John A. Buford

The Ohio State University
Physical Therapy Division
306 Allied Medical Professions
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Education

University of Wisconsin, Madison, B.S.
1979 – 1984, Physical Therapy
University of California, Los Angeles, Ph.D.
1986 – 1991, Kinesiology

Selected continuing education

1987 – present	Annual Meeting, Society for Neuroscience
1986	The Cyriax Method, L Pare, CalPTA
1987	Cortext, the brain and behavior
1991	American Physical Therapy Association, Annual Meeting
1994, 95	Neural Control of Movement, Annual Meeting
1996	Japanese Physical Therapy Association, Annual Meeting
1999	Beth Israel / Deaconess Medical Center, Boston Cardiopulmonary Rehab.
2000	APTA Combined Sections, New Orleans, Annual Meeting

Current licensure and certification

Licensed Physical Therapist: Ohio (PT-08484)

Employment and positions held

Madison General Hospital, WI 5/80 - 8/80	P.T. Patient Transporter
Arbor View Nursing Home, Madison 9/82 - 6/83	Nursing Assistant
St. Luke's Hospital – Houston 6/84 - 8/84	P.T. Intern
The Methodist Hospital – Houston 8/84 - 10/84	P.T. Intern
Rehabilitation Institute of Chicago 10/84 - 8/86	Staff Physical Therapist

University of California, Los Angeles	Graduate Student Researcher, 9/86 - 9/91 Teaching Fellow, Teaching Assistant Consultant	
Cedars Sinai Medical Center, L.A.	Part-time, Per-diem P.T.	6/87 - 4/88
Daniel Freeman Memorial Hospital, L.A.	Per-diem Physical Therapist	2/89 - 10/91
University of California, Los Angeles	Post-Doctoral Researcher	9/91 - 11/91
University of Washington, Seattle	NIH Post-Doctoral Trainee	1/92 - 11/92
University of Washington, Seattle	Post-Doctoral Researcher	12/92 - 6/94
University of Washington, Seattle	Research Assistant Professor	7/94 - 12/98
The Ohio State University	Assistant Professor	1/99 - present

Publications

Peer-Reviewed Articles

Buford, J.A., J.L. Smith, and R.F. Zernicke. Adaptive control for backward quadrupedal walking. I. Posture and hindlimb kinematics. J. Neurophysiol. 64: 745-755, 1990.

Buford, J.A. and J.L. Smith. Adaptive control for backward quadrupedal walking. II. Hindlimb muscle synergies. J. Neurophysiol. 64: 756-766, 1990.

Buford, J.A. and J.L. Smith Adaptive control for backward quadrupedal walking. III. Stumbling corrective reactions and cutaneous reflex sensitivity. J. Neurophysiol. 70: 1102-1114, 1993

Perell, K.L., R.J. Gregor, J.A. Buford, and J.L. Smith. Adaptive control for backward quadrupedal walking. IV. Hindlimb kinetics during stance and swing. J. Neurophysiol. 70: 2226-2240, 1993.

Pratt, C.A., J.A. Buford, and J.L. Smith. Adaptive control for backward quadrupedal walking. V. Mutable activation of bifunctional thigh muscles. J. Neurophysiol. 75: 832-842, 1996.

Inase, M., J.A. Buford, and M.E. Anderson. Changes in the control of arm position, movement, and thalamic discharge during local inactivation in the globus pallidus in the monkey. J. Neurophysiol. 75: 1087-1104, 1996.

Buford, J.A., M. Inase, and M.E. Anderson. Contrasting locations of pallidal-receiving areas and microexcitable zones in primate thalamus. J. Neurophysiol. 75: 1105-1116, 1996.

Buford, J.A. A preliminary description of movement-related and preparatory activity in primate reticular formation. J. Japan. Physical Therapy Assn. 23: 456-466, 1996.

Chapters in Edited Books

Smith, J.L., J.A. Buford, and R.F. Zernicke. Constraints during backward walking in the quadruped. In: Posture and Gait: Development, Adaptation, and Modulation. Amblard, B., Berthoz, A., and Clarac, F. (eds.) Elsevier, Amsterdam, 1988, pp. 391-400.

Zernicke, R.F., K. Schneider, and J.A. Buford. Intersegmental dynamics during gait: Implications for Control. In: Adaptability of Human Gait: Implications for the Control of Locomotion. (A.E. Patla, ed.). Elsevier Science Publishers, Amsterdam, 1991, pp. 187-202.

Smith, J.L, J.A. Buford, C. Chen, T.V. Trank, O. Wang, and H.S. Wijesinghe. Multifunctional CPG for the control of different forms of cat locomotion. The Physiologist 36: A-22, 1993.

Anderson M.E., M. Inase, J. Buford, and R.S. Turner. Movement and

preparatory activity of neurons in pallidal-receiving areas of the monkey thalamus. In: Role of the Cerebellum and Basal Ganglia in Voluntary Movement. Mano, N., Hamada, I., and DeLong, M.R. (eds.) Elsevier, Amsterdam, 1993, pp. 163-170.
Anderson, M.E., J.A. Buford, and M. Inase. Pallidal output circuits in the thalamus. In: Functional Linkages between the Cerebral Cortex and Basal Ganglia in the Control of Voluntary Movement. Kimura, M. and Graybiel, A. (eds.) Springer-Verlag, Tokyo, 1995, pp. 136-151.
Anderson, M.E., Ruffo, M., Buford, J.A., and Inase, M. Pallidal and cortical determinants of thalamic activity. In: Basal Ganglia and Thalamus in Health and Movement Disorders, Kluver, New York, In Press

Abstracts and Conference Proceedings
Buford, J.A., J.L Smith, and R.F. Zernicke. Kinematics of backward and forward treadmill walking in normal cats. Soc. Neurosci. Abstr. 14: 261, 1988.
Buford, J.A., J.L Smith, and R.F. Zernicke. Hindlimb muscle synergies during backward walking in the cat. Soc. Neurosci. Abstr. 15: 392, 1989.
Buford, J.A., R.F. Zernicke, and J.L. Smith. Swing-phase dynamics and EMG during backward quadrupedal walking. J. Biomech. 22: 993, 1989.
Buford, J.A. and J.L. Smith. Responses to hind paw stimulation during backward and forward walking in cats. Soc. Neurosci. Abstr. 16: 890, 1990.
Chung, S.H., J.L. Smith, and J.A. Buford. Gait-related semitendinosus EMG patterns and kinematics for treadmill locomotion in cats. Soc. Neurosci. Abstr. 16: 890, 1990.
Buford, J.A., K. Schneider, and R.F. Zernicke. Intersegmental dynamics of the lower extremity during the swing phase of treadmill locomotion at walking and running speeds. Physical Therapy 71: (Suppl.) S95, 1991.
Buford, J.A. and J.L. Smith. Context, phase, and location dependent responses to hindpaw stimulation during the step cycle. Soc. Neurosci. Abstr. 17: 1225, 1991.
Perell, K.L., R.J. Gregor, M.M. Ryan, J.A. Buford, and J.L. Smith. Hindlimb stance kinetics during backward walking: unexpected findings. Soc. Neurosci. Abstr. 17: 1225, 1991.
Smith, J.L., S.H. Chung, and J.A. Buford. Quadrupedal gallop: the unstudied gait. Soc. Neurosci. Abstr. 17: 1225, 1991.
Buford, J.A. and J.L. Smith. Stumbling corrective reactions during backward and forward walking in cats. In: Posture and Gait: Control Mechanisms. Vol 1. (Woollacott, M and Horak, F.B, eds.), University of Oregon Books, Eugene, 1992, p. 40-43.
Perell, K.L., R.J. Gregor, J.A. Buford, and J.L. Smith. A comparison of the weight distribution between forelimbs and hindlimbs during forward and backward walking in the cat. In: Posture and Gait: Control Mechanisms. (Woollacott, M and Horak, F.B, eds.), University of Oregon Books, Eugene, 1992, pp. 412.
Buford, J.A., M. Inase, and M.E. Anderson. Microexcitable zones in thalamus are separate from pallidal-receiving areas. Soc. Neurosci. Abstr. 18(1): 692, 1992.
Inase, M., J.A. Buford, and M.E. Anderson. Changes in thalamic cell discharge after injection of muscimol into the globus pallidus. Soc. Neurosci. Abstr. 18(1): 692, 1992.
Pratt, C.A., J.A. Buford, and J.L. Smith. Mutable activation of bifunctional thigh muscles during backward and forward walking. Soc. Neurosci. Abstr. 18(2): 1555, 1992.
Buford, J.A. and M.E. Anderson. Preparatory and movement related activity of neurons in pallidal-receiving thalamus. Soc. Neurosci. Abstr. 19(2): 1585, 1993.
Buford, J.A., A. Sawczuk, and M.E. Anderson. Neural activity in the globus pallidus of the monkey during motor sequencing. Soc. Neurosci. Abstr. 21(1): 411, 1995.
Buford, J.A. Activity in the primate reticular formation during preparation and execution of skilled reaching. J. Japan. Physical Therapy Assn. 23,

suppl. 1, 1996.
Anderson, M.E., Dubach, M., and Buford, J.A. Local blockade of GABAergic inhibition in the putamen induces brief changes in pallidal discharge at restricted times. Soc. Neurosci. Abstr. 22(1): 415, 1996.
Buford, J.A. Preparatory motor activity in the reticular formation of the monkey during reaching. Soc. Neurosci. Abstr. 22(3): 1841, 1996.
Ruffo, M. and Buford, J.A. Reticular formation control of reaching in the monkey. Soc. Neurosci. Abstr. 23: 765, 1997.
Eaton, R.C., Buford, J.A., and Anderson, M.E. Task-related changes in neural activity in the globus pallidus of monkeys during sequence motor tasks. Soc. Neurosci. Abstr. 23(1): 466, 1997.
Anderson, ME, M. Dubach, M Ruffo, R Eaton, and JA Buford. Effects on motor behavior of dopamine antagonists applied locally in the putamen of awake monkeys. Soc. Neurosci. Abstr. 24: 1650, 1998.
Lin. FM, Kr Bell, JA Buford, and ME Anderson. The control of repetitive bimanual index movements and the influence of external timing signal in Parkinson's disease. Soc. Neurosci. Abstr. 24: 1664, 1998.
Buford, J.A. Motor Outputs of the Primate Reticulospinal system. Soc. Neurosci. Abst, 25, 1999.

Grants

9/90-8/91 "Control of cutaneous reflexes during backward and forward walking in cats and related studies in intersegmental dynamics for cats and humans"
John A. Buford, P.I., Judith L. Smith, Graduate Advisor (UCLA)
Doctoral Award from the Foundation for Physical Therapy
Total: $4,240

7/94-6/99 "Reticular Formation Control of Reaching"
John A. Buford, P.I., Marjorie E. Anderson/Bradford Stokes, Sponsors
Clinical Investigator Development Award from NINDS
5-year Total Direct Costs: $346,130

6/1/95—5/31/97 “Analysis of Basal Ganglia Output”
Marjorie E. Anderson, P.I., John Buford and Mark Dubach, Co-Investigators
R01 from NINDS
1997-98 Total Direct Costs: $174,312

7/99-6/03 “Reticulospinal Control of Reaching” (active)
John A. Buford, P.I.
R01 from NINDS
1999-2000 Total Costs: $233,036
4-year total: $931,030

Professional organizations

Society for Neuroscience	1988 - present
Society for Neural Control of Movement	1995
American Physical Therapy Association	85,87,89-90,99-

Professional service related activities

1993 – present: ad-hoc Peer Reviewer, Journal of Neurophysiology

1994 – present: ad-hoc Peer Reviewer, Neuroscience Letters
Plus occasional ad-hoc reviews for Trends in Neuroscience and Experimental Brain Research
1996: Panelist, NIH NCMRR consensus conference, Gait Analysis In Rehabilitation Medicine

National presentations

4/95 Activity in primate globus pallidus during motor sequencing. Poster presentation at Neural Control of Movement, with M.E. Anderson and A. Sawczuk.
4/94 Reaction times differ for movement sequences made with and without targets visible prior to movement. Poster presentation at Neural Control of Movement, with M.E. Anderson.
4/93 Corticothalamic inputs may heavily influence thalamocortical neurons in pallidal receiving thalamus, Poster presentation at Neural Control of Movement, with M.E. Anderson.
The titles of 23 other national presentations are presented in the abstracts

International presentations

5/96 Preparatory activity in the primate reticular formation during skilled reaching. Invited presentation at the annual conference of the Japanese Physical Therapy Association.
5/96 Trends in Physical Therapy in the USA. Invited presentation repeated at four leading PT schools throughout Japan

Service to the university / college / school

1997 – 1998: Human Motion Analysis Committee, Univ. Wash. Dept. Rehab Medicine
1997 – 1998: P.T. Advisory and Evaluation Committee, Univ. Wash. Dept. Rehab Medicine
1999-present: Honors and Research Committee, OSU School Allied Medical Professions

Teaching

Spring 94 – 98 Biomechanics of Normal Human Locomotion: (UW REHAB 442, Guthrie) A series of 5 1.5 hr. lectures on terminology, kinematics, kinetics, development, and neural control of walking.

Spring 97-98 Biomechanics of Muscle (UW REHAB 442, Guthrie). A pair of 1.5 hour lectures on muscle physiology and biomechanics of muscle.

Spring 97-98 Biomechanics of Pathological Gait: (UW REHAB 442, Guthrie). A pair of lectures on biomechanics of common pathological gait

patterns in orthopedic and neurological impairments.

Spring 98 Biomechanics of Reaching (UW REHAB 442, Guthrie). A pair of lectures on reaching for prehension and functional mobility.

Summer 96 Therapeutic Exercise I. (UW REHAB 471, Buford and Kartin).

Summer 97-98: Therapeutic Exercise I (UW REHAB 471, Buford).

Winter 99: Medical Kinesiology (OSU PT 495, Chidley, Buford, Heiss): 6 1-hour lectures, 2 2-hour labs on biomechanics of normal and pathological gait.

Winter 99: Special Topics in Physical Therapy (OSU PT 693, 1 credit, Staff) guided study of selected in the professional physical therapy literature, 1 hour per week.

Spring 99: Cardiopulmonary Physical Therapy (OSU PT 560, 3 credits, Buford).

Spring 99: Special Topics in Physical Therapy (OSU PT 1 credit, 693, Staff) guided study of selected in the professional physical therapy literature, 1 hour biweekly.

Spring 99: Special Topics in Physical Therapy (OSU PT 693, Staff) guided study of selected in the professional physical therapy literature, 1 hour biweekly.

Winter 00: Medical Kinesiology (OSU PT 495, 5 credits, Chidley, Buford): 16 1-hour lectures, assisted with all 9 labs, leading 4.

Winter 00: Special Topics in Physical Therapy (OSU PT 693, 1 credit, Staff) guided study of selected in the professional physical therapy literature, 1 hour biweekly.

Spring 00: Cardiopulmonary Physical Therapy (OSU PT 560, 3 credits, Buford).

Spring 00: Special Topics in Physical Therapy (OSU PT 693, Staff) guided study of selected in the professional physical therapy literature, 1 hour biweekly.

Miscellaneous Contributions

Spring 1990: Neural Control of Movement (UCLA KINES 260, Smith): Electrophysiology of microstimulation in the motor cortex.

Fall 1992: Therapeutic Exercise II (UW REHAB 472, Trotter): “Neural Control of Locomotion,” 1 lecture on central pattern generation and spinal cord control of locomotion.

Spring 1993: Kinesiology (UW REHAB 442: Guthrie): 2 lectures on neural control and biomechanics of walking”

1995-1998: Freshman Seminar (UW General Studies 197, Dietz): “Do you know how you move?” Introduction to Physical Therapy and a demonstration of a kinesthetic illusion.

Winter 1996: Neurophysiological Topics in Rehabilitation Medicine (UW REHAB 522, Anderson): “Cortical Control of Movement”, selected readings in

neurophysiology.

Fall 1997: Careers in Physical Therapy. UW Educational Outreach Program.

Winter 1997: Physical Therapy Seminar (UW REHAB 513B, Kartin): "Neural Control of Locomotion," Selected graduate readings in basic neurophysiology for PT and OT graduate students.

Winter 1997: Motor Systems II (UW PBIO 542, Anderson, Fuchs):

"Intersegmental Dynamics: Implications for Control," Selected readings in biomechanics and neurophysiology.

Winter 1998: UW NEUBEH 565: "Neural Control of Motor Sequencing." Selected readings in the primary research literature for guided study of graduate students in the Neurobiology and Behavior Program. Four 1.5-hour seminars.

Winter 99: Dependency Small Group Session (OSU MED 661, Medical Humanities), led small group discussion of chemical dependency.

Winter 99: Research in Allied Medicine (OSU PT 695): Guided problem solving in research, 2 1-hour session in a team.

Spring 99: Management in Physical Therapy (OSU PT 510.03, Williams) Assisted students with problem-based learning in management projects.

Winter 00: Advanced topic in neurological physical therapy (Nichols, PT730). Led a three-hour seminar on the role of higher centers in normal and abnormal motor control.

Winter 00: Violence Small Group Session (OSU MED 661, Medical Humanities), led small group discussion of domestic violence and related problems faced by medical practicioners.

Spring 00: Management in Physical Therapy (OSU PT 510.03, Williams) Assisted students with problem-based learning in management projects.

Teaching Assistant Experience

1987-90 3 quarters, Kinesiology 126: Neural Bases of Movement, UCLA

1987 1 quarter, Kinesiology 13: Human Anatomy Laboratory, UCLA

1990 1 quarter, Kinesiology 299: Teaching Practicum for T.A.s, UCLA

Thesis, Research Student Supervision

6/95-8/95 Research mentor for Mr. James Locatelli, MSRTP, "Eye movements during preparation for reaching in primates", Accepted as ISMS project and rated as Excellent 3/25/96

7/95 – present: M.S. Committee for Nancy Haney, M.S. P.T. candidate, "Effect of gastrocnemius strengthening on spasticity and ambulation in children with diplegic cerebral palsy," Approved by Committee 3/2/98, Collecting data Summer 1999, Univ. Washington.

Fall 97 Gretchen Garside, REHAB 499 (1 cr), Undergraduate Research Project, "Annotated Bibliography of Selected Readings in Biomechanics of Locomotion."

Spring 98 Kim Helpenstell, REHAB 497 (1 cr), Undergraduate Reading Seminar, Directed readings on primate neurophysiology in preparation for a summer research experience

Spring 96 - Fall 98, Mitch Roitman, Ph.D. Neurobiology candidate, assisted Mr. Roitman in developing the apparatus and technique for neural recording in the ventral tegmental area of the rat during feeding.

Spring 00. Stephanie Moran, AM699 (1 cr), Led an undergraduate research project to illustrate the EMG of rapid, aimed arm movements in a human subject, culminating in a short research report written by the student.

Spring 00 – present. M.S. committee for Mr. Divid Fitch, M.S. candidate in PT: validity and reliability of treatment-based classification of low back pain.

Summer 00 – present: Ph.D. adviser for Mr. Adam Davidson, Ph.D. candidate in Neuroscience, topic to be determined.

HONORS

Doctoral Award from the Foundation for Physical Therapy
9/90 - 6/91