

Kamila Maria Jozwik

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Education

- **Massachusetts Institute of Technology and University of Cambridge**
Sir Henry Wellcome postdoctoral fellow 2018 - present
- **Free University Berlin**
Humboldt postdoctoral fellow 2016 - 2017
- **University of Cambridge**
PhD in Biological Sciences 2011 - 2016
- **University of Cambridge**
MPhil in Biological Sciences 2010 - 2011
- **University of Warsaw**
BSc in Biotechnology 2007 - 2010

Research Experience

- **Topography in deep neural networks**
Examined the role of topographical constraint in deep neural networks and their ability to model primate brain.
(with James DiCarlo and Nancy Kanwisher, Massachusetts Institute of Technology)
- **Deep neural model match for human and monkey**
Compared a wide range of deep neural network model matches to human and monkey inferior temporal cortex.
(with James DiCarlo and Nancy Kanwisher, Massachusetts Institute of Technology)
- **Hyperparameter search for predicting human brain responses**
Performed a large-scale hyperparameter search for predicting human brain responses in fMRI and MEG with deep neural networks.
(with James DiCarlo and Nancy Kanwisher, Massachusetts Institute of Technology)
- **Animacy dimensions in object recognition**
Inspected the contribution of different animacy dimensions in explaining representations of object images in humans and deep neural networks.
(with Nikolaus Kriegeskorte and Radoslaw Martin Cichy, Columbia University and Free University Berlin)

- **Object and word representations in humans and deep neural networks**
Investigated the representations of object images and written words in humans and deep neural networks.
(with Radoslaw Martin Cichy, Free University Berlin)
- **Feature and category object representations**
Examined the importance of visual features and semantic categories in primate inferior temporal cortex, human behaviour and deep neural networks.
(with Marieke Mur and Nikolaus Kriegeskorte, MRC Cognition and Brain Sciences Unit, University of Cambridge)
- **Face similarity and identity judgments**
Defined function approximating human face similarity judgments using Basel Face Space model and explored face similarity representations in deep neural networks.
(with Nikolaus Kriegeskorte, MRC Cognition and Brain Sciences Unit, University of Cambridge)
- **Functional dissection of hormonal gene transcription programs in breast cancer**
Characterised roles of transcription factors (FOXA1, MLL3 and GRHL2) and the mechanism underlying deposition of enhancer histone modification during breast cancer progression.
(with Jason Carroll, Cancer Research UK Cambridge Institute, University of Cambridge)

Publications

Journal publications:

- Cichy, R. M., Kriegeskorte, N., **Jozwik, K.M.**, van den Bosch, J.J.F. , Charest, I. (2019)
"The spatiotemporal neural dynamics underlying perceived similarity for real-world objects" Neuroimage, 194, 12-24 (collected and analysed part of behavioural data)
- **Jozwik, K.M.**, Kriegeskorte, N., Storrs, K. R., Mur, M. (2017)
"Deep convolutional neural networks outperform feature-based but not categorical models in explaining object similarity judgments" Frontiers in Psychology, 8(10):1726.
- **Jozwik, K.M.**, Kriegeskorte, N., Mur, M. (2016)
"Visual features as stepping stones toward semantics: Explaining object similarity in IT and perception with non-negative least squares" Special issue "Functional selectivity in perceptual and cognitive systems" Neuropsychologia 83:201-26.
- **Jozwik, K.M.**, Chernukhin, I., Serandour, A. A., Nagarajan, S., Carroll, J.S. (2016)
"FOXA1 directs H3K4 monomethylation at enhancers via recruitment of the methyltransferase MLL3" Cell Reports 17(10):2715-2723.
- **Jozwik, K.M.**, Carroll, J.S. (2012)
"Pioneer factors in hormone dependent cancers" Nature Reviews Cancer 12(6):381-5.

Peer-reviewed conference publications:

- **Jozwik, K.M.**, Lee, H., Kanwisher, N. and DiCarlo, J.J. (2019)
"Are topographic deep convolutional neural networks better models of the ventral visual stream?" Conference on Cognitive Computational Neuroscience.

- **Jozwik, K.M.**, Kriegeskorte, N., Cichy, R. M., Mur, M. (2018)
"Deep convolutional neural networks, features, and categories perform similarly at explaining primate high-level visual representations" Conference on Cognitive Computational Neuroscience.
- **Jozwik, K.M.**, Charest I., Kriegeskorte, N. and Cichy, R. M. (2017)
"Animacy dimensions ratings and approach for decorrelating stimuli dimensions" Conference on Cognitive Computational Neuroscience.

Preprints:

- **Jozwik, K.M.**, Schrimpf, M., Kanwisher, N. and DiCarlo, J.J. (2019)
"To find better neural network models of human vision, find better neural network models of primate vision" BioRxiv
- **Jozwik, K.M.**, Lee, M., Marques, T., Schrimpf, M., Bashivan, P. (2019)
"Large-scale hyperparameter search for predicting human brain responses in the Algonauts challenge" BioRxiv
- Adhya, D., Swarup, V., Nowosaid, P., Shum, C., **Jozwik, K.**, McAlonan, G., Mendez, M.A., Horder, J., Murphy, D., Geschwind, D.H, Price, J., Carroll, J., Srivastava, D.P., Baron-Cohen, S. (2018)
"Shared gene co-expression networks in autism from induced pluripotent stem cell (iPSC) neurons" BioRxiv (guided experimental design and bioinformatics analyses)

Manuscripts in preparation:

- **Jozwik, K.M.**, Kanwisher, N. and DiCarlo, J.J.
"Biologically inspired deep neural networks are the current best models of primate vision. What's next?" invited submission at Trends in Cognitive Sciences
- **Jozwik, K.M.**, Lee, H., Kanwisher, N. and DiCarlo, J.J. (2019)
"Topographic deep convolutional neural networks as models of inferior temporal cortex"
- **Jozwik, K.M.**, Charest I., Kriegeskorte, N. and Cichy R.M.
"Dimensions of animacy across time in human brain."
- **Jozwik, K.M.**, Kriegeskorte, N., Kietzmann, T., Cichy, R. M., Mur, M.
"Timecourse of conceptual feature and category models and recurrent deep neural networks in predicting object representations in human brain"

Research funding

Fellowships

- "Explaining the heterogeneity and topography in inferior temporal cortex with deep neural networks"
Sir Henry Wellcome Postdoctoral Fellowship, University of Cambridge, UK, Massachusetts Institute of Technology, US, Wellcome Trust, 2018
- "The spatio-temporal representation of objects in visual and semantic domains in human brain and machine"
Humboldt Foundation Postdoctoral Fellowship, Free University Berlin, Germany, Humboldt Foundation, 2017

- "The mechanisms of DNA repair"
Corbridge Cambridge Trust Scholarship for MPhil Studies, University of Cambridge, United Kingdom, Corbridge Trust, 2010
- "Roles of Raly protein in DNA repair"
MRC Weatherall Institute of Molecular Medicine Studentship, Oxford University, United Kingdom, Weatherall Institute of Molecular Medicine, 2010
- "Roles of ATRIP protein in DNA repair"
Amgen Foundation Research Scholarship, University of Cambridge, United Kingdom, Amgen Foundation, 2009
- "Mechanisms of transcription"
Molecular Biosciences International Student Scholarship, Aarhus University, Denmark, Danish National Research Foundation, 2009

Awards

- Churchill College By-Fellowship, 2019
- Best Poster Award at McGovern Institute at Massachusetts Institute of Technology Retreat, 2019
- International Brain Research Organization Stipend, 2016
- Organization for Human Brain Mapping Merit Abstract Award, 2016
- Concepts, Actions and Objects Conference Abstract Award, 2016
- Cambridge University Representative for Global Young Scientists Summit, 2013
- Path to Harvard Competition Winner, Academic Visit to Harvard University, 2010

Workshop organisation

- "Challenges for deep neural network models of visual cognition: from incorporating biological constraints to predicting correlational and causal experimental outcomes" workshop, Computational and Systems Neuroscience conference, 2019
- "Future of deep learning in brain research" workshop, University of Cambridge, Newton Trust, 2019

Travel

- Free University Dean's stipend, 2016
- Grant to attend Cold Spring Harbour Laboratory Computational Neuroscience: Vision Course, 2016
- Grant to attend Computational Vision Summer School at Black Forest, 2015
- Guarantors of Brain Travel Grant, 2015
- Grindley Travel Grant from Experimental Psychology Society, 2015
- Cambridge Philosophical Society Conference Grant, 2015
- Amgen Scholars Travel Award, 2013
- Darwin College Conference Grant, 2013

Teaching

- tutorial at Cambridge Vision Workshop "*Weighted representational modelling in deep neuronal networks*", 2016
- tutorial at MRC Cognition and Brain Sciences Methods Day "*Weighted representational modelling in fMRI and behaviour*", 2015
- Project design and supervision of undergraduate and Master students in neuroscience from different backgrounds (cognitive science, physics, computer science) at Free University Berlin (Elias Najarro, Anton Komissarov) and Massachusetts Institute of Technology (Laura Queipo, Hermes Suen), 2017-2019

Academic service

- Reviewer at Nature Human Behaviour, Nature Communications, Neuroimage, PLOS One, Human Brain Mapping, Journal of Experimental Psychology: Human Perception and Performance, IEEE Journal of Biomedical and Health Informatics, Molecular Autism, Royal Society Open Science, Cognitive Computational Neuroscience conference
- Member of Center for Brains, Minds Machines, Society for Neuroscience, Vision Sciences Society, Organization for Human Brain Mapping
- Organizer and co-chair of workshop "Challenges for deep neural network models of visual cognition: from incorporating biological constraints to predicting correlational and causal experimental outcomes", Computational and Systems Neuroscience Conference, 2019
- Debate chair and moderator "How do deep neural networks differ from brains" at Center for Brains, Minds and Machines retreat, Massachusetts Institute of Technology, 2018
- Public engagement talk "Deep neural networks: from recognising objects to making art" at Berlin Night of Science, Free University Berlin, 2017

Selected invited and conference talks

- "Are topographic deep convolutional neural networks better models of the ventral visual stream?" Data Blitz Talk at the 7th Cambridge Neuroscience Symposium "Artificial and Biological Cognition", 2019
- "Brain-inspired deep neural network models of object recognition in humans and monkeys" Invited Talk at the Symposium "How Humans and Machines Learn to See", 2019
- "Dissecting object recognition in humans, primates and deep neuronal networks" Invited Talk at Boston College, 2019
- "Dimensions of object recognition in humans, primates and deep neuronal networks" Invited Talk at Harvard Vision Lab, 2018
- "Mechanisms of object recognition in humans, primates and deep neuronal networks" Invited Talk at MRC Cognition and Brain Sciences Unit, 2018

- "Explaining brain area scaling and topography in monkey and human IT with deep neural networks" Talk at Center for Brains, Minds and Machines retreat, 2018
- "Representation of visual features and categories in across space and time in human, monkey, and convolutional neural networks" Talk at nanosymposium at the Society for Neuroscience conference, 2016
- "Visual features versus categories: Explaining object representations in primate IT and deep neural networks with weighted representational modeling" Talk at Concepts, Actions and Objects conference, 2016
- "Visual features as stepping stones toward semantics: Explaining object similarity in IT and perception with non-negative least squares" Talk at nanosymposium at the Society for Neuroscience conference, 2015

Referees

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