap	$29,000	2007	Assessment tools in Construction
Shannon, H., J., Cote, P., Frank, J., Griffith, L., Wells, R.	WorkSafeBC: Systematic Review Request	$108,500	2007-2008	Systematic Review of Low Back Pain in Workers

	for Proposals 2006			
Wells, R., Maracle, S.	Workplace Safety and Insurance Board: Bridging the Gap	$30,160	2008- 2009	Evaluating the effects of cold and glove use on manual dexterity and performance and the testing of potential solutions.
Wells, R., Amick, B	Office Ergonomics Research Committee	$23,720	2008- 2009	The prevalence of hand disorders amongst hand held device users and their relationship to patterns of device usage
Wells, R. Tupling, R. and Maracle, S.	Workplace Safety and Insurance Board:	$240, 999 (Total)	2008-2011	A versatile and comprehensive model to predict the effort required by the hand and wrist during manual work: development and evaluation
Kramer, D. Bigelow, P. Vi, P., Garritano, E., Wells, R.	Workplace Safety and Insurance Board	$348,870 (Total)	2008-2011	Encouraging construction companies to adopt innovations to reduce MSDs using different knowledge transfer techniques.

Graduate Student Supervision

a) Supervisor

PhD

Sirin, A.	Adaptations of the Neuromuscular system during prolonged submaximal cycling, 1991. Joint supervision with A. Patla.
Keir, P.	Functional Implications of the Musculoskeletal Anatomy and Passive Tissue Properties of the Forearm, 1995.
Moore, A.	Biomechanical and Psychophysical Studies of Repetitive Manual Tasks, 1999.
Neumann, P.	(University of Lund, Sweden, Co-supervisor with J. Winkel,)
Fischer S.	Thesis area under development. Joint supervisor with C. Dickerson

Masters

Hubley, C.	Assessment of the Suitability of Vertical Jumping for Investigating Storage of Elastic Energy in Muscle, 1981.
Morrissey, M.	Mechanical Efficiency of Concentric and Eccentric Bicycle Work, 1982.
Sutherland, D.	Cycling Effectiveness: A Comparison of Three Techniques. Withdrew from program.
Evans, N.	An Investigation of Current Hypotheses on Two- Joint Muscle Function, 1986.

Moore, A.	A Biomechanical Approach to Repetitive Strain Injuries, 1988.
Orr, S.	The effect of repetitiveness on the injury potential of manual tasks, 1992.
Ling, X.	A Three-Dimensional Dynamic Simulation Model of Human Prehension, 1993
Brodie D.	An Evaluation of the Utility of Ergonomics Checklists for Predicting Health Outcomes in a Manufacturing Environment, Sept 1996.
Neumann, P.	Inter-methods Comparison of Exposure Measures for Epidemiologic Study of Low Back Pain, August 1999.
Beech-Hawley, L.	Deadline Pressures in Newspaper Workers: Biomechanical and Psychosocial Stressors, May, 1998.
Simpson, M.	Effectiveness of Two Interventions in a Hand Sewing Industry, Dec, 1997.
Trainor, T.	Installing Lift Assists in Manufacturing Industry, July 2000
McRobbie, H.	Changes in Exposure and Health after Redesign of a Grinding Department , June 2000
Greig. M.	Using Force And Moment Wrench To Characterize Human Prehension, Sept 2001
Natale, J.	Effects of Participative Change Process in the Sewing Industry, July 2004.
Enns. J.	Job Rotation 2006
Reitzel, A.	Sustainability of Ergonomic Programs, 2006
Willms, K.	Attributes of Gloves Leading To Decreased Force And Increased Effort in Maximal And Sub-Maximal Grips, 2006
Morose, T.	Case Study Presentation Using Electronic Media, 2007
McFall, K.	Choice of Tasks for Job Rotation, 2007
Slater, L.	Application Of Normative Strength Data To Occupational Settings, in progress
Hogg, N.	Biomechanics of the Thumb During Mobile Device Use, in progress
Hurley, K.	Evaluating Ergonomic Interventions; Case Study Of A Redesigned Courier Truck, in progress

Teaching Expertise

Biomechanics of Human Movement;
Graduate and Undergraduate Assessment of Motor Performance;
Undergraduate Instrumentation;
Graduate and Undergraduate Courses in Injuries to Musculoskeletal System and Ergonomics
Task Analysis

University and Department Committees

University Senate 1998-1999

University Senate Finance Committee	1998-1999
University Computing Committee	1990-1996
University Appointment Review Committee	1994-2000
University Ad-Hoc Committee on UWinfo (Chair)	1999
University Ad-Hoc Committee on Newsgroups (Chair)	1998
Waterloo Advisory Council Liaison	1990-1996
Faculty Executive Committee	1990-1996
Faculty Administrative Council	1990-1996
Department Computing Committee	1997-present
Department Executive Committee	
Department Undergraduate Studies Committee	
Department Graduate Committee	
Ergonomic Option Coordinator	1997-1999, 2001-present
United Way Co-Chair	2006- present

Richard Wells

Department of Kinesiology, Faculty of Applied Health Sciences, University of Waterloo

Richard Wells is a Professor in the Department of Kinesiology, Faculty of Applied Health Sciences, University of Waterloo. He was educated as a Mechanical Engineer at the University of Manchester, England and McMaster University, Canada where he specialized in Applied Mechanics with application to human function and injury; head injury in boxing and description of human gait using assistive devices. Since joining the Department of Kinesiology, University of Waterloo, Richard has pursued similar work concerning seat belt loads and neck injury in head-first impacts. For the last decade his main research and teaching interests have been work related musculoskeletal disorders of the upper extremity and low back in industrial and office settings.

His interests are in work-related musculoskeletal disorders of the back and upper limbs; their causes, pathophysiology and prevention. He address these issues using anatomical and functional anatomical studies in cadavers and volunteer, by biomechanical modeling of the structures affected, by development of measurement, recording and processing approaches to document exposure at work, by participating in epidemiological studies to assess the work-relatedness of various workplace exposures and by the development of workplace processes to implement changes to prevent musculoskeletal disorders and monitor their health effects.

He is Director of the Centre of Research Expertise for Prevention of Musculoskeletal Disorders, a multi-university Centre hosted at the University of Waterloo, He is also an Adjunct Scientist at the Institute for Work and Health.. He is a past member of the Board of Directors of Occupational Health Clinics for Ontario Workers (OHCOW). He has been involved in ergonomics standards and regulations with ACGIH and OSHA in the USA and in the Ontario Strategy for the Prevention of MSD and CSA. He also acts as a consultant and speaker on ergonomic issues.