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CURRICULUM VITAE

Rieko Osu, PhD
Date of Birth : April 11, 1968

Department head
Department of Motor Control and Rehabilitation
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MAIN RESEARCH INTERESTS

Computational neuroscience of motor control and learning
Development of novel rehabilitation methods based on computational motor control

EDUCATION

Graduate

Kyoto University, Kyoto, Japan
Ph D., Psychology, 1996

Kyoto University, Kyoto, Japan
M. A., Psychology, 1993

Undergraduate

Kyoto University, Kyoto, Japan
B. A., Psychology, 1991

PROFESSIONAL EXPERIENCE

2009-	Department head, Department of Motor Control and Rehabilitation, ATR Computational Neuroscience Laboratories, Kyoto
2006-	Visiting Associate Professor, Department of Rehabilitation Medicine, School of Medicine, Keio University, Tokyo
2006-2008	Group Subleader, Biological ICT group, National Institute of Information and Communication Technology, Kyoto

2004-	Visiting Associate Professor, National Institute for Physiological Science, Okazaki
2004-	Senior Research Scientist, ATR Computational Neuroscience Laboratories, Kyoto
2003-2004	Senior Researcher, ATR Computational Neuroscience Laboratories, Kyoto
2001-2003	Researcher, ATR Human Information Science Laboratories, Kyoto
1999	Visiting Researcher, Dept. of Psychology, University of Western Ontario, Canada
1996-2001	Researcher, Exploratory Research Advanced Technology Organization, Kyoto
1994-1996	Intern, ATR Human Information Processing Laboratories, Kyoto

HONORS AND AWARDS

2007	ICONIP Best Paper Award
2004	Japan Neuroscience Society Young Investigator Award
2003	ATR Award
2002	JNNS Research Award
1993-1996	Research Fellowship for Young Scientists, JSPS

GRANT SUPPORT

2010-2013	Funding Program for Next Generation World-Leading Researchers, Osu R
2006-2008	Strategic Information and Communications R&D Promotion Program, Ministry of International Affairs and Communication, Osu R (PI), Liu M (Co-PI), Inoue N (Co-PI).
2004-2005	Grant in Aid for Scientific Research, JSPS, Osu R

PUBLICATIONS AND PRESENTATIONS

Journal paper (refereed)

1. Ganesh G, Takagi A, Osu R, Yoshioka T, Kawato M, Burdet E (2014) Two is better than one: Physical interactions improve motor performance in humans. Scientific Report, 4, 3824.
2. Ganesh G, Osu R, Naito E, Feeling the force: Returning haptic signals influence effort inference during motor coordination. Scientific Reports, 3: 2648, Web Open Access, 2013.
3. Kita K, Otaka Y, Takeda K, Sakata S, Ushiba J, Kondo K, Liu M, Osu R, Apilot study of sensory feedback by transcutaneous electrical nerve stimulation to improve manipulation deficit caused by severe sensory loss after stroke. Journal of NeuroEngineering and Rehabilitation, 10, 55, Web Open Access, 2013.
4. Han CE, Kim S, Chen S, PT, Lai YH, Lee JY, Lee J, Osu R, Winstein CJ, Schweighofer N, Quantifying Arm Non-use in Individuals Post-stroke. Neurorehabilitation and Neural Repair, 27, 439-447, 2013.
5. Yamaguchi T, Fujiwara T, Saito K, Tanabe S, Muraoka Y, Otaka Y, Osu R, Tsuji T, Hase K, Liu M (2012) The effect of active pedaling combined with electrical stimulation on spinal reciprocal inhibition. Journal of electromyography and kinesiology. DOI:10.1016/j.jelekin.2012.08.007.
6. Takahashi M, Takeda K, Otaka Y, Osu R, Hanakawa T, Gouko M, Ito K (2012) Event related

desynchronization-modulated functional electrical stimulation system for stroke rehabilitation: A feasibility study. Journal of NeuroEngineering and Rehabilitation, 9 (1), 56.

7. Osu R, Otaka Y, Ushiba J, Sakata S, Yamaguchi T, Fujiwara T, Kondo K, Liu M (2012) A pilot study of contralateral homonymous muscle activity simulated electrical stimulation in chronic hemiplegia. Brain Injury, 26 (9), 1105-12.
8. Aihara T, Takeda Y, Takeda K, Yasuda W, Sato T, Otaka Y, Hanakawa T, Honda M, Liu M, Kawato M, Sato M, Osu R (2012) Cortical current source estimation from electroencephalography in combination with near-infrared spectroscopy as a hierarchical prior. NeuroImage, 59 (4), 4006-4021.
9. Ikegami T, Hirashima M, Osu R, Nozaki D (2012) Intermittent visual feedback can boost motor learning of rhythmic movements: evidence for error feedback beyond cycles. Journal of Neuroscience, 32 (2), 653-657.
10. Osu R, Ota K, Fujiwara T, Otaka Y, Kawato M, Liu M (2011) Quantifying the quality of hand movement in stroke patients through three-dimensional curvature. Journal of NeuroEngineering and Rehabilitation 8, 62, Web Open Access, http://www.jneuroengrehab.com/content/8/1/62.
11. Tanaka S, Takeda K, Otaka Y, Kita K, Osu R, Honda M, Sadato N, Hanakawa T, Watanabe K (2011) Single Session of Transcranial Direct Current Stimulation Transiently Increases Knee Extensor Force in Patients With Hemiparetic Stroke. Neurorehabilitation and Neural Repair. 25, 565–569.
12. Aramaki Y, Haruno M, Osu R, Sdato N (2011) Movement initiation-locked activity of the anterior putamen predicts future movement instability in periodic bimanual movement. Journal of Neuroscience, 31, 9819-9823.
13. Mitrovic D, Klanke S, Osu R, Kawato M, Vijayakumar S (2010). A computational model of limb impedance control based on principles of internal model uncertainty. PLoS ONE, 5-I, 10-e13601.
14. Aramaki Y, Osu R, Sadato N (2010) Resource-demanding versus cost-effective bimanual interaction in the brain. Exp Brain Res, 203, 407-418.
15. Furuya S, Osu R, Kinoshita H (2009) Effective utilization of gravity during arm downswing in keystrokes by expert pianists. Neuroscience, 164, 822-31.
16. Callan A, Osu R, Yamagishi Y, Callan D, Inoue N (2009) Neural correlates of resolving uncertainty in driver's decision making. Human Brain Mapping. 30, 2804-12
17. Osu R, Morishige K, Miyamoto H, Kawato M (2009) Feedforward impedance control efficiently reduce motor variability. Neuroscience Research. 65, 6-10
18. Nambu I, Osu R, Sato M, Ando S, Kawato M, Naito E (2009) Single-trial reconstruction of finger-pinch forces from human motor-cortical activations measured by near-infrared spectroscopy (NIRS). NeuroImage, 47, 628-637.
19. Fujiwara T, Kasashima Y, Honaga K, Muraoka Y, Tsuji T, Osu R, Hase K, Masakado Y, Liu M (2009) Motor Improvement and Corticospinal Modulation Induced by Hybrid Assistive Neuromuscular Dynamic Stimulation (HANDS) Therapy in Patients With Chronic Stroke.

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20. Franklin D, Burdet E, Tee K, Osu R, Meng C, Milner T, Kawato M (2008) CNS Learns Stable, Accurate and Efficient Movements Using A Simple Algorithm, Journal of Neuroscience, 28, 11165-11173.
21. Franklin D, So U, Osu R, Kawato M (2008) Conflicting visual and proprioceptive reflex responses during reaching movements", Neural Information Processing : 14th International Conference, ICONIP 2007, Kitakyushu, Revised Selected Papers, Part I (Lecture Notes in Computer Science), 4984, 1002-1011.
22. Franklin D, So U, Osu R, Kawato M (2008) An involuntary muscular response induced by perceived visual errors in endpoint position, Neural Information Processing : 14th International Conference, ICONIP 2007, Kitakyushu, Revised Selected Papers, Part I (Lecture Notes in Computer Science), 4984, 1012-1020.
23. Otaka Y, Osu R, Kawato M, Liu M, Murata S, Kamitani Y (2008) Decoding syllables from human fMRI activity, Neural Information Processing : 14th International Conference, ICONIP 2007, Kitakyushu, Revised Selected Papers, Part II (Lecture Notes in Computer Science, 4985, 979-987.
24. Franklin D, Liaw G, Milner T, Osu R, Burdet E, Kawato M (2007) End-point stiffness of the arm is directionally tuned to instability in the environment. Journal of Neuroscience, 27, 7705-7716.
25. Imamizu H, Sugimoto N, Osu R, Tsutsui K, Sugiyama K, Wada Y, Kawato M (2007) Explicit contextual information selectively contributes to predictive switching of internal models. Experimental Brain Research, 181, 395-408.
26. Burdet E, Tee KP, Mareels I, Milner TE, Chew CM, Franklin DW, Osu R, Kawato M (2006) Stability and motor adaptation in human arm movements. Biological Cybernetics, 94, 20-32.
27. Hirai S, Osu R, Yoshioka T, Kawato M (2006) Simultaneous Adaptation and Switching for Two Viscous Force Fields. Electronics and Communications in Japan, Part 2, Vol. 89, No. 7, 29-38.
28. Hu Y, Osu R, Okada M, Goodale MA, Kawato M (2005) A model of the coupling between grip aperture and hand transport during human prehension. Experimental Brain Research, 167, 301-304.
29. Kaneko Y, Nakano E, Osu R, Wada Y, Kawato M (2005) Trajectory formation based on the minimum commanded torque change model using the euler-poisson equation. Systems and Computers in Japan, 36, 92-103.
30. Caithness G, Osu R, Bays P, Chase H, Klassen J, Kawato M, Wolpert DM, Flanagan RJ (2004) Failure to consolidate the consolidation theory of learning for sensorimotor adaptation tasks. Journal of Neuroscience, 24, 8662-8671.
31. Schaal S, Sternad D, Osu R, Kawato M (2004) Rhythmic arm movement is not discrete. Nature Neuroscience, 7, 1136-1143.
32. Osu R, Kamimura N, Iwasaki H, Nakano E, Harris CM, Wada Y, Kawato M (2004) Optimal impedance control for task achievement in the presence of signal-dependent noise. Journal of Neurophysiology, 92, 1199-215.

33. Osu R, Hirai S, Yoshioka T, Kawato M (2004) Random presentation enables subjects to adapt to two opposing forces on the hand. Nature Neuroscience, 11, 111-112.
34. Osu R*, Burdet E*, Franklin DW, Milner TE, Kawato M (2003) Different mechanisms involved in adaptation to stable and unstable dynamics. Journal of Neurophysiology, 90, 3255-3269. *These authors contributed equally to the work.
35. Franklin DW, Osu R, Burdet E, Kawato M, Milner TE (2003) Adaptation to stable and unstable dynamics achieved by combined impedance control and inverse dynamics model. Journal of Neurophysiology, 90, 3270-3282.
36. Franklin DW, Burdet E, Osu R, Kawato M, Milner TE (2003) Functional significance of stiffness in adaptation of multijoint arm movements to stable and unstable dynamics. Experimental Brain Research, 151, 145-157.
37. Osu R, Franklin DW, Kato H, Gomi H, Domen K, Yoshioka T, Kawato M (2002) Short- and long-term changes in joint co-contraction associated with motor learning as revealed from surface EMG. Journal of Neurophysiology, 88, 991-1004.
38. Servos P, Osu R, Santi A, Kawato M (2002) The neural substrates of biological motion perception: an fMRI study. Cerebral Cortex, 12, 772-782.
39. Burdet E*, Osu R *, Franklin D, Milner T, Kawato M (2001) The central nervous system stabilizes unstable dynamics by learning optimal impedance. Nature, 414, 446-449. *These authors contributed equally to the work.
40. Wada Y, Kaneko Y, Nakano E, Osu R, Kawato M (2001) Quantitative examinations for multi joint arm trajectory planning - using a robust calculation algorithm of the minimum commanded torque change trajectory. Neural Networks, 14, 381-393.
41. Burdet E, Osu R, Franklin DW, Milner TE, Kawato M (2000) A method for measuring endpoint stiffness during multi-joint arm movements. Journal of Biomechanics, 33, 1705-1709.
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43. Flanagan JR, Nakano E, Imamizu H, Osu R, Yoshioka T, Kawato M (1999) Composition and decomposition of internal models in motor learning under altered kinematic and dynamic environments. Journal of Neuroscience, 19:RC34.
44. Nakano E, Imamizu H, Osu R, Uno Y, Gomi H, Yoshioka T, Kawato M (1999) Quantitative examinations of internal representations for arm trajectory planning: minimum commanded torque change model. Journal of Neurophysiology, 81:2140-2155.
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46. Osu R, Uno Y, Koike Y, Kawato M (1997) Possible explanations for trajectory curvature in multijoint arm movements. J Exp Psychol Hum Percept Perform, 23, 890-913.
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1281-1302.

Conference proceedings (refereed)

1. Kita K, Takeda K, Sakata S, Ushiba J, Osu R, Otaka Y (2011) Development of a sensory feedback system using electrical stimulation for patients with sensory loss. International Conference on Rehabilitation Robotics (ICORR2011).
2. Hyon S, Osu, R, Otaka, Y (2009). Integration of multi-level postural balancing on humanoid robots . IEEE International Conference on Robotics and Automation (ICRA2009).
3. Franklin D, So U, Osu R, Kawato M (2008) Conflicting visual and proprioceptive reflex responses during reaching movements, Proceedings of 4th International Conference on Neural Information Processing.
4. Franklin D, So U, Osu R, Kawato M (2008) An involuntary muscular response induced by perceived visual errors in endpoint position, Proceedings of 4th International Conference on Neural Information Processing.
5. Otaka Y, Osu R, Kawato M, Liu M, Murata S, Kamitani Y (2008) Decoding syllables from human fMRI activity, Proceedings of 4th International Conference on Neural Information Processing,.
6. Morishige K, Osu R, Kamimura N, Iwasaki H, Miyamoto H, Wada Y, Kawato M (2007) How can we realize skillful and precise movement?", International Congress Series Vol. 1301 pp188-191.
7. Franklin DW, Burdet E, Osu R, So U, Tee KP, Milner T, Kawato M (2006) Learning the Dynamics of the external world: Brain Inspired learning for Robotic Applications. International Congress Series (ICS 1291), 109-112.
8. Morishige K, Osu R, Miyamoto H, Kawato M (2006) The sources of variability in the time course of reaching movements. International Congress Series (ICS 1291), 105-108.

Patent (Japan)

1. Osu R, Fujiwara T, Ushiba J, Otaka Y, Rehabilitation support system. 2007-269117 (pending).
2. Naito E, Osu R, Kawato M, Functional facilitation by transcranial magnetic stimulation 2006-261062 (pending).
3. Osu R, Otaka Y, Kawato M, Rehabilitation support system. 2006-047327 (pending).
4. Kamitani Y, Osu R, Otaka Y, Kawato M, Speech support system. 2006-62953 (pending).
5. Kamitani Y, Osu R, Otaka Y, Kawato M, Response acquisition system 2006-87930 (pending).
6. Osu R, Domen K, Feedforward movement training and evaluation system 3120065