

Chin-An Josh Wang 汪勁安

Education and Research Experience

- 2018 - **Medical Researcher**, Graduate Institute of Mind, Brain, and Consciousness, Taipei Medical University; Research Center of Brain and Consciousness, Department of Anesthesiology, Taipei Medical University-Shuang Ho Hospital
- 2010 - **Postdoctoral/Senior Research Associate**, Queen's University, Canada
2018 (Mentor: Dr. Douglas Munoz)
- 2009 **Ph.D. in Cognitive Neuroscience**, National Yang-Ming University, Taiwan
(Mentor: Drs. Ovid Tzeng and Jie-Li Tsai)
- 2007 - **Research Visit**, Department of Psychology, Binghamton University, NY
2009 (Mentor: Dr. Albrecht Inhoff)
- 2004 **M.S. in Cognitive Neuroscience**, National Yang-Ming University, Taiwan
(Mentor: Drs. Ovid Tzeng, Jie-Li Tsai and Daisy Hung)
- 2002 **B.S. in Psychology**, Fu Jen Catholic University, Taiwan

Funding and Awards

- 2020-2021 Taipei Medical University - Shuang Ho Hospital research grant. Role of pupil size on saccade generation (109TMU-SHH-06)
- 2020-2025 MOST Columbus research grant. Pupillometry in vision, arousal and cognition: an integrated approach using oculomotor and autonomic responses, brain stimulation, and computational modeling (109-2636-H-038-005).
- 2019-2020 Taipei Medical University - Shuang Ho Hospital research grant. Elucidating cortical mechanisms underlying the cognitive modulation on the pupil light and darkness reflex through noninvasive brain stimulation in the oculomotor paradigms (108TMU-SHH-03).
- 2019-2022 Taiwan Ministry of Science and Technology (MOST) research grant. Investigating attentional control of saliency: an integrated oculomotor approach using eye movement, pupillometry, and microsaccade (108-2410-H-038-002-MY3).
- 2012 - 2014 Postdoctoral Research Fellowship from the Natural Sciences and Engineering Research Council of Canada
- 2009 Germany Humboldt Postdoctoral Research Fellowship (declined to work with Dr. Munoz)
- 2009 Chiang Ching-Kuo Foundation Scholarship for Doctoral Students

Short-Term Research Overseas (Taiwan)

2008 Fulbright Scholarship (USA)

2007 National Science Council Oversea Scholarship (Taiwan)

Publications

*Refereed Journal Articles (*corresponding author)*

1. ***Wang C-A**, Munoz DP. Linking the superior colliculus to pupil modulation (under review).
2. ***Wang C-A**, White BJ, Munoz DP. Pupil-linked arousal in the midbrain superior colliculus (under review).
3. Chen J-T, Yep R, Hsu Y-H, *Cherng Y-G and ***Wang C-A**. Investigating arousal, anti-saccade preparation, and global luminance effects on microsaccade behavior (under review).
4. ***Wang C-A**, *Munoz DP. Coordination of pupil and saccade responses by the superior colliculus (under review).
5. Cherng Y-G, Crevecoeur F, and ***Wang C-A**. Modulation of pupillary light and darkness reflex on the generation of reflexive and voluntary saccade (in revision).
6. Cherng Y-G, Baird T, Chen J-T and ***Wang C-A**. (2020). Background luminance effects on pupil size associated with emotion and saccade preparation, *Scientific Reports*, 10:15718.
7. ***Wang C-A**, Huang J, Brien DC, & Munoz DP. (2020). Saliency and priority modulation in a popout paradigm: pupil size and microsaccade rate, *Biological Psychology*, 153. 107901.
8. Hsu Y-F, Baird T, ***Wang C-A**. (2020). Investigating cognitive load modulation on distractor processing using pupillary luminance responses in the anti-saccade paradigm. *European Journal of Neuroscience*, 52(3):3061-3073.
9. ***Wang C-A**, Baird T, Huang J, Coutinho J, Brien DC, Munoz DP. (2018). Arousal effects in pupil size, heart rate and skin conductance at an emotional face task. *Frontiers in Neurology*, 9, 1029. (special issue: The Pupil: Behavior, Anatomy, Physiology and Clinical Biomarkers).
10. ***Wang C-A**, Tworzyanski L, Huang J, *Munoz DP. (2018). Response anisocoria in the pupillary light and darkness reflex. *European Journal of Neuroscience*, 48(11):3379-3388.
11. ***Wang C-A**, Munoz DP. (2018). Neural basis of location-specific pupil luminance modulation. *Proceedings of the National Academy of Sciences*, 115(41):10446-10451.
12. ***Wang C-A**, Huang J, Yep R, Munoz DP. (2018) Comparing pupil light response modulation between saccade planning and working memory. *Journal of Cognition*, 1(1), 33. (Special Issue: What can pupils tell us about cognition?)
13. ***Wang C-A**, Blohm G, Huang J, Boehnke SE, Munoz DP. (2017) Multisensory integration in orienting behavior: pupil size, microsaccades and saccades. *Biological Psychology*, 129:36-44.
14. ***Wang C-A**, McInnis H, Brien DC, Pari G, *Munoz DP. (2016). Disruption of pupil size modulation correlates with voluntary saccade deficits in Parkinson's disease. *Neuropsychologia*, 80(8):176-184.
15. **Wang C-A**, *Munoz DP. (2015). A circuit for pupil orienting responses: implications for cognitive

modulation of pupil size. *Current Opinion in Neurobiology*, 33:134-140.

16. *Wang C-A, Brien DC, *Munoz DP. (2015). Pupil size reveals preparatory processes in the generation of pro- and anti-saccades. *European Journal of Neuroscience*, 41(8):1102-1110.
17. Ikeda T, Boehnke SE, Marino RA, White BJ, Wang C-A, Levy R, *Munoz, DP. (2015) Spatio-temporal response properties of local field potentials in the primate superior colliculus. *European Journal of Neuroscience*, 41(6): 856-865.
18. *Wang C-A, Munoz, D.P. (2014). Modulation of stimulus contrast on the human pupil orienting response. *European Journal of Neuroscience*, 40(5):2822-2832.
19. *Wang C-A, Boehnke SE, Itti L, Munoz DP. (2014). Transient pupil response is modulated by contrast-based saliency. *Journal of Neuroscience*, 34(2):408-417.
20. Wang C-A, *Inhoff AW. (2013). Extraction of linguistic information from successive words during reading: evidence for spatially distributed lexical processing. *Journal of Experimental Psychology: Human Perception and Performance*, 35, 1571-1584.
21. Wang C-A, Boehnke SE, White BJ, *Munoz DP. (2012). Microstimulation of the primate superior colliculus induces pupil dilation without evoking saccades. *Journal of Neuroscience*, 32, 3269-3236.
22. *Wang C-A, Inhoff AW. (2010). The influence of visual contrast and case changes on parafoveal preview benefits during reading. *Quarterly Journal of Experimental Psychology*, 63, 805-817.
23. *Inhoff AW, Greenberg SN, Solomon M, Wang C-A. (2009). Word integration and regression programming during reading: A test of the E-Z Reader 10 model. *Journal of Experimental Psychology: Human Perception and Performance*, 35, 1571-1584.
24. Wang C-A, *Inhoff AW, Radach R. (2009). Is attention confined to one word at a time? The spatial distribution of parafoveal preview benefits during reading. *Attention, Perception, & Psychophysics*, 71, 1487-1494.
25. Wang C-A, *Tsai J-L, Inhoff AW, Tzeng OJL. (2009). Acquisition of linguistic information to the left of fixation during the reading of Chinese text. *Language and Cognitive Processes*, 24, 1097-1123.
26. *Tsai J-L, Yen M-H, Wang C-A. (2005). Recoding on eye movements and its application on Chinese reading. *Research in Applied Psychology*, 28, 91-104. (in Chinese)

*Conference Proceedings (*talks: 17)*

*Wang C-A. *Linking the superior colliculus to pupil size*. Taiwan Society for Neuroscience, 2020.

Wang C-A, Hsu Y-F. *Investigating distractor interference by cognitive load using pupillary luminance responses in the anti-saccade paradigm*. Australasian Cognitive Neuroscience Society, 2019.

*Munoz DP, Wang C-A. *A circuit for pupil control during orienting*. European Conference on Eye Movements, 2019.

Wang C-A, Munoz DP. *Neural substrate for coordinated and uncoordinated pupil and saccade responses*. Neural Control of Movement, 2019.

*Munoz DP, Wang C-A. *Neural basis of location-specific pupil luminance modulation*. Neural Control

of Movement, 2019.

***Wang C-A**, Munoz DP. *The role of the superior colliculus in pupillary responses to saliency*. International Conference on Cognitive Science, 2017.

Wang C-A, Munoz DP. *Coordinated pupillary and saccadic responses through the superior colliculus*. Gordon Research Conference on Eye Movements, 2017.

***Wang C-A**, Munoz DP. *Superior colliculus coordinates pupillary and saccadic responses*. Vision Sciences Society, 2017.

Wang C-A, Munoz DP. *Modulation of pupillary light responses by saccade preparation, working memory, and microstimulation of the superior colliculus*. Society for Neuroscience, 2016.

Huang J, Smorenburg M, **Wang C-A**, Munoz DP. *Using pupil response to assess cognitive function across the healthy lifespan*. Canadian Association for Neuroscience, 2016.

***Wang C-A**, Munoz DP. *Attentional modulation of pupillary light responses by microstimulation of the superior colliculus*. Vision Sciences Society, 2016.

Kan JY, White BJ, **Wang C-A**, Itti, L, Munoz, DP. *Visual saliency response in the superficial and intermediate superior colliculus and the pupil*. Vision Sciences Society, 2016.

***Wang C-A**, Munoz DP. *Microstimulation of the superior colliculus produces coordinated saccade and pupil responses*. Society for Neuroscience, 2015.

***Wang C-A**, Munoz DP. *Pupil orienting responses coordinated by the superior colliculus*. International Pupil Colloquium, 2015.

***Wang C-A**, Munoz DP. *The role of the superior colliculus in the coordination of the pupil orienting response*. European Conference on Eye Movements, 2015.

Huang J, **Wang C-A**, Munoz DP. *Multisensory integration in human pupil orienting response*. Canadian Association for Neuroscience, 2015.

***Wang C-A**, Brien DC, Munoz DP. *Pupil size reveals preparatory processes in the generation of pro- and anti-saccades*. Vision Sciences Society, 2015.

Wang C-A, Munoz DP. *The role of the superior colliculus in the coordination of the pupil orienting response*. Society for Neuroscience, 2014.

Wang C-A, Munoz DP. *Modulation of stimulus saliency on human pupil orienting response*. Canadian Association for Neuroscience, 2014.

***Wang C-A**, Munoz DP. *The role of the superior colliculus in the coordination of the pupil orienting response*. Canadian Association for Neuroscience (satellite on Brain Circuits and Behaviour), 2014.

Ikeda T, Boehnke SE, White BJ, **Wang C-A**, Marino RA, Levy R, Munoz DP. *Visuomotor processing in the Superior Colliculus: Comparison between single unit activity and local field potentials*. Society for Neuroscience, 2013.

Wang C-A, Boehnke SE, Itti L, Munoz DP. *Modulation of stimulus saliency and modality on transient pupil responses*. Society for Neuroscience, 2013.

- Ikeda T, Boehnke SE, **Wang C-A**, White BJ, Marino RA, Levy R, Munoz DP. *Comparison of single unit and local field potential visual responses in the Superior Colliculus*. Gordon Research Conference on Eye Movements, 2013.
- Wang C-A**, Boehnke SE, Munoz DP. *Transient pupil response is evoked by a salient stimulus and superior colliculus microstimulation*. Gordon Research Conference on Eye Movements, 2013.
- Wang C-A**, Boehnke SE, Munoz DP. *Transient pupil dilation is evoked by salient visual stimulation and superior colliculus microstimulation*. Canadian Association for Neuroscience, 2013.
- ***Wang C-A**, Boehnke SE, Munoz DP. *The role of the superior colliculus in salience-driven pupil dilation*. Society for Neuroscience, 2012.
- ***Wang C-A**, Boehnke SE, White BJ, Munoz DP. *Pupil dilation is evoked by visual stimulus salience and microstimulation of the superior colliculus*. Canadian Society for Brain, Behaviour and Cognitive Science meeting, 2012.
- Wang C-A**, Boehnke SE, Munoz DP. *Pupil dilation evoked by a salient auditory stimulus facilitates saccade reaction times to a visual stimulus*. Vision Sciences Society, 2012.
- ***Wang C-A**, Boehnke SE, White BJ, Munoz DP. *Microstimulation of the primate superior colliculus induces pupil dilation without evoking saccades*. European Conference on Eye Movements, 2011.
- Wang C-A**, Boehnke SE, White BJ, Munoz DP. *Subthreshold microstimulation of the superior colliculus induces pupil dilation*. Vision Sciences Society, 2011.
- Wang C-A**, Boehnke SE, Munoz DP. *Pupil modulation during visual and oculomotor tasks*. Society for Neuroscience. 2010.
- *Inhoff AW, Seymour BA, **Wang C-A**, Fleischer J, Radach R. *Words are spatially indexed during reading*. Psychonomic Society, 2009.
- *Inhoff AW, **Wang C-A**. *Information acquisition after the skipping of words during reading*. European Conference on Eye Movements, 2009.
- Seymour BA, Inhoff AW, **Wang C-A**. *Saccade Trajectory Deviations in Van der Stigchel & Theeuwes (2007): General Inhibition, or Inhibition-of-Return?* Eastern Psychological Association, 2009.
- Wang C-A**, Inhoff AW, Seymour BA, Solomon MJ. *The influence of parafoveal word N-1 visibility on word N+1 recognition during reading*. Psychonomic Society, 2008.
- Inhoff AW, **Wang CA**, Solomon M, Seymour BA. *Is the processing of successive words strictly serial during reading?* Psychonomic Society, 2007.
- Wang C-A**, Tsai J-L, Inhoff AW, Lee C-Y, Hung DL, Tzeng OJL. *Parafoveal-on-foveal effects in Chinese Reading: an Eye-Movements Study*. European Conference on Eye Movements, 2007.
- *Inhoff AW, Solomon MJ, Seymour BA, **Wang C-A**. *Does saccade targeting determine the acquisition of parafoveal word information?* European Conference on Eye Movements, 2007.
- Wang C-A**, Tsai J-L, Tzeng OJL, Hung DL. *Retrieving word information in the left of fixation during Chinese sentence reading*. Annual Conference on Architectures and Mechanisms for Language Processing, 2006.

Wang C-A, Tsai J-L, Tzeng OJL, Hung DL. *Word identification in the left of fixation during Chinese sentence reading: An eye movement study*. International Conference on Processing Chinese and Other East Asian Languages, 2005.

Wang C-A, Tsai J-L, Tzeng OJL, Hung DL. *Using saccadic inhibition to investigate attentional control in reading Chinese: an oculomotor study*. Cognitive Neuroscience Society, 2005.

Supervisory/Teaching Experience

Master/Undergraduate Honor's Thesis Advisor/Co-Advisor

- 1) Risa Dwi Ratnasari (2019-2020, Master in Graduate Institute of Mind, Brain, and Consciousness, Taipei Medical University).
- 2) Tali Baird (2017-2018, Master in Neuroscience Program, Queen's University). Thesis title: Correlating sympathetic and parasympathetic control of saccade behaviour.
- 3) Tali Baird (2016-2017, Life Sciences Program, Queen's University). Thesis title: Exploring the interaction of endogenous and emotional attention: evidence from pupillometry, heart rate and skin conductance.
- 4) Leanne Tworzyanski (2016-2017, Life Sciences Program, Queen's University). Thesis title: Investigating the consensual response in the pupillary light and darkness reflexes.
- 5) Jeff Huang (2014-2015, Life Sciences Program, Queen's University). Thesis title: Contrast modulation in multisensory integration of pupil orienting response.
- 6) Asher Blum (2007-2008, Psychology Department, Binghamton University). Thesis title: The influence on inhibition of return by the directionality of language: A bilingual study.
- 7) Craig Matthews (2007-2008, Psychology Department, Binghamton University). Thesis title: Word highlighting and memory retention, possible enhancements in recognition.

Advisor for Independent Study and/or Summer Students

I have been actively involved in training many undergraduate and graduate students to develop research skills such as experimental design, programming, data collection and analysis, and theoretical development and interpretation. Queen's University: Tali Baird (2016), Rachel Yep (2015), Jeff Huang (2014), Benedict Chang (2011) and Zoe Sharp (2011). Binghamton University: Asher Blum (2007), Mallory Bersamira (2007-2008), Kay Dawson (2007), Jason Fleischer (2008-2009), Jing Li (2007-2009), Johnson Li (2007-2008), and Craig Matthews (2007-2008). National Yang-Ming University (Graduate students): Ying-Chun Lin (2004-2007), Chien-Chung Yang (2003-2005).

Teaching Experience

Lecture, Taipei Medical University
International Honors Program, Brain Sciences and Bio-imaging Systems Neuroscience (2019)

Lecture, Queen's University

Systems Neuroscience (2015-2017) in Life Sciences Program

Course Assistant, Queen's University

Honors Thesis Program (neuroscience thesis research project course) in Life Sciences Program (2014-2015)

Teaching Assistant, Binghamton University

Human Cognition in the Department of Psychology (Fall 2008, undergraduate course)

Administrative Duties

Ad-hoc reviewer for Applied Ergonomics, Brain Structure and Function, Consciousness and Cognition, Experimental Brain Research, European Journal of Neuroscience, Frontiers in Neurology, Journal of Neurophysiology, Journal of Vision, Neuropsychologia, Reading and Writing, Psychonomic Bulletin & Review.

Youth Outreach and Community Service: Annual Brain Awareness Day (2010-2016): Queen's University, Canada. Demonstrations the neural control of eye movements using video-based eye trackers for elementary and middle school students (or being a group leader).

Professional Affiliations

Member of the Society for Neuroscience

Member of the Vision Sciences Society

References

Douglas P. Munoz, Ph.D.

Canada Research Chair Professor
Centre for Neuroscience Studies
Department of Biomedical and Molecular
Sciences, Psychology, and Medicine,
Queen's University, Kingston, Ontario,
Canada, K7L 3N6
Phone: 613-533-2111
Fax: 613-533-6840
Email: doug.munoz@queensu.ca

Albrecht W. Inhoff, Ph.D.

Professor of Psychology
Department of Psychology, Binghamton
University, State University of New York,
Binghamton, New York 13902
Phone: 607-777-3958
Email: alwinhoff@gmail.com

Ovid J. L. Tzeng, Ph.D.

Distinguished Chair Professor and
Research Fellow, Institute of Linguistics,
Academia Sinica, 128, Section 2,
Academia Road 115, Taipei, Taiwan
Phone: 886-2-26525033
Email: ovid@gate.sinica.edu.tw

Laurent Itti, Ph.D.

Professor of Computer Science, Psychology and
Neuroscience, University of Southern California
Hedco Neuroscience Building, Room 07A, 3641 Watt
Way, Los Angeles, CA 90089
Phone: 213-740-3527
Fax: 213-740-5687
Email: itti@usc.edu

Gunnar Blohm, Ph.D.

Associate Professor of Neuroscience and Psychology
Centre for Neuroscience Studies, Departments of
Biomedical and Molecular Sciences, Queen's
University, Kingston, Ontario, Canada, K7L 3N6
Phone: 613-533-3385
Email: gunnar.blohm@queensu.ca

Cynthia M. Connine, Ph.D.

Professor of Psychology and Linguistics
Department of Psychology, Binghamton University,
State University of New York, Binghamton, New
York 13902
Phone: 607-777-2286
Email: connie@binghamton.edu