

## Ming-Shaung Ju 朱銘祥

### Personal

Birth Year: 1956

Dept. of Mechanical Engineering

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### Current Appointment

Professor

Department of Mechanical Engineering

Institute of Nanotechnology and Microsystem Engineering

National Cheng Kung University

### Education:

PhD 1986 Mechanical and Aerospace Engineering, Case Western Reserve University  
Cleveland, Ohio, USA

MS 1982 Mechanical Engineering, National Cheng Kung University

BS 1978 Mechanical Engineering, National Cheng Kung University

### Academic Experiences:

1993-present Professor, Mechanical Engineering, National Cheng Kung University

2009/8-10 Visiting Scholar, Dept. of Mechanical Eng., University of Washington, Seattle  
USA

2009-current Editor, J of Mechanics in Medicine and Biology

2004-2006 Associate Dean, Engineering College, National Cheng Kung University

2002-2004 Associate Director, Yen Tjing-Ling Technology Research & Development Center,  
National Cheng Kung University

2000/8-12 Visiting Professor, San Jose State University, San Jose, CA, USA

1996-1999 Head, Department of Mechanical Engineering, National Cheng Kung University

1996/6-7 Visiting Scientist, Orthopedic Biomechanics Lab., Mayo Clinic, Minnesota, U.S.A

1987-1993 Associate Professor, Department of Mechanical Engineering, National Cheng  
Kung University

### Awards, Honor Societies:

- Member of the Phi Tau Phi Scholastic Honor Society (1987)
- Distinguished Young Engineering, Chinese Society of Mechanical Engineering (1995)
- Who's who in the World (1995)
- Board of Directors, Chinese Society of Mechanical Engineers, Kaohsiung Branch.
- Board of Supervisors, Biomedical Engineering of R.O.C.
- President, Board of Directors, Taiwanese Society of Biomechanics(2006-2007)

### Publications:

- More than 149 technical papers on referred journals and international conferences
- Three book chapters and four ROC patents

### Research Interests:

- Biomechanics of Peripheral Nerve
- EEG-based Brain Computer Interface and Neural Prosthesis
- Neuro-Rehabilitation Robots and Motor Control System
- Micro-system Technology for Minimally Invasive Biomedical Devices

## Recent Publications: (2005-2010)

### Journal papers

1. C.-C.K. Lin, M.-S. Ju, H.-W. Huang, "Gender and Age Effects on Elbow Joint Stiffness in Health Subjects," *Arch Phys Med Rehabil* v 86, **2005**, pp. 82-85.
2. B.-C. Kung, M.-S. Ju, C.-C.K. Lin, S.-M. Chen, "Clinical Assessment of Forearm Pronation/Supination Torque in Stroke Patients", *J. of Medical and Biological Engineering*, v 25, n1, **2005**, pp.39-43.
3. M.S. Ju, C.C.K. Lin, D.H. Lin, I.S. Hwang, S.M. Chen, "A Rehabilitation Robot with Force-Position Hybrid Fuzzy Controller: Hybrid Fuzzy Control of Rehabilitation Robot," *IEEE Trans Neural Sys. Rehab Eng*, v13, n3, **2005**, pp.349-358.
4. H.S Cheng., M.-S. Ju, C.-C. K. Lin, "Estimation of peroneal and tibial afferents from a multi-channel cuff placed on the sciatic nerve," *Muscle & Nerve*, v 32, **2005**, pp.589-599.
5. M.-S. Ju, C.-C. K. Lin, J.-L. Fan, R.-J. Chen, "Transverse elasticity and blood perfusion of sciatic nerves under in situ circular compression," *J. of Biomechanics*, v 39, **2006**, pp.97-102.
6. C. H. Chang, J. D. Liao, J. J. J. Chen, M. S. Ju and C. C. Lin, "Alkanethiolate self-assembly monolayers upon Au-deposited nerve microelectrode: cell adhesion examined by total impedance and cell detachment force", *Nanotechnology*, v 17, **2006**, pp. 2449-2457.
7. C.K. Chung, P.K. Fung, Y.Z. Hong, M.S. Ju, C.C.K. Lin, T.C. Wu, "A novel fabrication of ionic polymer-metal composites (IPMC) actuator with silver nano-powders," *Sensors and Actuators B*, v 117, n2, **2006**, pp.367-375.
8. C.-C. Chiang, C.-C.K. Lin and M.-S. Ju, "An Implantable Capacitive Pressure Sensor for Biomedical Applications", *Sensors and Actuators: A Physical*, v 134, March **2007**, pp.382-388.
9. C.-C. K. Lin, M.-S. Ju, H.-W Huang, "Muscle Tone in Diabetic Polyneuropathy Evaluated by Quantitative Pendulum Test", *Arch Phys Med & Rehab* v 88, **2007**, pp. 368-373.
10. C.-W. Chen, C.-C. K. Lin, M.-S. Ju, "Detecting Movement-Related EEG Change by Wavelet Decomposition- Based Neural Networks Trained with Single Thumb Movement," *Clinical Neurophysiology*, v 118, n4, April **2007**, pp. 802-814.
11. W.-Y. Hsu, C.-C. Lin, M.-S. Ju, Y.-N. Sun, "Wavelet-based fractal features with active segment selection: Application to single-trial EEG data", *Journal of Neuroscience Methods*, v 163, June **2007**, pp. 145-160.
12. C.-C. K. Lin, M.-S. Ju, H.-S Cheng, "Model-based ankle joint angle tracing by cuff electrode recordings of peroneal and tibial nerves", *Med Biol Eng & Comput*, v 45, n 4, Apr., **2007**, pp. **375-385**.
13. B.-K. Fang, M.-S. Ju and C.-C.K. Lin, "A new approach to develop ionic polymer-metal composites (IPMC) actuator: fabrication and control for active catheter systems," *Sensors and Actuators: A Physical*, v 137, July, **2007**, pp.321-329.
14. C.-C. K. Lin, M.-S. Ju, "Applying Stochastic Resonance to Magnify  $\alpha$  and  $\beta$  Wave Suppression," *Computers in Biology and Medicine*, v38, n10, **2008**, pp.1068-1075.
15. C.L. Huang, C.W. Chang, J.D. Liao, Y.T. Wu, M.S. Ju, C.C.K. Lin, "Cells anchored upon a thin organic film with different nano-mechanical properties," *Applied Surface Science*, v 255, **2008**, pp.301-303.

16. C.-C. K. Lin, M.-S. Ju, S.-M. Chen, B.-W. Pan, "A specialized robot for active ankle rehabilitation and evaluation," *J of Medical & Biological Engrg.* v28, n2, June, **2008**, pp. 79-86. (**JMBE 2008 Outstanding paper**)
17. H.-H. Lin, B.-K. Fang, M.-S. Ju and C.-C.K. Lin, "Control of Ionic Polymer-Metal Composites (IPMC) for Active Catheter Systems via Linear Parameter-Varying (LPV) Approach", *J Intelligent Material Systems & Structures*, Feb **2009**; v20: pp. 273 - 282.
18. C.-W. Chen, M.-S. Ju, Y.-N. Sun, C.-C.K. Lin, "Model analyses of visual biofeedback training for EEG-based brain-computer interface," *J. of Computational Neuroscience* Oct. **2009**, v27, pp. 357-368.
19. C.-L. Huang, J.-D. Liao, C.-F. Yang, C.-W. Chang, M.-S. Ju, C.-C.K. Lin, " Cell adhesion over two distinct surfaces varied with chemical and mechanical properties," *Thin Solid Films* **2009**, v517, pp. 5386-5389.
20. C.-W. Chen, C.-C. K. Lin, M.-S. Ju, "Hand Orthosis Controlled by Using Brain-Computer Interface," *J of Medical & Biological Engrg.* Oct. **2009**, v29, n5, pp.234-241. (**JMBE 2009 Best Paper Award**)
21. H.-W. Huang, M.-S. Ju, W.-C. Wang, C.-C.K. Lin, "Muscle Tone of Upper Limbs Evaluated by Quantitative Pendulum Test in Patients with Acute Cerebellar Stroke," *J of Acta Neurologica Taiwanica*, Dec. **2009**, v 18, n 4, pp. 250-254.
22. R.-J. Chen, C.-C.K. Lin, M.-S. Ju, "In Situ Biomechanical Properties of Normal and Diabetic Nerves: An Efficient Quasi-Linear Viscoelastic Approach," accepted by *J of Biomechanics* (Dec. **2009**) doi:10.1016/j.jbiomech.2009.12.002
23. R.-J. Chen, C.-C.K. Lin, M.-S. Ju, "Quasi-Linear-Viscoelastic Properties of PC-12 Neuron-Like Cells Measured Using Atomic Force Microscopy," accepted by *J of Inst of Chinese Eng.* (Nov. **2009**)
24. C.-C.K. Lin, Y.N. Sun, M.-S. Ju. "Cortical representation area of face and neck by tactile stimulation: fMRI study," accepted by *Human Brain Mapping.* (Nov. **2009**)
25. B.K. Fang, C.-C.K. Lin, M.-S. Ju, "Development of Sensing/Actuating Ionic Polymer Metal-Composite (IPMC) for Active Guide-Wire System," *Sensors & Actuators: A. Physical.* Jan. **2010**, v 158, pp. 1-9.
26. R.-J. Chen, C.-C.K. Lin, M.-S. Ju, "In situ Transverse Elasticity and Blood Perfusion Change of Sciatic Nerves in Normal and Diabetic Rats," accepted *Clinical Biomechanics.* (Jan. **2010**) doi:10.1016/j.clinbiomech.2010.01.013

#### **Conference papers (2005-2010)**

1. M.-S. Ju, C.-C. K. Lin, R.-J. Chen, J.-L. Fan "Transverse Biomechanics of Peripheral Nerve and Its Applications," *79<sup>th</sup> International Center of Biocybernetics Seminar on Biomechanics of Tissue, Computer Aided Surgery and Micromechanics*, Warsaw, Poland, March 4-5, 2005. (**Invited Speech**)
2. C.K. Chung, Z.Y. Hong, P.K. Fung, M.S. Ju, C.-C.K.Lin, T.C. Wu, "A Novel Fabrication of Ionic Polymer-Metal Composite (IPMC) Actuator with Silver Nano-Powders," *The 13<sup>th</sup> International Conf. on Solid-State Sensors, Actuators and Microsystems, (Transducers '05)*, Seoul, Korea, June 5-9, 2005.
3. M.-S. Ju, P.-K. Fung, C.-C.K. Lin, Y.-Z. Hong, C.-K. Chung, T.-C. Wu, "Cardiac Catheter With Variable Head Curvature Actuated By IPMC (Ionic Polymer-Metal Composite)," *XXth Congress of the International Society of Biomechanics and 29th Annual Meeting of the American Society of Biomechanics*, Ohio, USA, Aug. 1-5, 2005.
4. Z.-W. Wu, M.-S. Ju, C.-C.K. Lin, "Muscle Coordination In Stroke Patients' Upper Limbs," *XXth Congress of the International Society of Biomechanics and 29th Annual Meeting of the American Society of Biomechanics*, Ohio, USA, Aug. 1-5, 2005.

5. C.-C. K. Lin, M.-C. Chen, S.-N. Yu, M.-S. Ju, "Chronic Electrical Stimulation of Four Acupuncture Points on Rat Diabetic Neuropathy," *The 27<sup>th</sup> Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, Shanghai, China, Sep. 1-4, 2005.
6. H.-S. Cheng, M.-S. Ju, C.-C.K. Lin and H.-L. Lin, "Trajectory Estimation of Rabbits Ankle by Peroneal and Tibial Electroneurograms," *The 2<sup>nd</sup> Asian Pacific Conference on Biomechanics*, Taipei, Taiwan, Nov. 23-25, 2005.
7. H.-L. Lin, M.-S. Ju, C.-C.K. Lin, "The Study of Selective Electrical Stimulation in Rabbit Sciatic Nerves," *The 2<sup>nd</sup> Asian Pacific Conference on Biomechanics*, Taipei, Taiwan, Nov. 23-25, 2005.
8. Z.-W. Wu, M.-S. Ju, C.-C.K. Lin, "Motor Adaptation under the Same Context in stroke and Normal Subjects," *The 2<sup>nd</sup> Asian Pacific Conference on Biomechanics*, Taipei, Taiwan, Nov. 23-25, 2005.
9. P.-C. Kung, M.-S. Ju, C.-C.K. Lin, "Upper Limb Rehabilitation Robot Augmented with Wrist Controllability Measurement System," *The 2<sup>nd</sup> Asian Pacific Conference on Biomechanics*, Taipei, Taiwan, Nov. 23-25, 2005.
10. R.-J. Chen, M.-S. Ju C.-C.K. Lin "Biomechanical and Perfusion Changes in Rat Nerves Caused by Diabetes Mellitus," *The 2<sup>nd</sup> Asian Pacific Conference on Biomechanics*, Taipei, Taiwan, Nov. 23-25, 2005.
11. M.-S. Ju, C.-C. K. Lin, S.-M. Chen, I.-S. Hwang, P.-C. Gung, Z.-W. Wu, "Application of Robotics to Assessment and Rehabilitation of Post-Stroke Patients," *The third Taiwan-Japan Workshop on Mechanical and Aerospace Engineering*, Hualian, Taiwan, Nov. 28-29, 2005.
12. D.-C. Lue, M.-S. Ju, C.-T. Huang, C.-C.K. Lin, "Portable System for Measuring Stiffness of Liver Tissue," *R.O.C. Biomedical Engineering Society 2005 Annual Symposium*, Chun-Li, Dec. 17-18, 2005.
13. J.-F.Chang, M.-S. Ju, C.-C.K. Lin, "Biomechanical Testing for Cells," *R.O.C. Biomedical Engineering Society 2005 Annual Symposium*, Chun-Li, Dec. 17-18, 2005.
14. W.-C. Liu, M.-S. Ju, C.-C.K. Lin, "Fuzzy Inference System for Neural Prosthesis Control," *R.O.C. Biomedical Engineering Society 2005 Annual Symposium*, Chun-Li, Dec. 17-18, 2005.
15. M.-C. Shih, M.-S. Ju, C.-C.K. Lin, "Enhancing ERD of Prosthesis for BCI," *R.O.C. Biomedical Engineering Society 2005 Annual Symposium*, Chun-Li, Dec. 17-18, 2005.
16. Z.-W. Wu, M.-S. Ju, C.-C. K. Lin, "A biomechanical model for comparison of motor adaptation of normal subjects interacted with a shoulder-elbow rehabilitation robot," *5<sup>th</sup> World Congress of Biomechanics*, Munich, Germany, July 29<sup>th</sup>-August 4<sup>th</sup>, 2006.
17. M.-S. Ju, T.-H. Lee, C.-C. K. Lin, "Effects of Axial train on Mechanical Properties of 3T3 Fibroblasts," *5<sup>th</sup> World Congress of Biomechanics*, Munich, Germany, July 29<sup>th</sup>-August 4<sup>th</sup>, 2006.
18. R.-J. Chen, M.-S. Ju, C.-C. K. Lin, "Transverse Quasi-Linear Viscoelastic Modeling of Rat Sciatic Nerves and Its Applications," *5<sup>th</sup> World Congress of Biomechanics*, Munich, Germany, July 29<sup>th</sup>-August 4<sup>th</sup>, 2006.
19. Chou-Ching K. Lin, Ming-Shaung Ju, Wei-Chen Liu, Hybrid amplitude/pulse width fuzzy modulation of electrical stimulation, *11<sup>th</sup> Annual Conference of the International FES Society* September 2006 – Zao, Japan.
20. Z.-W. Wu, M.-S. Ju, C.-C. K. Lin, "Motor Learning of Normal Subjects in Tracking with Rehabilitation Robot," *15<sup>th</sup> International Conference on Mechanics in Medicine and Biology*, Singapore, December 6<sup>th</sup>-December 8<sup>th</sup>, 2006.

21. R.-J. Chen, C.-C. K. Lin, M.-S. Ju, "A New Parameter Estimation Approach for Quasi-linear Viscoelastic Model of Rat Sciatic Nerves," *R.O.C. Biomedical Engineering Society 2006 Annual Symposium*.
22. Z.-X. Horng, C.-C. K. Lin, M.-S. Ju, "Development of a Robot for Neuro-Rehabilitation of Hand," *R.O.C. Biomedical Engineering Society 2006 Annual Symposium*.
23. M.-H. Chen, C.-C. K. Lin, M.-S. Ju, "Development of Portable Measuring System for Stiffness of Soft Tissues by using PZT," *R.O.C. Biomedical Engineering Society 2006 Annual Symposium*.
24. S.-A. Ma, C.-C. K. Lin, M.-S. Ju, "Design of a Robot for Neuro-Rehabilitation of Lower Limbs," *R.O.C. Biomedical Engineering Society 2006 Annual Symposium*.
25. C.-H. Feng, J.-F. Cheng, C.-C. K. Lin, M.-S. Ju, "Atomic Force Microscopy Study on Mechanical Properties," *R.O.C. Biomedical Engineering Society 2006 Annual Symposium*.
26. P.-C. Kung, M.-S. Ju, C.-C. K. Lin, "Design of a forearm rehabilitation robot," *10<sup>th</sup> International Conference on Rehabilitation Robotics (ICORR'07)*, Noordwijk, The Netherlands, June 13-15 2007.
27. C.-D. Zhang, J.-F. Chang, C.-C.K. Lin, M.-S. Ju, "Application of Atomic Force Microscopy to Biomechanics of PC12 Neuron-Like Cell," *ISB Congress XXI*, Taipei, Taiwan, July 1-5, 2007 ( also in *J. of Biomechanics* v 40, supplement 2, 2007).
28. Z.-W. Wu, C.-C.K. Lin and M.-S. Ju, "Muscle Activation Patterns of a Stroke Patient and Normal Subjects during Rehabilitation with a Robot System," *ISB Congress XXI*, Taipei, Taiwan, July 1-5, 2007 ( also in *J. of Biomechanics* v 40, supplement 2, 2007).
29. B.-W. Pan, C.-C. K.Lin, M.-S. Ju, "Development of a Robot for Ankle Rehabilitation of Stroke Patients," *ISB Congress XXI*, Taipei, Taiwan, July 1-5, 2007 (also in *J. of Biomechanics* v 40, supplement 2, 2007).
30. R.-J. Chen, M.-S. Ju and C.-C.K. Lin, "An Efficient Parameter Estimation Technique of Quasi-Linear Viscoelastic Model for Peripheral Nerves," *ISB Congress XXI*, Taipei, Taiwan, July 1-5, 2007 (also in *J. of Biomechanics* v 40, supplement 2, 2007).
31. J. C. Chen, M.-S. Ju, C.-C.K. Lin, "Inverse Finite Element Analysis to Estimate Biomechanical Properties of RatSciatic Nerve," *Asian Pacific Biomechanics Conference*, Tokyo, Japan, Nov.6-8, 2007.
32. T.-C. Lu, C. Huang, M.-S. Ju, J. C. Chen, H. M. Vong, "Design of a Hand-Held Device for Measuring Stiffness of Soft Tissues," *Asian Pacific Biomechanics Conference*, Tokyo, Japan, Nov.6-8, 2007. (**Young Investigator Award**)
33. C.-H. Feng, M.-S. Ju, C.-C.K. Lin, H.-M. Lan, "Quasi-Linear Viscoelastic Properties of PC-12 Cells," *Asian Pacific Biomechanics Conference*, Tokyo, Japan, Nov.6-8, 2007.
34. Z.-W. Wu, M.-S. Ju, C.-C.K. Lin, S.-M. Chen, H.-H. Lin, "Comparison of Muscle Activation Patterns between Normal Subjects and Stroke Patients during Robot-Aided Exercise," *Asian Pacific Biomechanics Conference*, Tokyo, Japan, Nov.6-8, 2007.
35. M.-C. Shih, C.-W. Chen, C.-C. K. Lin, M.-S. Ju, "A Study of Brain-Computer Interface (BCI) Controlled Orthotic Hand," *Asian Pacific Biomechanics Conference*, Tokyo, Japan, Nov.6-8, 2007.
36. H.-H. Lin, Z.-W. Wu, M.-S. Ju, C.-C. K. Lin, "Comparison of Upper-Limb Muscle Activation between Normal Subject and Stroke Patient during Robot-Aided Rehabilitation," *Annual Symposium of Taiwanese Society of Biomechanics*, Tainan, Taiwan, Dec. 21, 2007.
37. C.-C. Chan, M.-S. Ju, C.-C. K. Lin, "Electro-neurogram-Feedback Control of Ankle Torque on Paralyzed Rabbits by Functional Neural Stimulation," *Annual Symposium of Taiwanese Society of Biomechanics*, Tainan, Taiwan, Dec. 21, 2007.

38. C.-W. Chen, M.-C. Shih, C.-C. K. Lin, *M.-S. Ju*, ‘Brain-Computer-Interface-based Orthotic Hand,’ Annual Symposium of Taiwanese Society of Biomechanics, Tainan, Taiwan, Dec. 21, 2007.
39. P.-C. Kung, *M.-S. Ju*, C.-C. K. Lin, ‘Synergy Pattern for Evaluation of Stroke Patients in Robot-Aided Neuro-Rehabilitation,’ Annual Symposium of Taiwanese Society of Biomechanics, Tainan, Taiwan, Dec. 21, 2007.
40. H.-L. Lin, *M.-S. Ju*, C.-C. K. Lin, ‘Finite Element Analysis of Selective Electrical Stimulation on Nerve Fascicles within Sciatic Nerve by using Multi-contact Cuff Electrodes,’ Annual Symposium of Taiwanese Society of Biomechanics, Tainan, Taiwan, Dec. 21, 2007.
41. *M.-S. Ju*, ‘Development of Motor Neural Prosthesis and Brain Computer Interface System,’ The 1st France-Taiwan Workshop on Bilateral Cooperation in Health Technologies: Diagnostic Imaging, Telemedicine & Homecare, National Yang-Ming University, Taipei, Taiwan, March 26-28, 2008. **(invited)**
42. C.-C.K. Lin, *M.-S. Ju*, ‘Biomechanical Properties of Sciatic Nerves in Circular Compression,’ 7th International Symposium on Nano-Biomedical Engineering, National Cheng Kung University, Tainan, Taiwan, Oct. 16-17, 2008. **(invited)**
43. *M.-S. Ju*, C.-C. K. Lin, S.-M. Chen, ‘EMG and Biomechanics Studies on Rehabilitation of Stroke Patients with Assistance of a Shoulder-Elbow Robot,’ 7th International Symposium on Nano-Biomedical Engineering, National Cheng Kung University, Tainan, Taiwan, Oct. 16-17, 2008. **(invited)**
44. C.-W. Chen, C.-C. K. Lin, *M.-S. Ju*, ‘Brain-Computer Interface (BCI) based Orthotic Hand,’ 2008 Jointed Taiwanese Society of Sport Biomechanics and Taiwanese Society of Biomechanics Annual Symposium, Taichung Educational University, Nov. 1, 2008, pp. 9-10.
45. P.-C. Kung, *M.-S. Ju*, C.-C. K. Lin, S.-M. Chen, ‘Upper Extremity Rehabilitation Robot for Evaluating Abnormal Synergies of Stroke Patients,’ 2008 Jointed Taiwanese Society of Sport Biomechanics and Taiwanese Society of Biomechanics Annual Symposium, Taichung Educational University, Nov. 1, 2008, pp. 161-162.
46. C.-C. Chan, *M.-S. Ju*, C.-C.K. Lin, ‘Modeling Angle-Related Change of Electroneurogram Based on Muscle Spindle Model,’ 2008 Jointed Taiwanese Society of Sport Biomechanics and Taiwanese Society of Biomechanics Annual Symposium, Taichung Educational University, Nov. 1, 2008, pp. 165-166.
47. R.-J. Chen, *M.-S. Ju*, C.-C. K. Lin, S. Devasia, ‘Preconditioning Behaviour of PC-12 Neuron-like Cells,’ 2008 Jointed Taiwanese Society of Sport Biomechanics and Taiwanese Society of Biomechanics Annual Symposium, Taichung Educational University, Nov. 1, 2008, pp. 293-294.
48. H.H. Lin, *M.-S. Ju*, C.-C.K. Lin, Y.N. Sun, S.-M. Chen, ‘Motor Learning of Normal Subjects Exercised with a Shoulder-Elbow Rehabilitation Robot,’ The 13<sup>th</sup> International Conference on Biomedical Engineering, 3-6 Dec. 2008, Singapore.
49. B.K. Fang, *M.-S. Ju*, C.-C. K. Lin, ‘Development of Active Guide-wire for Cardiac Catheterization by using Ionic Polymer-Metal Composites,’ The 13<sup>th</sup> International Conference on Biomedical Engineering, 3-6 Dec. 2008, Singapore.
50. *M.-S. Ju*, H.-M. Lan, C.-C. K. Lin, ‘Application of Atomic Microscopy to Investigate Axonal Growth of PC-12 Neuron-like Cells,’ The 13<sup>th</sup> International Conference on Biomedical Engineering, 3-6 Dec. 2008, Singapore.
51. *M.-S. Ju*, H.M. Vong, C.-C. K. Lin, S.-F. Ling ‘Development of Soft Tissue Stiffness Measuring Device for Minimally Invasive Surgery by using Sensing Cum Actuating Method,’ The 13<sup>th</sup> International Conference on Biomedical Engineering, 3-6 Dec. 2008, Singapore.

52. C.-H. Huang, C.-C.K. Lin, M.-S. Ju, “Stochastic Resonance in Primary Moto-Sensory Area of Cerebral Cortex,” 2008 Annual Meeting of ROC Biomedical Engineering Society.
53. H.H. Lin, M.-S. Ju, C.-C.K. Lin, S.M. Chen, “Analysis of Muscle Activation Patterns via Biomechanical Model of Subjects Exercised with an Upper-Limb Rehabilitation Robot,” Jointed Symposium of ROC Biomedical Engineering Society and ISOBME, Chang Gung University, Tao-Yen, Dec. 12-13, 2008.
54. C.H. Huang, C.-C. K. Lin, M.-S. Ju, “Stochastic Resonance in Primary Moto-Sensory area of Cerebral Cortex,” Jointed Symposium of ROC Biomedical Engineering Society and ISOBME, Chang Gung University, Tao-Yen, Dec. 12-13, 2008.
55. B.K. Fang, M.-S. Ju, C.-C.K. Lin, “Development of Active Guide-Wire for Cardiac Catheterization by using Ionic Polymer-Metal Composites,” Jointed Symposium of ROC Biomedical Engineering Society and ISOBME, Chang Gung University, Tao-Yen, Dec. 12-13, 2008.
56. Y.Y. Wang, Y.N. Sun, C.-C.K. Lin, M.-S. Ju, “Automated Detection of Retina Layers in Optical Coherence Tomography (OCT) Images,” Jointed Symposium of ROC Biomedical Engineering Society and ISOBME, Chang Gung University, Tao-Yen, Dec. 12-13, 2008.
57. M.-S. Ju, S.H. Gao and C.-C.K. Lin, “Control of Active Ankle Muscle Torque by using Electromyography-based Model for Robot-Assisted Rehabilitation of Stroke Patients,” 4<sup>th</sup> Asian Pacific Conference on Biomechanics, University of Canterbury, Christchurch, New Zealand, April 14-17<sup>th</sup>, **2009**.
58. M.-S. Ju, “Rehabilitation Robots for Assessments and Physical Therapy of Stroke Patients,” 成功大學創新醫療科技論壇, Engineering College, NCKU, April 28, 2009. (**invited**)
59. P.-C. Kung, C.-C.K. Lin, M.-S. Ju, S.-M. Chen, “Time course of abnormal synergies of stroke patients treated and assessed by a neuro-rehabilitation robot,” 2009 IEEE 11th International Conference on Rehabilitation Robotics (ICORR), Kyoto, Japan, June 23-26, **2009**.
60. 楊竣淵，高聖涵，朱銘祥，林宙晴，運用肌電圖回授之復健機器人於中風病患踝關節主動扭矩控制之研究，中國機械工程學會第二十六屆全國學術研討會論文集，國立成功大學，台南市，Nov. 20-21, **2009**.
61. P.-C. Kung, M.-S. Ju, C.-C.K. Lin, S.-M. Chen, “Abnormal Synergies Between Shoulder And Elbow Muscles Of Stroke Patients Treated And Assessed By A Neuro-Rehabilitation Robot,” Jointed ROC Biomedical Engineering Society and Taiwanese Society of Biomechanics 2009 Symposium, Dec. 10-12, **2009**, Yang-Ming Univ. Taipei. (**2009國際生物力學暨台灣生物力學年度學術研討會優等獎**)
62. C.-C. Chiang, M.-S. Ju, C.-C.K. Lin, “Monitoring and Mathematical Modeling of Rat Epileptic EEG,” Jointed ROC Biomedical Engineering Society and Taiwanese Society of Biomechanics 2009 Symposium, Dec. 10-12, **2009**, Yang-Ming Univ. Taipei. (**2009生物醫學工程國際研討會暨中華民國醫學工程學術研討會口頭論文競賽特優**)
63. C.-C. Chan, C.-C.K. Lin and M.-S. Ju, “Estimate Ankle Joint Angles from Agonist and Antagonist Electroneurograms – A Structural Muscle Spindle Model Approach,” Jointed ROC Biomedical Engineering Society and Taiwanese Society of Biomechanics 2009 Symposium, Dec. 10-12, **2009**, Yang-Ming Univ. Taipei. (**2009國際生物力學暨台灣生物力學年度學術研討會大會佳作獎**)
64. C.H. Huang, C.C.K. Lin, M.S. Ju, “Stochastic Resonance In Primary Moto-Sensory Area Of Cerebral Cortex,” Jointed ROC Biomedical Engineering Society and Taiwanese Society of Biomechanics 2009 Symposium, Dec. 10-12, **2009**, Yang-Ming Univ. Taipei.

65. J.-T. Lu, C.-C.K. Lin, M.-S. Ju, “Real-Time Method for Detecting Event-Related Desynchronization of Mu Rhythm by Simplification of Hilbert Huang Transform,” Jointed ROC Biomedical Engineering Society and Taiwanese Society of Biomechanics 2009 Symposium, Dec. 10-12, **2009**, Yang-Ming Univ. Taipei.
66. J.-Y. Yung, C.-C.K. Lin, M.-S. Ju, “Gait Rehabilitation in Stroke Patients Aided by Rehabilitation Robot with EMG Feedback,” Jointed ROC Biomedical Engineering Society and Taiwanese Society of Biomechanics 2009 Symposium, Dec. 10-12, **2009**, Yang-Ming Univ. Taipei.
67. Y.-S. Lin, C.-C.K. Lin, M.-S. Ju, “Development of Micro-Tensile Testing System for Measuring Biomechanical Properties of C2C12 Myotube,” Jointed ROC Biomedical Engineering Society and Taiwanese Society of Biomechanics 2009 Symposium, Dec. 10-12, **2009**, Yang-Ming Univ. Taipei.

### **Book Chapters:**

1. M.-S. Ju, C.-C. K. Lin, R.-J. Chen, J.-L. Fan, Transverse biomechanics of peripheral nerve and its applications, pp. 140-155, in *Lecture Notes of the ICB Seminar- Biomechanics of Tissue, Computer Aided Surgery and Micromechanics*, Edited by J. Vander Sloten, K. Kedzior, K. Skalski, Warsaw 2006.
2. M.-S. Ju, C.-C. K. Lin, S.-M. Chen, I.-S. Hwang, P.-C. Kung, Z.-W. Wu, Applications of Robotics to Assessment and Physical Therapy of Upper Limbs of Stroke Patients, in *Rehabilitation Robotics* edited by Aleksandar Lazinica, Advanced Robotic Systems International, Vienn, Austria, EU, 2007.  
(<http://s.i-techonline.com/Book/Rehabilitation-Robotics/Rehabilitation-Robotics.zip>)

### **Invited Speeches:**

1. M.S. Ju, “Neuro-rehabilitation Robots for Upper Extremities of Post-Stroke Patients,” *International Symposium on Biomedical Engineering, Nanotechnology, and Precision Mold*, Kun-Sian University of Technology, Nov. 10-14, 2003.
2. M.S. Ju, “Biomechanical Assessments and Rehabilitation of Stroke Patients,” *International Symposium on Biomedical Engineering, Nanotechnology, and Precision Mold*, Kun-Sian University of Technology, Oct. 4-6, 2004.
3. M.S. Ju, “Biomechanical Assessments and Rehabilitation of Stroke Patients,” *International Symposium on Biomedical Engineering, Nanotechnology, and Precision Mold*, Kun-Sian University of Technology, Oct. 4-6, 2004.
4. M.-S. Ju, “Transverse Biomechanics of Peripheral Nerve and Its Applications,” *79<sup>th</sup> International Center of Biocybernetics Seminar on Biomechanics of Tissue, Computer Aided Surgery and Micromechanics*, Warsaw, Poland, March 4-5, 2005.
5. M.-S. Ju, “Applications of Micro-Electro-Mechanical System and Nanotechnology to Development of Spiral Cuff Electrodes for Neural Prosthesis and Active Catheter,” *2<sup>nd</sup> International Symposium on 2007 Tohoku University Global COE Program, Global Nano-Biomedical Engineering Education and Research Network Centre*, Sendai, Japan, September 28<sup>th</sup>, 2007.
6. M.-S. Ju, “Applications of Electromyogram, Electroencephalogram and Electroneurogram to Prosthesis Control,” *Asian Pacific Biomechanics Conference*, Tokyo, Japan, Nov.6-8, 2007.



7. M.-S. Ju, "Development of Motor Neural Prosthesis and Brain Computer Interface System," *The 1st France-Taiwan Workshop on Bilateral Cooperation in Health Technologies: Diagnostic Imaging, Telemedicine & Homecare*, National Yang-Ming University, Taipei, Taiwan, March 26-28, 2008.
8. M.-S. Ju, C.-C. K. Lin, S.-M. Chen, "EMG and Biomechanics Studies on Rehabilitation of Stroke Patients with Assistance of a Shoulder-Elbow Robot," *7th International Symposium on Nano-Biomedical Engineering*, National Cheng Kung University, Tainan, Taiwan, Oct. 16-17, 2008.
9. M.-S. Ju, "Rehabilitation Robots for Assessments and Physical Therapy of Stroke Patients," 成功大學創新醫療科技論壇, Engineering College, NCKU, April 28, 2009.
10. M.-S. Ju, "Applications of Mu-Rhythm-based Brain-Computer Interface" *1st Taiwan-Japan Symposium on Innovative Health Technology-Medical and Assistive Devices*, National Cheng Kung University, Tainan, Taiwan, 9th-10th November, 2009.

### **Teaching:**

#### Undergraduate Courses:

- Automatic Control
- Introduction to Biomechanics
- Introduction to Biomechanical Engineering

#### Graduate Courses:

- Linear System Theory (in English)
- Optimal Control Theory
- Adaptive Control Theory (in English)
- Biomechanics of Living Tissues and Cells

### **Recent Research Grants:**

- Cooperative Investigator, Stochastic Resonance in Primary Moto-Sensory Area of Cerebral Cortex, R.O.C. National Science Council Grant, 2007-2010.
- Principal Investigator, *In Situ* Biomechanics of Soft Tissues - with Applications to Robot-Assisted Surgery, R.O.C. National Science Council Grant, 2006-2009.
- Principal Investigator, Development of an electroactive polymer actuated guide wire for cardiac catheter, R.O.C. National Science Council Grant, 2006-2009.
- Cooperative Investigator, Innovation and development project on medical devices for promoting clinically functional restoration, R.O.C. Ministry of Economy Grant, 2006-2009.
- Principal Investigator, Integrated Research on Repair of Peripheral Nerve via Tissue Engineering, R.O.C. National Science Council Grant, 2005-2008.
- Principal Investigator, Extension and Modification of a Shoulder-Elbow Rehab-Robot, R.O.C. National Science Council Grant, 2003-2006.
- Principal Investigator, Research on Biomechanical Engineering Program, R.O.C. National Science Council Grant, 2004-2006.

- Cooperative Investigator, Real Time Control of Robot Arm with EEG in Normal and Lower Motor Neuron Lesion Subjects, R.O.C. National Science Council Grant, 2002-2005.