

CURRICULUM VITAE (Spring, 2017)

Alison Lynn McKenzie, PT, M.A., DPT, Ph.D.
Professor of Physical Therapy
Department of Physical Therapy
Crean College of Health and Life Science
Harry and Diane Rinker Campus
Chapman University
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Irvine, CA 92618
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Education: Chapman University
Orange, CA
2008-2012
Doctor of Physical Therapy (DPT)
Transitional Doctor of Physical Therapy Program, 2012

University of California, Berkeley and San Francisco
Berkeley, CA and San Francisco, CA
1990-1991
Postdoctoral Fellowship in Anatomy

University of California, Berkeley
Berkeley, CA
1990
Ph.D. in Anatomy, Dissertation: Enriched Environment: A model for studying the effects of rehabilitation on neural recovery following motor cortical lesioning.

University of California, Berkeley
Berkeley, CA
1987
M.A. in Anatomy
Thesis: The effects of enriched environment on the motor cortex of 906-day-old Long-Evans rats.

University of Utah
Salt Lake City, UT
Graduate school prerequisite coursework, 1982-1983

University of Utah
Salt Lake City, UT
1977-81
B.S. in Physical Therapy (magna cum laude)

Licensure Information/Registration Number:

Physical Therapist; State of California, Board of Medical Quality Assurance,
Examination in Physical Therapy (# 12126)

Employment and Positions Held:

Academic
Professor of Physical Therapy (100% time)
From 1995 to 2007 (tenured 2001; full professor 2007)
Chapman University
Orange, CA

Project Scientist (2011-present)
Department of Neurology
University of California
Irvine, CA

Visiting Researcher (2009-2011)
Department of Neurology
University of California
Irvine, CA

Assistant Clinical Professor of Physical Therapy (Without salary)
University of California
San Francisco, CA
From 1995 to 2008

Assistant Clinical Professor/Assistant Professor of Physical Therapy (25%-100% time)
University of California
San Francisco, CA
From 1987 to 1995

Graduate Student Instructor
University of California
Berkeley, CA
From 1983 to 1987

Graduate Anatomy Tutor
University of California
Berkeley, CA
From 1985 to 1986

Physiology Course Reader
University of California
Berkeley, CA
1984

Non-academic

Independent and *Pro Bono* Practice
From 1981-present

Physical Therapist (Per Diem)
Hillhaven/Vencor/Tenet
San Diego, CA
From 1995 to 1999

Physical Therapist (Per Diem)
Pace/Symphony Rehab
San Diego, CA
From 1994 to 1995

Physical Therapist (Per Diem)
Laguna Honda Hospital
San Francisco, CA
From 1993 to 1994

Physical Therapist (Contracting)
Rehabilitation Health Services/Sutter Corporation
San Diego, CA
From 1991 to 1994

Director of Rehabilitation
Hillhaven Convalescent Hospitals
Hayward, Castro Valley, and San Leandro, CA
From 1987 to 1988

Physical Therapist (Per Diem)
Alta Bates/Herrick Hospital

Berkeley, CA
From 1984 to 1991

Physical Therapist (Per Diem)
Providence Hospital
Oakland, CA
1984

Physical Therapist (Contracting)
Pacific Industrial Medical Clinic
Burlingame, CA
1984

Physical Therapist (Per Diem)
Adams Physical Therapy
Bountiful, UT
From 1981 to 1983

Staff Physical Therapist
Lakeview Hospital
Bountiful, UT
From 1981 to 1983

Peer Reviewed Publications:

Byl NN, **McKenzie AL**, Longaker MT, West Judith, Stem R: "Application of hyaluronic acid enhances early healing in incisional wounds," *European Journal of Physical Medicine & Rehabilitation*, vol 2: 184-189, 1992.

Byl, Nancy, **McKenzie, Alison**, West, Judith, Whitney, JoAnn, Hunt, Thomas, and Scheuenstruh, Heinz: "Low dose ultrasound effects on wound healing: A controlled study with Yucatan pigs," *Archives of Physical Medicine and Rehabilitation*, 3: 656-664, 1992.

Byl N, **McKenzie A**, Longaker M, West J, Stem R: "Amniotic fluid enhances wound healing: a randomized controlled three week trial in mini Yucatan pigs, " *European Journal of Physical Medicine & Rehabilitation*, 3: 105-113, 1993.

Byl, Nancy, **McKenzie, Alison**, Halliday, Betty, Wong, Theresa, O'Connell, John: The Effects of phonophoresis with corticosteroids: A controlled pilot study, "*Journal of Orthopedic and Sports Physical Therapy*, 18: 590-600, 1994.

Byl, Nancy, **McKenzie, Alison**, Wong, Theresa, West, Judith, Hunt, Thomas: "Incisional wound healing: A Controlled study of low and high dose ultrasound," *Journal of Orthopedic and Sports Physical Therapy*, 18: 619-628, 1994.

Byl, Nancy, **McKenzie, Alison**, West, Judith, Whitney, JoAnn, Hunt, Thomas, Williams, Harriet, and Scheunestuhl, Heinz. "Pulsed microamperage stimulation: The effects of microamperage galvanic simulation on wound healing," *Physical Therapy*, 74: 201-213, 1994.

Westmark R, Aihara N, Noble L, and **McKenzie A**, "Intrathecal administration of endothelin- I in the rat:: Impact on spinal cord blood flow and the blood-spinal cord barrier," *Neuroscience Letters*, March, 1995.

McKenzie AL, Hall JJ, Aihara N, Noble LJ, "Immunolocalization of endothelin in the traumatized spinal cord: relationship to blood-spinal cord barrier breakdown," *Journal of Neurotrauma*, 12: 257-268, 1995.

Byl N, Wilson F, Merzenich M, Melnick M, Scott P, Oakes A, and **McKenzie A**: "Sensory dysfunction associated with repetitive strain injuries of tendinitis and focal hand dystonia: A comparative study, "*Journal of Orthopedic and Sports Physical Therapy* 23: 235-244, 1996.

Byl N, Hamati D, Melnick, M, Wilson F, and **McKenzie A**, " The sensory consequences of

repetitive strain injuries of tendinitis and focal hand dystonia. *J of Back and Musculoskeletal Rehabilitation* 7: 27-39, 1996.

Byl N, **McKenzie A**, and Nagarajan S. "Effect of sensory discrimination training on structure and function in a musician with focal hand dystonia," *Physical Therapy Case Reports*; 3: 94-111, 2000.

Byl N, **McKenzie A**, and Nagarajan S. "Differences in somatosensory hand organization: healthy flutist and flutist with focal hand dystonia," *J of Hand Therapy*, October-December, 13:302-309, 2000.

Byl N, and **McKenzie A**. "Treatment effectiveness of patients with a history of repetitive hand use and focal hand dystonia: a planned, prospective, follow-up study," *J of Hand Therapy*, October -December, 13:289-301, 2000

Byl N, Merzenich M, Roberts T, Nagarajan S, and **McKenzie A**. "Correlation of clinical neuromusculoskeletal and central somatosensory performance: variability in controls and patients with focal hand dystonia," *Neuroplasticity*, 9(3):177-203, 2002.

McKenzie A, Nagarajan S, Roberts T, Merzenich M, Byl N. "Somatosensory representation of the digits and clinical performance in patients with focal hand dystonia," *Am J of Physical Med and Rehab*, 82(10):737-749, 2003.

Byl N, Nagarajan S, **McKenzie A**. "Effect of sensory discrimination training on structure and function in patients with focal hand dystonia: a case series," *Archives of Physical Medicine*, 84(10):1505-1514, 2003.

McKenzie A, Gutierrez B. "The Varied-Integrative-Progressive (VIP) model for anatomical instruction in physical therapist education," *Journal of Physical Therapy Education*. 2007; 21 (2): 17-28.

Invited manuscript:

McKenzie A, Goldman S, Barrango C, Shrimme M, Wong T, Byl N. "Differences in physical characteristics and response to rehabilitation for patients with hand dystonia: Musicians' Cramp compared to Writers' Cramp," special issue of the *J of Hand Therapy*, 22:172-82; 2009.

Invited manuscript:

Byl N, Archer E, **McKenzie A**. Focal hand dystonia: "Effectiveness of a home program of fitness and learning-based sensorimotor and memory training," special issue of the *J of Hand Therapy*, 22:183-98; 2009.

Invited book chapter on pain:

McKenzie A. Pain Science, Section I, Rehabilitation Clinical Advisor (Brechtel, J, Sueki D, editors), Elsevier, 2009.

See J, Der-Yeghiaian L, Chou C, Chan V, **McKenzie A**, Reinkensmeyer D, Cramer SC. A standardized approach to the Fugl-Meyer assessment and its implications for clinical trials. *Neurorehabilitation and Neural Repair*. 2013; 27: 732.

Burke E, Dodakian L, See J, **McKenzie A**, Riley JD, Le V, et al. A multimodal approach to understanding motor impairment and disability after stroke. *Journal of Neurology*. 2014;261(6):1178-86.

Burke Quinlan E, Dodakian L, See J, **McKenzie A**, Le V, Wojnowicz M, Shahbaba B, Cramer SC. Neural function, injury, and stroke subtype predict treatment gains after stroke. *Ann Neurol*. 2015 Jan;77(1):132-45.

Wu J, Quinlan EB, Dodakian L, **McKenzie A**, Kathuria N, Zhou RJ, Augsburg R, See J, Le VH, Srinivasan R, Cramer SC. Connectivity measures are robust biomarkers of cortical function and plasticity after stroke. *Brain*. 2015;138:2359-6.

Mousavi Hondori H, Khademi M, Dodakian L, **McKenzie A**, Lopes CV, Cramer SC.

Choice of Human-Computer Interaction Mode in Stroke Rehabilitation. *Neurorehabil Neural Repair*. 30: 258-265; 2016.

Dewanjee P, Tran G, Stewart J, Quinlan E, Dodakian L, **McKenzie A**, See J, and Cramer S. Role of corpus callosum integrity in arm function differs based on motor severity after Stroke. *Neuroimage: Clinical*. 2017; 14: 641-647.

McKenzie A, Dodokian L, See J, Le V, Burke E, Bridgford C, Head D, Abraham J, Meng L, Han V, Cramer S. The Validity of Robot-based Assessments of Upper Extremity Function, in press, *Archives of Physical Medicine and Rehabilitation*, 2017. (DOI: <http://dx.doi.org/10.1016/j.apmr.2017.02.033>)

Dodakian L. **McKenzie A**, Le V. See J. Pearson Fuhrhop K, Quinlan E, Zhou R, Augsberger R, Tran X, Cramer S. A home-based telerehabilitation program for patients with stroke. In revision for: *Neurorehabilitation & Neural Repair*, spring, 2017.

Scacchi W, Dodakian L, Le V, **McKenzie A**, Cramer S. Smart Stroke Telerehabilitation: Problems and Practical Solutions. In submission to *IEEE Software*, spring, 2017.

In preparation:

Mahraj S Didlake D, Mahraj S, **McKenzie A**. A systemic review of upper extremity robotic therapy interventions in persons with stroke. In preparation for submission to the *J of Neurologic Physical Therapy*, 2017.

McKenzie A, Shibuya K, Burke E, Dodakian L, See J, Cramer S. The Use of Voxel-Based Lesion Symptom Mapping to Relate Lesion Location to Motor Performance in Chronic Stroke Survivors. In preparation for *Neuro Image*, 2017.

McKenzie A, Mendoza J, Martinez R, Pagador L. Stroke Boot Camp: A model for community-based, intensive, interdisciplinary rehabilitation for chronic stroke survivors. In preparation for *Physical Therapy Journal*, 2017.

Mousavi Hondori H, Khademi M, Dodakian L, **McKenzie A**, Lopes CV, Scacchi W, Cramer SC. Augmented Reality upper extremity training and cortical connectivity post-stroke (data analysis in progress).

Current Projects: (data collection in progress)

McKenzie A, Razeghian J, Lopez J, Beuttler R, Grant-Beuttler M. The Kinematics of Tele-rehabilitation.

Wu J, Dodakian L, See J, Le V, **McKenzie A**. Cramer S. Robot-based therapy for upper extremity neurorecovery post-stroke.

Cramer S et al. Multi-site clinical trial of intensive Telerehabilitation vs. intensive In-Clinic therapy post-stroke.

Invited chapter,

Byl N., Kretchmer J., **McKenzie A**. In: Skirven: Rehab of the Hand & Upper Extremity, 7/e, Elsevier.

Published Abstracts of Peer Reviewed Presentations:

McKenzie A and Byl, N. "Somatotopic Changes in Patients with Occupational Hand Cramps: Magnetic Source Imaging," California Chapter, American Physical Therapy Association Annual Conference, October, 1998.

Byl N, **McKenzie A**, Nagarajan S, Blake D, Merzenich M. "Somatosensory changes in patients with focal hand dystonia as measured by MSI," *Society for Neuroscience Abstracts*, 1999.

McKenzie A, and Byl N. "Somatosensory changes in patients with focal hand dystonia measured with magnetic source imaging," Combined Sections Meeting, American Physical Therapy Association, 1999.

McKenzie A, Nagarajan S, Byl N. "Sensory discriminative retraining modifies the

somatosensory hand representation: a musician with focal hand dystonia," *Society for Neuroscience Abstracts*, 1999.

Byl NN, Nagarajan S, and **McKenzie A**. Effect of sensorimotor training on structure and function in three patients with focal hand dystonia, *Society for Neuroscience Abstracts*, 2000.

McKenzie, A. Integrating basic and applied neuroscience with professional development issues in graduate physical therapy education, *Society for Neuroscience Abstracts*, 2000.

McKenzie A. "Anatomy of the Thoracic Spine and Rib Cage," invited presentation, California Chapter of the American Physical Therapy Association Annual Conference Program Abstracts, October 2000.

Wegmann E, Anderson K, Sweaner J, **McKenzie A**, and Brechter J. "The effect of therapeutic stretching on persons with postural abnormalities," American Physical Therapy Association Annual Conference, 2001.

Byl N and **McKenzie A**. Variations in somatosensory evoked potentials (SEPs) following sensory stimulation to the hand: patients with focal hand dystonia, *Society for Neuroscience Abstracts*, 2001.

Byl N, Nagarajan S, and **McKenzie A**. "Somatosensory evidence as a basis for validating the selection of PT intervention: Patients with focal hand dystonia," Combined Sections Meeting, American Physical Therapy Association, 2002.

McKenzie A, Shrimm M, Barrango C, Wong T and Byl N. Differences in clinical parameters between writers and musicians with focal hand dystonia, *Society for Neuroscience Abstracts*, 2004.

Vuong A, McKenzie A, Brechter JH. Comparison of posture, range of motion, and shoulder pain between volleyball players and non volleyball players. *JOSPT* 35(1):A32, 2005.

Byl N, Nagarajan S, **McKenzie A**. The effects of learning based sensorimotor retraining on structure and function in three musicians with focal hand dystonia, Proceedings of the APTA III Step Conference, 2005.

McKenzie AL, Eidal SA, Talavera KE, Womack WR, and Byl NN. The effects of one month of sensorimotor retraining on individuals with focal hand dystonia and normal, healthy controls. Combined Sections Meeting of the APTA, 2006.

McKenzie AL and Gutierrez B. The Varied-Integrative-Progressive (VIP) Model for anatomical instruction in a Doctor of Physical Therapy Program. Combined Sections Meeting of the American Physical Therapy Association, 2007.

Byl NN, Archer E, Nagarajan S, Webster R, and McKenzie AL. Focal Hand Dystonia: Effectiveness of learning based training (Home training with and without PT supervised practice), California Physical Therapy Annual Conference, 2007.

McKenzie A and Byl N. The effects of a comprehensive sensorimotor retraining program on individuals with focal hand dystonia vs. normal control participants. *Society for Neuroscience annual conference*, 2008.

McKenzie A, Brechter J, Tominaga D, Adamson K, Hatten K, McGovern J. Using admission criteria to predict academic success in a DPT program. Combined Sections Meeting of the American Physical Therapy Association, February, 2009.

McKenzie A and Byl N. Hand dominance vs. side of involvement in individuals with writer's cramp or musician's cramp forms of focal hand dystonia, poster presentation, *Society for Neuroscience annual conference*, 2009.

Invited presentation (1/2 day):

McKenzie A. Putting a Little Life into a "Dead" Science: New perspectives on Teaching Anatomy, American Physical Therapy Association Annual Conference, 2010.

McKenzie A, Der-Yeghiaian L, See J, Nguyen D, Le V, Cramer S. Predicting and Detecting Arm Motor Gains in a Trial of Robotic Therapy, poster presentation, *International Stroke*

Conference of the American Heart Association, 2011.

McKenzie, A, Der-Yeghiaian L, See J, Le V, Cramer S. A robot-based assessment of upper extremity function is valid and may be useful for tele-outcomes after stroke. International Stroke Conference of the American Heart Association, 2013.

Burke E, Der-Yeghiaian L, Riley J, **McKenzie A**, Le V, Cramer S. Neural systems injury provides insight into individual behaviors while global injury is useful for global outcome in chronic stroke. International Stroke Conference of the American Heart Association, 2013.

Shibuya K, Burke E, **McKenzie A**, Cramer SC. Relationship Between Lesion Location and Motor Performance in Chronic Stroke Survivors Using Voxel-Based Lesion Symptom Mapping (VLSM), accepted for Poster Presentation, APTA Combined Sections Meeting, 2013.

Stewart J, Quinlan E, Dodakian L, **McKenzie A**, See J, Cramer S. Effective Connectivity during paretic hand movements after stroke: effect of side of brain damage. Organization for Human Brain Mapping (OHBM) Annual Meeting, 2014.

Khademi, Maryam, Hossein Mousavi Hondori, **Alison McKenzie**, Lucy Dodakian, Cristina Videira Lopes, and Steven C. Cramer. "Free-hand interaction with leap motion controller for stroke rehabilitation." In *CHI'14 Extended Abstracts on Human Factors in Computing Systems*, pp. 1663-1668. ACM, 2014.

Khademi, Maryam, Hossein Mousavi Hondori, **Alison McKenzie**, Lucy Dodakian, Cristina Videira Lopes, and Steven C Cramer. "Comparing direct and indirect interaction in stroke rehabilitation." In *CHI'14 Extended Abstracts on Human Factors in Computing Systems*, pp. 1639-1644. ACM, 2014.

Stewart JC, Dewanjee P, Quinlan EB, Dodakian L, **McKenzie A**, See S, Cramer S. Relationship between M1-M1 coupling during paretic hand movement and corpus callosum integrity after stroke. To be presented at the Society for Neuroscience Annual Meeting, 2014.

Selected for moderated featured oral presentations:

Shibuya K, Burke E, Dodakian L, See J, Cramer S, McKenzie A. The Use of Voxel-Based Lesion Symptom Mapping to Relate Lesion Location to Motor Performance in Chronic Stroke Survivors. International Stroke Conference, San Diego, CA 2014 (moderated oral presentation)

Dodakian L, **McKenzie A**, Burke E, See J, Zhou R, Augsberger R, Cramer S. A Home-Based Telerehabilitation System for Patients With Stroke. International Stroke Conference, San Diego, CA 2014 (moderated oral presentation)

Wu J, Kathuria N, Burke E, Dodakian L, See J, **McKenzie AL**, Srinivasan R, Cramer SC. Cortical connectivity is a powerful predictor of motor recovery in chronic stroke. International Stroke Conference, San Diego, CA 2014 (moderated oral presentation)

Khademi M, **McKenzie A**, Dodakian L, Lopes CV, Cramer S. Utility of Augmented Reality in Relation to Virtual Reality in Stroke Rehabilitation. International Stroke Conference, San Diego, CA 2014 (moderated oral presentation)

Burke E, Dodakian L, See J, Riley JD, **McKenzie A**, Le V, Cramer S. Different Predictors of Treatment Gains in Lacunar and Non-lacunar Stroke. International Stroke Conference, San Diego, CA 2014 (moderated oral presentation).

Stewart JC, Dewanjee P, Quinlan EB, Dodakian L, **McKenzie A**, See J, Cramer SC. Relationship between M1-M1 coupling during paretic hand movement and corpus callosum integrity after stroke. In submission for Society for Neuroscience Annual Meeting, 2014.

Stewart JC, Quinlan EB, Dodakian L, **McKenzie A**, See J, Steven C. Cramer S. Role of Contralesional Hemisphere during Paretic Hand Movement Differs Based on Level of Motor Impairment. Platform Presentation, International Stroke Conference, 2015.

Dewanjee P, Tran G, Stewart JC, Quinlan EB, Dodakian L, **McKenzie A**, See J, Cramer S. Structural Integrity of the Corpus Callosum Correlates with Sensorimotor Impairment after Stroke. International Stroke Conference Platform Presentation, 2015.

Stewart J, Burke Quinlan E, Dodakian L, **McKenzie A**, See J, Cramer S. Effective Connectivity during Paretic Hand Movements after Stroke: Effect of Side of Brain Damage. Poster presentation, Organization for Human Brain Mapping Annual Conference, 2015.

Mahraj S, Didlake, D, **McKenzie, A**. A Systematic Review of Upper Extremity Robotic Therapy Interventions in Persons with Stroke. American Physical Therapy Association, Combined Sections Meeting, 2016.

Wu J, Dodakian L, See J, Burke Quinlan E, Meng Le V, **McKenzie A**, Cramer S. Recovery varies across ICF dimensions in robot-based therapy after stroke. Abstract submission for Association for Academic Psychiatrists annual meeting, 2017

Zhou, R, Ingemanson M, Choi, J, Wu K, Kaur A, Frani F, Yand D, Katur N, Cassiday J, Scacchi W, Dodakian L, **McKenzie A**, Lopes C, Cramer C. Targeted Training of motor-pareital circuit improves its behavioral output. International Stroke Conference, 2017.

McKenzie, Alison; Grant-Beuttler, Marybeth; Beuttler, Richard; See, Jill; Razeghian, Justin; Lopez, Jazmin; Le, Vu, Cramer S. Kinematic Analysis of a Game-Based Telerehabilitation System for Post-Stroke Upper Extremity Recovery. In submission for the Combined Sections Meeting, American Physical Therapy Association, 2018.

Peer Reviewed Scientific and Professional Presentations (those not previously cited above under abstracts):

Pham H, Immel K, Martin A, **McKenzie A** PT, PhD, Der-Yeghianian L, See J, Cramer SC. Robot-Assisted Hand Motor Therapy Improves Function in Subjects with Hemiparetic Stroke. Schmid College of Science Research Fair, Chapman University, 2012.

Fitzgerald HM, Pagador LP, Geller MT, Alonas AM, Brechter JH, **McKenzie AL**. The Effects of an Intensive, Inter-Disciplinary Therapy Program on Individuals with Chronic Stroke (Stroke Bootcamp). Schmid Science Research Forum, Chapman University, 2012.

McKenzie A and Der-Yeghiaian. Hand Wrist Robotic Device (HWRD) Trial. Orange County Stroke Rehabilitation Network Seminar, 2011.

Invited presentation (1/2 day):

McKenzie A. Functional Anatomy Review of the Upper Extremity, Kaiser Permanente Hand Therapy Fellowship Program, 2011.

Didlake D and **McKenzie A**. A Systematic Review of Upper Extremity Robotic Therapy Interventions in Persons with Stroke. Presented at the Schmid College of Science Forum, Chapman University, 2011.

McKenzie A. Functional Anatomy Review of the Upper Extremity, Kaiser Permanente Hand Therapy Fellowship Program, 2010.

Byl NN, Archer E, and **McKenzie AL**. Focal Hand Dystonia: Intensive Sensorimotor Training, California Physical Therapy Annual Conference, 2007.

McKenzie A. Functional Anatomy Review of the Upper Extremity, Kaiser Permanente Hand Therapy Fellowship Program, 2007.

McKenzie AL and Gutierrez B. The Varied-Integrated-Progressive (VIP) Model for Anatomical Instruction in a Doctor of Physical Therapy Program, accepted for the Combined Sections Meeting, American Physical Therapy Association Annual Conference, 2007.

McKenzie A. Functional Anatomy Review of the Upper Extremity, Kaiser Permanente Hand Therapy Fellowship Program, 2006.

McKenzie AL, Eidal SA, Talavera KE, Womack WR, and Byl NN. The effects of one month of sensorimotor retraining on individuals with focal hand dystonia and normal, healthy controls. Combined Sections Meeting of the APTA, 2006.

McKenzie A. Invited speaker: "Sensorimotor retraining for focal hand dystonia and repetitive strain injuries," Board of Trustees Meeting, Chapman University, 2005.

Byl N, Nagajaran S, **McKenzie A.** The effects of learning based sensorimotor retraining on structure and function in three musicians with focal hand dystonia, Proceedings of the APTA III Step Conference, 2005.

McKenzie A. Invited speaker: Faculty Development, Combined Sections, APTA Annual Meeting, 2005.

Vuong A, **McKenzie A**, Brechter JH. Comparison of posture, range of motion, and shoulder pain between volleyball players and non volleyball players. *JOSPT*, 35(1):A32, 2005.

McKenzie A. Functional Anatomy Review of the Upper Extremity, Kaiser Permanente Hand Therapy Fellowship Program, 2005.

McKenzie, AL, Cindy Barrango, Elizabeth Coulter, Sam Ith, Rahsaunia Johnson, Maria Shrime, Tricia Wong, and Nancy Byl. The effects of sensorimotor retraining on musicians and writers with focal hand dystonia, CAPTA Annual Conference, 2004.

McKenzie A, Shrime M, Barrango C, Wong T and Byl N. Differences in clinical parameters between writers and musicians with focal hand dystonia, Society for Neuroscience Abstracts, 2004.

McKenzie A and Ferdig S. The Forgotten Foundation of the Cervical Spine: Segmental Awareness and Control. One day pre-conference course, California Physical Therapy Association Annual Conference October, 2004.

McKenzie A. "Sensorimotor retraining for Focal Hand Dystonia: Implications and Applications," Dystonia Support Group, San Diego, CA 2004.

McKenzie A. Functional Anatomy Review of the Upper Extremity, Kaiser Permanente Hand Therapy Fellowship Program, 2004.

McKenzie A. Anatomy of the Hand and Forearm, South Coast Hand Therapy Clinic, 2003.

McKenzie A. "How to prevent movement disorders," Chapman University-University of California at Irvine Mini Medical School Seminar, 2003.

McKenzie A. "Focal hand dystonia and its relationship to repetitive strain injuries," Science Forum, Chapman University, April 2002.

Byl N and **McKenzie A.** "Prevention of repetitive strain injuries in musicians," Music Teachers Association Conference, San Diego, CA, 2002.

Byl N, Nagarajan S, and **McKenzie A.** "Somatosensory evidence as a basis for validating the selection of PT intervention: Patients with focal hand dystonia," Combined Sections Meeting, American Physical Therapy Association, 2002.

Wegman E, Anderson K, Parker J, **McKenzie A**, Brechter J. The effect of stretching on persons with postural abnormalities, American Physical Therapy Association, 2001.

Byl N and **McKenzie A.** Variations in somatosensory evoked potentials (SEPs) following sensory stimulation to the hand: patients with focal hand dystonia, Society for Neuroscience Annual Conference, 2001.

McKenzie, A. Integrating basic and applied neuroscience with professional development issues in graduate physical therapy education, Society for Neuroscience Annual Conference, 2000.

Byl NN, Nagarajan S, and **McKenzie A.** Effect of sensorimotor training on structure and function in three patients with focal hand dystonia, Society for Neuroscience Annual Conference, 2000.

McKenzie A. "Anatomy of the Thoracic Spine and Rib Cage," invited presentation, California Chapter of the American Physical Therapy Association Annual Conference, October 2000.

McKenzie A, Najagara S, Byl N. "Sensory discriminative retraining modifies the somatosensory hand representation: a musician with focal hand dystonia," accepted for poster presentation, Society for Neuroscience Annual Conference, October, 1999.

Byl N, **McKenzie A,** Najagaran A, Blake D, Merzenich M. "Somatosensory changes in patients with focal hand dystonia as measured by MSI," accepted for poster presentation, Society for Neuroscience Annual Conference, October, 1999.

McKenzie A. "Anatomy of the Hand," invited presentation, California Chapter of the American Physical Therapy Association Annual Conference, Palm Springs, CA, October 1999.

McKenzie A, Diaz D, Melnick M. "Funding Tips for Your Research Project," invited presentation, California Chapter of the American Physical Therapy Association Annual Conference, Palm Springs, CA, October, 1999.

McKenzie A, and Byl N. "Somatosensory changes in patients with focal hand dystonia measured with magnetic source imaging," Combined Sections Meeting, American Physical Therapy Association, 1999.

McKenzie A and Byl, N. "Somatotopic Changes in Patients with Occupational Hand Cramps: Magnetic Imaging," California Chapter, American Physical Therapy Association Annual Conference, 1998.

McKenzie A. "Enriched Environment," invited presentation, Neuroplasticity Conference: Interface of Basic and Clinical Science, 1998.

McKenzie A and Roundtree A, "Proprioception and performance on the single-leg balance test following ACL reconstruction," California Chapter, American Physical Therapy Association Annual Conference, 1997.

Conrad A, Hansen S, Lau J, See J, Canfield J, and **McKenzie A,** "Comparison of FIM scores between managed care and Medicare patients in a SNF," California Chapter, American Physical Therapy Association Annual Conference, 1997.

Thornberg S, Line C, Browne P, and **McKenzie A,** "Testing stereognosis in normal adults using a key test," California Chapter, American Physical Therapy Association Annual Conference, 1997.

McKenzie A. Invited presentation (one day course), California Chapter, American Physical Therapy Association, "Review of the Anatomy of the Shoulder with Dissection," San Diego, CA, 1995.

Westmark R, Aihara N, **McKenzie A,** and Noble L, "Intrathecal administration of endothelin- I in the rat: Impact on spinal cord blood flow and the blood-spinal cord barrier," Society for Neuroscience Annual Conference, 1994.

McKenzie AL, Hall J, Aihara N, and Noble L, "Endothelin and blood-spinal cord barrier breakdown in spinal cord injury," Society for Neuroscience Annual Conference, 1993.

Goyenche Y, Gabb D, Byrne C. **McKenzie A,** "Functional Range of Motion in Skilled Musicians with Focal Dystonia.," California Chapter, American Physical Therapy Association Annual Conference, 1993.

McKenzie A. "Neuroplasticity: Clinical applications of latest findings," California Chapter, American Physical Therapy Association Annual Conference, 1992.

Byl, Nancy, **McKenzie, Alison,** West, Judith, Stem, Robert. The effects of hyaluronidase on wound healing, California Chapter, American Physical Therapy Association, 1992.

McKenzie, Alison,L, Khatami, H Oster, H, and Diamond, MC. The effects of enriched environment distal to lesioned motor cortex; American Physical Therapy Association Annual Conference, 1992.

McKenzie A and Byl N. Phonophoresis and wound healing, California Chapter American Physical Therapy Association, 1992.

McKenzie A, The effects of enriched environment distal to motor cortical lesions, American Physical Therapy Association Annual Conference, 1992.

Byl, Nancy, **McKenzie, Alison**, West, Judith, Stem, Robert. The effect of endogenous and commercial hyaluronic acid on healing. Annual Meeting, American Physical Therapy Association, 1991.

McKenzie, Alison, Diamond, Marian et al. Enriched Environment: A model for rehabilitation, European Brain and Behavioral Society Meeting on Recovery after Neural Injury, 1991.

Byl, Nancy, **McKenzie, Alison**, West, Judith, Whitney, JoAnn, Hunt, Thomas: The difference in tensile strength and collagen deposition following high and low dose ultrasound of acute incisional wounds, Annual Meeting, CAPTA 1991.

Byl, Nancy, **McKenzie, Alison**, West, Judith, Whitney, JoAnn, Hunt, Thomas. The effects of ultrasound on subcutaneous oxygen and temperature. Annual Meeting, American Physical Therapy Association, 1990.

Byl, Nancy, **McKenzie, Alison**, West, Judith, Whitney, JoAnn, Hunt, Thomas. Effect of pulsed galvanic stimulation on collagen deposition, California Chapter, American Physical Therapy Association Annual Conference, 1990.

Byl, Nancy, **McKenzie, Alison**, West, Judith, Whitney, JoAnn, Hunt, Thomas. Microamperage stimulation: effects of healing. Annual Meeting, CAPTA, 1990.

Byl, Nancy, **McKenzie, Alison**, West, Judith, Whitney, JoAnn, Hunt, Thomas. Microamperage stimulation: effects on subcutaneous oxygen. Annual Meeting, CAPTA, 1990.

Byl, Nancy, **McKenzie, Alison**, West, Judith, Whitney, JoAnn, Hunt, Thomas. The effect of ultrasound on tensile strength and collagen deposition, California Chapter, American Physical Therapy Association Annual Conference, 1989.

Byl, Nancy, **McKenzie, Alison**, West, Judith, Whitney, JoAnn, Hunt, Thomas. The effects of ultrasound on collagen deposition and tensile strength. Annual Meeting, American Physical Therapy Association, 1989.

Byl, Nancy, **McKenzie, Alison**, West, Judith, Whitney, JoAnn, Hunt, Thomas. The effect of ultrasound on wound healing and subcutaneous oxygen and temperature, California Chapter, American Physical Therapy Association Annual Conference, 1989.

McKenzie, Alison, Diamond, Marian. The effects of enriched environment on the motor cortex of 906-day-old Long-Evans Rats, Annual Meeting, American Association of Anatomists, 1986.

Abstracts (that were not presented)

None

Non-Peer Reviewed Publications:

Featured in Los Angeles Times article on Stroke Boot Camp, August, 2013.

McKenzie, A. "Mentored and collaborative anatomy instruction," *American Association of Anatomists Newsletter*, June 2006.

McKenzie, A. "Hot and cold baths may help ease arm pain," *Be Stroke Smart* 16 (9): 3, 1999.

McKenzie, A. "Brain cell function after stroke," *Be Stroke Smart*, 9(4):9, 1992.

Non-Peer Reviewed Presentations:

Razeghian J, Lopez J, Ikeda-Simao T, Christensen R, Espino R, Beuttler R, Grant-Beuttler, M, **McKenzie, A.** The Validity of a Game-Based Telerehabilitation System for Stroke Rehabilitation. Rinker Research Forum, 2017.

Boucher C, Chun K, Jansen J, Lee M, Urata M, Cramer SC, Beuttler SC, Grant-Beuttler M
McKenzie A. The development of kinematic methods for telerehabilitation. Rinker Research Forum, 2016.

Mahraj S, Didlake, D, **McKenzie, A.** A Systematic Review of Upper Extremity Robotic Therapy Interventions in Persons with Stroke Chapman University Doctor of Physical Therapy Research Forum, 2015.

Brabant K, Clements S, Knoblauch R, Mora A, Tanimoto K, **McKenzie A.** Reliability and Validity of FitBit Zip™ in Individuals with Stroke. Chapman University Doctor of Physical Therapy Research Forum, 2015.

Hicks K, Olalia J, Stanton D, Sturm C, TenKate M, Cipriani D, Beuttler R, McKenzie A. The Effects of an Intensive, Interdisciplinary Circuit-Training Therapeutic Intervention (Stroke Boot Camp 2014) on Individuals with Chronic Stroke or Traumatic Brain Injury. Chapman University Doctor of Physical Therapy Research Forum, 2015.

P. Liang, N.H. Monday, L. Pebdani, **A. McKenzie**, S.C. Cramer. Telerehabilitation. Chapman University Doctor of Physical Therapy Research Forum, 2014.

Handwerger-Holk J, Martinez R, Mendoza J, Dodakian L, Augsberger R, Cipriani D, **McKenzie A.** The Effects of an Intensive, Interdisciplinary, Circuit-Training Therapeutic Intervention (Stroke Boot Camp 2013) on Individuals with Chronic Stroke. Chapman University Doctor of Physical Therapy Research Forum, 2014.

McKenzie A L, Dodakian L. J. See J. Zhou R. Augsberger R, Avrit K, Garcia A, Mardini M, Cramer SC.
Feasibility of Incorporating Post-Stroke Telerehabilitation into a Community Setting. Chapman University Doctor of Physical Therapy Research Forum, 2014.

Garcia E, Ann Natali A, Dodakian L, See J, Augsberger R, Cramer SC, **McKenzie A.** Using Voxel-Based Lesion Symptom Mapping to Relate Lesion Location to Motor Performance and perceived Disability in Chronic Stroke Survivors. Chapman University Doctor of Physical Therapy Research Forum, 2014.

Adams L*, Bergstrom *, Chiang R*, Giang J*, Najera A*, McKenzie A. **The Effects of an Intensive, Interdisciplinary, Circuit-Training Therapeutic Intervention (Stroke Boot Camp 2015) on Individuals with Chronic Stroke.** Chapman University Rinker Research Forum, 2016.

Funded/In Review Grant Activity:

Graduate Student Instructor
Approximately \$4,000
Nonresident tuition fee waiver
1983, University of California at Berkeley

Graduate Student /Research Assistant.
Grant in Aid (Approximately \$1,000)
1984, Sigma Xi

Graduate Student /Research Assistant
Approximately \$20,000.
University of California Graduate Student Training Grant 1984-85; 1986-87, NIH

Principal Investigator, Master's Thesis Research
California Physical Therapy Fund Scholarship; \$2000
1987; California Chapter, APTA

Principal Investigator, Dissertation Research, UCB
Physical Therapy Graduate Student Scholarship
Approximately \$5,700 for Dissertation Research

1987-88, American Physical Therapy Association

Co-investigator,
UCSF REAC grants
Approximately \$37,000.0
1989-1990, UCSF Academic Senate

Principal investigator for studies to develop methodology for analyzing rapid finger movements of the fingers of skilled musicians. These studies were precursors for a larger, more comprehensive series of clinical studies of individuals with focal dystonia of the hand.

\$1320.
Research Grant
1991, California Physical Therapy Fund

Co-investigator for a series of studies examining the effects of various physical therapy modalities on wound healing. My role was to develop and carry out the surgical and histological methodology, develop appropriate treatment methods for animals, collect and analyze data, train research assistants, and assist with preparing seven published manuscripts and seven presentations at professional meeting.

\$5,000.
Research Grants
1989-90, California Chapter of the American Physical Therapy Association Fund

Principal investigator for a study using an animal model to evaluate the neuroanatomical and behavioral changes associated with a rehabilitative environment following lesioning of the motor cortex.

\$30,000.
Postdoctoral Research Fellowship
1990-91, National Stroke Association

Co-investigator for a pilot study to develop and adapt methodology for evaluating subtle somatosensory changes on the hands in individuals with focal dystonia.

\$2500. The findings contributed to three published manuscripts. Research Grant
1992, California Physical Therapy Fund Research Grant

Co-investigator for a series of experiments examining markers for neuronal injury following traumatic neurological injury in an animal model. The primary emphasis of this research was on changes in the blood-brain barrier and factors which might attenuate them.

My primary role was in developing new immunohistochemical methodology for spinal cord injury experiments. My individual allocation from the grant was approximately \$20,000.

RO-1
1992-4, NIH

Principal investigator for a multi-user equipment project for animal model experiments ranging from brain injury, spinal cord injury, and stroke, to anesthesia.

\$5,000.00
Shared Equipment Grant
1992-3, UCSF Academic Senate

Principal investigator for a series of experiments examining the relationships between endothelin and blood-brain barrier breakdown in the traumatized spinal cord. Two publications and two presentations at national scientific meetings ensued.

\$12,000.
Individual Investigator Grant
1993-94, UCSF Academic Senate

Principal investigator for a series of clinical and methodological experiments evaluating the efficacy on various treatment models of physical therapy and CPM use following ACL reconstruction. Currently, three manuscripts are in preparation, however, the primary study is a five-year longitudinal study.

Approximately \$10,000.
Clinical Validation Study, Sutter Corporation, San Diego, CA

Principal investigator for a clinical study using Magnetic Source Imaging to examine somatosensory reorganization in patients with focal dystonia of the hand Chapman Faculty Research Grant; \$2,000

Histology Laboratory Development
Chapman University Faculty Development Grant, 1999-2000; \$2000

Focal Hand Dystonia: The Effects of Immobilization vs. Sensory Retraining
Co-Investigator
Dystonia Foundation, \$200,000, (not funded)

Focal Hand Dystonia: The Effects of Constraint-Induced Therapy vs. Sensorimotor Retraining.
Co-Investigator (N Byl, PI)
Packard Foundation, \$1,700,000. Approved and brought forth as one of 2 (out of 17) proposals submitted from UCSF for international competition, but not funded at final level.

Structure-Function Relationships in Muscle Contracture
Co-Investigator (R Lieber, PI)
NIH, \$225,000 (July 03-June 06)

Mentored and Collaborative Instruction in Human Anatomy, PI
American Association of Anatomists, \$2,500, 2003-2004

Chapman University Faculty Sabbatical Grant, 2003-2004
(80% salary for one year)

The Treatment of Focal Hand Dystonia with Sensorimotor Training
Co-investigator (N Byl, PI)
NIH, \$2,820,059; approved, not funded.

Principal investigator, Morphological Quantification of the Somatosensory Cortex in an Animal Model for Focal Hand Dystonia, \$1300, Chapman University Faculty Research Grant, 2006-2007.

Faculty Sabbatical Leave Grant awarded for fall semester, 2009 (full salary for one semester)

Grant-Beuttler M, Brechter J, McKenzie A (Co-PIs). (~\$346K) Computerized Motion Analysis System equipment grant, National Science Foundation, in revision for re-submission, 2011.

Byl N (PI); Nagaranjan S (Co-investigator), (~\$250K) A McKenzie (co-investigator). Multimodal functional neuroimaging-based biomarkers for task-specific focal hand dystonia. NIH, NINDS, RO-1, (not funded) 2010.

McKenzie A. (\$500K) Chapman Physical Therapy and Wellness Clinic. Turner-Gililand Family Foundation, on hold pending institutional space allocation, 2011.

McKenzie A. Chapman University Faculty Scholarly Activity Grant (\$5000), 2011.

Peterson, D. and McKenzie, A. Striatal dopamine and sensorimotor therapy in focal dystonia; National Institutes of Health, R-21, submitted spring 2011 (not funded).

McKenzie, A and Byl, N. Enhancing the Efficacy of Sensorimotor Retraining Therapy for the Treatment of Task-Specific Focal Hand Dystonia; submitted to Dystonia Coalition, spring 2011 (not funded).

Sponsor for Faculty-Sponsored Student Research Grants, Chapman University for:
Taryn Chun; Stroke Boot Camp (\$200.00), 2013.
Kelli Sharp; *Identifying lesion area and lesion size with fMRI for Subjects with Chronic Hemiparetic Stroke*. (\$700.00)
Sara Gilliland; *Morphological Quantification of the somatosensory cortex in an animal model for focal hand dystonia*. (\$300.00), 2008.

Frucht S (PI), Peterson D (Co-PI). A new rating scale for focal task-specific dystonia of the musician's hand.

Dystonia Coalition; \$50K.

A McKenzie role: Assisted with grant application and literature review; member of working group of experts assembled to develop a standardized assessment instrument for musician's dystonia

Cramer, SC (PI) Brain Plasticity and Rehabilitation after Stroke

NIH NICHD K-24 Mentorship Award, \$118K per year (2013-16)

A McKenzie role: Key personnel; consulted/assisted with grant preparation and development of collaboration with Dr. Steven Cramer and the University of California at Irvine and the Departments of Neurology and Anatomy and Neurobiology to provide mentoring for physical therapists and physical therapist students to pursue research interests and academic careers with an emphasis on neurorehabilitation and neuroimaging for persons with stroke.

Cramer S (PI); Telerehabilitation For Patients With Stroke

NIH NINDS (multi-center study); \$566K for year 2014 (approx. 2 M for 3 yrs)

A McKenzie role: Co-investigator/key team member for developing aims and approach/methods, implementing preliminary studies, collecting and analyzing data; assisted with grant preparation. Continue to be key member of multi-disciplinary team for multi-year, multi-site study.

McKenzie A. Chapman University Faculty Conference Grant (\$2300)

Consultant, NIH (National Institute of Neurological Diseases and Stroke) RO-1; 1U01NS091951-01A1: Telerehabilitation in the Home versus Therapy In-Clinic for Patients with Stroke (Steven Cramer, PI) (\$7500/yr)

McKenzie A. Duff A, Jonathan N, Jester S. Stroke Boot Camp: A Model for Integrated Care for Individuals with Chronic Stroke. Crean College Interdisciplinary Grant (\$10K; not funded).

Consultant, NIH. RO-1. A Pilot Study of Long-Term Home-Based Telerehabilitation. (Steven Cramer, PI, in submission.)

Other Scholarly Products:

None

Research Activity:

Stroke.

Telerehabilitation. After completing a recent pilot study using a Telerehab system, our team (Dr. Steven Cramer and his laboratory personnel in the Department of Neurology at the University of California at Irvine and Doctor of Physical Therapy faculty and students from Chapman University) is conducting a multi-year, multi-site study that includes a comparison of intensive in-clinic rehabilitation vs. telerehabilitation for chronic stroke. Multiple dimensions, including motor behavior, neuroimaging, social/caregiver support, motivation, patient education, and engagement, technical innovations, and ease of use are being addressed in this first study to be selected by the NIH NINDS Stroke Network research group. As a corollary, I am currently investigating the kinematics of the movements produced during Telerehabilitation and the validity of Telerehabilitation-based assessments.

Robotic Therapy for regaining upper extremity function after stroke. During my sabbatical leave (Fall, 2009), I began collaborating with Dr. Steven Cramer and his laboratory personnel in the Department of Neurology at the University of California at Irvine. In addition to assisting with transcranial magnetic stimulation (TMS), Functional Magnetic Resonance Imaging (fMRI), electromyography (EMG), behavioral testing, genetic testing, and subject recruitment, I assisted with robotic therapy testing and

training. We recently completed a longitudinal (5 year) study of robotic therapy for restoring hand and wrist function individuals with stroke and am assisting with an investigation of home-based, virtual reality game-based tele-rehabilitation paired with a dopamine agonist for recovery of hand and wrist function after stroke.

Stroke Boot Camp. Using a community service model for delivering intensive, inter-disciplinary rehabilitation post-stroke, my collaborators and I are studying the effectiveness of 1 week therapy and related activities on functional improvements for chronic stroke survivors. This project combines community service/service learning, inter-professional clinical education, and research into a model for delivering intensive, short-term (2 weeks) rehabilitation intervention.

Focal Hand Dystonia. I have collaborated with investigators at the Universities of California at San Francisco and San Diego on several studies aimed at quantifying the characteristic abnormal movement patterns and sensory disturbances observed in musicians with focal dystonia, a movement disorder of unknown etiology. Most of these studies have involved student researchers.

Pedagogical Research: I have been gathering data since the inception of our Doctor of Physical Therapy Program to evaluate the effectiveness of my anatomical instruction. Thus far, I have completed two longitudinal studies and am working on a third. As part of this line of study, I mentored and collaborated with Barbara Gutierrez, a DPT student through our Directed Research program. I also mentored Dr. Sara Gilliland, who is currently pursuing her Ph.D. in Education at ICU, with an emphasis on pedagogical research on teaching basic science coursework, specifically the anatomical sciences, in physical therapist education programs. In addition to exploring anatomical instruction, I have been studying the relationships between our admission criteria and students' success in the program. This line of research is being conducted in collaboration with Drs. Jacki Brechter and Dorcas Tominaga and 3 DPT students in our program.

Continuous Passive Motion in Rehabilitation: (In conjunction with Sutter/OrthoLogic Corp.) Studies on the efficacy of using continuous passive motion (CPM) devices following ACL reconstruction. I designed a five-year prospective study that was conducted in collaboration with Dr. Jeffrey Halbrecht in San Francisco, CA. (Since the sponsoring company retained proprietary control of the data, it was not disseminated.)

Spinal Cord Injury: Mechanisms of Injury

I collaborated with investigators in the UCSF Department of Neurosurgery on a study that utilized an animal model for spinal cord injury. Using immunocytochemistry and laser Doppler flowmetry, we looked at the relationships between the expression of endothelin, a potent vasoactive peptide, ischemia, and the breakdown of the blood-brain barrier with graded spinal cord injury and recovery over time. The second half of the study involved investigating the effects of therapeutic (pharmaceutical) intervention on these parameters.

Enriched Environment: A Model for Rehabilitation

My doctoral and postdoctoral research pertained to the utilization of an animal model for studying the effects of enriched environment on neuroanatomical and behavioral changes following lesioning of the forelimb motor cortex of adult, male, Long-Evans rats. This model represents a "rehabilitation environment" suitable for studying the effects of increased activity on neural recovery. The rationale for these studies was to examine the role of experience on functional and structural changes that may be associated with neural plasticity and recovery.

Wound healing studies

The purpose of this series of experiments was to evaluate the effects of various therapeutic agents and modalities on wound healing. Several parameters were measured, including: subcutaneous oxygen and temperature, hydroxyproline deposition, DNA content, tensile strength, the quality of healing (using both observational and histological scaling methods), and change in size of the wounds.

Continuing Education Workshops Conducted/Organized:

Stroke Rehabilitation Research Seminar Speaker and Organizer. Co-sponsored by Chapman University Department of Physical Therapy, University of California Department of Neurology, and the Orange County Stroke Rehab Network. Fall 2010-

2016.
Sensorimotor Processing Dysfunction and Movement Dysfunction: Focal Innovations Summit: Collaborative Care Models. American Physical Therapy Association Webinar, 2013.
Dystonia and Complex Regional Pain Syndromes, co-sponsored by the California Physical Therapy Association and UCSF, 2013.
Anatomy Review of the Upper Extremity, Kaiser Permanente Hand Fellowship Program, 2005-2013.
Innovation Summit Collaborative Care Models, American Physical Therapy Association Webinar, 2013.
Mentored Collaborative Teaching in Anatomy Workshop, Chapman University, 2005-6.
R Kinyamu and A McKenzie. Anatomy Review of the Upper Extremity, Kaiser Permanente Hand Fellowship Program, 2004.
McKenzie A and Ferdig S. The Forgotten Foundation of the Cervical Spine: Segmental Awareness and Control. One day pre-conference course, California Physical Therapy Association Annual Conference to be held Oct, 2004.
Anatomy Review of the Upper Extremity, Kaiser Permanente Hand Fellowship Program, 2004.
Anatomy Review of the Hand and Forearm, South Coast Hand Therapy, 2003.
Lower Extremity Dissection for Clinical Instructors, 2003,
Upper Extremity Dissection for Clinical Instructors, 2003.
Head, Neck, and Trunk Dissection for Clinical Instructors, 2003.
Anatomy Review of the Upper Extremity, Kaiser Permanente Hand Fellowship Program, 2002-2003.
Anatomy Review of the Hand and Forearm, South Coast Hand Therapy, 2002.
Review of Neuroanatomy, half-day course for the Fran Joswick Therapeutic Riding Center staff, presented at Chapman University, March, 2002.
Panelist for Discussion of the Transitional DPT, San Diego District, California Physical Therapy Association, 2002.
Review of Functional Anatomy, Sharp Rees Stealy Physical Therapy Department, 2001.
What is the DPT?, presented to the San Diego District, California Physical Therapy Association, 2000.
"Review of Functional Anatomy," UCSF Continuing Education Weekend Course, 1989-2000.
Instructor, "Gross Human Anatomy for the Advanced, College Preparatory High School Student" sponsored by the University of California at San Francisco, 1999.
Instructor, "Gross Human Anatomy for the High School Educator" sponsored by the University of California at San Francisco, 1999.
Poster Tour Guide, California Chapter, APTA Annual Conference, 1998,1999.
San Diego District, CCAPTA Cal-PT-PAC Fundraiser Seminar, 1996 (organized)
Sharp-Reese-Stealy; Anatomy of the Spine, April, 1996Sharp-Reese-Stealy; Anatomy of the Knee, March, 1996
Review of Shoulder Anatomy, CCAPTA Annual Conference, (Oct., 1995);
Smith & Nephew DonJoy, Inc., Shoulder, Knee and Ankle Anatomy, June, 1995;
Anatomy Review, USC Dept. of Biokinesiology and Physical Therapy, 1995;
Smith & Nephew DonJoy, Inc., Lower Extremity and Shoulder Courses, (1994);
Back Anatomy, UCSF Graduate Program in Physical Therapy Clinical Instructors, 1994;
Review of Functional Anatomy for Health Care Providers, San Diego, CA, 1994;
St. Mary's Hospital Spine Center Physical Therapy Staff, 1991-94;
UCSF Physical Therapy Staff, 1993; Kaiser Vallejo Physical Therapy Staff, 1991
Herrick/Alta Bates Hospital Rehabilitation Staff In-service Program:
Review of Neurophysiology, 1990;
Functional Anatomy of the Shoulder Girdle Complex, 1989;
Research Presentation on the Effects of Enriched Environment on the Aging Motor Cortex, 1986
Enriched Environment: A Model for Rehabilitation, presentation to the UCSF/SFSU Graduate Program in Physical Therapy general faculty & search committee and to the University of California Department of Integrative Biology Graduate Seminar, 1991
Guest lectures in anatomy and neuroanatomy, University of California at Berkeley, 1987-91
University of California at Berkeley, Dissertation Defense, 1990
Anatomy Review, Kaiser Permanente Physical Therapy Staff, 1989
Inservices on Transfer Techniques and Back Injury Prevention, Hillhaven Corp., 1987-88
University of California at Berkeley Teaching Assistant Workshops (1985-86)

Membership in Scientific/Professional Organizations:

American Physical Therapy Association (1979-present);
Research, Neurology, Education, and Orthopedic Sections, APTA (1989-91;1994-present; 2002-present, respectively)
Founding member, Anatomy Education Special Interest Group, APTA Education Section (application in process, 2017)
Stroke Special Interest Group, APTA Neurology Section, 2016-present.
Research Special Interest Group, California Chapter, APTA 1993-2013
American Association of Clinical Anatomists (2010-present)
Orange County Stroke Rehabilitation Network (2009-present; founding member)
Organization for Human Brain Mapping (2012-present)
American Heart Association, Professional Member (2010-present)
American Association of Anatomists (2002-present)
Society for Neurosciences (1993-present)
National Stroke Association (1990-2006)
American Association for the Advancement of Science (1988-2008)
Society for Neurotrauma (1993-1996)
New York Academy of Sciences (1988-1992)

Consultative and Advisory Positions Held:

NIH Telerehabilitation Multi-Center Grant (Dept. of Neurology, UCI).
Founding Board Member, Help for Stroke, 2013-present.
Consultant for Stroke Boot Camps for several institutions and agencies, 2013-present.
Consultant for Anatomy Laboratory Design, 2007-present.
Consultant for preparing Physical Therapy faculty to teach anatomy (2012-present).
Advisor to Saddleback College Adaptive Kinesiology Program, 2013.
Reviewer (ad hoc) Anatomical Sciences Education, 2010-present.
California Physical Therapy Association, Abstract Reviewer, 2010-2014.
Founding member, Orange County Stroke Rehabilitation Network, 2009- (Organized county-wide organization for stroke rehabilitation professionals, stroke survivor groups and caregivers; led or co-led quarterly meetings and assisted with website development, compiled list of available resources, organized and presented at annual seminar.)
Alternate, American Physical Therapy Association Advisory Panel on Education, 2008-09
District Representative and Public Relations Committee Chair, Orange County District of the American Physical Therapy Association, 2007-2009.
Reviewer, Physical Therapy, 2005-
Reviewer, Journal of Biomechanics, 2007-
Chair, Advisory Panel on Research, American Physical Therapy Association, 2004.
Member, Advisory Panel on Research, American Physical Therapy Association, 2003-2005.
Grant reviewer, California Physical Therapy Fund, 1995-2002; 2004; 2007-.
Special Awards Subcommittee (Mary McMillan Lectureship), American Physical Therapy Association, 2005.
Research Awards Committee, American Physical Therapy Association, (2001-05).
Special Awards Subcommittee (Mary McMillan Lectureship), American Physical Therapy Association, 2005.
Vice President, Education Section, Academic Faculty Special Interest Group, 2003.
Vice Chair and Nominating Committee Chair, Research Special Interest Group, California Chapter, APTA, 2001-2003.
Director, Research Special Interest Group, California Chapter, APTA, (1998-2000);
Nominating Committee, San Diego District, APTA (1998-2000);
California Chapter, APTA Grants Reviewer, California Foundation for Physical Therapy (1994-2000);
Appointed to the Expert Resource Panel of the Government Affairs Committee, California Chapter of the American Physical Therapy Association (CPTA), 1999.
Nominated by the CCPATA Assembly of Representatives to serve on the National Research Advisory Board of the APTA, 1999, 2000.
National Stroke Association "Ask the Expert" Advisory Board. Published response to stroke survivors questions in: Be Stroke Smart, vol 16 (9), p 3, 1999.
Interviewed for report on current stroke rehabilitation research, 'All Things Considered,' National Public Radio, June 12, 1999.
Previous reviewer for Journal of Orthopedic and Sports Physical Therapy.
Consultant, Medicolegal Reviewer for Physical Therapy malpractice cases.

Advisor to California Chapter, APTA for professional issues and worker's compensation (1990-1994; 2004);
Scientific consultant, World of Wonder (1995);
Chair, San Diego District/APTA Political Action Committee, San Diego District, APTA (1994-1997);
Research consultant, Sutter/Orthologic Corporation (1993-1998);
Providing Physical Therapy services to: Rehabilitative Health Services (1991-1994);
Herrick/Alta Bates Hospital (1988-90), Hillhaven Corporation (1987-88; 1995), the UCSF
General Medical Clinic, and the UCSF Center for Human Performance Education and
Testing.
National Stroke Association/APTA Advisory Board, 1991-92.
Secretary, Public Relations Committee, Golden Gate District of the American Physical
Therapy Association (1988-93)

Community Service:

Coordinator, Inter-disciplinary Stroke Boot Camp, Chapman University; 2011-present.
Organizer, Stroke Awareness Picnic for Stroke Survivors and their families, rehabilitation
professionals and service providers, 2010-2017.
Help For Stroke, Stroke Awareness Community Event, 2017
Help For Stroke 5K, Pasadena, CA, 2016.
Provide *pro bono* physical therapy services, 1981-present.
Featured speaker on stroke, The Connor Bubble cable interview program, 2014.
Speaker, Help For Stroke organizational meeting, 2013.
Dana Point, CA Beach Clean Up, 2012-present.
Panel member, Careers Choices for Ph.D.'s in Biology, University of California at Irvine,
2011.
Guest lecturer for UCI COSMOS program for high school students, 2010
Interviewed for Health Matters television program, 2009
Participate in various charitable fund raising activities
Volunteer for physical therapy booths at health fairs, runs
Active in local politics and community enhancement activities
Member, ACLU
Host family, USA Homestays.
Speaker, Encinitas City Council Meeting on the topic of building a new Recreation and
Fitness Center, 1999, 2000
Secretary, Architectural Committee, Sierra Morena Homeowners Association, Carlsbad,
CA (1994-1996);
Assisted with pre and post run warm-up exercises, Run to the Far Side (199-94)
Assisted with career days at UCB, UCD, Diablo Valley College, Seton High School, and
San Francisco Unified School District (1989-1993)

Service to the University/College/School on Committees/Councils/Commissions:

Chapman University

University Wide

Long Range Planning Council, 2017-
Office of Research Financial Conflict of Interest Committee, 2016-
Diversity and Inclusion Search Committee Trainer, 2016-
Faculty Personnel Committee, 2014-2016
Faculty Grievance Committee, 2010-2013.
Member, Medical School Feasibility Task Force, 2011
Chair, Faculty Academic Council, 2007-2008.
Member, Senate Executive Board, 2007-2008.
Member, Institutional Review Board (2004-2009; 2001; 1995-97)
Member, Bloodborne Pathogen Committee, 2007-2012
Member, Faculty Senate, 2005-7
Member, *ad hoc* Scientific Integrity Committee
Member, *ad hoc* Health Sciences Task Force
Member, Director of Office of Sponsored Research Search Committee, 2005
Member, Education Search Committee, 2004-2005
Graduate Studies Committee (1998-2000)
WASC/Graduate Committee (1999-2002)

Crean College/School/Department of Physical Therapy Service

Chair, Physical Therapy Promotion and Tenure Committee, 2017-

Anatomy Team Leader, 2000-present
Anatomy Laboratory oversight: training and supervision of technical staff, Willed Body Program management; health and safety compliance, budget, scheduling, organization, 1995-2016.
Chair, Physical Therapy Search Committees for 5 Faculty Searches, 2015-16.
DPT Accreditation Self Study Report Team, 2015-16.
DPT Faculty Practice Task Force, Curriculum Committee, 2015-16
Chair, task force on faculty load and course directors, 2015-16
Task Force for Crean College Promotion and Tenure Guidelines, 2016.
Coordinator, Anatomy & Neuroscience Team Accreditation and Planning Task Forces, 2015-
Chair, Department of Physical Therapy Search Committee for 3 Faculty Searches, including Chairperson, 2014-15.
Search Committee member and lead trainer/coordinator for two Rinker-Crean Anatomy Laboratory Specialists, 2014-15.
Faculty liaison for addressing Rinker Anatomy Laboratory renovation-related issues, 2014-15.
DPT Faculty Representative, Admissions Receptions, Open Houses, and Luncheons, 2014-15.
DPT faculty liaison, Rinker and departmental issues, 2014.
Faculty Coordinator, Rinker Campus Technology Task Force to trouble-shoot/resolve IT & Media issues at new Rinker Health Sciences Campus, 2014-15.
Chair, Department of Physical Therapy Search Committee for 8 Faculty Searches, 2013-14.
Rinker Campus Building/Anatomy Laboratory Design Working Group, 2013-14.
Faculty Review Committee Policies and Procedures Task Force, 2014
Faculty Review Committee, 2013-
Full Professor Faculty Review Committee, 2013-
Academic Advising-approximately 18 students/year (2013-)
Director, Approved Agency for Physical Therapy Continuing Education (2013-)
Participant, Rinker Campus Inter-Professional Education Task Force and IPE facilitator

Schmid College of Sciences/ Wilkinson College/Physical Therapy Department

Member, Faculty Search Committee, 2011
Member, Safety Committee, 2011-
Member, Dean's Advisor Council, 2009--
Director, Approved Agency for Physical Therapy Continuing Education (2011-12)
Crean School of Health and Life Sciences VisionTask Force, 2010-2011
Guest Instructor, Neuroanatomy for College of Educational Studies Communication Disorders Program, 2010-2013
Member, Schmid College Dean Vetting Committee, 2008-2009
Co-chair, Physical Therapy Faculty Search Committee, 2008-09
Liaison for International Clinical Internships (established and continue to oversee and coordinate internships in Costa Rica, 2005-present)
Member, Faculty Review Committee, (2008-10; 2003-2005; 2001)
Anatomy and Neuroscience Laboratory Design and Coordination, 2007-08
Anatomy and Neuroscience Laboratory Management, 1993-
Co-Chair, Faculty Search Committee, Department of Physical Therapy, 2007-2009
Science Task Force, 2006-8
Member, Biological Science Search Committee, 2006.
Wilkinson Faculty Senate Coordinator, 2006-7.
Chair, Physical Therapy Faculty Search Committee (3 positions), 2004-5
Chair, Admissions Task Force, Department of Physical Therapy, 20004.
Science Faculty Promotion and Tenure Guidelines Committee, 2003.
Faculty Practice Committee, Department of Physical Therapy, 2002-2003.
Search Committee, Department of Physical Therapy, 2002-2003.
Science Liaison, Department of Physical Therapy, 2003-2009.
Program/Curricular Faculty Retreats, Department of Physical Therapy, 2000-present
Assisted with WASC, CAPTE accreditation reports, 2002.
Revised, coordinated PT 680 Research Analysis seminar, 2002.
Participated in and/or presented at ½ day departmental recruitment receptions 2000-present.
Pre-professional (physical therapy) student advising, 2000-present.
Clinical Site Visitor for San Diego County, 1995-present.
Department Representative to weekly Division of Natural and Applied Sciences Chairs Meetings, Wilkinson College Chairs Meeting, 2000-2001.

Research Series Task Force, Department of Physical Therapy, 1999.
Coordinator, Anatomy and Neuroanatomy Laboratories, 2001-
Assist with undergraduate Anatomy, Neuroanatomy, Kinesiology, and Psychology
Laboratories, 1995-present.
Panelist for Chapman University Student Scientific Society, 2000-2001.
Participant, Division of Natural and Applied Sciences, Discover Chapman, 1999-2001.
Chair, Search Committee, Division of Physical Therapy, 1998.
Admissions Committee, Curriculum Committee, Budget Committee, Scheduling Task
Force, Promotions and Honors Committee; Chair, Continuing Education Committee,
Comprehensive Examination and Remediation Course Committee

University of California at Irvine

Mentoring/advising, excellence in undergraduate research program; mentoring graduate
students and post-doctoral fellows, Department of Neurology.
Guest lecturer, Nurse Practitioner Program, 2012-

University of California at San Francisco

Academic Senate (1991-1995)
Graduate Program in Physical Therapy (Curriculum in Physical Therapy): Admissions
Committee (1987-2000)
Academic Review Committee (1987-8/95)
Research Committee, Graduate Program in Physical Therapy (1989-95; chair, 92-93)
Interdisciplinary Graduate Group (1990-95)

University of California at Berkeley Department of Physiology-Anatomy

Student Representative to faculty meetings (1984) Instructor for teaching assistant
training workshops (1985-86)

Honors and Awards:

Team member, Robert Newcomb Interdisciplinary Team Science Award, Institute for
Clinical and Translational Science, University of California at Irvine, 2017

Sabbatical Leave, Chapman University, spring, 2017.

Selected by Class of 2016 to speak at their Awards Ceremony and don doctoral hoods
at commencement, 2016.

Valerie Scudder Award for Excellence in Teaching, Scholarship, and Service, Chapman
University, 2015.

Chapman University DPT faculty member selected by students to bestow doctoral
hoods at commencement (multiple years).

Chapman University Faculty Conference Grant, 2014.

Chapman University Doctor of Physical Therapy Program Commencement Speaker,
2013.

4.0 GPA for transitional Doctorate of Physical Therapy (t-DPT) degree, 2012.

Valery Scudder Award for outstanding faculty achievement in teaching, scholarship and
service, Chapman University, 2011.

Chapman University Doctor of Physical Therapy Program Commencement Speaker,
2011.

Chapman University Faculty Scholarly Research Grant, 2010

Sabbatical leave
Chapman University, fall 2009

Faculty-Sponsored Student Scholarly Research Grant awarded to:
Taryn Chun, SPT (2013): Stroke Boot Camp

Sara Gilliland, SPT (2007-2008): Morphological Quantification of the

Somatosensory Cortex in an Animal Model for Focal Hand Dystonia

Kelli Sharp, SPT (2007-2008): Identifying Lesion Area and Lesion Size with fMRI for Subjects with Chronic Hemiparetic Stroke

Outstanding Physical Therapist
Orange County District
American Physical Therapy Association, 2006-7

Excellence in Service Award
Chapman University, 2006

Faculty Scholarly Activity Grant
Chapman University, 2006-07

Nominated for the Dorothy E. Baethke-Eleanor J. Carlin Award for Excellence in Academic Teaching
American Physical Therapy Association, 2005

Sabbatical leave
Chapman University, 2002-2003

Excellence in Teaching Award
(Declined several additional nominations due to concurrent service on Faculty Review Committee)
Chapman University, 2000

Faculty Development Grant
Chapman University, 1999

Valerie Scudder Award for Outstanding Faculty Achievement
Chapman University, 1998

Faculty Research Award
Chapman University, 1997-98

Nominated for the Distinguished Teaching Award
University of California at San Francisco, 1994

Individual Investigator Award
UCSF Academic Senate, 1993-94

Faculty Research Award,
California Chapter, APTA, 1992

Postdoctoral Research Fellowship
National Stroke Association, 1990-91

Graduate Scholarship
American Physical Therapy Foundation 1987-88

Graduate Scholarship
California/American Physical Therapy Association Fund 1987

Outstanding Graduate Student Instructor, Joint Medical Program
Universities of California at Berkeley and San Francisco, 1987

Elected to Phi Kappa Phi
University of Utah, 1981

Elected to Mortar Board
University of Utah, 1981

Graduated Magna cum laude
University of Utah, 1981

Dean's List
University of Utah, 1977-1981

Tri Delta Scholarship
University of Utah, 1980

Non-resident Merit Scholarship
University of Utah, 1977-79

Continuing Education Attended: (partial list)

Combined Sections Meeting, American Physical Therapy Association, Nashville, TN, 2008.
Strategic Planning Summit, California Physical Therapy Association, Pomona, CA, 2008.
American Association of Anatomists/FASEB Annual Conference, San Diego, CA, 2008.
Association of Hand Therapists Test Prep Course for Certified Hand Therapists, 2008.
California Physical Therapy Association Annual Meeting, Oakland, CA, 2008.
Society for Neuroscience Annual Meeting, San Diego, CA, 2008.
PT 711, Applied Pharmacology, Chapman University t-DPT Program, 2008.
PT 723, Cardiopulmonary Differential Diagnosis, Chapman University t-DPT Program, 2009
Clinical Radiology, one day seminar sponsored by CPTA, spring, 2009.
Combined Sections Meeting, American Physical Therapy Association, Las Vegas, NV, 2009.
Diagnostic Imaging, Chapman University t-DPT Program, 2009.
Neuroplasticity in Neurorehabilitation. One day seminar, Rancho Los Amigos National Hospital, fall 2009.
Stem Cell Symposium, University of California at Irvine, Fall, 2009.
Society for Neuroscience Annual Conference, Fall, 2009.
Combined Sections Meeting of the American Physical Therapy Association, 2010.
American Association of Anatomists Annual Conference, 2010.
Annual Conference, American Physical Therapy Association, 2010.
Spatial Parameter Mapping 8 for Basic and Clinical Investigators (week-long course on Functional MRI data acquisition and processing), 2010.
Society for Neuroscience Annual Conference, 2010.
Screening and Examination Course, Chapman University Transitional Doctorate Program in Physical Therapy, 2010-11.
Imaging and Genetics Conference, University of California at Irvine, 2011.
International Stroke Conference, Los Angeles, CA, 2011
Combined Sections Meeting, American Physical Therapy Association, 2011.
Learning and Memory Symposium, UCI, 2011
Abilities Expo, Los Angeles, CA, 2011
Cardiopulmonary Differential Diagnosis, Chapman University, 2011
LSVT Big and Loud Treatment of Parkinsons Disease, Orange County District meeting, 2011.
PT 722 Advanced Neurological Practice Management, Chapman University, 2011
PT 721 Advanced Orthopedic Practice Management, Chapman University, 2012
Combined Sections Meeting, American Physical Therapy Association, 2012.
International Stroke Conference, 2012
Physical Therapy Ethics and Law, APTA 2013
Combined Sections Meeting, American Physical Therapy Association, 2013
International Stroke Conference, 2013
California Physical Therapy Association Annual Conference, 2013
Society for Neuroscience Annual Meeting, 2013
Flipped Classroom Workshop, Chapman University, 2013.
Basic Life Support and AED, 2013
International Stroke Conference, 2014
American Association of Anatomists Annual Meeting, 2014
Combined Sections Meeting, American Physical Therapy Association, 2014
Combined Sections Meeting, American Physical Therapy Association, 2015
California Physical Therapy Association Annual Meeting, 2015
California Physical Therapy Association Annual Meeting, 2016
American Association of Anatomists Annual Meeting, 2016.
Combined Sections Meeting, American Physical Therapy Association, 2016

Current Teaching Responsibilities in the DPT Program:

PT 510 (Course Director) Functional Human Anatomy I
PT 513 Developmental Anatomy
PT 522 (Course Director) Functional Human Neuroanatomy I
PT 522L (Course Director) Functional Human Neuroanatomy I Lab
PT 523 (Course Director) Functional Human Neuroanatomy II,
PT 523L Functional Human Neuroanatomy II Lab
PT 752 and 753 Scientific Inquiry II and III
PT 799 Scientific Inquiry
PT 796I International Clinical Experience