

EXPERIENCES

Aug. '08 - present
Aug. '06 - Aug. '08

Research Scientist
Post Doctoral Fellow

Center for Adaptive Neural Systems, Arizona State University

- ***Adaptive electrical stimulation for locomotor retraining after spinal cord injury:*** The goal of this study is to develop strategies for FES (functional electrical stimulation)-assisted intervention that accelerates and enhances the recovery following spinal cord injury by tapping into the intrinsic plasticity of the nervous system. Designed and implemented a rodent model FES system that includes body weight support and cutaneous input systems and an adaptive controller to electrically evoke limb swing movements. Conducted experiments to evaluate the controller's ability to use agonist/antagonist control to control cyclic movements of the limb over extended trials for chronic training.
- ***Neural-enabled prostheses for sensorimotor integration:*** The goal is clinical delivery of prosthetic systems that integrate versatile, sensory-enabled artificial limbs with amputee. Manufactured intrafascicle electrodes. As a prelude to human testing, conducting experiments that use the phrenic nerve preparation to characterize the ability of recording/stimulating of the customized intrafascicular electrodes.
- ***Therapeutic neuromodulation approach to better management for urinary dysfunction:*** Demonstrating feasibility of electrical stimulation-assisted therapy that can promote any beneficial plasticity of bladder function related reflexes following urinary dysfunction and also characterizing the optimized therapeutic intervention to enhance bladder management after injury.

Dec. '02-June '06

Research Assistant

Bioengineering (Neural Interfaces/advisor: Dr. Richard A. Normann),
University of Utah

- ***The feasibility of an intraneural auditory prosthesis stimulating electrode array:*** Contributed to the development of a novel auditory prosthesis using intraneural auditory nerve stimulation via penetrating microelectrode arrays than could overcome inherent problems of the traditional cochlear implants.
- ***Electrophysiological Recording of Primary Auditory Cortex:*** Constructed a functional model of primary auditory cortex using high electrode count, microelectrode array recording in an acute feline preparation.

Sep. '04 –July '06

Exhibit Developer

Utah Science Center (Museum), Salt Lake City

- ***Development of scientific interactive exhibits:*** The Utah Science Center provides visitors with interactive exhibits to facilitate personal scientific revelations through personal and hands-on experiments. Designed, implemented, and maintained several hands-on exhibits.

Jan. '03-May'03

Teaching Assistant (*Course: Fundamental of Biomedical Engineering*)
Bioengineering, University of Utah

Sep. '99–Aug. '01

Research Assistant

Bioengineering (Biomechanics/advisor: Dr. Kent N. Bachus), University of Utah

- **Biomechanical study of transfer of posterior tibialis tendons:** Tested different tendon transfer routing methods for surgeons to better choose them in correcting foot drop. Developed and implemented the method of accurate measurement of rotational joint angle using a motion capturing device.

July '95–Jan. '98

Korean Oversea Volunteer

Consultant & Teacher, Cebu & Bicol Colleges, Philippines

- Consulted about adjusting educational curriculums. Offered and developed a course material (lab experimental tutorial for mechatronics). Developed a CNC machining simulation program

Mar. '93–Mar. '95

Research Assistant

Mechanical Engineering (Robotics/advisor: Dr. Youngil Youm, POSTECH, Korea)

- **Development of a Powered Prosthetic Arm Controlled by Electromyogram (EMG) Signals:** Designed and built a 3-degree of freedom powered artificial arm and also developed its control algorithm using neural network theory to provide a better control strategy.

INVITED REVIEWER

(Journal) IEEE Transactions on Biomedical Engineering, 2007.

(Conference) 3rd International Conference on Body Area Networks, 2008.

(Journal) IEEE Transactions on Biomedical Engineering, 2008.

PEER-REVIEWED PUBLICATIONS

D'astous JL, Macwilliams BA, **Kim SJ**, Bachus KN, "Superficial Versus Deep Transfer of the Posterior Tibialis Tendon", J Pediatr Orthop. 2005 March/April; 25(2):245-248.

Seung-Jae Kim, Hwasoon Choi, Yougil Youm, "Development of strategies for myoelectric prosthetic control", J. Biomed. Eng. Res. Vol.26, No.4, 243-249, 2005

Kim SJ, Manyam S, Warren D, Normann RA, "Electrophysiological Mapping of Cat in Primary Auditory Cortex with Microelectrode Arrays", Ann Biomed Eng. 2006 Feb;34(2):300-9. Epub 2006 Feb 16.

Kim SJ, Badi AN, Normann RA, "Neuronal Responses in Cat Primary Auditory Cortex to Direct Intraneural Auditory Nerve Stimulation", Laryngoscope. 2007 Jun;117(6):1053-62.

Kim SJ, Mallika Fairchild, Alexandre Iarkov, James Abbas, Ranu Jung, "Adaptive control for functional neuromuscular stimulation movement therapy", IEEE Trans Neural Syst Rehabil Eng. 2008, In print.

IN REVIEW

Kim SJ, Hillen BK, Jung R, "Solving the Inaccurate Alignment Problem by Using a Virtual Reference Coordinate System", Submitted to Foot & Ankle International.

PEER-REVIEWED CONFERNCES AND ABSTRACTS

Kim SJ, Boninger M, Cooper R, Koontz A, Souza A, "Wheelchair Braking Biomechanics", Resna Conference, Menneapolis, Minesota, July, 2002

Badi A.N., **Kim S. J.**, Shelton C., Normann R.A., "Electrode Independence in a Novel VIII Nerve Auditory Prostheses". Society for Neuroscience, New Orleans, 2003.

Kim SJ, Manyam S, Badi AN, Normann RA, "Neural Responses in Feline Auditory Cortex to Direct Auditory Nerve Stimulation", Soc. Neurosci. Abs., 2004.

Kim SJ, Badi AN, Normann RA, "Electrophysiological Mapping of Cat Primary Auditory Cortex with Microelectrode Arrays", Soc. Neurosci. Abs., 2005.

Kim SJ, Mukherjee M, Jung R, "Adaptive electrical stimulation for rodent locomotion training produces fatigue-resistant responses", Int. Neurotrauma Symposium, 2007.

Kim SJ, Mukherjee M, Jung R, "Adaptive Control for Neuromuscular Stimulation Therapy in an Intermittent Training Paradigm", BMES, 2007.

Kim J, Cho S, **Kim SJ**, "Preliminary Studies to Develop a Ubiquitous Computing and Health-monitoring System for Wheelchair Users", BodyNets, Tempe, AZ, March, 2008.

Andrade J, **Kim SJ**, Christensen D.A., "Bioengineering Education via Projects and Activities for an Interactive Science Center: the University of Utah Experience", 3rd Biomedical Engineering Education Summit Meeting, St. Charles, IL, June, 2008.

Abbas J, **Kim SJ**, Fairchild M, Allison S, Krishnamurthi N, Jung R, "On the Use of Adaptive Control in Stimulation-Assisted Neuromotor Therapy", International FES Society Conference, German, 2008

THESIS

Kim, SJ, *Neuronal Responses in Feline Primary Auditory Cortex to Acoustic and Direct Intraneural Auditory Nerve Stimulation*. Doctoral Philosophy in Bioengineering, University of Utah, August 2006.

Kim, SJ, *Biomechanical Study of Transfer of Posterior Tibialis Tendons: Comparison of Various Route Methods*. Master Thesis, University of Utah, August 2001.

Kim, SJ, *Development of a Prosthetic Arm & It's Control by Bioelectric Signals*. Master Thesis, Pohang University of Science & Technology, March 1995.

COMPUTER SKILLS

Matlab, LabVIEW, Visual C++, C++, Visual Basic, AutoCAD, SolidWorks, MacroMedia
Flash & Dreamweaver, SPSS

COMMUNITY SERVICES

Sep. '02–July '06 Volunteer for Meals-on-Wheels: Delivering meals to homebound seniors
June '03–June '04 The President of Korean Student Association of University of Utah

The electric resume (<http://biokimcom.g3.cc/resumeJAE.html>) provides my experiences in more detail.