

# Yan T. Wong

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OBJECTIVE      To push forward the development of neural prosthetic devices and to rigorously pursue answers to significant medical research questions through engineering and neuroscience.

EDUCATION      **New York University**

- Postdoctoral research fellow, 2008-2013
  - Development of brain machine interfaces that allow restoration of high degree of freedom movements for quadriplegics and amputees.
  - Investigating planning and decision making activity in neuronal circuits of the posterior parietal cortex and its relationship to eye-hand coordination. Experiments involve simultaneous multiple area, multiple electrode recordings in behaving animals and the development of non-linear decoding algorithms.

## University of New South Wales

Ph.D., Graduate School of Biomedical Engineering, 2009

- Dissertation Topic: Effects of Simultaneous Neurostimulation in a Vision Prosthesis
- Tasks involved microelectronic (ASIC) neurostimulator design, optical imaging and multielectrode recordings of the visual cortex in response to visual and electrical stimulation of the retina, and high density electrode design.

Master of Biomedical Engineering, 2004

Bachelor of Engineering (Comp), First Class Honours, 2004

KEY SKILLS      Practical experience in multi-electrode electrophysiology in behaving primates. Advanced knowledge of signal processing techniques for physiological signals. Practical experience (anaesthesia, surgery and maintenance) in whole animal preparations (primates, cats, rabbits, and sheep). Theoretical experience in experimental design. Record of collaboration between universities and overseas. Experience in microelectronics design. Fluent in many programming languages and analytical software. Advanced animal ethics and Occupational Health and Safety consultation training.

**SELECTED HONOURS AND AWARDS** Twice winner of the Student Paper Competition at the Annual International Conference of the IEEE EMB (2006, New York, USA and 2007, Lyon, FR).  
 Third place paper at the IEEE Asia Pacific Postgraduate Student Paper Contest (2006).  
 Winner of the AusBiotech National Student Excellence Award (2006, Sydney, Aus).  
 University of New South Wales, Faculty of Engineering Deans Award (2003, 2004),  
 the Taste of Research Summer Scholarship (2003), and Undergraduate Award (2000).  
 Australian Postgraduate Award Scholar (2005-2008).  
 Supplementary Engineering Award Scholar (2005-2008).

**EMPLOYMENT** **Madry Technologies Pty Ltd, Graduate Engineer** **Dec 2004 - Apr 2005**  
 Development of custom software and hardware applications for biomedical applications, in particular for the automation for clinical psychological tests.

**ResMed Ltd, Clinical Research Engineer** **Nov 2003 - Mar 2004**  
 Designed and created a system to investigate carbon dioxide rebreathing in CPAP therapy masks and its dependency on vent flow. This involved developing a system to acquire analogue and digital signals for the experiment and development of protocols to run the experiment.

**Australian Vision Prosthesis Group, UNSW, Research Assistant** **2002 - 2003**  
 Development of an external device to control a vision prosthesis and research into image processing methodologies to deliver maximum information to implantees.

**TEACHING EXPERIENCE** Guest lecturer: Brain computer interfaces EL9113 (NYU)  
 Guest lecturer: Neuronal Dynamics NEURL-UA 302 (NYU)  
 Teaching assistant: Engineering in Biology and Medicine BIOM1010 (UNSW)  
 Teaching assistant: Introduction to Engineering Design & Innovation ENGG1000 (UNSW)  
 Teaching assistant: Software Project Management COMP3711 (UNSW)  
 Teaching assistant: Clinical Information Systems BIOM9450 (UNSW)

**JOURNAL ARTICLES** **Y.T. Wong**, M.M. Fabiszak, N. Daw, B. Pesaran., "Effector-dependent modulations of neural activity by relative value in posterior parietal cortex.", *Nature Neuroscience* (in prep)

**Y.T. Wong**, M.M. Fabiszak, N. Daw, B. Pesaran., "Coherent neural activity coordinates movement decisions across the posterior parietal cortex", *Proceedings of the National Academy of Sciences* (in prep)

D. Putrino\*, **Y.T. Wong\***, A. Weiss, B. Pesaran., "Development of an upper limb virtual prosthesis and its use as an analogue for training control of a high dimensional Brain Machine Interface device", *Journal of Neurophysiology* (in prep)

**Y.T. Wong**, B. Pesaran., "Local Field Potential Decoding", *Encyclopedia of Computational Neuroscience* (in press)

**Y.T. Wong**, S.C. Chen, J.M. Seo, J.W. Morley, N.H. Lovell, G.J. Suaning, “Focal activation of the feline retina via a suprachoroidal electrode array” *Vision Research*, 49(8):825-33, 2009.

**Y.T. Wong**, N.B. Dommel, P.J. Byrnes-Preston, T. Lehmann, L.E. Hallum, N.H. Lovell, G.J. Suaning. “Retinal Neurostimulator for a Multi-Focal Vision Prosthesis” *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, 15:425-434, Sept 2007

D.A. Markowitz, **Y.T. Wong**, C.M. Gray, B. Pesaran., “Optimizing the Decoding of Movement Goals from Local Field Potentials in Macaque Cortex”, *The Journal of Neuroscience* 31 (50), 18412-18422, 2011.

D.A. Markowitz, R.A. Shewcraft, **Y.T. Wong**, B. Pesaran., “Competition for visual selection in the oculomotor system” *The Journal of Neuroscience* 31 (25), 9298-9306, 2011.

S.C. Chen, L.E. Hallum, **Y.T. Wong**, N. Dommel, G.J. Suaning, and N.H. Lovell, “Artificial Vision” *Encyclopedia on Biomedical Engineering*, P. Bonato (ed), 2010, Wiley Press.

N.B. Dommel, **Y.T. Wong**, T. Lehmann, C. W. Dodds, N.H. Lovell, G.J. Suaning, “A CMOS retinal neurostimulator capable of focussed, simultaneous stimulation” *Journal of Neural Engineering*,6:035006, 2009.

PEER  
REVIEWED  
CONFERENCE  
PAPERS

**Y.T. Wong**, D. Putrino, B. Pesaran., “Utilizing movement synergies to improve decoding performance for a brain machine interface” *Proc. 35th IEEE EMBS Annual International Conference*, 2013

**Y.T. Wong**, M. Viger, D. Putrino, D. Pfau, J. Merel, L. Paninski, B. Pesaran., “Decoding arm and hand movements across layers of the macaque frontal cortices” *Proc. 34th IEEE EMBS Annual International Conference*, 2012

D. Putrino, **Y.T. Wong**, M. Viger, B. Pesaran, “Development of a closed-loop feedback system for real-time control of a high-dimensional Brain Machine Interface” *Proc. 34th IEEE EMBS Annual International Conference*, 2012

**Y.T. Wong**, M.A. Hagan, D.A. Markowitz, B. Pesaran., “The tracking of reaches in three-dimensions” *Proc. 33rd IEEE EMBS Annual International Conference*, 2011

C.W. Dodds, **Y.T. Wong**, P.J. Byrnes-Preston, M. Rendl, N.H. Lovell, G.J. Suaning. “Performance in Saline of Laser Fabricated Stimulating Electrode Arrays for a Retinal Prosthesis” *Presented at the 4th International IEEE EMBS Conference on Neural Engineering*, 2009.

**Y.T. Wong**, S.C. Chen, Y.A. Kerdraon, P.J. Allen, M.F. McCombe, J.W. Morley, N.H. Lovell, and G.J. Suaning, “Efficacy of supra-choroidal, bipolar, electrical stimulation in vision prosthesis” *Proc. 30th IEEE EMBS Annual International Conference*, 2008, 1789-1792.

T. Lehmann, N.H. Lovell, G.J. Suaning, P. Preston, **Y.T. Wong**, N. Dommel, L.H. Jung, Y. Moghe, K. Das. “Implant Electronics for Intraocular Epiretinal Neurostimulators” *International Society for Circuits and Systems Conference*, 2008.

**Y.T. Wong**, L.E. Hallum, S.C. Chen, N.B. Dommel, S.L. Cloherty, J.W. Morley, G.J. Suaning, N.H. Lovell, “Optical Imaging of Electrically Evoked Visual Signals in Cats: I. Responses to Corneal and Intravitreal Electrical Stimulation” *Proc. 29th IEEE EMBS Annual International Conference*, 2007, 1635-1638.

S.C. Chen, **Y.T. Wong**, L.E. Hallum, N. B. Dommel, S.L. Cloherty, J.W. Morley, G.J. Suaning, , N.H. Lovell, “Optical Imaging of Electrically Evoked Visual Signals in Cats: II. ICA ‘Harmonic Filtering’ Noise Reduction” *Proc. 29th IEEE EMBS Annual International Conference*, 2007, 3380- 3383.

**Y.T. Wong**, N.B. Dommel, P.J. Byrnes-Preston, T. Lehmann, N.H. Lovell, G.J. Suaning, “Microelectronic retinal prosthesis: I. A neurostimulator for the concurrent activation of multiple electrodes” *Proc. 28th Annual International Conference of the IEEE EMBS*, 2006, 4647-4650

N.B. Dommel, **Y.T. Wong**, P.J. Byrnes-Preston, T. Lehmann, N.H. Lovell, G.J. Suaning, “Microelectronic retinal prosthesis: II. Use of high-voltage CMOS in retinal neurostimulators” *Proc. 28th Annual International Conference of the IEEE EMBS*, 2006, 4651-4654.

N.B. Dommel, **Y.T. Wong**, P.J. Byrnes-Preston, T. Lehmann, N.H. Lovell, G.J. Suaning, “The design and testing of an epi-retinal vision prosthesis neurostimulator capable of concurrent parallel stimulation” *Proc. 28th Annual International Conference of the IEEE EMBS*, 2006, 4700-4709.

**Y.T. Wong**, G.J. Suaning, S. Dokos, P. Preston, N. Dommel, D. Grace, N.H. Lovell, “An FPGA based vision prosthesis prototype: implementing an efficient multiplexing method for addressing electrodes” *Proc. 27th Annual International Conference of the IEEE EMBS*, 2005, 5268-5271.

N.H. Lovell, S. Dokos, P. Preston, T. Lehmann, N. Dommel, A. Lin, **Y.T Wong**, N. Opie, L.E. Hallum, S. Chen, G.J. Suaning, “A retinal neuroprosthesis design based on simultaneous current injection” *Third International Conference on Microtechnologies in Medicine and Biology*, 2005, 98-101.

PROFESSIONAL Member of IEEE, and the Institution of Engineers, Australia

MEMBERSHIPS Member of the Society of Neuroscience

Member of the New York Academy of Sciences

IEEE EMBS UNSW student club chair (2004-2008)

IEEE EMBS NSW chapter Student Development Officer (Founding Officer) (2007,2008)

PERSONAL **Interests:** Social games of squash, distance running and coffee

DETAILS **Personal Details:** Australian citizen (currently applying for a green card)

**Personal Qualities:** Highly energetic, hard working, enthusiastic

REFERENCES Bijan Pesaran, PhD

A/Professor

Center for Neural Science

New York University, NY, USA

Nigel H. Lovell, PhD

Professor

Graduate School of Biomedical Engineering

University of New South Wales, Sydney, AUS

Gregg J. Suaning, PhD

A/Professor

Graduate School of Biomedical Engineering

University of New South Wales, Sydney, AUS