Ilker Yildirim

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Positions

Massachusetts Institute of Technology
Department of Brain & Cognitive Sciences
Research Scientist, 2016-present.

Massachusetts Institute of Technology
Department of Brain & Cognitive Sciences
The Rockefeller University
Laboratory of Neural Systems (joint)
Postdoctoral fellow, 2014-2016.

Education

2014, Ph.D., Brain & Cognitive Sciences and Computer Science (joint), University of Rochester.
Thesis: From Perception to Conception: Learning Multisensory Representations
2011, M.A., Brain & Cognitive Sciences, University of Rochester.
2009, M.S., Computer Science, Bogazici University, Istanbul, Turkey.
2007, B.S., Computer Science, Bogazici University, Istanbul, Turkey.

Publications
(Rigorously & competitively peer-reviewed. * indicates equal contribution.)

• Yildirim, I., Freiwald, W. F., & Tenenbaum, J.B. (under revision). Efficient inverse graphics in biological face processing. *bioRxiv 282798.*

• Yildirim, I., Wu, J., Kanwisher, N., & Tenenbaum, J.B. (submitted). An integrative computational architecture for object-driven cortex.

• Yildirim, I., Siegel, M., & Tenenbaum, J.B. (to appear). Physical object representations for perception and cognition. *The Cognitive Neurosciences,* 6^{th} *edition*, Gazzaniga, Mangun, Poeppel (Editors).

• Bates, C.J., Yildirim, I., Battaglia, P.W., & Tenenbaum, J.B. (revised & resubmitted). Modeling human intuitions about liquid flow with particle-based simulation *arXiv:1809.01524*

• Yildirim, I.*, Smith, K.*, Belledonne, M.*, Wu, J., & Tenenbaum, J.B. (2018). Neurocomputational modeling of human physical scene understanding. *In* 2^{nd} *Cognitive Computational Neuroscience Conference (CCN).* [Selected as a talk.]

• Yildirim, I.*, Gerstenberg, T.*, Saeed, B., Toussaint, M., & Tenenbaum, J.B. (2017). Physical problem solving: Joint planning with symbolic, geometric, and dynamic constraints.*In* 39^{th} *Annual Conference of the Cognitive Science Society (CogSci).*

• Janner, M., Wu, J., Kulkarni, T., Yildirim, I., Tenenbaum, & J.B. (2017). Self-supervised intrinsic image decomposition. *Neural Information Processing Systems (NIPS).*

• Yildirim, I.*, Janner M.*, Belledonne, M., Wallraven, C., Freiwald, W., & Tenenbaum, J.B. (2017). Causal and compositional generative models in online perception. *In* 39^{th} *Annual Conference of the Cognitive Science Society (CogSci).*

• Yildirim, I.*, Siegel, M.*, & Tenenbaum, J.B. (2016). Perceiving Fully Occluded Objects via Physical Simulation. *In* 38^{th} *Annual Conference of the Cognitive Science Society (CogSci).*

• Allen, K.R., Yildirim, I., & Tenenbaum, J.B. (2016). Integrating Identification and

Perception: A case study of familiar and unfamiliar face processing. *In* 38^{th} *Annual Conference of the Cognitive Science Society (CogSci).*

• Yildirim, I.*, Wu, J.*, Lim, J., Freeman, W.T., & Tenenbaum, J.B. (2015). Galileo: Perceiving physical object properties by integrating a physics engine with deep learning. *Neural Information Processing Systems (NIPS).*

• Erdogan, G., Yildirim, I., & Jacobs, R. A. (2015). From Sensory Signals to Modality-Independent Conceptual Representations: A Probabilistic Language of Thought Approach. *PLoS Computational Biology.*

• Yildirim, I., Kulkarni, T.D., Freiwald, W.A., & Tenenbaum, J.B. (2015). Efficient analysis-by-synthesis in vision: A computational framework, behavioral tests, and comparison with neuronal representations. *In* 37^{th} *Annual Conference of the Cognitive Science Society (CogSci).*

• Bates, C. J., Yildirim, I., Tenenbaum, J.B., & Battaglia, P.W. (2015). Humans predict liquid dynamics using probabilistic simulation. *In* 37^{th} *Annual Conference of the Cognitive Science Society (CogSci).*

• Yildirim, I. & Jacobs, R.A. (2015). Learning Multisensory Representations for Auditory-Visual Transfer of Sequence Category Knowledge: A Probabilistic Language of Thought Approach. *Psychonomic Bulletin & Review.*

• Yildirim, I., Degen, J., Tanenhaus, M. K., & Jaeger, T. F. (2015). Talker-specificity and adaptation in quantifier interpretation. *Journal of Memory and Language.*

• Erdogan, G., Yildirim, I., & Jacobs, R. A. (2014). Transfer of object shape knowledge across visual and haptic modalities. *In* 36^{th} *Annual Conference of the Cognitive Science Society (CogSci).*

• Transfer of Object Category Knowledge Across Visual and Haptic Modalities: Experimental and Computational Studies. Yildirim, I. & Jacobs, R. A. (2013). *Cognition.*

• Yildirim, I. & Jacobs, R.A. (2012). A Rational Approach to the Acquisition of Multisensory Representations. *Cognitive Science.*

• Yildirim, I. & Jacobs, R.A. (2010). A Bayesian Nonparametric Approach to Multisensory Perception. *In* 32^{nd} *Annual Conference of the Cognitive Science Society (CogSci).*

• Yildirim, I. & Yolum, P. (2009). Hybrid Models for Achieving and Maintaining Cooperative Symbiotic Groups. *Mind & Society.*

• Yildirim, I., Aran, O., Yolum, P., & Akarun, L. (2009). Cooperative Sign Language Tutoring: A Multiagent Approach. *In Proceedings of Engineering Societies in Agents' World X.*

• Yildirim, I. & Yolum, P. (2008). Hybrid Models for Achieving and Maintaining Collaborative Symbiotic Groups. *In* 5^{th} *European Social Simulation Association Conference.*

Invited talks

• Dagstuhl Seminar in "3D Morphable Models", Leibniz-Zentrum für Informatik, March 03-08, 2019.

• Columbia University, Center for Theoretical Neuroscience Seminar Series. New York, February 2018.

• Cognitive Neuroscience Society (CNS) Invited Symposium, Boston, March 2018.

• Hierarchical Multisensory Integration Workshop, Barcelona, June 2017.

• University of Toronto, Department of Computer Science Seminar, April 2017.

• Vision seminar, MIT, March 2017.

• Brown University, Perception and Action Seminar Series, December 2016.

• Physical and Social Scene Understanding Workshop, CogSci Conference, August 2016.

• University Electro-Communications, Tokyo; Workshop on Object vision, November 2015.

• RIKEN Institute, Tokyo; Special seminar, November 2015.

• Face ID Challenge Workshop, MIT, September 2015.

• Tong lab, Vanderbilt University, February 2014.

• Saxe Lab, MIT, January 2014.

Students
(+ indicates co-authored at least one paper)

• Mario Belledonne^{+}. BCS post-bach research assistant. 2016-present.

• Amir Soltani. BCS post-bach research assistant. 2016-present.

• Basil Saeed^{+}. EECS & BCS undergraduate. 2016-present.

• Kate Lin. Wellesley Uni. Neuroscience and Psychology undergraduate. 2018-present.

• Sualeh Asif. MIT undergraduate. 2018-present.

• Michael Janner^{+}. EECS undergraduate. 2015-2018.

• Shraman Chaudhiri. EECS MSc. 2016-2018.

• Aaditya Singh. EECS & BCS undergraduate. 2017-2018.

• Skylar Sutherland. BCS & Math undergraduate. 2018 summer.

• Pallavi Mishra. EECS MSc. 2016-2017.

• Wendy Wei. BCS undergraduate. 2015-2016.

Teaching

Guest lecturer

• Neurally Inspired Models of Information Processing (Fall 2011, Summer 2012, Fall 2012, Summer 2013). University of Rochester.

• Dynamical Systems (Fall 2011). University of Rochester.

• Motor Control (Fall 2010). University of Rochester.

Teaching Assistant

- Cognition, Spring 2011. University of Rochester.
- Foundations of Cognitive Science, Fall 2011; University of Rocheter.
- Neural Foundations of Behavior, Fall 2012. University of Rochester.

Service

Organizer, *Deep Learning in Computational Cognitive Science*, CogSci conference, July 2017.

Reviewer for *Psychological Review, Proceedings of the National Academy of Sciences, Attention, Perception & Psychophysics, IEEE PAMI, IET Computer Vision, Annual Conference of the Cognitive Science Society (CogSci), Cognitive Computational Neuroscience Conference (CCN).*

Press coverage

WIRED magazine, "MIT Researchers Want to Teach Robots How to Wash Dishes", 2015.

VICE magazine, "How to Teach a Robot to Build a Rube Goldberg Machine", 2015.

Boston globe, "MIT system makes human-like predictions about how objects move through the world", 2015.

Awards

Schloss Dagstuhl - NSF Support Grant. 2018.

Outstanding dissertation prize, University of Rochester. 2015.

Best paper award, Engineering Societies in the Agents' World X, 2009, for "Cooperative sign language tutoring: A multiagent approach."