

BIOGRAPHICAL SKETCH

NAME		POSITION TITLE	
Jack M. Winters		Professor of Biomedical Engineering	
EDUCATION/TRAINING			
INSTITUTION AND LOCATION	DEGREE	YEAR(s)	FIELD OF STUDY
University of California, San Diego	A.B.	1979	Bioengineering
University of California, Berkeley	M.S.	1980	Mech. Engng
University of California, Berkeley & San Francisco	Ph.D.	1985	Bioengineering

Positions:

- 1/09-6/09: *Visiting Research Professor of Bioengineering and Orthopedic Surgery*, UC San Diego
 11/02– present: *PI and Co-Director, RERC on Accessible Medical Instrumentation*
 2/00 - present: *John P. Raynor Distinguished Chair* (endowed), Marquette University
 4-00 – present: *Adjunct Professor, Dept. of Physical Medical & Rehabilitation*, Medical College of Wisconsin
 1/00 – present: *Professor of Biomedical Engineering, Dept. of Biomedical Engng.*, Marquette University
 1/00 – 8/03: *Department Chair, Dept. of Biomedical Engineering*, Marquette University
 7/99 - 12/99: *Founding Dept. Chair, Dept. of Biomedical Engineering*, The Catholic Univ. of America
 12/91-12/93, 9/97-7/99: *Director, Biomedical Engineering Program*, The Catholic Univ. of America
 9/96 - 12/99: *Professor of Biomedical Engineering*, The Catholic University of America
 7/95 – 9/02: *Consultant to the Medical Staff*, National Rehabilitation Hospital, Washington DC
 7/94 - 9/94: *Visiting Research Associate, Rehab Engng. Center on Rehab Robotics*, Univ. Delaware
 1/93 - 8/93: *Associate Program Director, Biomedical Engineering & Research to Aid Persons With Disabilities Program*, National Science Foundation (ave. 40% time)
 8/91 - 8/96: *Associate Professor of Biomedical Engineering*, The Catholic University of America
 8/85- 7/91: *Assistant Professor of Bioengineering*, Dept of Chemical & Bio Engng, Arizona State University (tenure granted 4/91) – *joint appointment on Exercise Science faculty*
 8/85 - 7/91: *Lab Director, Joint Function & Gait Lab*, Harrington Arthritis Research Center, Phoenix

Professional Honors

- Magna Cum Laude, Univ. of California, San Diego, 1979 (3.9 UC-GPA)
 Univ. of Calif. Regents Fellowship, 1979-82; NIH Systems & Integrative Biology Trainee, 1981-84
 Fellow, AIMBE (American Institute of Medical & Biological Engineering)

Professional Service (selected):

- Symposium Organizer, 15 sessions (80 papers), *1st World Congress in Biomechanics*, La Jolla, Aug 1990
 Co-Organizer, *9th Engng Found. Conf. (EFC) on Biomech. & Neural Control*, Ohio, 1996 (with P. Crago)
 Symposium Organizer, 5 sessions (20 papers), *13th Southern Biomed. Engng. Conf.*, Bethesda, Apr, 1994
 Organizer, Workshop (for Council of BME Chairs): *Design in Biomedical Engng. Curricula*, Tempe, Oct, 1994.
 Organizer, *Workshop on Home Care Technologies for the 21st Century*, at FDA, Rockville, April, 1999
 Chair/Program Chair (2000-2001), *Amer. Soc. Engng Educators - Biomedical Engng Div.* (ASEE-BED)
RESNA 2000 Science Chair; RESNA Research Committee Chair, 1999-2002; Symposium Organizer, 2001
 Program Chair/Division Chair (2000-2002), *Amer. Soc. Engng Educators - Biomedical Engng Div.* (ASEE-BED)
 Chair, *Council of Chairs of Bio/Biomedical Engineering Programs*, 2002-2003 (Vice-Chair 2001-2002)
 Co-Organizer, *Workshop on Accessible & Usable Medical Instrumentation*, at FDA, Rockville, October, 2005
 Session Organizer, 3 sessions, *World Congress Biomech*, Munich, July 2006
 Editorial Boards: *J Biomech* (1992-95), *Whitaker Foundation* (1999-2003), *IEEE Neural Sys & Rehab Engng*, 2005-2007), *Assistive Tech* (2004-present), *J NeuroEngng & Rehab* (2006-)
 Reviewer for over 15 different journals spanning engineering, biomechanics, neuroscience and rehabilitation, and for 4 NSF grant review panels, 4 NIH panels, 5 Whitaker panels, and 2 NIDRR panels.

Selected Recent Publications (from 2000-present, from over 130 total):

- Winters, J.M.**, "Motion Analysis and Telerehabilitation: Healthcare Delivery Standards and Strategies for the New Millennium," in *Pediatric Gait: A New Millennium in Clinical Care & Motion Anal. Techn.*, IEEE Press, pp. 16-22, 2000.
- Winters, J.M.** and Crago, P.E., *Biomechanics and Neural Control of Movement*, 46 chapters, 683 pages, Springer-Verlag, New York, 2000.
- Winters, J.M.**, "Terminology and Foundations of Movement Science," In: *Biomech. & Neural Control of Movem.* (eds: Winters, J.M. & Crago, P.E.), Chap. 1, pp. 1-35, Springer-Verlag, NY, 2000.
- Winters, J.M.**, "Subtle nonlinear neuromuscular properties are consistent with teleological design principles," In: *Biomech. & Neural Control of Movem.* (eds: Winters, J.M. & Crago, P.E.), Chap. 7, pp. 100-111, Springer-Verlag, NY, 2000.
- Winters, J.M.**, "Study posture/movement selection & synergies via a synthesized neuro-optimization framework," In: *Biomechanics and Neural Control of Movement* (eds: Winters, J.M. and Crago, P.E.), Chapter 35, pp. 458-476, Springer-Verlag, New York, 2000.
- Winters, J.M.**, Lathan, C., Sukthankar, S., Pieters, T., and Rahman, T. "Human Performance and Rehabilitation Technologies," In: *Biomechanics and Neural Control of Movement* (eds: Winters, J.M. and Crago, P.E.), Chapter 37, pp. 493-515, Springer-Verlag, New York, 2000.
- Winters, J.M.**, TeleRehabilitation Research: Emerging Opportunities, *Annual Reviews of Biomedical Engineering*, 4:287-320, 2002.
- Winters, J.M.**, Robinson, C., Simpson, R. and Vanderheiden, G. (eds.), *Emerging and Accessible Telecommunications, Information and Healthcare Technologies*, RESNA Press, Arlington, 2002.
- Lathan, C.E. A. Kinsella, M. Rosen, **J. Winters**, and C. Trepagnier, "Human Factors Engineering of Home Telemedicine and Telerehabilitation Systems," *Telemedicine Journal*, 2000.
- Tran, B., Krainak, D.M., Lauderdale, D.E. and **Winters, J.M.**, "Video Telephony in Tele-Health Care: Accessible and Emerging Technologies," *Emerging and Accessible Telecommunications, Information and Healthcare Technologies*, Winters et al., eds., RESNA Press, pp. 128-135, 2002
- Winters J.M.**, "Rehabilitative Telehealthcare Anywhere: Was the Homecare Technologies Workshop Visionary?" In *Emerging and Accessible Telecom., Information and Health Technologies*, ed JM Winters, C. Robinson, R. Simpson, G. Vanderheiden. Arlington: pp. 95-111, RESNA Press, 2002.
- Reinkensmeyer, D., Lum, P. and **Winters, J.M.**, "Emerging Technologies for Improving Access to Movement Therapy Following Neurologic Injury," *Emerging and Accessible Telecommunications, Information and Healthcare Technologies*, Winters et al., eds, RESNA Press, pp 136-150, 2002.
- Rosen, M., **Winters, J.M.** and Lauderdale, D., "State-of-the-Science: Telerehabilitation," in *Emerging and Accessible Telecom., Inform. & Healthcare Techn.*, Winters et al., eds., RESNA Press, pp. 220-245, 2002.
- Draye, J.-P., **Winters, J.M.** and Cheron, G. "Self-Selected Modular Recurrent Neural Networks with Postural and Inertial Subnetworks Applied to Complex Movements," *Biol. Cybern.*, 82:27-39, 2002.
- Winters, J.M.**, Wang, Y. and Winters, J.M. "Wearable Sensors and Telerehabilitation: Integrating Intelligent Telerehabilitation Assistants With a Model for Optimizing Home Therapy," *IEEE/EMBS Magazine, Special Issue on Wearable Medical Technologies*, 22: 56-65, June 2003.
- Ellsworth, C. and **Winters, J.M.** An Innovative System to Enhance Upper-Extremity Stroke Rehabilitation, *Proc. IEEE/EMBS*, 4 p., Cancun, IEEE Press, 2003.
- Feng, X. and **Winters, J.M.** Universal Joystick Interface for Interactive Teleassessment and Remote Therapy, *Proc. BMES*, Nashville, 2003.
- Wang, Y. and **Winters, J.M.** An Event-Driven Dynamic Recurrent Neuro-Fuzzy System for Adaptive Prognosis in Rehabilitation, *Proc. IEEE/EMBS*, 4 p., Cancun, 2003.
- Winters, J.M.** and Winters, J.M. "A Telehomecare Model for Optimizing Rehabilitation Outcomes, *J. Telemed. & E-Health*, special issue on telerehabilitation, 10:200-212, 2004.
- Winters, J.M.**, Follette Story, M., Campbell, S., Lemke, M., Danturthi, S., Barr, A., Rempel, D. Mobile Usability Lab: A Tool for Studying Medical Device Accessibility for Users with Diverse Abilities, 3 p., *RESNA 2004*.
- Feng, X., Ellsworth, C., Johnson, L. and **Winters, J.M.** UniTherapy and TheraJoy: Computer-Based Tools to Enhance Neurorehabilitation Assessment and Therapy, 3 p., *RESNA 2004*

- Winters J.M.** and Winters J.M., “A Telehomecare Model for Optimizing Rehabilitation Outcomes, *J. Telemed. & E-Health*, special issue on telerehabilitation, 10:200-212, 2004.
- Lemke, M.R., **Winters, J.M.**, Campbell, S., Danturthi, S., Story, M.F., Barr, A. and Rempel, D.M. Mobile Usability Lab: A Tool for Accessibility and Usability Testing of Medical Instrumentation, 4 p., *Proc. IEEE/EMBS*, San Francisco, 2004
- Winters, J.M.**, Feng, X., Wang, Y., Johnson, L.M. and Foil, J. Progress Toward Universal Interface Technologies for Telerehabilitation, 4 p., *Proc. IEEE/EMBS*, San Francisco, 2004.
- Johnson, L.M. and **Winters, J.M.** Enhanced TheraJoy Technology for use in Upper-Extremity Stroke Rehabilitation, 4 p., *Proc. IEEE/EMBS*, San Francisco, 2004.
- Wang, Y. and **Winters, J.M.** An Input Classification Scheme for Use in Evidence-Based Dynamic Recurrent Neuro-Fuzzy Prognosis, 4 p., *Proc. IEEE/EMBS*, San Francisco, 2004.
- Wang, Y. and **Winters, J.M.** A Dynamic Neuro-Fuzzy Model Providing Bio-State Estimation and Prognosis Prediction for Wearable Intelligent Assistants, *J. NeuroEngng & Rehab*, no. 8446813556113114, 17 p., 2005.
- Lemke MR and **Winters JM.**, Experiences Using Mobile Usability Lab to Investigate Medical Device Biomechanical Barriers, 3 p., *Proc. RESNA*, 2005
- Feng, X. and **Winters, J.M.** “UniTherapy: A Computer-Assisted Motivating Neurorehabilitation Platform for Teleassessment and Remote Therapy,” 4 p., *Int. Congr. Rehab Robotics (ICORR)*, Chicago, 2005.
- Johnson, L. and **Winters, J.M.** “Evaluation of Tracking Performance Using Joystick Manipulators That Engage Different Arm Workspaces,” 4 p., *Int. Congr. Rehab Robotics (ICORR)*, Chicago, 2005.
- Feng, X. and **Winters, J.M.** “Progress towards a Service-Oriented Universal Access Telerehabilitation Platform,” 4 p., *Int. Congr. Rehab Robotics (ICORR)*, Chicago, 2005.
- Feng, X., Johnson, M., Johnson, M., **Winters, J.M.**, “A Suite of Computer-Assisted Techniques for Assessing Upper-Extremity Motor Impairments”, 4 p, Shanghai, *IEEE EMBC* 2005.
- Winters, J.M.** and Story, M.F. (eds), *Medical Instrumentation: Accessibility and Usability Considerations*, 473 pages, Boca Raton: *CRC Press*, October, 2006.
- Winters, J.M., Story, M.F., Barnekow, K., Kailes, J.I., Premo, B., Schwier, E., Danturthi, S. and **Winters, J.M.**, Results of a National Survey on Accessibility of Medical Instrumentation for Consumers, in *Medical Instrumentation: Accessibility and Usability Considerations* (Winters, J.M., Story, M.F., eds), Chapter 2, pp. 13-28, *CRC Press*, Boca Raton, 2006.
- Erlandson, R.F., Enderle, J.D. and **Winters, J.M.**, Educating Engineers in Universal and Accessible Design, in *Medical Instrumentation: Accessibility and Usability Considerations* (Winters, J.M., Story, M.F., eds), Chapter 8, pp. 101-118, *CRC Press*, Boca Raton, 2006.
- Winters, J.M.**, Rempel, D., Story, M.F., Lemke, M., Barr, A., Campbell, S. and Danturthi, S. The Mobile Usability Lab Tool for Accessibility Analysis of Medical Devices: Design Strategy and Use Experiences, in *Medical Instrumentation: Accessibility and Usability Considerations* (Winters, J.M., Story, M.F., eds), Chapter 13, pp. 173-190, *CRC Press*, Boca Raton, 2006.
- Lemke, M. and **Winters, J.M.**, Comparison of Accessibility Tools for Biomechanical Analysis of Medical Devices: What Experts Think, in *Medical Instrumentation: Accessibility and Usability Considerations* (Winters, J.M. and Story, M.F., eds), Chapter 14, 191-211, *CRC Press*, Boca Raton, FL, 2006.
- Smith, R.E., Lemke, M.R., Barnekow, K., Mendonca, R., Winter, M, Schwanke, T. and **Winters, J.M.**, Quantifying Accessibility and Creating a Metric with the MED-AUDIT, in *Medical Instrumentation: Accessibility and Usability Considerations* (Winters, J.M. and Story, M.F., eds), Chapter 22, pp. 283-296, *CRC Press*, Boca Raton, FL, 2006.
- Winters, J.M.**, Future Possibilities for Interface Technologies that Enhance Universal Access to Healthcare Devices and Services , in *Medical Instrumentation: Accessibility and Usability Considerations* (Winters, J.M. and Story, M.F., eds), Chapter 25, pp. 321-340, *CRC Press*, Boca Raton, FL, 2006.
- Feng, X. and **Winters, J.M.**, Emerging Personalized Home Rehabilitation: Integrating Service with Interface, in *Medical Instrumentation: Accessibility and Usability Considerations* (Winters, J.M. and Story, M.F., eds), Chapter 27, pp. 355-372, *CRC Press*, Boca Raton, FL, 2006.
- Danturthi, R.S., Shroff, P. and **Winters, J.M.**, Progress in Using the Universal Remote Console Standard to Create User-Customized Interfaces for Future Medical Devices, in *Med. Instrum.: Accessibility & Usability Consid.* (Winters, J.M., Story, M.F., eds), Chapter 28, pp. 373-392, *CRC Press*, Boca Raton, FL, 2006.

- Winters, J.M.** and Story, M.F. Results of the Workshop on Interfaces for Accessible Medical Instrumentation, in *Medical Instrumentation: Accessibility & Usability Considerations* (Winters, J.M., Story, M.F., eds), Chapter 31, pp. 419-444, CRC Press, Boca Raton, FL, 2006.
- Feng, X. and **Winters, J.M.**, A Home Rehabilitation Appliance that Integrates Universal Access with Personalized Interface, 5 p., *Transdiscipl. Conf. Distributed Diagnosis & Home Healthcare*, Arlington, 2006.
- Shroff, P. and **Winters, J.M.**, Generation of Multi-Modal Interfaces for Hand-Held Devices Based on User Preferences and Abilities, 5 p., *Transdiscipl. Conf. Distrib. Diagnosis & Home Healthcare*, Arlington, 2006.
- Winters, J.M. and **Winters, J.M.**, Integrating Telehealth into Nursing Education: Experiences, Options, and Strategies," in press, *J. Cardiovascular Nursing*, 2007.
- Wang, Y. and **Winters, J.M.**, Predictive Model for Allostasis and Homeostasis," *Intern. Symp. Bio-Medical Informatics & Cybernetics*, 4 p., Orlando: July, 2007.
- Feng, X. and **Winters, J.M.** An Interactive Framework for Personalized Home-Based Computer-Assisted Motivating Neurorehabilitation, *IEEE Trans. Inform. Techn. In Biomedicine*, 11: 518-526, 2007.
- Johnson, M.J, Feng, X, Johnson, L. and **Winters, J.M.** Potential of a suite of robot/computer-assisted motivating systems for personalized, home-based, stroke rehabilitation, *J NeuroEngineering & Neurorehab*, 8074446371021466, 2007.
- Story, M.F., Lemke, M.F., MacDonald, C., Kailes, J.I., Rempel, D.M., **Winters, J.M.**, "Guidelines for Designing and Selecting Accessible Medical Equipment," in press, RESNA.
- Lemke, M. and **Winters, J.M.**, Barriers to Medical Devices: Removing Barriers to Medical Devices for Users With Impairments, *Ergonomics in Design*, 16: 18-25, 2008. [Won HFES best paper award]
- Story, M.F., Luce, A., Leung, L., Omiatek, E., Lemke, M.R., **Winters, J.M.**, Rempel, D.M., "Accessibility of Radiology Equipment for Patients with Mobility Disabilities, xx:xx-xx, 2009, *Human Factors*.
- Feng, X. and **Winters, J.M.**, A Pilot Study Evaluating Use of a Computer-Assisted Neurorehabilitation Platform for Upper-Extremity Stroke Assessment, 6:15, *J NeuroEngng & Neurorehab*, 2009
- Hazra, P., Myklebust, J. and **Winters, J.M.**, "Evaluation of Applied Forces and EMG in a 3D Arm Workspace: Comparison Between Young, Aged and Stroke Population," 4p, *Proc. EMBC*, 2009.

Submitted, or to be submitted to journals by end of 2009:

- Feng, X. and **Winters, J.M.**, Multivariate Nonlinear Regression Analysis of Trajectory Tracking Performance in Chronic Stroke-induced Hemiparesis, to be submitted to *Arch. Phys. Med. & Rehab*.
- Wang, Y. and **Winters, J.M.**, Allostasis Plus Homeostasis: Adaptively Striving for Future Viability Plus Present Stability, to be submitted to *Biological Cybernetics*.
- Wang, Y. and **Winters, J.M.**, Predictive Model of Muscle Adaptation to Use History, in preparation, to be submitted to *Journal of Biomechanics*.
- Wang, Y. and **Winters, J.M.**, A General Model Predicting the Biophysical Dynamics of Skeletal Muscle Fatigue for Many Task Protocols, in preparation, for submission to *Journal of Physiology*.
- Wang, Y. and **Winters, J.M.**, Modeling the Pathophysiology and Treatment of Primary Hypertension, to be submitted to *Hypertension*.
- Wang, Y., **Winters, J.M.** and Subramaniam, S., "Use of Skeletal Muscle Toolkit for Various Types of Muscle Disuse Data," to be submitted to *Biophysical Journal*.
- Winters, J.M.**, Wang, Y. Subramaniam, S. "Skeletal Muscle Protein Families and Toolkit for Microarray Studies," to be submitted to *Biophysical Journal*.
- Winters, J.M.** *Bioengineering of Living Actuators: Muscle Tissue Exposed*. Textbook nearing completion, part of bioengineering textbook series (Enderle, J., Series Editor), Morgan & Claypool, to be out 2010.

Selected Older Publications (prior to 2000):

1. *Muscle Modeling and Natural/Artificial Actuators (prior to 1999, 4 or more pages):*

Winters, J.M. and Stark, L., "Analysis of Fundamental Movement Patterns Through the Use of In-Depth Antagonistic Muscle Models," *IEEE Trans. Biomed. Engng.*, BME-32: 826-839, 1985.

Winters, J.M. and Bagley, A.M., "Biomechanical Modelling of Muscle-Joint Systems: Why it is Useful," *IEEE Engin. Med. & Biol.*, 6:17-21, 1987.

- Winters, J.M.** and Stark, L., "Muscle Models: What is Gained and What is Lost by Varying Model Complexity", *Biol. Cybern.*, 55: 403-420, 1987.
- Winters, J.M.** and Stark, L. "Simulated Mechanical Properties of Synergistic Muscles Involved in Movements of a Variety of Human Joints," *J. Biomech.*, 12:1027-1042, 1988.
- Winters, J.M.**, Stark, L. and Seif-Naraghi, A.H., "An Analysis of the Sources of Muscle-Joint System Impedance," *J. Biomech.*, 12:1011-1025, 1988.
- Winters, J.M.**, Nam, M.H. and Stark, L., "Modeling Dynamical Interaction Between Fast and Slow Movement: Saccadic Eye Movement Behavior in the Presence of the Slower VOR," *Math. Biosci.*, 68: 150-187, 1984.
- Winters, J.M.**, "Hill-Based Muscle Models: A Systems Engineering Perspective", Chapter 5 in *Multiple Muscle Systems: Biomech. and Movem. Organiz.*, (eds: Winters, J.M. and Woo, S.Y.), pp. 69-93, Springer-Verlag, New York, 1990.
- Hannaford, B. and **Winters, J.M.**, "Actuator Properties and Movement Control: Biological and Technological models", Chapter 7 in *Multiple Muscle Systems: Biomechanics and Movement Organization*, (eds: Winters, J.M. and Woo, S.L-Y.), pp. 101-120, Springer-Verlag, New York, 1990.
- Seif-Naraghi, A.H. and **Winters, J.M.**, A.H., "Optimal Strategies for Scaling Goal-Directed Arm Movements", Chapter 19 in *Multiple Muscle Systems: Biomechanics and Movement Organization*, (ed: Winters, J.M. and Woo, S.L-Y.), pp. 312-334, Springer-Verlag, New York, 1990.
- Yamaguchi, G.T., Sawa, A.G.-U., Moran, D.W., Fessler, M.J. and **Winters, J.M.** "A Survey of Human Musculotendon Actuator Properties," Appendix in *Multiple Muscle Systems: Biomechanics and Movem. Organiz.*, (eds: Winters, J.M. and Woo, S.L-Y.), pp. 717-778, Springer-Verlag, New York, 1990.
- Winters, J.M.**, Tannous, R.E. and SAGRANICHINY, E.S., "Braided pneumatic "artificial muscle" actuators in rehabilitation: Principles, Fabrication, and Applications, *13th Southern Biomed. Engng. Conf.*, Bethesda, 502-505, 1994.
- Winters, J.M.** and SAGRANICKINY, E.S., "Why Braided Pneumatic Actuators in Rehabilitation Robotics? Principles, Properties, and Suggested Applications," *Int. Conf. on Rehab Robotics*, pp. 201-208, Wilmington, June, 1994.
- Winters, J.M.**, "How Detailed Should Muscle Models be to Understand Multi-Joint Movement Coordination?" *Human Movement Science*, 14: 401-442, 1995.
- Hannaford, B., **Winters, J.M.**, Chou, C-P., Marbot, P-H., "The Anthroform Biorobotic Arm: A System for the Study of Spinal Circuits, *Annals of Biomed. Engng.*, 23:399-408, 1995.
- Winters, J.M.**, "An Improved Muscle-Reflex Actuator for Use in Large-Scale Neuromusculoskeletal Models", *Annals of Biomed. Engng*, 23:359-374, 1995.

2. Large-Scale Biomechanical Systems (1990s, 4 or more pages)

- Winters, J.M.** and Woo, S.L-Y., *Multiple Muscle Systems: Biomechanics and Movement Organization*, 47 chapters, 801 pages, Springer-Verlag, New York, August, 1990.
- Zajac, F. and **Winters, J.M.**, "Modeling Musculoskeletal Movement Systems: Joint and Body-Segment Dynamics, Musculotendon Actuation, and Neuromuscular Control", Chapter 8 in *Multiple Muscle Systems: Biomech. & Movem. Organiz.* (ed: Winters, J.M. and Woo, S.Y.), pp. 121-148, Springer-Verlag, New York, 1990.
- Hogan, N. and **Winters, J.M.**, "Principles Underlying Movement Organization: Upper Limb and Single Joint", Chapter 9 in *Multiple Muscle Systems: Biomechanics and Movement Organization*, (eds: Winters, J.M. and Woo, S.L-Y.), pp. 182-194, Springer-Verlag, New York, 1990.
- Winters, J.M.** and Peles, J.D., "Neck Muscle Activity and 3-D Head Kinematics During Quasi-Static and Dynamic Tracking Movements, Chapter 28 in *Multiple Muscle Systems: Biomechanics and Movement Organization*, (eds: Winters, J.M. and Woo, S.L-Y.), pp. 461-480, Springer-Verlag, New York, 1990.
- Andersson, B.J. and **Winters, J.M.**, "Role of Muscle in Postural Tasks: Spinal Loading and Postural Stability", Chapter 22 in *Multiple Muscle Systems: Biomechanics and Movement Organization*, (eds: Winters, J.M. and Woo, S.L-Y.), pp. 377-395, Springer-Verlag, New York, 1990.

- Mungiole, M. and **Winters, J.M.**, "Overview: Influence of Muscle on Movements Involving the Lower Limb", Chapter 33 in *Multiple Muscle Systems: Biomechanics and Movement Organization*, (eds: Winters, J.M. and Woo, S.L-Y.), pp. 550-567, Springer-Verlag, New York, 1990.
- Winters, J.M.**, "Optimized Strategies for Goal-Directed Human Movements", in *Trends in Biological Cybernetics*, pp. 13-25, (ed: Menon, J.), 1991.
- Fuller, J.J. and **Winters, J.M.**, "Joint Loading During Stretching Exercises Recommended for Osteoarthritis: A Biomechanical Analysis", *J. Geriatric Rehab.*, 6: 25-33, 1991.
- Fuller, J.J. and **Winters, J.M.**, "Joint Loading During Stretching Exercises Recommended for Osteoarthritis: A Biomechanical Analysis", *Ann. of Biomed. Engng.*, 21: 277-288, 1993.
- Winters, J.M.** and Kleweno, D.G., "Effect of Initial Upper Limb Alignment on Muscle Contributions to Isometric Strength Curves," *J. Biomech.*, 26: 143-153, 1993.
- Winters, J.M.**, Osterbauer, P., Peles, J.D., Derickson, K., Debur, K. and Fuhr, A., "3-D Head Axis of Rotation Variation During Tracking Movements: A Diagnostic Tool for Assessing Neck Function", *Spine*, 18: 1178-1185, 1994.
- Winters, J.M.** and Van der Helm, F.C.T. (1994) "A field-based musculoskeletal framework for studying human posture and manipulation in 3D", pp. 410-415, *Proc. of the Symp. on Modeling and Control of Biomed. Sys., Intern. Fed. On Autom. Control*, March, Galveston.
- Winters, J.M.** and van der Helm, F.C.T., "Relations Between Stability, Redundancy and Optimization for Postural Neuro-Mechanical Systems: Principles," *13th Southern Biomed. Engng. Conf.*, Bethesda, pp. 239-243, 1994.
- Winters, J.M.** "Neuromusculoskeletal considerations for designing optimized human powered commuter vehicles," *13th Southern Biomed. Engng. Conf.*, Bethesda, 787-790, 1994.
- Staropoli, A., Dang, T., **Winters, J.M.**, Van der Helm, F.C.T. and Malawar, M., "Quantitative assessment of selected activities of daily living after surgical resection of the shoulder," *13th Southern Biomed. Engng. Conf.*, Bethesda, 939-942, 1994.
- Dang, T. Staropoli, A., **Winters, J.M.**, Van der Helm, F.C.T. and Malawar, M., "3-D analysis of shoulder range of motion tasks: effects after shoulder girdle resection surgery," *13th S. Biomed. Engng. Conf.*, Bethesda, 935-938, 1994.
- Winters, J.M.**, "Concepts in Neuro-Muscular Modelling", In: *3-D Analysis of Human Movement*, (eds: Allard et al.), Chapter 12, pp. 257-292, Human Kinetics, 1995.
- Winters, J.M.** "Intelligent Synthesis of Neuromusculoskeletal Signals Using Fuzzy Expert Critics", *SPIE Smart Sensing, Processing and Instrumentation: Smart Sensors & Actuators for Neural Prosthesis, Vol. 2718*, pp. 456-468, San Diego, 1996.
- Winters, J.M.** "Consider Neuromusculoskeletal Redundancy and Extended Proprioception When Designing Smart Structures to Interface with Humans", *SPIE Smart Sensing, Processing and Instrumentation: Smart Sensors and Actuators for Neural*, Vol. 2718, pp. 469-480, San Diego, February, 1996.
- Winters, J.M.** "Consider Neuromusculoskeletal Redundancy and Extended Proprioception When Designing Smart Structures to Interface with Humans", *SPIE Smart Sensing, Processing and Instrumentation: Smart Sensors and Actuators for Neural*, Vol. 2718, pp. 469-480, San Diego, February, 1996.

Patent

U.S. Patent No. 5,203,346: A non-invasive method and equipment for determining the kinematic function of the cervical spine, 1993. [led to product by start-up company: Whiplash Analysis, Inc. (Phoenix, AZ)]

Research Support (Total funding as PI ~\$12 million – 5 grants of at least \$900,000 are listed in bold)

Whitaker Foundation (11/86-11/89)	Samaritan Rehabilitation Institute (12/87-3/89)
National Science Foundation (1/89-6/92)	Nat Chiropr Research Council (9/88-2/91)
Whiplash Analysis, Inc. (6/89-2/91)	Nat Inst Disab & Rehab Res-US DOE (10/89-1/91)
Univ.Wash. (sub - main Off. Naval Res.)(5/91-5/93)	Washington Hosp. Center (5/93- 4/95)
NRH/DOD (CUA sub) (10/95-9/99), "Assistive Technology Research Center"	
National Science Foundation (9/96-8/98, 1/99-12/00)	Whitaker Foundation (5/98 - 1/00);

NIDRR-DOE, RERC-Telerehab (10/98-1/00)

Nat Rehab Hosp / NIDRR-DOE (1/00 – 12/03)

Falk Foundation (11/01-10/06)

Whitaker Foundation (7/02-6/06)

NIDRR-DOE: RERC-Accessible Medical Instrumentation (11/02-10/08)

(Pending proposal to NIDRR)

Courses Taught (courses in bold taught at least 3 times)

Arizona State University:

BME 416/516: Biomechanics (3)

BME 518: Biomaterials (3)

BME 494: Biocontrol Sys. Microcomp. Lab (1)

BME 419/519: Biocontrol Systems (3)

BME 521: Neuromuscular Control Systems (3)

BME 599: Bioengineering Graduate Seminar (1)

Catholic University:

ENGR 191: Computer Graphics and Design (2)

BE 494: Biomedical Senior Design (3)

BE 528: Rehabilitation Engineering (3)

BE 728: Advanced Topics in Rehab Engineering (3)

BE 398: Junior Biomechanical Design (3)

BE 521: Neuromusculoskeletal Systems (3)

BE 535: Optimization of Human Performance (3)

Marquette University:

BIEN 001-002: Intro Biomed Engng Methods (2, 2)

BIEN 157/298: Intelligent Biosystems (3)

BIEN 167: Rehab Engng: Neurorehab/Telerehab (3)

BIEN 4931/5931: Bioengineering of Living Actuators (3)

BIEN 267: Principles Rehab Biosystems (3, team-taught)

HOPR 196 Design in Nature & Society (3) [honors program]

BIEN 155: Biomed Signals & Systems (4)

BIEN 168: Rehab Engng: Pros., Orthotics, Seating

BIEN 191: Biomechanical Design Lab (3)

BIEN 268: Modeling Rehab Biosystems (3)

Also: Supervisor for 26 past graduate students and for roughly 30 BME senior design team projects.