

MAUREEN A. HAGAN

ARC DECRA Fellow, Monash University
26 Innovation Walk Clayton, VIC. 3800 Australia
+61 9905 2047
maureen.hagan@monash.edu

SUMMARY

My research focuses on the mechanisms of neuronal communication both within and across brain areas. Specifically, how the laminar architecture of cortex organizes and integrates information from feedforward and feedback processes. My work is multidisciplinary and includes high-density, multi-brain area electrophysiology, computational neural models, neural engineering, and behavioral models of sensorimotor integration and cognition. I have expertise in eye movement and reaching behavior and physiology as well as visual perception and development. I also have experience analyzing large scale neural signals for the development of neural prosthetics.

EDUCATION

New York University, Doctor of Philosophy 2007-2013
Dissertation research: *Eye-hand coordination in the posterior parietal cortex*

- Studied neural circuits in the parietal cortex using simultaneous multi-electrode, dual-area recordings from behaving non-human primates.
- Analyzed temporal patterning of spiking activity relative to local field potentials using spike-LFP coherence.

University of California, Los Angeles, Bachelor of Science 2002-2006
Undergraduate thesis: *Deep brain stimulation as a therapy for Parkinson's disease in rodent models*

- Developed a rodent model for studying the long-term effects of deep brain stimulation including the immune response to prolonged high frequency stimulation.

Okinawa Institute of Science and Technology, Summer course 2016
Okinawa Computational Neuroscience Course - competitive entry summer school for computational and theoretical neuroscience

RESEARCH EXPERIENCE

Monash University, Postdoctoral research fellow 2014-present
Understanding the mechanisms communication and laminar organization of information across the visual hierarchy using multi-electrode recordings and computational models.

New York University, Postdoctoral research fellow 2013-2014
Using eye-hand coordination as a model for studying communication between brain areas. Development of analytical tools for studying spiking and local field potential relationships in large datasets and computational models for multi-area communication.

University of California, Los Angeles, Research assistant 2006-2007
Characterized neurogenic potential of multipotent stem cells isolated from rodent skeletal muscles and analyzed behavioral deficits of genetic mouse models for Parkinson's disease, laboratory of Marie-Françoise Chesselet, MD, PhD.

University of California, San Diego, Summer undergraduate researcher 2004
Studied effects of lesions to the posterior cingulate cortex on retention of sequential memory tasks, laboratory of Andrea Chiba, PhD.

RESEARCH FUNDING	Ideas Grant , NHMRC \$749,140	2020-2023
	Discovery Project , ARC \$425,000	2020-2022
	Network of Excellence , Monash University \$200,000	2019-2020
	CIBF Strategic Initiative , ARC Centre of Excellence \$125,520	2019
	Discovery Early Career Research Award , ARC \$383,551	2018-2021
	CIBF Strategic Initiative , ARC Centre of Excellence \$12,500	2018
	Australia-Germany Research Collaboration , UA-DAAD \$32,500	2018-2019
	Dean's Dissertation Fellowship , New York University \$75,344 USD	2012-2013
	Training grant, Visual Neurosciences , US NIH \$197,952 USD	2009-2011
MacCracken Fellowship , New York University \$75,344 USD	2007-2008	
SUPERVISION	Joanita D'Souza, <i>HDR candidate</i>	2020-present
	Sabrina Meikle, <i>HDR candidate</i>	2020-present
	Timothy Allison-Walker, <i>HDR candidate</i>	2018-present
	Nathan Huynh, <i>Honours</i>	2018
TEACHING EXPERIENCE	Lecturer , Neuroscience Master's program, Monash	2019
	Developed course material for Master's class in neuroscience focused on sensorimotor integration	
	Lecturer , Sensory and Cognitive Neuroscience, Monash	2019-2020
	Developed lecture material on Trends in Neuroscience for undergraduate course	
	Lecturer , Sensory and Cognitive Neuroscience, Monash	2015-2020
	Developed a scientific writing practical for undergraduates to give them hands on experience evaluating scientific material and developing writing skills	
	Lecturer & Teaching assistant , Introduction to Neuroscience, NYU	2013
	Developed lecture material on the neural mechanisms of decision-making and reward for undergraduates	
Lecturer & Teaching assistant , Behavioral & Integrative Neuroscience, NYU	2011	
Teaching assistant , Brain and Behavior, NYU	2008	
JOURNAL & CONFERENCE PUBLICATIONS	Shewcraft R.A., Dean H.L., Fabiszak M.M., Hagan M.A. , Wong Y.T., Pesaran B. Excitatory/inhibitory responses shape coherent neuronal dynamics driven by optogenetic stimulation in the primate brain. <i>Journal of Neuroscience</i> . 2020.	
	Yoo P.E., Oxley TJ, Hagan M.A. , John S, Ronayne S.M., Rind G.S., Brinded A.M., Opie N.L., Moffat B.A., Wong Y.T. Distinct neural correlates underlie inhibitory mechanisms of motor inhibition and motor imagery restraint. <i>Frontiers in Behavioral Neuroscience</i> . 2020.	
	Hagan, M.A. , Chaplin, T.A., Huxlin, K.R., Rosa, M.G.P. and Lui, L.L. Altered sensitivity to motion of area MT neurons following long-term V1 lesions. <i>Cerebral Cortex</i> 2019.	
	Hadjidimitrakis K., Bakola S., Wong Y. T., Hagan M.A. Mixed spatial and movement representations in the primate posterior parietal cortex. <i>Frontiers in Neural Circuits</i> 2019.	
	Hagan, M.A. , Dean, H.L., and Pesaran, B. Spike-field representations in parietal area LIP during coordinated reach and saccade movements. <i>Journal of Neurophysiology</i> . 2012.	
	Dean, H.L., Hagan, M.A. , and Pesaran, B. Only coherent spiking in posterior parietal cortex coordinates looking and reaching. <i>Neuron</i> . 2012.	

Chaplin, T.A., **Hagan, M.A.**, Allit, B.J., and Lui, L.L. Neuronal correlations in MT and MST impair population decoding of opposite directions of random dot motion. *eNeuro*. 2018.

Chaplin, T.A., Allit, B.J., **Hagan, M.A.**, Price, N.S., Rosa, M.G.P., Rajan, R., and Lui, L.L. Auditory motion does not modulate spiking activity in the middle temporal and medial superior temporal visual areas. *European Journal of Neuroscience*. 2018.

Chaplin, T.A., Allit, B.J., **Hagan, M.A.**, Price, N.S., Rajan, R., Rosa, M.G.P. and Lui, L.L. Sensitivity of neurons in the middle temporal area of marmoset monkeys to random dot motion. *Journal of Neurophysiology*. 2018.

Yoo P.E., **Hagan M.A.**, John S.E., Opie N.L., Ordidge R.J., O'Brien T.J., Oxley T.J., Moffat B.A., Wong Y.T. Spatially dynamic recurrent information flow across longrange dorsal motor network encodes selective motor goals. *Human Brain Mapping*. 2018.

Yoo P.E., Oxley T.J., John S.E., Opie N.L., Ordidge R.J., O'Brien T.J., **Hagan M.A.**, Wong Y.T., Moffat B.A. Feasibility of identifying the ideal locations for motor intention decoding using unimodal and multimodal classification at 7T-fMRI. *Scientific Reports*. 2018.

Hagan, M.A., Rosa, M.G.P. and Lui, L.L. Neural plasticity following lesions of the primate occipital lobe: the marmoset as an animal model for studies of blindsight. *Developmental Neurobiology*. 2017.

Li, D.-P., **Hagan, M.A.**, and Kiorpes, L. Linking structure and function: Development of lateral spatial interactions in macaque monkeys. *Visual Neuroscience*. 2013.

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

**INVITED
PRESENTATIONS**

Hagan, M.A. "Communication across the visual hierarchy - inputs from V1 to MT" *University of Melbourne, College of Optometry*. Mar 2020 - postponed due to COVID-19.

Hagan, M.A. "Functional inhibition across a sender-receiver communication channel coordinates looking and reaching" *Systems and Computational Neuroscience Down Under*. Jan 2020.

Hagan, M.A. "Laminar organization of feedforward input from V1 to MT in marmosets." *University Tuebingen*. Dec 2018.

Hagan, M.A. "Communication through hierarchical processing in the visual system." *Australasian Neuroscience Society*. Dec 2017.

Hagan, M.A. "Motion sensitivity of MT cells long after V1 lesions." *ARC Centre for Integrative Brain Function Annual meeting*. Dec 2017.

Hagan, M.A. "A New World in Vision Research: The Common Marmoset." *Asia-Pacific Conference on Vision*. July 2017.

Hagan, M.A. "Functional inhibition coordinates looking and reaching." *University of Sydney, Anderson Stuart research seminar series*. Apr 2017.

Hagan, M.A. "Neurons in MT are less likely to be direction selective after chronic V1 lesions." *Australasian Neuroscience Society*. Dec 2016.

Hagan, M.A. "Neurons in MT are less likely to be direction selective after chronic V1 lesions." *Center for Neural Science, New York University*. Nov 2016.

Hagan, M.A. "Functional inhibition in the posterior parietal cortex mediates eye-hand behaviour." *2nd Monash Brain Function Workshop*. Dec 2015.

Hagan, M.A. "Eye-hand coordination in the posterior parietal cortex." *University of Melbourne Biomedical engineering seminar series*. July 2015.

Hagan, M.A. "Eye-hand coordination in the posterior parietal cortex." *Monash University Physiology seminar series*. July 2015.

**PROFESSIONAL
MEMBERSHIPS**

Australasian Society for Neuroscience
Society for Neuroscience
New York Academy of Sciences

REFERENCES

Prof Bijan Pesaran, PhD.
Center for Neural Science, New York University

Prof Marcello Rosa, PhD.
Department of Physiology, Monash University

Dr Nicholas Price, PhD.
Department of Physiology, Monash University