

# Anil Kumar Thota

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## EDUCATION

**Master of Science: Biomedical Engineering, Neural Engineering**

Case Western Reserve University, 2012

**Master of Science: Biomedical Engineering, Rehabilitation Engineering**

University of Kentucky, 2004

**Bachelor of Engineering: Biomedical Engineering**

Osmania University Hyderabad, Andhra Pradesh, 1998

## TECHNICAL SKILLS

**Programming:** MATLAB®, Simulink, LabVIEW, SPSS®, Python, Tableau

**Productivity Tools:** MS Access, Outlook, Word, Excel, PowerPoint, XPP

**Web Programming:** CMS software (Joomla), PHP, HTML, MySQL

## PROFESSIONAL EXPERIENCE

**Florida International University, Department of Biomedical Engineering - *Research Scientist***

*Miami, FL. February 2016 – Present; Research Associate April 2012 – February 2016*

- Design and development of MATLAB®, Python software routines to parse hundreds of records of text data for data management, data processing, data analysis, and reporting.
- Co-mentored master's student in using Machine Learning Tools for analyzing EEG data obtained while human volunteer participants were performing different types of meditation.
- Implemented target tracking by virtual prosthetic hand in Virtual Integrated Environment to improve the performance of the control of the prosthetic hand by decoded real-time EMG signals.
- Develop experimental methods and standard operating procedures for conducting and supervising preclinical animal studies as well as clinical human research trials.
- Designed, developed and supervised the collection of synchronized multimodal data that include data from wearables, kinematic, kinetic, imaging (fMRI, fNIRS), and neural (EMG, EEG) to ensure acquiring reliable outcome measures necessary for successful project completion.
- Led the development of the "Hand Usage Monitor" standalone module based on Python powered micro-controller board that complements the clinical effectiveness of the implanted device in the real-world environment.
- Developed algorithms using data from wearables to track the improvement or change in the balance of an amputee fitted with a new or updated prosthetic leg.
- Extract business/research needs from the pilot data/literature review to submit grant proposals as Principal Investigator.
- Collaborate and work in multi-team environments with multi-disciplinary teams that include students, professors, clinicians, administrative staff, vendors, and contract manufacturers.
- Write, edit, and publish technical writings, manuscripts, papers, presentations, and grant preparation and submissions.
- Mentor graduate, undergraduate, and high school students and provided technical support to laboratory group members in their research projects.
- Managed financial tracking, gather and create project reports, attend/initiate project status meetings.

**Cleveland Clinic, Department of Biomedical Engineering - *Research Engineer***

*Cleveland, OH. September 2005 – April 2012*

- Played key roles in the development of a one-of-a-kind mobile app that serves as a clinical diagnostic (aid) tool for balance problems in people with mTBI (sports concussion).
- Implementing, analyzing, and reporting projects that evaluate the efficacy of Deep Brain Stimulation parameter adjustments in Parkinson's disease patients.
- Served as internal consultant/subject matter expert for device development, data collection and analysis software requirements for projects carried out by post-doctoral fellows, and research scientists.

- Developed Biomedical Instrumentation Laboratory course for senior undergraduate students at Case Western Reserve University to teach the fundamentals of data acquisition and analyzing biomedical signals.

### **Arizona State University, Department of Biomedical Engineering - Research Engineer**

*Tempe, AZ. March 2004 – September 2005*

- Managed resources, personnel, and data collection processes for projects involving functional electrical stimulation therapy in incomplete spinal cord injury rodent animal models.
- Documented (written and video) standard operating procedures (SOP) for all the research techniques, protocols, and research equipment usage.

### **Harvard-MIT Division of Health Sciences and Technology - Visiting Scholar**

*Cambridge, MA. May 2003 – February 2004*

- Performed experiments for the project to understand the synaptic plasticity (memory and learning) involving rodent surgery, management, and data analysis.
- Provided technical and analytical assistance to the scientists and post-docs in the lab.
- Modernized research equipment, optimized laboratory space, and maintained computer hardware.

### **University of Kentucky, Department of Biomedical Engineering - Research Assistant**

*Lexington, KY. August 2000 – April 2003*

- Collaborated on projects aimed at understanding recovery after Spinal Cord Injury.
- Designed experimental setup, performed chronic surgeries in rodent animal models, performed animal care, and analyzed 3-D kinematic data collected in synchronous with EMG signals using MATLAB<sup>®</sup> and LabVIEW.

### **Swarn Jayanthi Samudiak Hospital - Biomedical Engineer**

*Mathura, India. September 1999 – July 2000*

- Installed biomedical equipment and designed a layout for laboratories in a 50-Bed super specialty hospital.
- Provided training for paramedics and orientation programs for doctors for safe equipment handling.
- Maintained vendor warranties and service contracts for laboratory equipment to ensure prompt service.

### **Osmania University, Department of Biomedical Engineering - Assistant Professor/Research Assistant**

*Pradesh, India. June 1998 – August 1999*

- Taught Biomedical Signal Processing (BMSP) for senior undergraduate students.
- Developed MATLAB<sup>®</sup> routines to reduce speckle noise from ultrasound data for better visualization.

## **PUBLICATIONS AND PRESENTATIONS**

### Patents

1. A. K. Thota, R. Jung, S. S. Kuntaegowdanahalli, “Multi-lead Multi-electrode Management System.” Patent No. US9409009 B2, Aug 9, 2016
2. A. K. Thota, R. Jung, S. S. Kuntaegowdanahalli, “Multi-lead Multi-electrode Management System.” Patent No. US10,384,057B2, Aug 20, 2019

### Journal Publications

1. R. Jung, J.J. Abbas, S. S. Kuntaegowdanahalli, and A. K. Thota “Bionic intrafascicular interfaces for recording and stimulating peripheral nerve fibers”, *Bioelectronics in Medicine*, 12/2017; DOI: 10.2217/bem-2017-0009
2. J. Alberts, M. Phillips, M. Lowe, A. Frankemolle, A. Thota, E. Beall, M. Feldman, A. Ahmed and A. Ridgel, 2016. “Cortical and motor responses to acute forced exercise in Parkinson’s disease”. *Parkinsonism & Related Disorders*, 01/2016
3. J. Alberts, A. Thota, J. Hirsch, S. Ozinga, T. Dey, D. Schindler, M. M. Koop, D. Burke and S. Linder, “Quantification of the Balance Error Scoring System with Portable Technology”, *Medicine & Science in Sports & Exercise*, 01/2015; DOI: 10.1249/MSS.0000000000000656
4. J. Alberts, J. Hirsch, M. M. Koop, D. Schindler, D. Kana, S. Linder, S. Campbell, and A. Thota “Quantification of Postural Stability Using Accelerometer and Gyroscopic Measures”, *Journal of Athletic Training*, 04/2015; DOI: 10.4085/1062-6050-50.2.01
5. A. K. Thota, S. S. Kuntaegowdanahalli, J. Orbay, A. K. Starosiak, J. Abbas, J. Orbay, K. W. Horch, and R. Jung “A system and method to interface with multiple groups of neurons in several fascicles of peripheral nerves”, *Journal of Neuroscience Methods*, 08/2014; DOI: 10.1016/j.jneumeth.2014.07.020

6. E. B. Beall, M. J. Lowe, J. L. Alberts, A. M. M. Frankemolle, A. K. Thota, C. Shah and M. D. Phillips “The Effect of Forced-Exercise Therapy for Parkinson's Disease on Motor Cortex Functional Connectivity”, *Brain connectivity* 3 (2), 190-198, 2013
7. J. Alberts, K. Hallahan, A. Thota, A. M. Noecker, J. L. Vitek and C. C. McIntyre, “Reducing cognitive-motor declines associated with bilateral subthalamic deep brain stimulation through computational modelling in a Parkinson's disease patient”. *J Neurol Neurosurg Psychiatry*. 81(10), 2010, 1170-2
8. L. Rosenstein, A. L. Ridgel, A. Thota, B. Samame and J. L. Alberts, Effects of Combined Robotic Therapy and Repetitive-Task practice on upper-extremity function in a patient with chronic stroke, *American Journal of Occupational Therapy*, 62(1), 2008, 28-35
9. A. K. Thota, S. Carlson, E. Knapp, B. Thompson, and R. Jung, Neuromechanical Control of Locomotion, *Journal of Neurotrauma*, 24(2), 2005, 442-465
10. A. Thota, S. Carlson and R. Jung, “Recovery of locomotor function after treadmill training of incomplete spinal cord injured rats”, *Biomedical Sci. Instrum*, 37, 2001, 63-67

#### Conference Publications

1. L. E. Lykholt, S. Ganeswarathas, A. K. Thota, K. R. Harreby, W. Jensen and R. Jung, “Information on Ankle Angle from Intramuscular EMG Signals during development of Muscle Fatigue in an Open-Loop Functional Electrical Stimulation system in Rats”, *Replace, Repair, Restore, Relieve – Bridging Clinical and Engineering Solutions in Neurorehabilitation*. W. Jensen, O. K. Andersen and M. Akay, Springer International Publishing, 7: 529-536, 2014 DOI: 10.1007/978-3-319-08072-7
2. A. K. Thota, and J. L. Alberts, “Novel use of retro-reflective paint to capture 3D kinematic gait data in non-human primates”, *Proceedings of the 29th Southern Biomedical Engineering Conference*, Miami: 113-114, 2013, DOI 10.1109/SBEC.2013.65.
3. A. K. Thota, S. S. Kuntaegowdanahalli, J. Orbay, A. K. Starosiak, J. Abbas, K. W. Horch, and R. Jung, “A multi-lead, multi-electrode system for neural interface-enabled advanced prostheses”, *Proceedings of the 29th Southern Biomedical Engineering Conference*, Miami: 109-110, 2013, DOI 10.1109/SBEC.2013.63
4. A. K. Thota and R. Jung, “Specific overground walking kinematic measures are related to degree of spinal injury in the rat”, *Proceedings of the 29th Southern Biomedical Engineering Conference*, Miami: 165-166, 2013, DOI 10.1109/SBEC.2013.91.
5. R. Jung, E.A. Knapp, A.K. Thota, B.T. Thompson, S. Mulligan, N. Ravi and A. Quick, “Quantitative outcome measures for assessing motor control in a rodent model of spinal contusion injury”, *Proceedings of the 2nd Joint EMBS-BMES Conference*, pg. 2556-7, Oct 23-26, 2002, Houston, TX

#### Oral Presentations

1. “Control of Ankle Movement by Stimulating with Longitudinal Intrafascicular Electrodes”, *Biomedical Engineering Society Annual Conference*, San Antonio, October 22-14, 2014
2. “True Crutch-Free Walking – A Neuromorphic Orthotic Control System”, 2014 Bioflorida annual conference, Fort Lauderdale, Florida, October 12-14, 2014
3. “True Crutch-Free Walking – A Neuromorphic Orthotic Control System”, SE/Bio plan competition, Richmond, Virginia, November 5-7, 2013
4. “Novel use of retro-reflective paint to capture 3D kinematic gait data in non-human primates”, 29th Southern Biomedical Engineering Conference, Miami, Florida, May 3-5, 2013.
5. “Adaptive control of endpoint position by weighted activation of force fields”, Annual Fall Meeting of the Biomedical Engineering Society, Duke University, Durham, North Carolina. Oct. 4-7, 2001
6. “Kinematic and Electromyographic analysis of treadmill walking after locomotor training in a rodent model of incomplete Spinal cord injury”, Department of PM&R, Kentucky Clinic, June 7th, 2001, University of Kentucky, Lexington, KY
7. “Recovery of locomotor function after treadmill training of incomplete spinal cord injured rats”, Annual Rocky Mountain Biomedical Symposium, Copper Mountain, CO Engineering Society, April 2001

#### Conference Poster Presentations

1. R. Jung, S. Kuntaegowdanahalli, A. Thota, A. Pena, K.W. Horch, J. Patrick and J. Abbas, “Neural-enabled prosthetic hand system to restore sensation in upper-limb amputees” Control No. 2018-S-12764-SfN, Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, November 3-7, 2018.
2. J.J. Abbas, S. Kuntaegowdanahalli, K.W. Horch, L. Ricon Gonzalez, A. E. Pena, A. K. Thota , B. K. Hillen, D. Aguilar, and R Jung, “Assessment of functional benefits afforded by sensory-enabled prostheses to upper-limb amputees” Control 2018-S-12778-SfN, Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, November 3-7, 2018.
3. V. Dargam, M. Beralt, A. Darcy Mahoney, R. Jung, A.K. Thota, L. Rincon Gonzalez, C. Myland and V. Leon, “Language proficiency and executive function: an fNIRS study” Control No. 2018-S-15797-SfN, Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, November 3-7, 2018.

4. V. Dargam, M. Beralt, A. Darcy Mahoney, R. Jung, A.K. Thota and L. Rincon Gonzalez, "Language proficiency and executive function: an fNIRS study", Biomedical Engineering Society Conference, Atlanta, GA, October 17-20, 2018.
5. J.J. Abbas, S. Kuntaegowdanahalli, A. K. Thota, A. E. Pena, "Development of a sensory-enabled neuroprosthetic hand system", Military Health System Research Symposium, August 20-23, 2018, Orlando. FL.
6. I. Black , J. Abbas, K.W. Horch, A. Thota and R. Jung, "Development of a rootlet interface to localize cutaneous stimuli applied to specific regions of the rat hindlimb" Control No. 2016S3863SfN, Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, November 12-16, 2016. Online.
7. R. Siu, B Hillen, A. Thota, J. Abbas, S. Renaud, R. Jung. "Parametrization of a closed-loop adaptive controller for respiratory pacing in a rodent model". Control No. 2016-S-12427-SfN. Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, November 12-16, 2016. Online.
8. C. Joshi, A. K. Thota, S. U. Pragma and R. Jung, "EEG Spectral Changes before and after an eight week intervention period of Preksha Meditation", 13th Annual Conference of Society of Brain Mapping and Therapeutics, Miami, FL, April 8-10, 2016.
9. A. K. Thota, S. Kuntaegowdanahalli, K Horch, J. Abbas, and R. Jung, "Biocompatibility Testing of an Implantable Intrafascicular Electrode System in Rabbits", Society of Neuroscience, Chicago, October 17-21, 2015.
10. A. K. Thota, S. Kuntaegowdanahalli, R. Siu, J. Abbas, and R. Jung, "Evaluation of an Implantable Intrafascicular Electrode System in Rodents", Society of Neuroscience, Chicago, October 17-21, 2015.
11. A. Arrinda, J. Loayza, G. Oscar, P. Juan, A. K. Thota, R. Jung, "Quantitative Analysis of Balance Control in Amputees Using Portable Device", Biomedical Engineering Society Annual Conference, Tampa, October 7-11, 2015
12. R. Siu, B. Hillen, A. Thota, J. Abbas, S. Renaud, R. Jung, "Adaptive control of lung volume for respiratory pacing in the rodent model", Collaborative Research in Computational Neuroscience (CRCNS) PI Meeting, Seattle, Washington , September 28-30, 2015.
13. J. Loayza, A. Arrinda, A. Konjengbam, A. Alfred, A. K. Thota, R. Jung, "Quantitative Assessment of Gait and Balance for Determining Alignment Parameters for Prosthetic Fitting", Biomedical Engineering Society Annual Conference, San Antonio, October 22-14, 2014
14. T. Bejarano, A. K. Thota, D. Brunt, R. Jung, "Comparison of Neuromuscular Activity during the Lateral Step Task in Younger and Older Adults, San Antonio, October 22-14, 2014
15. S. Linder, J. Hirsch, M. Koop, D. Schindler, A. Thota and J. Alberts "Quantification of Postural Stability Using Accelerometer and Gyroscopic Measures from the iPad", American Academy of Neurology, Philadelphia, April, 2014
16. M. Abdelghani, A. K. Thota, J. J. Abbas, K. W. Horch, and R. Jung, "Recording Motor Activity in Human Subjects", Defense Advanced Research Projects Agency RE-NET PI Meeting, Scottsdale, Arizona, February 2014.
17. K. A. Mills, L. C. Markun, M. San Luciano, A. Thota, C. A. Racine, P. A. Starr, J. L. Alberts and J. L. Ostrem, "Effects of STN DBS for dystonia on dual-task cognitive function", 17th international congress of Parkinson's disease and Movement Disorders, Sydney, Australia, June, 2013
18. A. K. Thota and R. Jung, "Specific overground walking kinematic measures are related to degree of spinal injury in the rat", 29th Southern Biomedical Engineering Conference, Miami, May 2013.
19. A. K. Thota, S. S. Kuntaegowdanahalli and R. Jung, "Multi-lead multi-longitudinal intrafascicular electrode system for neural recording", Defense Advanced Research Projects Agency RE-NET PI Meeting, New Orleans, Louisiana, November 2012.
20. A. K. Thota, Susan M. Linder, Joshua R. Hirsch, Scott Campbell, Dan Kana, Sarah Richardson, Steven M. Sidik and Jay L. Alberts. "Quantitative and objective assessment of postural stability using accelerometer and gyroscope in-the-field following sport-related concussion", 2nd Annual Traumatic Brain Injury conference, Washington D.C., March, 2012
21. E. B. Beall, A. K. Thota, A. M. M. Frankemolle, J. L. Alberts, M. D. Phillips and M. J. Lowe, "Altered motor resting state fcMRI in Parkinson's disease with forced exercise vs medication." Organization for Human Brain Mapping 2011; 2686, Quebec City, Canada
22. J. L. Alberts, E. B. Beall, A. M. M. Frankemolle, A. K. Thota, M. D. Phillips and A. L. Penko, "Pattern of alterations in motor circuit resting state fcMRI in Parkinson's Disease patients due to medication and forced exercise", J. Sport Exerc. Psychol. 2011 Jun.; 33:S48-S49
23. A. K. Thota, W. Xu J. R. Hirsch, Z. I. Wang, J. Zhang, J. L. Vitek and J. L. Alberts, "Upper extremity motor function assessment for non-human primates, a novel modification of the Klüver board task and computer-assisted analysis of movement kinematics", Society of Neuroscience, 459.23/P1, Nov 10-17, 2010, San Diego, CA
24. A. K. Thota, I. Z. Wang, K. Baker J. Zhang, W. Xu, J. Vitek and J. L. Alberts, "Biomechanical assessment of normal and parkinsonian gait in the non-human primate during treadmill locomotion", 271.24/CC52, Society of Neuroscience, Oct 14-21, 2009, Chicago, IL
25. R. Kaw, A. Thota and O. Minai, "Pulmonary hypertension in obese patients: an analysis of hemodynamic data", Chest 2008 134: p134003
26. A. K. Thota, C. Maks, C. C. McIntyre and J. L. Alberts, "Deep brain stimulation parameter selection with quantitative biomechanical and computational models", Society of Neuroscience, 693.4/N6, Nov 3-7, 2007, San Diego, CA.

27. A. K. Thota, C. Maks, C. C. McIntyre and J. L. Alberts, "A Biomechanical And Computational Approach To Deep Brain Stimulation Parameter Selection", Biomedical Engineering Society, P5.94, Sep 27-29, 2007, Los Angeles, CA
28. J. V. Lynskey, A. Belanger, T. Kanchiku, G. Venkatasubramanian, M. Mukherjee, A. Thota, J. Abbas and R. Jung, "Therapeutic Neuromuscular Stimulation Therapy Improves Recovery of Locomotion after Incomplete Spinal Cord Injury in Adult Rats", 11th International Symposium on Neural Regeneration, December 14-18, 2005, Asilomar, CA
29. M. Mukherjee, A. Belanger, T. Kanchiku, J. Lynskey, A. Thota, J. J. Abbas and R. Jung, "Functional neuromuscular stimulation after incomplete spinal cord injury in rodents promotes recovery of locomotion", National Neurotrauma Society, Nov 10-11, 2005, Washington, DC. Journal of Neurotrauma 22(10): 1220-1220 P222 OCT 2005
30. R. Jung, S. Carlson, E. Knapp, A. Thota, B. Thompson, N. Ravi, J. Alton and T. Coates, "Locomotor training in a rodent model of incomplete spinal cord injury". Journal of Neurotrauma 19(10): P359, pg. 1337, 2002
31. R. Jung, S. Carlson, L. Knapp, A. Thota, B. Thompson, N. Ravi, and T. Coates, "Locomotor training in a Rodent Model of Incomplete Spinal Cord Injury", 8th Annual Spinal Cord & Head Injury Research Symposium literature. June 24-26, 2002. Embassy Suits Hotel. Lexington, KY

### **PROFESSIONAL AFFILIATIONS**

Society of Neuroscience; IEEE Engineering in Medicine and Biology Society; Biomedical Engineering Society