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KENDRICK KAY

CURRICULUM VITAE

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Web: http://cvnlab.net
Google Scholar: citations: 7514, h-index: 33, profile link: http://scholar.google.com/citations?user=hlthz-YAAAAJ
Research Interests: computational neuroscience, vision, cognitive neuroscience, fMRI methods, statistics

Education and Professional History

2015–present, University of Minnesota, Twin Cities.
Assistant Professor at the Center for Magnetic Resonance Research, Department of Radiology.
Adjunct Assistant Professor in Psychology (2016–present).
Affiliate of Graduate Program in Neuroscience (2016–present).
Affiliate of Biomedical Engineering Graduate Program (2018–present).

2013–2015, Washington University in St. Louis. Visiting Scholar in the Psychology Department.

Postdoctoral: 2009–2013, Stanford University. Postdoctoral Scholar. Advisor: Brian Wandell.

Graduate: 2003–2009, University of California, Berkeley. Ph.D. in Psychology. Advisor: Jack Gallant.

Undergraduate: 1998–2002, Harvard University. A.B. in Philosophy, magna cum laude.

Publications

P = Primary research article; R = Review, commentary, or book chapter

58 primary research articles + 14 review/commentary/book chapters = 72 total.

2024:

P Tuckute, G., Sathe, A., Srikant, S., Taliaferro, M., Wang, M., Schrimpf, M., **Kay, K.**, Fedorenko, E. Driving and suppressing the human language network using large language models. *Nature Human Behaviour* (2024).

2023:

P Wang, A.Y., **Kay, K.**, Naselaris, T., Tarr, M.J., Wehbe, L. Better models of human high-level visual cortex emerge from natural language supervision with a large and diverse dataset. *Nature Machine Intelligence* (2023).

P Zou, F., Guo, W., Allen, E.J., Wu, Y., Charest, I., Naselaris, T., **Kay, K.**, Kuhl, B.A., Hutchinson, J.B., DuBrow, S. Re-expression of CA1 and entorhinal activity patterns preserves temporal context memory at long timescales. *Nature Communications* (2023).

R **Kay, K.**, Bonnen, K., Denison, R.N., Arcaro, M.J., Barack, D.L. Tasks and their role in visual neuroscience. *Neuron* (2023).

P St-Yves, G., Allen, E.J., Wu, Y., **Kay, K.***, Naselaris, T.* Brain-optimized deep neural network models of human visual areas learn non-hierarchical representations. *Nature Communications* (2023).

P White, A.L., **Kay, K.N.**, Tang, K.A., Yeatman, J.D. Engaging in word recognition elicits highly specific modulations in visual cortex. *Current Biology* (2023).

2022:

P Pennock, I.M.L., Racey, C., Allen, E.J., Wu, Y., Naselaris, T., **Kay, K.N.**, Franklin, A., Bosten, J.M. Color-biased regions in the ventral visual pathway are food selective. *Current Biology* (2022).

P Gulban, O.F., Bollmann, S., Huber, R., Wagstyl, K., Goebel, R., Poser, B.A., **Kay, K.***, Ivanov, D.* Mesoscopic in vivo human T2* dataset acquired using quantitative MRI at 7 Tesla. *NeuroImage* (2022).

P Prince, J.S., Charest, I., Kurzawski, J.W., Pyles, J.A., Tarr, M.J., **Kay, K.N.** Improving the accuracy of single-trial fMRI response estimates using GLMsingle. *eLife* (2022).

P Roth, Z.N., **Kay, K.***, Merriam, E.P.* Natural scene sampling reveals reliable coarse-scale orientation tuning in human V1. *Nature Communications* (2022).

P Benson, N., Yoon, J., Forenzo, D., Engel, S., **Kay, K.**, Winawer, J. Variability of the Surface Area of the V1, V2, and V3 Maps in a Large Sample of Human Observers. *Journal of Neuroscience* (2022).

P Kurzawski, J.W., Gulban, O.F., Jamison, K., Winawer, J.*, **Kay, K.*** Non-Neural Factors Influencing BOLD Response Magnitudes within Individual Subjects. *Journal of Neuroscience* (2022).

P **Kay, K.** The risk of bias in data denoising methods: examples from neuroimaging. *PLoS One* (2022).

P Vanasse, T.J., Boly, M., Allen, E.J., Wu, Y., Naselaris, T., **Kay, K.**, Cirelli, C., Tononi, G. Multiple Traces and Altered Signal-to-Noise in Systems Consolidation: Complementary Evidence from the 7T fMRI Natural Scenes Dataset. *PNAS* (2022).

P Gu, Z., Jamison, K.W., Khosla, M., Allen, E.J., Wu, Y., St-Yves, G., Naselaris, T., **Kay, K.**, Sabuncu, M.R., Kuceyeski, A. NeuroGen: activation optimized image synthesis for discovery neuroscience. *NeuroImage* (2022).

P Allen, E.J., St-Yves, G., Wu, Y., Breedlove, J.L., Prince, J.S., Dowdle, L.T., Nau, M., Caron, B., Pestilli, F., Charest, I., Hutchinson, J.B., Naselaris, T.*, & **Kay, K.*** A massive 7T fMRI dataset to bridge cognitive neuroscience and artificial intelligence. *Nature Neuroscience* (2022).

P Allen, E., Mesik, J., **Kay, K.**, Oxenham, A. Distinct representations of tonotopy and pitch in human auditory cortex. *Journal of Neuroscience* (2022).

2021:

P Arcaro, M.J., Livingstone, M.S., **Kay, K.N.**, Weiner, K.S. The retrocalcarine sulcus maps different retinotopic representations in macaques and humans. *Brain Structure and Function* (2021).

P Zhao, Y., **Kay, K.**, Tian, Y., & Ku, Y. Sensory recruitment revisited: Ipsilateral V1 involved in visual working memory. *Cerebral Cortex* (2021).

P Poltoratski, S., **Kay, K.**, Finzi, D., & Grill-Spector, K. Holistic face recognition is an emergent phenomenon of spatial processing in face-selective regions. *Nature Communications* (2021).

R Shen, F.X., Wolf, S.M., Bhavnani, S., Deoni, S., Elison, J.T., Fair, D., Geethanath, S., Garwood, M., Gee, M.S., **Kay, K.**, Lim, K.O., Estrin, G.L., Luciana, M., Peloquin, D., Rommelfanger, K., Schiess, N., Siddiqui, K., Torres, E., Vaughan, J.T. Emerging Ethical Issues Raised by Highly Portable MRI Research in Remote and Resource-Limited International Settings. *NeuroImage* (2021). PMID: 34062266.

R Naselaris, T., Allen, E., & **Kay, K.** Extensive sampling for complete models of individual brains. *Current Opinion in Behavioral Sciences* (2021).

2020:

P Rokem, A. & **Kay, K.** Fractional Ridge Regression: a Fast, Interpretable Reparameterization of Ridge Regression. *GigaScience* (2020). PMID: 33252656.

R Kording, K.P., Blohm, G., Schrater, P., & **Kay, K.** Appreciating the variety of goals in computational neuroscience. *Neurons, Behavior, Data analysis, and Theory* (2020).

P Zhang, R-Y., Wei, X-X., & **Kay, K.** Understanding multivariate brain activity: evaluating the effect of voxelwise noise correlations on population codes in functional magnetic resonance imaging. *PLoS Computational Biology* (2020). PMID: 32810133.

P **Kay, K.**, Jamison, K.W., Zhang, R.-Y., & Ugurbil, K. A temporal decomposition method for identifying venous effects in task-based fMRI. *Nature Methods* (2020). PMID: 32895538.

P Zhang, R. & **Kay, K.** Flexible top-down modulation in human ventral temporal cortex. *NeuroImage* (2020). PMID: 32439537.

P Margalit, E., Jamison, K.W., Weiner, K.S., Vizioli, L., Zhang, R.-Y., **Kay, K.N.***, & Grill-Spector, K.* Ultra-high-resolution fMRI of Human Ventral Temporal Cortex Reveals Differential Representation of Categories and Domains. *The Journal of Neuroscience* (2020). PMID: 32094202.

2019:

P Hermes, D., Petridou, N., **Kay, K.***, & Winawer, J.* An image-computable model for the stimulus selectivity of gamma oscillations. *eLife* (2019). PMID: 31702552.

P Zhou, J., Benson, N.C., **Kay, K.**, & Winawer, J. Predicting neuronal dynamics with a delayed gain control model. *PLOS Computational Biology* (2019).

P **Kay, K.**, Jamison, K.W., Vizioli, L., Zhang, R., Margalit, E., & Ugurbil, K. A critical assessment of data quality and venous effects in sub-millimeter fMRI. *NeuroImage* (2019). PMID: 30731246.

2018:

P Benson, N.C., Jamison, K.W., Arcaro, M.J., Vu, A.T., Glasser, M.F., Coalson, T.S., Van Essen, D.C., Yacoub, E., Ugurbil, K., Winawer, J.*, & **Kay, K.*** The Human Connectome Project 7 Tesla retinotopy dataset: Description and population receptive field analysis. *Journal of Vision* (2018). PMID: 30593018.

P Charest, I., Kriegeskorte, N., & **Kay, K.** GLMdenoise improves multivariate pattern analysis of fMRI data. *NeuroImage* (2018). PMID: 30170148.

P Papale, P., Leo, A., Cecchetti, L., Handjaras, G., **Kay, K.**, Pietrini, P., Ricciardi, E. Foreground-background segmentation revealed during natural image viewing. *eNeuro* (2018). PMID: 29951579.

R Naselaris, T., Bassett, D.S., Fletcher, A.K., Kording, K., Kriegeskorte, N., Nienborg, H., Poldrack, R.A., Shohamy, D., **Kay, K**. Cognitive Computational Neuroscience: A New Conference for an Emerging Discipline. *Trends in Cognitive Sciences* (2018). PMID: 29500078.

P Kupers, E.R., Wang, H.X., Amano, K., **Kay, K.N.**, Heeger, D.J., Winawer, J. A non-invasive, quantitative study of broadband spectral responses in human visual cortex. *PLOS One* (2018). PMID: 29529085.

2017:

P Zhou, J., Benson, N.C., **Kay, K.**, & Winawer, J. Compressive Temporal Summation in Human Visual Cortex. *Journal of Neuroscience* (2017). PMID: 29192127.

R Zhang, R., Engel, S.A., & **Kay, K.** Binocular Rivalry: A Window into Cortical Competition and Suppression. *Journal of the Indian Institute of Science* (2017).

R Grill-Spector, K., **Kay, K.**, & Weiner, K.S**.** The Functional Neuroanatomy of Face Processing: Insights from Neuroimaging and Implications for Deep Learning. In: *Deep Learning for Biometrics. Advances in Computer Vision and Pattern Recognition*, edited by B. Bhanu & A. Kumar (2017).

R **Kay, K.N.** Principles for models of neural information processing. *NeuroImage* (2017). PMID: 28793238.

R Grill-Spector, K., Weiner, K.S., **Kay, K.**, & Gomez, J. The Functional Neuroanatomy of Human Face Perception. *Annual Review of Vision Science* (2017). PMID: 28715955.

P Kim, D., **Kay, K.**, Shulman, G., & Corbetta, M. A new modular brain organization of the BOLD signal during natural vision. *Cerebral Cortex* (2017). PMID: 28981593.

P Weiner, K., Barnett, M.A., Witthoft, N., Golarai, G., Stigliani, A., **Kay, K.N.**, Gomez, J., Natu, V.S., Amunts, K., Zilles, K., Grill-Spector, K. Defining the most probable location of the parahippocampal place area using cortex-based alignment and cross-validation. *NeuroImage* (2017). PMID: 28435097.

P **Kay, K.N.** & Yeatman, J.D. Bottom-up and top-down computations in word- and face-selective cortex. *eLife* (2017). PMID: 28226243.

2016:

P Strappini, F., Gilboa, E., Pitzalis, S., **Kay, K.**, McAvoy, M., Nehorai, A., & Snyder, A. Adaptive smoothing based on Gaussian processes regression increases the sensitivity and specificity of fMRI data. *Human Brain Mapping* (2016). PMID: 27943516.

P Khaligh-Razavi, S-M., Henriksson, L., **Kay, K.**, & Kriegeskorte, N. Fixed versus mixed RSA: Explaining visual representations by fixed and mixed feature sets from shallow and deep computational models. *Journal of Mathematical Psychology* (2016). PMID: 28298702.

P Vu, A.T., Phillips, J., **Kay, K.**, Phillips, M., Johnson, M., Shinkareva, S., Tubridy, S., Millin, R., Grossman, M., Gureckis, T., Bhattacharyya, R., & Yacoub, E. Using precise word timing information improves decoding accuracy in a multiband-accelerated multimodal reading experiment. *Cognitive Neuropsychology* (2016). PMID: 27686111.

2015:

R Naselaris, T. & **Kay, K.N.** Resolving ambiguities of MVPA using explicit models of representation. *Trends in Cognitive Sciences* (2015). PMID: 26412094.

P Henriksson, L., Khaligh-Razavi, S., **Kay, K.**, & Kriegeskorte, N. Visual representations are dominated by intrinsic fluctuations correlated between areas. *NeuroImage* (2015). PMID: 25896934.

P Rokem, A., Yeatman, J.D., Pestilli F., **Kay K.N.**, Mezer, A., Van der Walt, S., & Wandell, B.A. Evaluating the accuracy of diffusion MRI models in white matter. *PLOS ONE* (2015). PMID: 25879933.

P **Kay, K.N.**, Weiner, K.S., & Grill-Spector, K. Attention reduces spatial uncertainty in human ventral temporal cortex. *Current Biology* (2015). PMID: 25702580.

P Etzel, J.A., Cole, M.W., Zacks, J.M., **Kay, K.N.**, & Braver, T.S. Reward motivation enhances task coding in frontoparietal cortex. *Cerebral Cortex* (2015). PMID: 25601237.

R Wandell, B.A., Winawer, J., & **Kay, K.N.** Computational modeling of responses in human visual cortex. In: *Brain Mapping: An Encyclopedic Reference*, edited by P. Thompson & K. Friston (2015).

2014:

P O'Brien, M.J., Keegan, M.S., Goldstein, T., Millin, R., Benvenuto, J., **Kay, K.**, & Bhattacharyya, R. Sparse Atomic Feature Learning via Gradient Regularization: With Applications to Finding Sparse Representations of fMRI Activity Patterns. *IEEE SPMB* (2014).

P Pestilli, F., Yeatman, J.D., Rokem, A., **Kay, K.N.**, & Wandell, B.A. Evaluation and statistical inference for human connectomes. *Nature Methods* 11(10), 1058–63 (2014). PMID: 25194848.

P Menon, S., Yu, M., **Kay, K.**, & Khatib, O. Haptic fMRI: Accurately Estimating Neural Responses in Motor, Pre-Motor, and Somatosensory Cortex During Complex Motor Tasks. *IEEE EMBS* (2014). PMID: 25570385.

2013:

P **Kay, K.N.**, Rokem, A., Winawer, J., Dougherty, R.F., & Wandell, B.A. GLMdenoise: a fast, automated technique for denoising task-based fMRI data. *Frontiers in Neuroscience* 7 (2013). PMID: 24381539.

P Mezer, A., Yeatman, J.D., Stikov, N., **Kay, K.N.**, Cho, N.-J., Dougherty, R.F., Perry, M.L., Parvizi, J., Hua, L.H., Butts-Pauly, K., & Wandell, B.A. Quantifying the local tissue volume and composition in individual brains with magnetic resonance imaging. *Nature Medicine* 19(12), 1667–72 (2013). PMID: 24185694.

P Menon, S., Brantner, G., Aholt, C., **Kay, K.**, & Khatib, O. Haptic fMRI: Combining Functional Neuroimaging with Haptics for Studying the Brain's Motor Control Representation. *IEEE EMBS* (2013). PMID: 24110643.

P Winawer, J., **Kay, K.N.**, Foster, B.L., Rauschecker, A.M., Parvizi, J., & Wandell, B.A. Asynchronous Broadband Signals Are the Principal Source of the BOLD Response in Human Visual Cortex. *Current Biology* 23, 1–9 (2013). PMID: 23770184.

P **Kay, K.N.**, Winawer, J., Rokem, A., Mezer, A., & Wandell, B.A. A Two-Stage Cascade Model of BOLD Responses in Human Visual Cortex. *PLoS Computational Biology* 9(5), 1–16 (2013). PMID: 23737741.

P **Kay, K.N.**, Winawer, J., Mezer, A., & Wandell, B.A. Compressive spatial summation in human visual cortex. *Journal of Neurophysiology* 110(2), 481–493 (2013). PMID: 23615546.

2011:

R **Kay, K.N.** Understanding visual representation by developing receptive-field models. In: *Visual Population Codes: Towards a Common Multivariate Framework for Cell Recording and Functional Imaging*, edited by N. Kriegeskorte & G. Kreiman (2011).

P Vu, V.Q., Ravikumar, P., Naselaris, T., **Kay, K.N.**, Gallant, J.L., & Yu, B. Encoding and decoding V1 fMRI responses to natural images with sparse nonparametric models. *Annals of Applied Statistics* 5, 1159–1182 (2011). PMID: 22523529.

R Naselaris, T., **Kay, K.N.**, Nishimoto, S., & Gallant, J.L. Encoding and decoding in fMRI. *NeuroImage* 56, 400–410 (2011). PMID: 20691790.

2009:

P Naselaris, T., Prenger, R.J., **Kay, K.N.**, Oliver, M., & Gallant, J.L. Bayesian reconstruction of natural images from human brain activity. *Neuron* 63, 902–915 (2009). PMID: 19778517.

P Gallant, J., Naselaris, T., Prenger, R., **Kay, K.**, Stansbury, D., Oliver, M., Vu, A., & Nishimoto, S. Bayesian Reconstruction of Perceptual Experiences from Brain Activity Measurements. In: *Augmented Cognition*, HCII 2009, LNAI 5638, edited by D.D. Schmorrow et al. (2009).

R **Kay, K.N.** & Gallant, J.L. I can see what you see. *Nature Neuroscience* 12, 245–246 (2009). PMID: 19238184.

P Ravikumar, P., Vu, V.Q., Yu, B., Naselaris, T., **Kay, K.N.**, & Gallant, J.L. Nonparametric sparse hierarchical models describe V1 fMRI responses to natural images. In: *Advances in Neural Information Processing Systems* 21, edited by D. Koller, D. Schuurmans, Y. Bengio, & L. Bottou (2009).

2008:

P **Kay, K.N.**, Naselaris, T., Prenger, R.J., & Gallant, J.L. Identifying natural images from human brain activity. *Nature* 452, 352–355 (2008). PMID: 18322462.

P **Kay, K.N.**, David, S.V., Prenger, R.J., Hansen, K.A., & Gallant, J.L. Modeling low-frequency fluctuation and hemodynamic response timecourse in event-related fMRI. *Hum. Brain Mapp.* 29, 142–156 (2008). PMID: 17394212.

2007:

P Hansen, K.A., **Kay, K.N.**, & Gallant, J.L. Topographic organization in and near human visual area V4. *J. Neurosci.* 27, 11896–11911 (2007). PMID: 17978030.

Activities & Editorial Boards

2022/05, Organized Vision Sciences Society 2022 Symposium "Beyond representation and attention: Cognitive modulations of activity in visual cortex"

2021/01–present, Editorial Board for *PLOS One*

2020/09–present, Handling Editor for *Aperture*

2020/06–present, Section Editor (Computational & Theoretical) for *Neuroscience Insights*

2019/02–2020/06, Editor for *PLoS Computational Biology* Cognitive Neuroscience Channel

2018/06–present, Editorial Board for *Neurons, Behavior, Data Analysis and Theory* (NBDT)

2018/02, Guest Editor for *Vision* Special Issue “Visual Perception and Its Neural Mechanisms”

2015/10–2022/11, Organizer and steering committee member for Cognitive Computational Neuroscience, a new annual scientific conference, first held Sept 2017

2014/05, Organized Vision Sciences Society 2014 Symposium "Understanding representation in visual cortex: why are there so many approaches and which is best?"

Invited Talks

2023/02, Ohio State University, Center for Cognitive and Behavioral Brain Imaging seminar series
What is the Natural Scenes fMRI Dataset, and what is it good for?

2022/11, University of Minnesota, Biomedical Engineering-Industry Grand Rounds
Machine learning in visual and cognitive neuroscience

2022/09, ISMRM Study Group “Current Issues of Brain Function” (Topic: AI in fMRI)
Using the massive 7T fMRI Natural Scenes Dataset to drive computational models of visual representation

2022/09, Netherlands Institute for Neuroscience, NIN Open Data Symposium
What is the Natural Scenes fMRI Dataset, and what is it good for?

2022/07, University of Washington, NeuroHackademy
Introduction to the Natural Scenes Dataset

2022/07, Flatiron Institute, Center for Computational Neuroscience
Characterizing signal and noise in the Natural Scenes Dataset

2022/06, Columbia University, Zuckerman Institute
Characterizing signal and noise in the Natural Scenes Dataset

2022/04, UT-Austin, Center for Perceptual Systems Seminar
The Natural Scenes Dataset: rationale, methods development, and scientific applications

2022/03, Sungkyunkwan University (South Korea), Neuro@noon seminar
Big-data and computational approaches in cognitive neuroscience

2022/02, Stanford University, Friday Seminar Cognition Faculty Invited Speaker
The Natural Scenes Dataset: rationale, methods development, and scientific applications

2021/12, University of Coimbra, Conference on "How Computational Neuroscience and Artificial Intelligence (should) impact Psychological Research"
Leveraging a constrained modeling approach to understand information processing in human visual cortex

2021/11, Northwestern University, Department of Neurology Research Seminar Series
Scientific and methodological advances from the 7T fMRI Natural Scenes Dataset

2021/10, University of Montreal, Cerebrum seminar series
The Natural Scenes Dataset: an integration of cognitive computational neuroscience

2021/04, Spinoza Centre for Neuroimaging (Netherlands) User Meeting
Current controversies in ultra-high-field (UHF) imaging

2021/01, MRC Cognition and Brain Sciences Unit Chaucer Club
A data-driven approach to advancing cognitive neuroscience

2020/11, University of Washington Psychology Cognitive Colloquium
A data-driven approach to advancing cognitive neuroscience

2020/10, University of California Berkeley Neuroimaging Seminar Series
A temporal decomposition method for identifying venous effects in task-based fMRI

2020/01, New York University Abu Dhabi, Workshop (5 day)
The Big Data Revolution in Neuroscience

2019/11, 12th Biennial Minnesota High Field Workshops
A temporal decomposition method for removing venous effects from task-based fMRI

2019/07, Massachusetts Institute of Technology, The Algonauts Project Workshop
The Natural Scenes Dataset: massive high-quality whole-brain 7T fMRI measurements during visual perception and memory

2019/05, University of Birmingham, School of Psychology
Models, large fMRI datasets, and a method for removing venous artifacts from fMRI data

2019/05, University of Sussex, School of Psychology Colloquia
A model-based, data-driven approach towards understanding visual processing in the brain

2019/05, Kavli Royal Society, Meeting on "Memory reactivation: replaying events past, present and future"
Neural activity and information processing: a perspective from visual neuroscience

2018/12, NYU Abu Dhabi, Conference on "Conscious and Unconscious Limits on Perception"
How do measurement and modeling of the brain lead to an understanding of perception?

2018/12, Cuban Neuroscience Center, Winter School of the International School on Neurotechnology
Using fMRI to measure and model information processing in the human visual system

2018/10, UC-Berkeley, Helen Wills Neuroscience Institute Colloquium
Opportunities and challenges of high-field fMRI for neuroscience applications

2018/06, Center for Information and Neural Networks (Osaka, Japan)
Ultra-high-resolution fMRI: the problem of veins and a potential solution

2017/10, OSA Fall Vision Meeting Symposium: Forward models in vision science
Bottom-up and top-down computations in word- and face-selective cortex

2017/10, 11th Biennial Minnesota High Field Workshops
Ultra-high-resolution fMRI: challenges in data analysis and interpretation for neuroscience applications

2017/03, BrainHack Global Bloomington, Indiana University, Imaging Research Facility
Software tools motivated by analysis of fMRI data

2016/10, University of Wisconsin-Madison, Department of Psychology
Developing signal processing techniques for ultra-high-resolution fMRI

2016/09, Neurohackweek Workshop, University of Washington eScience Institute
Modeling fMRI data

2016/08, European Conference on Visual Perception (Symposium talk)
A fully computable model of stimulus-driven and top-down effects in high-level visual cortex

2016/06, Bangalore Cognition Workshop, Indian Institute of Science
Using functional neuroimaging and computational modeling to understand the nature of top-down effects in human visual cortex

2016/05, Vision Sciences Society (Symposium talk)
What are deep neural networks and what are they good for?

2016/03, University of Washington, Institute for Learning & Brain Sciences
A fully computable model of stimulus-driven and top-down effects in high-level visual cortex

2016/01, University of Pennsylvania, Institute for Research in Cognitive Science
A fully computable model of stimulus-driven and top-down effects in high-level visual cortex

2015/12, Yale University, Yale Magnetic Resonance Research Center
A quantitative model of bottom-up and top-down computations in high-level visual cortex

2015/11, Baylor College of Medicine, Center for Advanced MR Imaging
A model of bottom-up and top-down computations in high-level visual cortex

2015/10, University of Minnesota, Digital Technology Center
Using functional neuroimaging to develop computational models of sensory and cognitive processing

2015/09, Minnesota Workshop on High and Ultra-High Field Imaging
HCP Retinotopic Mapping

2015/06, UC-Berkeley, Redwood Center for Theoretical Neuroscience
Using functional neuroimaging to reveal the computations performed by the human visual system

2015/04, University of Minnesota, Center for Magnetic Resonance Research
Using functional neuroimaging to reveal the computations performed by the human visual system

2015/03, Cosyne (Computational and Systems Neuroscience) Workshop
Modeling top-down influences on representation in word- and face-selective cortex

2014/11, University of Glasgow, Institute of Neuroscience and Psychology
How the brain builds high-level representations of visual stimuli

2014/09, Carnegie Mellon University, Psychology Department
How the brain builds high-level representations of visual stimuli

2014/05, Vision Sciences Society (Symposium talk)
Identifying the nonlinearities used in extrastriate cortex

2013/05, MRC Cognition and Brain Sciences Unit
GLMdenoise: a fast, automated technique for denoising task-based fMRI data

2013/04, MRC Cognition and Brain Sciences Unit
A two-stage cascade model of BOLD responses in human visual cortex

2008/11, Dartmouth, Psychology and Brain Sciences
Using computational models of voxels to identify images seen by an observer

2008/11, Guest Lecture for Math 126 at Dartmouth
Building computational models of V1 voxels & Mathematical details of estimating receptive-field models

2008/03, Cosyne (Computational and Systems Neuroscience) Workshop
Using voxel receptive field models to identify natural images seen by an observer

2007/12, UC-Berkeley Brain Imaging Center Research Day
Building a general decoder for human visual cortex

Teaching Experience

2022, Instructor, University of Washington, NeuroHackademy
Lectured on “What is PCA, really?”

2020, Instructor, New York University Abu Dhabi
The Big Data Revolution in Neuroscience (5-day workshop)

2019, Organizer, University of Minnesota
Weekly Neuroanalysis workshop

2017–2018, Co-Instructor, University of Minnesota
Neuroscience 8111: Quantitative Neuroscience

2017, Guest Lecturer (Data Management), University of Minnesota
Neuroscience 8321: Career Skills and Understanding Responsibilities As a Neuroscientist

2015–2016, Guest Lecturer (Statistics and fMRI), University of Minnesota
Neuroscience 8320: Neurostatistics

2015, Co-Instructor, Washington University in St. Louis
Psychology 4450: Functional Neuroimaging Methods

2014–2015, Instructor, Washington University in St. Louis
Psychology 3604: Cognitive Neuroscience

2014, Guest Lecturer (Computational Modeling), Washington University in St. Louis
Psychology 519: Advanced Cognitive, Computational and Systems Neuroscience

2014, Instructor, Washington University in St. Louis
Psychology 5007: Statistics and Data Analysis in MATLAB

2012, Instructor, Stanford University
Psychology 216A: Statistics and Data Analysis in MATLAB

2011, Teaching Assistant, Stanford University
Psychology 30: Sensation and Perception

2004, Graduate Student Instructor, UC-Berkeley
Psychology 110: Biological Psychology
Psychology 101: Research Design and Data Analysis

2002–2003, Teaching Assistant, Harvard University
Computer Science Extension 220: Artificial Intelligence

2000–2002, Teaching Fellow, Harvard University
Computer Science 121: Introduction to Formal Systems and Computation

Grants

Completed:

2018/09–2022/08, NIH RF1 MH117015 (PI: Geoffrey Ghose), "Linking neuronal, metabolic, and hemodynamic responses across scales", Role: Co-I, 24% effort

2017/09–2022/08, NIH U01 EB025144 (PI: Kamil Ugurbil), "Elementary Neuronal Ensembles to Whole Brain Networks: Ultrahigh Resolution Imaging of Function and Connectivity in Humans", Role: Co-I, 9% effort

2018/10–2021/09, NSF IIS-1822683 (PI: Kendrick Kay), "CRCNS Research Proposal: Collaborative Research: Evaluating Machine Learning Architectures Using a Massive Benchmark Dataset of Brain Responses to Natural Scenes", Role: PI, 25% effort

2014/09–2017/12, NIH R01 EY023915 (PI: Kalanit Grill-Spector), "Functional-neuroanatomy of high-level visual cortex: a quantitative multimodal approach", Role: Consultant, $15,000/year

2013/11–2014/11, IARPA BAA-12-05 Subaward N003630801, "Knowledge Representation in Neural Systems", Role: Consultant, Total Costs: $36,305

2011/05–2011/09, Center for Cognitive and Neurobiological Imaging Neuroventures grant, "Visual signals in ventral occipital cortex measured with spin echo and gradient echo fMRI", Role: Co-PI, Total Costs: $6,800

Active:

2023/09–2026/07, NIH 1R01HD114489-01 (PI: Sophia Vinci-Booher, co-I: Kendrick Kay), "CRCNS: Dense longitudinal neuroimaging to evaluate learning in childhood", Role: co-I, 17% effort

2023/09–2027/06, NIH 1R01EY035533-01 (PI: Dora Hermes, co-PI: Kendrick Kay), "Electrical stimulation to control feedback modulation of perception", Role: co-PI, 25% effort

2023/07–2027/06, NIH 1R01EY034118-01A1 (PI: Kendrick Kay, co-PI: Clay Curtis), "Deep sampling of cognitive effects in the human visual system", Role: PI, 34% effort

2022/04–2026/03, NIH 2R01EY023384-06A1 (PI: Thomas Naselaris, co-I: Kendrick Kay), "Seen and mental images in visual cortex", Role: Co-I, 5% effort

Awards

2003, National Defense Science and Engineering Graduate Fellowship

Peer Reviewer

Journals:

Artificial Intelligence, Cerebral Cortex, eLife, Frontiers in Neuroscience, Human Brain Mapping, Investigative Ophthalmology & Visual Science, Journal of Neurophysiology, Journal of Neuroscience, Journal of Neuroscience Methods, Journal of Vision, Measurement, Nature, Nature Biomedical Engineering, Nature Communications, Network Neuroscience, Neural Computation, Nature Machine Intelligence, Network Neuroscience, Neurocomputing, NeuroImage, Neuron, Neuropsychologia, Philosophical Transactions B, PLoS Biology, PLoS Computational Biology, PLoS ONE, PNAS, Statistica Sinica, Trends in Cognitive Sciences, Trends in Neurosciences

Funding Agencies:

KU Leuven, Research Council (Belgium)
U.S. Army's Institute for Collaborative Biotechnologies (ICB)
National Institutes of Health (SPC Study Section, Ad-hoc, Early Career Reviewer; BCHI Study Section, Ad-hoc)
National Science Foundation (Cognitive Neuroscience; Robust Intelligence; Integrative Strategies for Understanding Neural and Cognitive Systems; Perception, Action, & Cognition)
Netherlands Organisation for Scientific Research
Research Councils UK
Agence Nationale de la Recherche (France)
Czech Science Foundation (Czech Republic)
Research Foundation Flanders (Belgium)
Wellcome Trust (England)
Wellcome Trust DBT India Alliance

Research Mentorship

- Luca Vizioli, Postdoc, September 2015–June 2017

- Keith Jamison, Research Staff, November 2015–October 2017
- Ruyuan Zhang, Postdoc, February 2016–February 2018
- Li Tong, Visiting Professor from China National Digital Switching Center, November 2016–November 2017
- Yijie Zhao, Visiting PhD student from East China Normal University, November 2016–January 2018
- Akshay Jagadish, Research Assistant, October 2017–March 2018
- Chris Racey, Postdoc, October 2016–October 2019
- Emily Allen, Postdoc, August 2017–present
- Davie Yoon, Research Assistant, July 2018–November 2019
- Yihan Wu, Research Assistant, September 2018–January 2020
- Anahita Mehta, Postdoc, January 2018–present
- Logan Dowdle, Postdoc, June 2019–present
- Tom Gebhart, Grad student, May 2019–June 2021
- Asha Ramalaxmi, Masters student, March 2019–August 2020
- Daniel Guest, Grad student, April 2019–present
- Hannah Berg, Grad student, July 2019–July 2021
- Jacob Prince, Grad student, April 2020–present
- Jan Kurzawski, Postdoc, August 2020–present
- Faruk Gulban, Postdoc, August 2019–present
- Tiasha Roy, Postdoc, October 2021–present
- Daniel Stehr, Postdoc, November 2021–present
- Royoung Kim, Grad student, November 2021–present
- Isaac Liao, Undergrad, March 2022–present
- Celia Durkin, Grad student, June 2022–present
- Jing Zhou, Postdoc, June 2022–present
- Tia Ou, Grad student, September 2022–present

Collaborators (current)

- Michael Arcaro, University of Pennsylvania
- Eli Merriam, National Institute of Mental Health
- Kevin Weiner, University of California, Berkeley
- Andrew Oxenham, University of Minnesota
- Jon Winawer, New York University
- Kalanit Grill-Spector, Stanford University
- Jason Yeatman, University of Washington
- Ian Charest, University of Montreal
- Thomas Naselaris, University of Minnesota
- Ben Hutchinson, University of Oregon
- Dora Hermes, Mayo Clinic
- Alex White, Barnard College
- Amy Kuceyeski, Weill Cornell Medicine
- Rod Braga, Northwestern University
- Won Mok Shim, Sungkyunkwan University, Korea
- Pat Bolan, University of Minnesota
- Tomas Knapen, VU University Amsterdam
- Radek Cichy, Free University of Berlin
- Daphna Shohamy, Columbia University
- Steve Engel, University of Minnesota
- Brad Duchaine, Dartmouth College
- Anahita Mehta, University of Michigan