

PROMOTION RECOMMENDATION  
The University of Michigan  
College of Literature, Science, and the Arts

David J. Brang, assistant professor of psychology, College of Literature, Science, and the Arts, is recommended for promotion to associate professor of psychology, with tenure, College of Literature, Science, and the Arts.

Academic Degrees:

Ph.D. 2012 University of California, San Diego  
B.A. 2007 University of California, San Diego

Professional Record:

2016-current Assistant Professor, Department of Psychology, University of Michigan  
2012-2016 Post-doctoral Scholar, Psychology, Northwestern University  
2012-2016 Post-doctoral Scholar, Neurology, University of Chicago

Summary of Evaluation:

Teaching: Professor Brang is an excellent teacher, and his areas of teaching are vital to the department and college. He has two areas of instruction at the undergraduate and graduate levels - the neuroscience of perception and human electrophysiological methods. He has taught the perception course to undergraduates four times, consistently with stellar ratings (Q1s: 4.79-5.00; Q2s: 4.91-5.00), and the graduate course twice with equally impressive ratings (Q1s 5.00, 5.00; Q2s 4.83, 5.00). Professor Brang taught the electrophysiology methods course to undergraduates twice with very strong ratings particularly for a methods class (Q1s: 4.25, 4.27; Q2s: 4.33, 4.69). For the graduate course on electrophysiology, he taught it twice with ratings ranging from very good to stellar (Q1s: 4.30, 5.00; Q2s: 4.94, 4.90). Professor Brang mentors many undergraduates, some of whom help with data collection during surgeries. He is the primary mentor of three graduate students and a postdoctoral fellow. The students and post-doctoral scholars are authors on many papers and the post-doctoral scholars received a highly competitive NIH F32 fellowship.

Research: Professor Brang's research examines mechanisms involved in the integration of multisensory (e.g., auditory and visual) information. It is through this integration of sensory information from different modalities that the brain and mind understand the world. Professor Brang uses electrocorticography (ECoG)—electrodes implanted in the brains of patients with epilepsy or a tumor. Unlike other human neuroscience methods, ECoG allows for the direct measurement of neural activity and, thus, such research is vital to our understanding of the human brain. Professor Brang used ECoG to show that some forms of sensory integration occur through low-frequency oscillations of neurons from one sensory cortical area to another. These oscillations prime neurons to fire, thereby facilitating sensory integration. Professor Brang is also one of the foremost scholars on synesthesia. For people with this condition, sounds often elicit visual perceptions. Based on years of his own rigorous research as well as that of others, Professor Brang developed a neural theory explaining synesthesia and the process of sensory integration more broadly. Using principles from stochastic resonance, the theory states that increased levels of neural excitability in sensory areas lead to synesthesia in some with genetic predisposition or sensory loss.

### Recent and Significant Publications:

- Aabedi, A.A., Lipkin, B., Kaur, J., Kakaizada, S., Reihl, S.J., Young, J.S., Lee, A.T., Krishna, S., Chang, E.F., Brang, D., Hervey-Jumper, S.L. (2021). "Functional alterations in cortical processing of speech in glioma-infiltrated cortex." *Proceedings of the National Academy of Sciences*, 118(46). <https://doi.org/10.1073/pnas.2108959118>.
- Plass, J., Ahn, E., Towle, V.L., Stacey, W.C., Wasade, V.S., Tao, J.X., Wu, S., Issa, N.P., Brang, D. (2019). "Joint encoding of auditory timing and location in visual cortex." *Journal of Cognitive Neuroscience*, 31(7), 1002-1017.
- Ganesan, K., Plass, J., Beltz, A.M., Liu, Z., Grabowecky, M., Suzuki, S., Stacey, W.C., Wasade, V.S., Towle, V.L., Tao, J.X., Wu, S., Issa, N.P., Brang, D. (in press). "Visual speech differentially modulates beta, theta, and high gamma bands in auditory cortex." *European Journal of Neuroscience*.
- Lalwani, P. Brang, D. (2019). "Stochastic resonance model of synesthesia." *Philosophical Transactions of the Royal Society B: Biological Sciences*, 374, 20190029. <https://doi.org/10.1098/rstb.2019.0029>.

Service: Since he arrived at UM in 2016, Professor Brang has provided leadership and service to the department, the university, and the broader research community. He served on the cognition and cognitive neuroscience (his area within psychology) graduate admissions and social committees, and chaired the graduate recruitment committee twice. After completion of his K99/R00, he served on the Department of Psychology Executive Committee, which meets weekly and involves a heavy service load. Also, he served on the department's student academic affairs committee, along with other committees within the department and university. At the national level, he has reviewed grants for the Department of Veterans Affairs and the American Psychological Association, and manuscripts for 35 journals. In addition, he has made ECoG analytic pipelines freely available to the scientific community. Finally, he has been sharing his research to nonscientific audiences with media coverage in *Scientific American*, *Discover Magazine*, *Psychology Today*, and *The Atlantic* as well as documentaries on the History Channel and National Geographic.

### External Reviewers:

Reviewer (A): "Dr. Brang's work is of uniformly high quality, and he has authored more than fifty peer-reviewed research articles, a healthy number for a scientist at his career stage. His research topics have good breadth and focus...His studies are rigorous and thought provoking."

Reviewer (B): "All these studies have a lasting effect in their field beyond the simple main results. However, they may be easily missed for people outside our field, in particular as the focus on synesthesia touches upon a topic that often gathers public interest but which comes with a rather small representation in the domain general fields of perception or cognition. With this in mind, I find that David Brang last left a clear and individual mark in the multisensory field and established his own niche, in which he makes pioneering contributions."

Reviewer (C): "Dr. Brang reliably publishes his work in high-quality, international, and peer-reviewed journals...spanning from those focused on cognitive neuroscience to more general-audience as well as methodological and clinically oriented venues alike. This diversity, in my opinion, is indicative of the maturity of Dr. Brang's research activities, because it shows his expansion beyond a niche domain that is oftentimes the focus of a person's thesis and post-doctoral work. Instead, Dr. Brang is clearly making advances across multiple parallel domains."

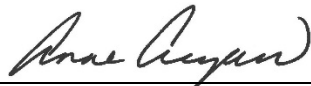
Reviewer (D): “In addition to the basic science contributions of his work, [Professor Brang’s] work also has clinical and translational implications for epilepsy and gliomas. He carries forward a collaborative approach from his graduate and postdoctoral training, and has built on this background to set up his own research program in which he excels at mutually beneficial collaborative interactions. Further, his efforts to develop open-source tools and datasets provide valuable service to the scientific community.”

Reviewer (E): “Even in early stages of his career [Professor Brang] showed outstanding potential...All of this was an excellent early indicator of his ability and potential, and it was clear to me from our very first meeting that [Professor Brang] would go on to be a career academic, and an influential player in the field of multisensory research. Nine years on from his PhD, [Professor Brang] has reached and exceeded all we might expect from a world-class academic.”

Reviewer (F): “I am very impressed with Dr. Brang’s scholarly output and the growing impact of his work...His work is almost universally published in very good impact journals...these journals also reflect the evolution of Dr. Brang’s scholarly thinking in moving from studies focused on the fascinating characterization of synesthesia to more mechanistically-oriented studies focused on the mechanisms of multisensory integration to his most recent work focused on the nature, organization, and plasticity within language networks.”

Summary of Recommendation:

Professor Brang has made very important contributions in research, in teaching, and in service and his work reflects very well on the Department of Psychology, the College of LSA, and the University of Michigan. The Executive Committee of the College of Literature, Science, and the Arts and I recommend that Assistant Professor David J. Brang be promoted to the rank of associate professor of psychology, with tenure, College of Literature, Science, and the Arts.



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Anne Curzan, Dean  
Geneva Smitherman Collegiate Professor of  
English Language and Literature, Linguistics,  
and Education  
Arthur F. Thurnau Professor  
College of Literature, Science, and the Arts

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