

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel in the order listed for Form Page 2.
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME John Chae, M.D., M.E.		POSITION TITLE Associate Professor of Physical Medicine and Rehab Associate Professor of Biomedical Engineering	
EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)			
INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY
Duke University, Durham, N.C.	B.S.E.	1984	Biomedical Engineering
Dartmouth College, Hanover, N.H.	M.E.	1986	Biomedical Engineering
N.J. Medical School, Newark, N.J.	M.D.	1990	Medicine
R. W. Johnson Med. Sch., Piscataway, N.J.		1991	Intern-Internal Medicine
N.J. Medical School, Newark, N.J.		1994	Resident-PM&R

NOTE: The Biographical Sketch may not exceed four pages. Items A and B may not exceed two of the four-page limit.

A. Positions and Honors. List in chronological order previous positions, concluding with your present position. List any honors. Include present membership on any Federal Government public advisory committee.

PROFESSIONAL EXPERIENCE

1994-present Attending physician, MetroHealth Center for Rehabilitation, Cleveland, OH
 1995-2003 Assistant Professor of PM&R, Case Western Reserve University, Cleveland, OH
 1996-2001 Director, Stroke Rehabilitation, MetroHealth Center for Rehabilitation, Cleveland, OH
 1998-2002 Attending physician, Orthopedics, MetroHealth Medical Center, Cleveland, OH
 2000-2003 Assistant Professor of Biomedical Engineering, Case Western Reserve University
 2000-present Attending physician, PM&R, Louis Stokes Veterans Affairs Medical Center, Cleveland, OH
 2001-present Director of Research, Dept of PM&R, Case Western Reserve University
 2003-present Associate Professor of PM&R, Case Western Reserve University, Cleveland, OH
 2003-present Associate Professor of Biomedical Engineering, Case Western Reserve University, Cleveland, OH
 2004-present Associate Director of Clinical Affairs, Cleveland FES Center, Cleveland, OH

BOARD CERTIFICATION

1991 Diplomate, National Board of Medical Examiners
 1995 Diplomate, American Board of PM&R

HONORS AND AWARDS

2002 Alumnus Award, Kessler Institute for Rehabilitation, Dept. of PM&R, N.J. Med. Sch.
 2003 Young Academician Award, Association of Academic Physiatrists
 2003 Award of Tenure, Case Western Reserve University, Cleveland, OH
 2003 Chair Award for Contributions in Research, Dept. PM&R, Case Western Reserve University

SCIENTIFIC REVIEW AND STUDY SECTIONS

Advisory Council, Rehabilitation Medicine Scientist Training Program (NIH-K12): December 2000 to present
 NSD-A Study Section, NIH-NINDS: Ad hoc reviewer, 10/01, 2/02, 2/03, 6/03
 Function, Integration and Rehabilitation Sciences Subcommittee study section: NIH-NICHD, Member 7/03-present

B. Selected peer-reviewed publications (in chronological order). Do not include publications submitted or in preparation. (Last 3 years and selected publications prior to 3 years; senior author in italics.)

- Chae JC*, Johnston MV, Kim H. and Zorowitz RD. Admission Motor Impairment as a Predictor of Physical Disability after Stroke Rehabilitation. *Am J Phys Med Rehabil* 1995; 74: 218-223.
- Chae J*, Zorowitz R, Johnston M. Functional Outcome of Hemorrhagic and Nonhemorrhagic Stroke Survivors After In-patient Rehabilitation: A Matched Comparison. *Am J Phys Med Rehabil* 1996; 75: 177-182.
- Chae J*, Hart R. A comparison of discomfort associated with surface and percutaneous intramuscular electrical stimulation for persons with chronic hemiplegia. *Am J Phys Med Rehabil* 1998; 77: 516-522.
- Chae J*, Zorowitz R, Johnston M. Role of lesion laterality on the functional status of cortical and subcortical nonhemorrhagic stroke survivors. *Am J Phys Med Rehabil* 1998; 77: 415-420.
- Chae J*, Bethoux F, Bohinc T, Dobos L, Davis T, Friedle A. Neuromuscular stimulation for upper extremity motor and functional recovery in acute hemiplegia. *Stroke* 1998; 29: 975-97.
- Francisco G, *Chae J*, Chawla H, Kirsblum S, Zorowitz R, Lewis G, Pang S. EMG triggered neuromuscular stimulation for improving the arm function of acute stroke survivors: A randomized pilot study. *Arch Phys Med Rehabil* 1998; 79:570-575.
- Chae J*, Kilgore K, Triolo R, Creasey G. Functional Neuromuscular Stimulation. In: DeLisa, J., Gans, D., eds. *Rehabilitation Medicine: Principles and Practice*. 4th ed. Philadelphia: J. B. Lippincott Company, 1998: 611-634.
- Chae J*, Yu D. Neuromuscular stimulation for motor relearning in hemiplegia. *Critical Reviews in Physical Medicine and Rehabilitation* 1999;11:279-298.
- Chae J*, Kilgore K, Triolo R, Creasey G. Neuromuscular Stimulation in Spinal Cord Injury Rehabilitation. *North American Clinics of Physical Medicine and Rehabilitation* 2000;11: 209-226.
- Chae J*, Yu D. Neuromuscular stimulation for neuroprostheses in hemiplegia. *Critical Reviews in Physical Medicine and Rehabilitation* 2000; 12: 1-23.
- Chae J*, Yu D. Critical Review of Neuromuscular Electrical Stimulation for Treatment of Motor Dysfunction in Hemiplegia. *Assistive Technology* 2000; 12: 33-49.
- Chae J*, Yu D, Walker ME. Percutaneous, Intramuscular Neuromuscular Electrical Stimulation for the Treatment of Shoulder Subluxation and Pain in Chronic Hemiplegia: A Case Report. *Am J Phys Med Rehabil* 2001; 80: 296-301.
- Yu DT, *Chae J*, Fang Z-P, Walker ME. Percutaneous intramuscular neuromuscular electrical stimulation for treating shoulder subluxation and pain in chronic hemiplegia: A pilot study. *Arch Phys Med Rehabil* 2001; 82:20-5.
- Chae J*, Hart R, Knutson J, Fang Z-P. Sensitivity and Selectivity of Intramuscular and Transcutaneous Recording Electrodes in Detecting EMG Signals from Adjacent Forearm Muscles. *Am J Phys Med Rehabil* 2001; 80: 374-379.
- Yu DT, *Chae J*, Walker ME, Hart RL, Petroski GG. A comparison of pain associated with percutaneous intramuscular and transcutaneous neuromuscular electrical stimulation for treating shoulder subluxation in hemiplegia. *Arch Phys Med Rehabil* 2001; 82: 756-60.
- Chae J*, Fang Z-P, Walker M, Pourmedhdi S, Knutson J. Intramuscular EMG Controlled Neuromuscular Electrical Stimulation for Ankle Dorsiflexion Recovery in Chronic Hemiplegia. *Am J Phys Med Rehabil* 2001; 80: 842-847.
- Chae J*, Fang Z-P, Walker M, Pourmehdi S. Intramuscular EMG Controlled Neuromuscular Electrical Stimulation for Upper Extremity Recovery in Chronic Hemiplegia. *Am J Phys Med Rehabil* 2001; 80: 935-941.
- Chae J*, Yu, D. Neuromuscular electrical stimulation for motor restoration in hemiparesis. *Top Stroke Rehabil* 2002; 8:24-39.
- Chae J*, Yang, G, Park BK, Labatia I. Delay in initiation and termination of muscle contraction, motor impairment and physical disability in upper limb hemiparesis. *Muscle Nerve*, 2002; 25: 568-575.
- Chae J*, Yang G, Park BK, Labatia I. Muscle Weakness and Co-contraction in Upper Limb Hemiparesis: Relationship to Motor Impairment and Physical Disability. *Neurorehabil Neural Repair*, 2002; 16: 241-248.
- Yu DT, *Chae J*. Neuromuscular stimulation for shoulder dysfunction in hemiplegia. *Critical Reviews in Physical Medicine and Rehabilitation*, 2002; 14: 1-23.
- Chae J*, Triolo R, Kilgore K, Creasey G, DiMarco A. Neuromuscular Electrical Stimulation in Spinal Cord Injury. In: Kirshblum S, Campagnolo D, Delisa J., eds. *Spinal Cord Injury Medicine*. Philadelphia, Lippincott Williams and Wilkins, 2002; 360-388.
- Chae J*, Yang G, Labatia I. Upper limb motor function in chronic hemiparesis: Concurrent validity of the Arm Motor Ability Test. *Am J Phys Med Rehabil* 2003; 82: 1-8.
- Chae J*. Neuromuscular Electrical Stimulation for Motor Relearning in Hemiparesis. *Phys Med Rehabil Clin N Am* 2003; S93-S109.
- Park BK, *Chae J*, Lee YH, Yang G, Labatia I. Median nerve somatosensory evoked potentials and upper limb motor function in hemiparesis. *Electromyogr Clin Neurophysiol*, 2003; 43: 169-179.
- Chae J*, Hart R. Intramuscular hand neuroprosthesis for chronic stroke survivors. *Neurorehabil Neural Repair* 2003; 17: 109-117.
- Yu DT, *Chae J*, Walker ME, Kirsteins A, Elovic EP, Flanagan SR, Harvey RL, Zorowitz RD, Frost FS, Grill JH, Feldstein M., Fang ZP. Intramuscular neuromuscular electrical stimulation for post-stroke shoulder pain: A multi-center randomized clinical trial. *Arch Phys Med Rehabil* 2004; 85: 695-704.
- Chae J*, Kilgore K, Triolo R, Creasey G, DiMarco A. Functional Neuromuscular Stimulation. In: DeLisa, J., Gans, D., eds. *Rehabilitation Medicine: Principles and Practice*. 5th ed. Philadelphia: J. B. Lippincott Company, *in-press*.

C. Research Support. List selected ongoing or completed (during the last three years) research projects (federal and non-federal support). Begin with the projects that are most relevant to the research proposed in this application. Briefly indicate the overall goals of the projects and responsibilities of principal investigator identified above.

ONGOING

1R01 HD044816 (PI: Chae)

1-1-05 to 12-30-09

NIH-NICHD

FES for Footdrop in Hemiparesis

The objective of this study is to evaluate the motor relearning effect of ambulation training with peroneal nerve stimulation. This is a single-blinded randomized clinical trial with follow-up to 6-mo post completion of treatment.

1R01HD39913-01 (PI: Chae)

5-1-01 to 4-30-05

NIH-NICHD

Electrostimulation for hemiplegia

The objective of this study is to demonstrate the efficacy of EMG-controlled neuromuscular electrical stimulation in enhancing the upper limb motor recovery of chronic stroke survivors as reflected by objective measures of motor impairment and physical disability. The study consists of a double-blinded, placebo controlled, randomized clinical trial with follow-up of up to one-year post completion of treatment.

BRTT03-10 (PI: Peckham)

7-1-03 to 6-30-06

State of Ohio

Neurostimulation and Neuromodulation Partnership

The goal of the Ohio Neurostimulation and Neuromodulation Partnership is to develop an alliance between the academic and commercial sectors that will provide a mechanism to commercialize the extraordinary findings and technologies developed in the Ohio in the area of neurostimulation

1R43HD045103 (PI: Fang)

8-1-03 to 7-30-04

NIH-NICHD

Intramuscular Electrical Stimulation for Low Back Pain

The objective of this SBIR phase I study is to demonstrate the safety and clinical efficacy of percutaneous intramuscular electrical stimulation in reducing chronic low back pain. This is an exploratory case series clinical trial with follow-up to 6-mo post completion of treatment.

COMPLETED

1 R29 HD35616-01 (PI: Chae)

7-1-98 to 6-30-03

NIH-NICHD

Electrostimulation for stroke rehabilitation: Effects and mechanisms.

The goal of this FIRST award project is to assess the efficacy of EMG-controlled neuromuscular stimulation in facilitating the motor recovery of chronic stroke survivors as reflected by neurophysiologic measures of central motor function.

(PI: Yu; Co-PI: Chae)

1-1-00 to 6-30-03

NeuroControl Corporation

Evaluation of a 6-week Percutaneous Neuromuscular Stimulation Regimen for Treating Shoulder Subluxation and Pain in Post-Stroke Individuals

The objective of this study is to demonstrate the safety and clinical efficacy of percutaneous intramuscular electrical stimulation in reducing shoulder pain in persons with chronic hemiparesis. This is a multi-center, single-blinded randomized clinical trial with follow-up to one-year post completion of treatment.

1 R43 NS36484 (PI: Fang; Co-PI: Chae)

4-1-00 to 3-30-02

NIH-NINDS

EMG-controlled stimulator for stroke rehabilitation

This SBIR phase II project 1) further develops and tests the tripolar electrode introduced in phase I and 2) evaluates the efficacy of EMG-controlled neuromuscular stimulation in facilitating the motor recovery of acute stroke survivors.