

CURRICULUM VITAE

吳仕煒



國籍：台灣

出生日期：1977 年 8 月 30 日

ADDRESS

國立陽明交通大學 神經科學研究所

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EMPLOYMENT

2021 年 2 月 – 迄今 教授

台灣 國立陽明交通大學 神經科學研究所

2015 年 8 月 – 2021 年 1 月 副教授

台灣 國立陽明大學 神經科學研究所

2010 年 8 月 – 2015 年 7 月 助理教授

台灣 國立陽明大學 神經科學研究所

2008 年 9 月 – 2010 年 5 月 博士後研究

美國 加州理工學院 人文和社會科學系

EDUCATION

2003 年 – 2008 年, 美國 紐約大學 實驗心理學 博士

1995 年 – 1999 年, 台灣 國立政治大學 心理學 學士

GRANTS

Neurocomputational substrates for biases in judgment and decision making. NTD 4,723,000,
Ministry of Science and Technology (MOST), Taiwan. Grant number: MOST

110-2410-H-A49A-504-MY3, 2021-2024.

Neural mechanisms for dynamic value computations in decision making. New Partnership Program for the Connection to the Top Labs in the World, Ministry of Science and Technology, Taiwan. 2019-2021.

Value and probability coding in the brain: combining fMRI with intracranial electrophysiology to understand their neural coding properties. NTD 3,804,000, Ministry of Science and Technology (MOST), Taiwan. Grant number: MOST 108-2410-H-010-012-MY3, 2019-2022.

The influence of variability in prior information on information integration: an investigation on the psychological and neural mechanisms, NTD 4,776,000, Ministry of Science and Technology (MOST), Taiwan. Grant number: MOST 107-2410-H-010-003-MY3, 2018-2021.

Neural and computational mechanisms for food choice, NTD 868,000, Ministry of Science and Technology (MOST), Taiwan. Grant number: MOST 106-2420-H-010-003-, 2017.

Neural mechanisms for reference-dependent value computations, NTD 3,941,000, Ministry of Science and Technology (MOST), Taiwan. Grant number: MOST 104-2410-H-010-002-MY3, 2015-2018.

The neurobiology of decision-making: How prior experience, environmental uncertainty, and rewards affect how the brain makes decisions, NTD 5,203,000, National Science Council (NSC), Taiwan. Grant number: NSC 101-2628-H-010-001-MY4, 2012-2016 (category: research grant for excellent young investigator).

Neural mechanisms for integrative value computation, NTD 2,178,000, National Science Council (NSC), Taiwan. Grant number: NSC 99-2410-H-010-013-MY2, 2010-2012.

HONORS AND AWARDS

2018-2019 Stanford Neurosciences Institute Visiting Scholar Award, Stanford University, USA

2018-2019 Fulbright Senior Scholar

2017 Teaching Award, National Yang-Ming University, Taipei, Taiwan.

2003-2008 McCracken Doctoral Fellowship, New York University, New York, USA

PEER-REVIEWED PUBLICATIONS

(*: corresponding author)

Farashahi, S., Xu, J., Wu, S-W., Soltani, A. (2020). Learning arbitrary stimulus-reward associations for naturalistic stimuli involves transition from learning about features to learning about objects. *Cognition*, 205:104425, doi: 10.1016/j.cognition.2020.104425.

Yang, Y-Y., Wu, S-W.* (2020). Base rate neglect and neural computations for subjective weight in decision under uncertainty. *Proceedings of the National Academy of Sciences USA*, doi:10.1073/pnas.1912378117.

- Lin, W-H., Gardner, J.L., Wu, S-W.* (2020). Context effects on probability estimation. *PLOS Biology* 18(3): e3000634.
- Farashahi, S., Ting, C-C., Kao, C-H., Wu, S-W.*, Soltani, A.* (2018). Dynamic combination of sensory and reward information under time pressure. *PLOS Computational Biology* 14(3): e1006070.
- Wu, S-W.*, Delgado, M.R., Maloney, L.T. (2015). Gambling on visual performance: Neural correlates of metacognitive choice between visual lotteries. *Frontiers in Neuroscience*, 9:314. doi: 10.3389/fnins.2015.00314.
- Yu, J., Tseng, P., Hung, D.L., Wu, S-W., Juan, C-H. (2015). Brain stimulation improves cognitive control by modulating medial-frontal activity and preSMA-vmPFC functional connectivity. *Human Brain Mapping*. doi: 10.1002/hbm.22893.
- Ting, C-C., Yu, C-C., Maloney, L.T., Wu, S-W.* (2015). Neural mechanisms for integrating prior knowledge and likelihood in value-based probabilistic inference. *Journal of Neuroscience*, 35:1792-1805.
- Wu, S-W.*, Delgado, M.R., & Maloney, L.T. (2015). Motor decision-making. In: Arthur W. Toga, editor. *Brain Mapping: An Encyclopedic Reference*, vol. 3, pp. 417-427. Academic Press: Elsevier.
- Wu, S-W.*, Delgado, M. R., & Maloney, L. T. (2011). The neural correlates of the subjective utility of monetary outcome and probability weight in economic and in motor decision under risk. *Journal of Neuroscience*. 31(24), 8822-8831.
- Zhang, H., Wu, S-W., & Maloney, L. T. (2010). Planning multiple movements within a fixed time limit: The cost of constrained time allocation in a visuo-motor task. *Journal of Vision*, 10(6), 1-17.
- Wu, S-W.*, Dal Martello, M. F., & Maloney, L. T. (2009). Suboptimal allocation of time in sequential movements. *PLoS ONE* 4(12): e8228. doi:10.1371/journal.pone.0008228.
- Wu, S-W.*, Delgado, M. R., & Maloney, L. T. (2009). Economic decision-making compared with an equivalent motor task. *Proceedings of the National Academy of Sciences USA*, 106, 6088-6093.
- Dean, M., Wu, S-W., Maloney, L. T. (2007). Trading off speed and accuracy in rapid, goal directed movements. *Journal of Vision*, 7(5), 1-12.
- Wu, S-W.*, Trommershauser, J., Maloney, L. T., Landy, M. S. (2006). Limits to human movement planning in tasks with asymmetric gain landscapes. *Journal of Vision*, 6(1), 53-63.

BOOK CHAPTERS

- Wu, S-W.*, Glimcher, P.W. (2018). The emerging standard neurobiological model of decision making: Strengths, weaknesses, and future directions. In S. Chen, M. Kaboudan, & Y. Du (Authors) *The Oxford University Handbook on Computational Economics and Finance* (pp. 688-713). New York: Oxford University Press.

TEACHING/MENTORING

Undergraduate & Graduate Courses:

- Mathematical Statistics (every Spring semester since 2011)
- Decision making and the brain (every Fall semester since 2010)
- Cognitive Neuroscience (co-teach, every Fall semester since 2010)
- Research Methods in Cognitive Neuroscience (co-teach, every Fall semester since 2015)
- Functional Magnetic Resonance Imaging: Data Analysis and Applications to Cognitive Neuroscience (Spring, 2011-2018)
- Computational modeling of behavior and brain (Fall, 2020)

Graduate students (Ph.D.):

- Mu-Chen Wang, 2016-present
- Wan-Yu Shih, 2015-present
- Shu-Ching Lee, 2013-2018

Graduate students (Masters):

- Wen-Yi Yang (2021-present)
- Chih-Yin Lu (2021-present)
- Hui-Ching Hsu (2020-present)
- Chen-Yi Hsu (2018-2021)
- Siao-Jhen Wu (2017-2020)
- Yi-Ju Liu (2017-2020)
- Chia-Jen Lee (2016-2020)
- Zheng-Jie Luo (2014-2016)
- Yun-Yen Yang (2014-2016)
- Poa-Kai Feng (2013-2016)
- Wei-Hsian Lin (2012-2014)
- Chih-Chung Ting (2012-2014)
- Ya-Shuan Liu (2011-2013)
- Tzu-Yung Wang (2011-2013)

PROFESSIONAL ACTIVITIES

Leadership Positions

- Organizer, Taiwan Neuroeconomics Colloquium Series, 2011-present.
- Elected Executive Board Member, Taiwan Society of Cognitive Neuroscience, 2021-present.
- Elected Executive Board Member, Taiwan Society of Cognitive Neuroscience, 2016-2018.

- Executive Board Member, Taiwan Mind and Brain Imaging Center, Ministry of Science and Technology, Taiwan, 2011-present.

Ad Hoc Reviewer

- Neuron, PNAS, Journal of Neuroscience, Cerebral Cortex, Journal of Neurophysiology, PLOS ONE, Scientific Reports, Social Cognitive and Affective Neuroscience, Quarterly Journal of Psychology, Frontiers in Human Neuroscience, Journal of Visualized Experiments, Journal of Cognitive Neuroscience, Psychonomic Bulletin & Review, Scandinavian Journal of Psychology, Psychological Review

Grant Reviewer (ad-hoc)

- Ministry of Science and Technology, Taiwan (Experimental Psychology), 2012-present.
- Division for Social Sciences, Netherlands Organisation for Scientific Research (NWO, the Dutch research council, 2016.

Invited Talks (National & International)

2021

May 3. Foundations of neuroeconomic analysis. Department of Psychology, Fo-Guang University, Yilan, Taiwan.

May 7. Information-weighting system in the brain. Graduate Institute of Mind, Brain and Consciousness, Taipei Medical University, Taipei, Taiwan.

2020

October 15. Information-weighting system in the brain. Center for Information Technology Innovation, Academic Sinica, Taipei, Taiwan

September 11. Understanding human cognition through intracranial recordings and functional neuroimaging. Symposium at the 1st annual meeting of the Taiwan Society for Neuroscience, Taipei, Taiwan.

August 27. Neuroeconomics. University System of Taiwan-Joint Research Centre for Language and Human Complexity, Taipei, Taiwan.

2019

December 31. Probability estimation and its neurocomputational substrates. Institute of Brain and Mind Sciences, National Taiwan University, Taipei, Taiwan.

April 19. Probability estimation and its neurocomputational substrates. Department of Psychology, Rutgers University Newark, NJ, USA.

April 18. Probability estimation and its neurocomputational substrates. Neuroeconomics Forum, Yale University, CT, USA.

April 16. Probability estimation and its neurocomputational substrates. Computational

Neuroscience Initiative, University of Pennsylvania, PA, USA.

- April 11. Probability estimation and its neurocomputational substrates. Department of Economics, Columbia University, NY, USA.
- April 11. Probability estimation and its neurocomputational substrates. Brain, Behavior & Cognition Seminar Series, Department of Psychology, Boston University, MA, USA.
- April 10. Base-rate neglect and neural computations for subjective weight. Cognitive Brown Bag, Department of Psychology, Dartmouth College, NH, USA.
- March 20. Probability estimation and its neurocomputational substrates. Probability estimation and its neurocomputational substrates. Cognitive Seminar, Department of Psychology, Ohio State University, OH, USA.
- March 6. Probability estimation and its neurocomputational substrates. Cognitive Neuroscience Seminar, Department of Psychology, University of California Berkeley, CA, USA.

2018

- October 19. Probability estimation and its neurocomputational substrates. FriSem, Department of Psychology, Stanford University, CA, USA.
- March 15. Exploring the boundary of human rationality. Neuroscience workshop, City University of Hong Kong, Hong Kong.

2017

- May 22. How irrational? A connectivity-based mechanism for suboptimal probabilistic inference. International workshop on brain, language, and cognition. Nanjing University, China.

2016

- March 30. The impact of irrelevant stimuli on the judgment of reward probability. Department of Psychological and Brain Sciences, Dartmouth College, USA.
- September 27. Weighting the past and present: Neural computations for probabilistic inference about rewards. Sagol School of Neuroscience, Tel Aviv University, Israel.
- September 28. Task-related, time-dependent connectivity and the dynamics of decision making. Hebrew University of Jerusalem.

2015

- July 23. Perception, action, and statistical decision theory. Shanghai Neuroeconomics Collective Summer School.
- July 21. Weighting the past and the present: Neural computations for probabilistic inference about rewards. Institute of Neuroscience, Shanghai Institutes for Biological Sciences, Chinese Academy of Science, China.
- April 23. Weighting the past and the past: Neural computations for probabilistic inference about rewards. Center for Neural Science, New York University.
- March 16. Neural mechanisms for reward-related probabilistic inference. Department of Economic,

University of Zurich.

2014

- December 12. Neural mechanisms for Bayesian integration in value-based probabilistic inference. Workshop on Information and Neural Decision Sciences. National Cheng-Chi University, Taipei, Taiwan.
- November 14. Integrating the past and present: Neural mechanisms for Bayesian integration in value-based probabilistic inference. Department of Psychological and Brain Sciences, Dartmouth College, USA
- October 17. Decision making and the brain. Department of Electrical Engineering, National Tsing Hua University, Hsinchu, Taiwan.
- September 13. Decision making and the brain. Taiwan Cognitive Neuroscience Summer School, National Central University, Jhongli, Taiwan.
- August 31. Value-based decision making in fronto-parietal circuits. Society of Clinical Neurophysiology Annual Meeting, Tai-chung, Taiwan.
- July 2. Gambling on your perceptual abilities: The tradeoff between sensory uncertainty and subjective value of rewards in economic choice. Symposium on Neuroscience and Behavioral Economics, National Yang-Ming University, Taipei, Taiwan.
- February 22. Dissociable but interactive neural systems for updating and choice computations in sequential decision making. Symposium on Brain and Mind Sciences, College of Medicine, National Taiwan University, Taipei, Taiwan.
- January 18. The neurobiology of decision-making under uncertainty. Taiwan Society of Cognitive Neuroscience Annual Meeting, National Central University, Jhongli, Taiwan.

2013

- December 5. Characterizing choice and neural computations in the framework of statistical decision theory. Mini Symposium on Human Perception and Decision Making. RIKEN Brain Science Institute, Japan.
- July 25. Understanding neural mechanisms for updating computations in the context of Bayesian decision theory. Symposium on decision making and neural computation. Taiwan Mind and Brain Imaging Center, National Cheng-Chi University, Taipei, Taiwan.

2012

- September 22. Integrating the past and the present: Neural mechanisms for updating computations under uncertainty. Annual Meeting of the Taiwan Neuroscience Society, Taipei, Taiwan.
- July 5. fMRI applications in cognitive neuroscience. Summer school in cognitive neuroscience, Taipei, Taiwan.
- Jan 3. Neuroeconomics: past, present, controversy. Institute of Economics, Academia Sinica, Taipei, Taiwan.

2011

- December 2. The neural correlates decision under risk. Neuroscience Club Special Seminar, National Tsing Hua University, Hsinchu, Taiwan.
- Aug 31. The neural correlates of probability in economic, motor, and perceptual decision under risk. Cross-strait joint symposium on social cognitive neuroscience. Research Center on Mind, Brain, and Learning; Department of Psychology, National Cheng-Chi University, Taipei, Taiwan.
- July 6. The emergence of a neuroeconomic treatment in the study of choice behavior. Summer school in cognitive neuroscience, Taipei, Taiwan.
- March 24. The representation and updating of probability information in decision under risk. Microeconomics seminar, Department of Economics, National Taiwan University, Taipei, Taiwan.

2010

- October 21. Integrating the past and present: Neural mechanisms for dynamic value computations during decision-making. Department of Psychology, National Chengchi University, Taipei, Taiwan.
- Neural computation of probability in decision under risk. 2010 Frontiers in Neuroscience: From genes to cognition symposium, Taipei, Taiwan.
- Neural computation of probability in decision under risk. Department of Psychology, National Cheng Kung University, Tainan, Taiwan.
- Neural computation of risk, beliefs, and information updating. Neuromorphic Engineering Student Society, California Institute of Technology, Pasadena, USA.
- Computational mechanisms for representing and updating beliefs during decision making. Institute of Neuroscience, National Yang-Ming University, Taipei, Taiwan.
- Economic decision-making compared with an equivalent motor task. Department of Psychology, National Taiwan University, Taipei, Taiwan.
- The neural correlates of value and probability in decision making under risk and in an equivalent motor task. Vision Sciences Society, Naples, Florida, USA.

2008

- The economics of movement planning and its connection to decision making under risk. Center for Mind, Brain, and Learning, National Cheng-Chi University, Taipei, Taiwan.
- The economics of movement planning and its connection to decision making under risk. Division of the Humanities and Social Sciences, California Institute of Technology, Pasadena, USA.

CONFERENCE ABSTRACTS

- Shih, W-Y., Wu, S-W. (2020) Past and current subjective-value signals in the human orbitofrontal cortex (OFC): A stereo-electroencephalography (sEEG) study. Taiwan Society for Neuroscience, Taipei, Taiwan.
- Lin, W-H., Gardner, J.L., Wu, S-W. (2019) Context effects on probability estimation. Society for Neuroscience, Chicago, USA.
- Wu, S-J., Wu, S-W. (2019) High gamma activity in the human prefrontal and insular cortices represent monetary gains and losses during decision making. Society for Neuroscience, Chicago, USA.
- Liu, Y-J., Wu, S-W. (2019) The role of information lifespan and rate of information flow on decision making. Society for Neuroscience, Chicago, USA.
- Wang, M-C., Wu, G., Wu, S-W. (2019) Over- and underreaction in detecting regime shifts and the neurocomputational substrates for estimating probability of change. Society for Neuroeconomics, Dublin, Ireland.
- Lee, C-J., Wu, S-W. (2019) Persistence in base-rate neglect is associated with weighting subjective uncertainty on prior distributions. Society for Neuroeconomics, Dublin, Ireland.
- Hsu, C-Y., Wu, S-W. (2019) Conjoint measurement of quality and quantity of sensory data in evidence-based decision-making. Society for Neuroeconomics, Dublin, Ireland.
- Wang, M-C., Wu, S-W. (2018) The parietal cortex dynamically integrates the cost and benefit of time to inform decision timing. Society for Neuroscience, San Diego, USA.
- Shih, W-Y., Wu, S-W. (2018) Evidence for past and present subjective value signals in the human orbitofrontal cortex. Society for Neuroeconomics, Philadelphia, USA.
- Chang, S-Y., Wu, S-W. (2017) Greater sense of psychological ownership enhances endowment effect on risk. Society for Neuroeconomics, Toronto, Canada. Poster Number 1-B-5.
- Lee, S-C., Wu, S-W. (2017) Reconsidering the description-experience gap: Overweighting of rare events in experience-based decision under risk. Society for Neuroeconomics, Toronto, Canada. Poster Number 3-L-36.
- Wang, M-C., Wu, S-W. (2016). Trading off information against reward in time in a perceptual decision task. Society of Neuroeconomics, Berlin, Germany. Poster Number 2-E-16.
- Yang, Y-Y., Wu, S-W.(2016) Computational substrates for suboptimal probabilistic inference. Society for Neuroeconomics. Berlin, Germany. Poster number:3-E-18.
- Feng P-K., Wu S-W. (2016) Decisions about when: Trading off information against rewards in time in a visuo-motor decision task. Cognitive Neuroscience Society. New York, New York, USA. Poster Number D160.
- Lee, S-C., Wu-S-W. (2016) Humans overweight, not underweight, small probabilities in experience-based decision under risk. Cognitive Neuroscience Society. New York City, New York, USA. Poster Number B164.
- Yang, Y-Y., Wu, S-W.(2016) Weighting the past and the present: Asymmetric influences of past and present information reliability on suboptimal probabilistic inference. Cognitive Neuroscience Society. New York, USA. Poster number: B167.

- Yeh, M-J., Wu, S-W. (2014). Using knowledge about perceptual performance to make value-based decisions. Cognitive Neuroscience Society. Boston, Massachusetts, USA.
- Lin, W-H., Wu, S-W. (2013). Absolute or relative? Neural coding of reward probability in the ventromedial prefrontal cortex. Society for Neuroscience. San Diego, California, USA.
- Ting, C-C., Wu, S-W. (2013). The medial prefrontal cortex integrates prior knowledge and current sensory evidence in a value-based decision task. Society for Neuroscience meeting, San Diego, California, USA.
- Liu, Y-H., Wu, S-W. (2013). Distortion of proportion estimation in sensory judgment. Cognitive Neuroscience Society meeting, San Francisco, California, USA.
- Wang, T-Y., Wu, S-W. (2013). The dynamics of probability distortion in decision under risk. Cognitive Neuroscience Society meeting, San Francisco, California, USA.
- Yu, C., Maloney, L. T., Wu, S-W. (2012). Near-optimal Bayesian integration in judgments under risk. Society for Neuroscience, New Orleans, Louisiana, USA.
- Liu, Y-H., Wu, S-W. (2012). Integration of dynamic reward schedules and speed-accuracy tradeoff in perceptual decision making. Vision Sciences Society, Naples, Florida, USA.
- Wang, T-Y., Wu, S-W. (2012). Visual feedback-related probability learning and its contributions to decision from experience. Vision Sciences Society, Naples, Florida, USA.
- Wu, S-W., Delgado, M. R., Maloney, L. T. (2011). The neural correlates of probability distortion in perceptual and in economic decision under risk. Society for Neuroscience. Washington DC, Maryland, USA
- Wu, S-W., Shimojo, S., O'Doherty, J. P., Glimcher P. W., Rangel, A. (2010). A fronto-parietal system for dynamic value computation during decision-making. Society for Neuroscience, San Diego, California, USA.
- Wu, S-W., Shimojo, S., O'Doherty, J. P., Rangel, A. (2009). Dynamical Bayesian computations of decision value in vmPFC. Society for Neuroscience, Chicago, Illinois, USA.
- Wu, S-W., Delgado, M. R. Maloney, L. T. (2008). Neural correlates of value and probability in decision under risk and in an equivalent motor task. Society for Neuroscience, Washington DC, Maryland, USA.
- Wu, S-W., Maloney, L. T. (2008). Neural correlates of value and probability in decision under risk and in an equivalent motor task. Computational and Systems Neuroscience, Salt Lake City, Utah, USA.
- Wu, S-W., Dal Martello, M. F., Maloney, L. T. (2007). Performance in rapid, sequential visually-guided pointing movements. Vision Sciences Society, Sarasota, Florida, Abstract: Journal of Vision, 7(6), 167a.
- Wu, S-W., Dal Martello, M. F., Maloney, L. T. (2006). Trajectory planning in sequential movements. Workshop: Bridging the gap between sensation and motor control: from computation to behavior, Rauischoizhausen, Germany, July, 2006.
- Wu, S-W., Dean, M., Maloney, L. T. (2006). Humans trade off speed and accuracy to maximize expected gain in planning movements to targets that rapidly decreases in reward across time. Vision Sciences Society, Sarasota, Florida, Abstract: Journal of Vision, 6(6), 927a.

- Maloney, L. T., Wu, S-W., Dal Martello, M. F. (2006). Movement planning under risk differs from decision making under risk in how subjects make use of probability information. Vision Sciences Society, Sarasota, Florida, Abstract: Journal of Vision, 6(6), 928a.
- Wu, S-W., Maloney, L. T., Dal Martello, M. F. (2005). Planning sequences of arm-hand movements to maximize expected gain. European conference on Visual Perception, A Coruna, Spain, Abstract: Perception (Supplement), 34, 23.
- Wu, S-W., Maloney, L. T., Dal Martello, M. F. (2005). Movement Planning in rapid 'foraging' task: Maximization of expected value in strategy selection? Vision Sciences Society, Florida, Abstract: Journal of Vision, 5(8), 125a.
- Wu, S-W., Trommershauser, J., Maloney, L. T., Landy, M. S. (2004). Planning rapid movements to maximize gains in scenes with multiple regions carrying reward or penalty. Vision Sciences Society, Florida, Abstract: Journal of Vision, 4(8), 145a.