

# Manoj Kumar

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## EDUCATION

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- Ph.D. Neuroscience Program, University of Illinois at Urbana-Champaign, Urbana, IL, 2017  
Thesis: *The Influence of Semantics on the Visual Processing of Natural Scenes*  
Advisors: Diane M. Beck and Kara D. Federmeier
- M.S. Engineering and Applied Science, Yale University, New Haven, CT, 1999  
Attended Department of Mechanical Engineering, University of Houston, TX, 1995-1996
- B.Tech. Mechanical Engineering, Institute of Technology, Banaras Hindu University, Varanasi, India, 1992

## APPOINTMENTS: ACADEMIC AND NATIONAL LABORATORIES

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- 2022– Associate Research Scholar, Princeton Neuroscience Institute, Princeton University
- 2017–2022 Postdoctoral Research Associate, Princeton Neuroscience Institute, Princeton University
- 2021, Spring Lecturer, Dept. of Electrical and Computer Engineering, Princeton University
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### Engineering

- 1994–1995 Research Fellow, Computational and Theoretical Fluid Dynamics Division,  
National Aerospace Laboratories, Bangalore, India
- 1993-1994 Graduate Trainee, Computational and Theoretical Fluid Dynamics Division,  
National Aerospace Laboratories, Bangalore, India

## RESEARCH EXPERIENCE

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- 2014–2017 Graduate Research Assistant, Neuroscience Program,  
University of Illinois at Urbana-Champaign
- 2011–2013 NSF IGERT Fellow, Neuroscience Program,  
University of Illinois at Urbana-Champaign
- 1997–1998 Graduate Research Assistant, Engineering and Applied Science,  
Yale University

## PROFESSIONAL EXPERIENCE: SOFTWARE INDUSTRY

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- 2001–2011 CSC (formerly Covansys), MI, USA
- 2000–2001 Youngsoft Inc., MI, USA

## PUBLICATIONS

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### Preprints

Michelmann, S., **Kumar, M.**, Norman, K. A., & Toneva, M. (2023). Large language models can segment narrative events similarly to humans. *arXiv*. <https://doi.org/10.48550/arXiv.2301.10297>

**Kumar, M.**, Goldstein, A., Michelmann, S., Zacks, J. M., Hasson, U., & Norman, K. A. (2022). Bayesian surprise predicts event boundaries in narrative listening. *PsyArXiv*. (*under revision*).  
<https://doi.org/10.31234/osf.io/qd2ra>

### Peer Reviewed Publications

**Kumar, M.**, Anderson, M. J., Antony, J. W., Baldassano, C., Brooks, P. P., Cai, M. B., Chen, P.-H. C., Ellis, C. T., Henselman-Petrusek, G., Huberdeau, D., Hutchinson, J. B., Li, Y. P., Lu, Q., Manning, J. R., Mennen, A. C., Nastase, S. A., Richard, H., Schapiro, A. C., Schuck, N. W., ... Norman, K. A. (2021a). BrainIAK: The brain imaging analysis kit. *Aperture Neuro*, 1(4), 19.  
<https://doi.org/10.52294/31bb5b68-2f84-411b-8c00-a1dacb61e1da>

**Kumar, M.**, Federmeier, K. D., & Beck, D. M. (2021b). The N<sub>300</sub>: An index for predictive coding of complex visual objects and scenes. *Cerebral Cortex Communications*, 2(2), tgabo30.  
<https://doi.org/10.1093/texcom/tgabo30>

Levitis, E., Van Praag, C. D. G., Gau, R., Heunis, S., DuPre, E., Kiar, G., Bottenhorn, K. L., Glatard, T., Nikolaidis, A., Whitaker, K. J., et al. (2021). Centering inclusivity in the design of online conferences—an OHBM–open science perspective. *GigaScience*, *10*(8), giabo51.

<https://doi.org/10.1093/gigascience/giabo51>

**Kumar, M.**, Ellis, C. T., Lu, Q., Zhang, H., Capotă, M., Willke, T. L., Ramadge, P. J., Turk-Browne, N. B., & Norman, K. A. (2020). BrainIAK tutorials: User-friendly learning materials for advanced fMRI analysis. *PLOS Computational Biology*, *16*(1), e1007549.

<https://doi.org/10.1371/journal.pcbi.1007549>

**Kumar, M.**, Federmeier, K. D., Fei-Fei, L., & Beck, D. M. (2017). Evidence for similar patterns of neural activity elicited by picture- and word-based representations of natural scenes. *NeuroImage*.

<https://doi.org/10.1016/j.neuroimage.2017.03.037>

### Peer Reviewed Publications: Engineering

**Kumar, M.**, Arakeri, J., & Shankar, P. (1995). Translational velocity oscillations of piston generated vortex rings. *Physics of Fluids*, *7*(11), 2751–2756.

Shankar, P., & **Kumar, M.** (1995). Vortex rings generated by drops just coalescing with a pool. *Physics of Fluids*, *7*(4), 737–746.

Shankar, P., & **Kumar, M.** (1994a). Experimental determination of the kinematic viscosity of glycerol-water mixtures. *Proceedings of the Royal Society of London. Series A: Mathematical and Physical Sciences*, *444*(1922), 573–581.

Shankar, P., & **Kumar, M.** (1994b). Toroidal vortex rings. *Current Science*, *66*, 151–151.

**Kumar, M.**, & Shankar, P. (1993). The kinematic viscosities of ethylene glycol and castor oil. *Current Science*, *65*(12), 983–984.

### CONFERENCE PROCEEDINGS

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#### Conferences: Oral Presentation

2022 **Kumar, M.**, Goldstein, A., Michelmann, S., Zacks, J.M., Hasson, U., and Norman, K.A. (2022). Event segmentation in story listening using deep language models, Psychonomic Society, Boston, MA, USA.

2022 **Kumar, M.**, Goldstein, A., Michelmann, S., Zacks, J.M., Hasson, U., and Norman, K.A. (2022). Event segmentation in narrative listening, Manhattan Area Memory Meeting, Manhattan, NYC, USA.

- 2020 Hackathon, Organization for Human Brain Mapping, Montreal (Virtual).
- 2019 Open Science Room, Organization for Human Brain Mapping, Rome, Italy.
- 2019 Hackathon, Organization for Human Brain Mapping, Rome, Italy.
- 2018 BrainIAK Demonstration, Organization for Human Brain Mapping, Singapore.
- 2015 **Kumar, M.**, Zhang, Y., Beck, D. M., and Federmeier, K. D. (2015). The good, the bad and the early: top-down influence on scene categorization. Oral Presentation at the Society for Neuroscience Annual Meeting, Chicago, IL.
- 2014 **Kumar, M.**, Federmeier, K. D., Fei-Fei, L. and Beck, D. M. (2014). Visual and semantic similarities across pictures and words. Oral Presentation at the Vision Sciences Society Meeting, St. Petersburg, FL.
- 1995 **Kumar, M.** and Shankar, P.N. (1995). A new vortex ring translational instability. Proceedings of the 6<sup>th</sup> Asian Congress of Fluid Mechanics, Singapore.

#### **Conferences: Poster Presentation**

- 2022 **Kumar, M.**, Goldstein, A., Michelmann, S., Zacks, J.M., Hasson, U., and Norman, K.A. (2022). Event segmentation in story listening using deep language models. Cognitive Science Society, Toronto, Canada.
- 2022 **Kumar, M.**, Goldstein, A., Michelmann, S., Zacks, J.M., Hasson, U., and Norman, K.A. (2022). Event segmentation in story listening using deep language models. Context and Episodic Memory Symposium, Philadelphia.
- 2020 **Kumar, M.**, Ellis, C.T., Lu, Q., Zhang, H., Capotă, M., Willke, T.L., Ramadge, P.J., Turk-Browne, N.B., and Norman, K.A., (2020). BrainIAK education: User-friendly tutorials for advanced, computationally-intensive fmri analysis. Organization for Human Brain Mapping, Montreal (virtual).
- 2019 **Kumar, M.**, Turk-Browne, N.B., and Norman, K.A. (2019). The impact of predictability on memory representations, Society for Neuroscience Annual Meeting, Chicago, IL.
- 2019 **Kumar, M.**, Ellis, C.T., Lu, Q., Zhang, H., Capotă, M., Willke, T.L., Ramadge, P.J., Turk-Browne, N.B., and Norman, K.A., (2019). Brainiak education: User-friendly tutorials for advanced, computationally-intensive fmri analysis, Society for Neuroscience Annual Meeting, Chicago, IL.
- 2019 **Kumar, M.**, Ellis, C.T., Lu, Q., Zhang, H., Turk-Browne, N.B., Ramadge, P.J., and Norman, K.A. (2019). BrainIAK Tutorials: User-friendly tutorials for advanced, computationally-intensive fmri analysis, Organization for Human Brain Mapping, Rome.

- 2018 **Kumar, M.**, Ellis, C.T., Ramadge, P.J., Norman, K.A., and Turk-Browne, N.B. (2018). Brainiak education: User-friendly tutorials for advanced, computationally-intensive fmri analysis, Society for Neuroscience Annual Meeting, San Diego, CA.
- 2018 **Kumar, M.**, Turk-Browne, N.B., Ramadge, P.J., and Norman, K.A. (2018) BrainIAK Tutorials: User-friendly tutorials for cutting-edge MVPA methods, Organization for Human Brain Mapping, Singapore.
- 2017 **Kumar, M.**, Zhang, S., and Beck, D. M. (2017). Similarities between deep neural networks and brain regions in processing good and bad exemplars of natural scenes. Vision Sciences Society Meeting, St. Petersburg, FL.
- 2017 **Kumar, M.**, Zhang, Y., Beck, D. M., and Federmeier, K. D. (2017). It's the right cue: hemispheric differences in predictive processing of natural scenes. Cognitive Neuroscience Society, San Francisco, CA.
- 2016 **Kumar, M.**, Federmeier, K. D., Fei-Fei, L., and Beck, D. M. (2016). The neural semantic representations of fine-grained object categories, Society for Neuroscience Annual Meeting, San Diego, CA.
- 2016 **Kumar, M.**, Federmeier, K. D., Fei-Fei, L., and Beck, D. M. (2016). Visual and semantic neural representations for animate and inanimate objects. Vision Sciences Society Meeting, St. Petersburg, FL.
- 2015 **Kumar, M.**, Zhang, Y., Beck, D. M., and Federmeier, K. D. (2015). Scene Categorization: The Good, the bad and the early. Society for Psychophysiological Research Annual Meeting, Seattle, WA.
- 2015 **Kumar, M.**, Zhang, Y., Beck, D. M., and Federmeier, K. D. (2015). Scene categorization: the good, the bad and the early. Cognitive Neuroscience Society, San Francisco, CA.
- 2015 **Kumar, M.**, Zhang, Y., Beck, D. M., and Federmeier, K. D. (2015). Scene categorization: the good, the bad and the early. Vision Sciences Society Meeting, St. Petersburg, FL.
- 2014 **Kumar, M.**, Federmeier, K. D., Fei-Fei, L., and Beck, D. M. (2014). Evidence for a common semantic representation for pictures and words. Cognitive Neuroscience Society, Boston, MA.
- 2013 **Kumar, M.**, Fei-Fei, L., and Beck, D. M. (2013). Frontal contributions to natural scene processing. Vision Sciences Society Meeting, Naples, FL.

#### **Peer Reviewed Extended Conference Abstracts: Engineering**

- 1998 Massot, M., **Kumar, M.**, Smooke, M.D., and Gomez A. (1998). Spray counter flow diffusion flames of heptane: experiments and computations with detailed kinetics and transport. Twenty Seventh Symposium (International) on Combustion, p. 1975.

- 1995 **Kumar, M.** and Shankar, P.N. (1995). A new vortex ring translational instability. Proceedings of the 6<sup>th</sup> Asian Congress of Fluid Mechanics, p. 1576.

## TALKS

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### Invited Talks

- 2021 Zacks Lab Meeting, Washington University of Saint. Louis, St. Louis, MO.
- 2017 DiCarlo Lab Meeting, Massachusetts Institute of Technology, Cambridge, MA.
- 2017 Intel Project Meeting, Princeton Neuroscience Institute, Princeton University, Princeton, NJ.
- 2016 Center for Neural Science, Indian Institute of Science, Bangalore, India.
- 2013 Vision Lab Meeting, Center for Neural Science, Indian Institute of Science, Bangalore, India.

### Internal Presentations

- 2018 Intel Meeting, Princeton University.
- 2016 Guest Lecture, Core Neuroscience Course, University of Illinois at Urbana-Champaign.
- 2016 Cognitive Neuroscience Brown Bag, Dept. of Psychology, University of Illinois at Urbana-Champaign.
- 2015 Guest Lecture, Core Neuroscience Course, University of Illinois at Urbana-Champaign.
- 2015 Spring Seminar Series, Neuroscience Program, University of Illinois at Urbana-Champaign.
- 2015 Cognitive Brown Bag, Dept. of Psychology, University of Illinois at Urbana-Champaign.
- 2015 Visual Cognition and Human Performance Brown Bag, Dept. of Psychology, University of Illinois at Urbana-Champaign.
- 2014 Cognitive Neuroscience Brown Bag, Dept. of Psychology, University of Illinois at Urbana-Champaign.
- 2013 Visual Cognition and Human Performance Brown Bag, Dept. of Psychology, University of Illinois at Urbana-Champaign.
- 2013 Neuroscience Seminar, University of Illinois at Urbana-Champaign.
- 2012 Neuro-Engineering IGERT Meeting, University of Illinois at Urbana-Champaign.

## TEACHING

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- 2021, Spring Assistant Instructor, NEU480 – fMRI Decoding: Reading Minds Using Brain Scans, Princeton University  
Responsible for teaching and grading the laboratory section of this course
- 2014, Spring Teaching Assistant, PSYC 100: Introduction to Psychology, University of Illinois at Urbana-Champaign  
Primary instructor: responsible for syllabus, teaching and grading
- 2013, Fall Teaching Assistant, PSYC 100: Introduction to Psychology, University of Illinois at Urbana-Champaign  
Primary instructor: responsible for syllabus, teaching and grading

### Courses

I can teach the following courses: Introduction to Psychology Vision, Memory, Research Methods, fMRI Analysis and Decoding (using public datasets), Cognitive Psychology, Cognitive Neuroscience

## AWARDS

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- 2011-2013 NSF IGERT Fellowship, University of Illinois at Urbana-Champaign
- 1996 Graduate Student Fellowship, Yale University

### WORKSHOPS: ORGANIZED

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- 2019 BrainIAK ISC/SRM Workshop at Princeton University, Princeton, NJ, USA
- 2019 BrainIAK Hackathon at Virginia Tech, Blacksburg, VA, USA
- 2019 BrainIAK MURI Workshop at Princeton University, Princeton, NJ, USA
- 2018 BrainIAK Workshop at Princeton University, Princeton, NJ, USA

### WORKSHOPS: PARTICIPATED AND LED PROJECTS

- 2020 Organization for Human Brain Mapping, Hackathon, Virtual (Montreal)

- 2019 BrainIAK Workshop at the Princeton University Brainhack, Princeton, NJ, USA
- 2019 Organization for Human Brain Mapping, Hackathon, Rome, Italy
- 2018 BrainIAK Hackathon at Yale University, New Haven, CT, USA

## SERVICE

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- 2017 – BrainIAK Committers Group Member  
Help people run and troubleshoot fMRI analysis: [www.brainiak.org](http://www.brainiak.org)
- 2015 EEG demonstration to the public at the Beckman Institute Open House at UIUC<sup>†</sup>
- 2013 Mentor to undergraduate students as a part of Illinois Summer Neuroscience Institute
- 2013 Host for the Neuroscience Program Open House at UIUC<sup>†</sup>
- 2012 One of two organizing members for SFN Night at UIUC<sup>†</sup>
- 2012 One of four organizing committee members for the 2012  
UIUC<sup>†</sup> Neuro-Engineering IGERT symposium
- 2012 Organized a visiting faculty seminar for the Neuro-Engineering seminar series at UIUC<sup>†</sup>

<sup>†</sup>University of Illinois at Urbana-Champaign