

DAMON A. CLARK, PHD

Assistant Professor, Department of Molecular, Cellular, and Developmental Biology
Secondary appointment in Physics
Yale University
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Contact Information

Department of MCDB
KBT Room 224
New Haven, CT 06511

email: damon.clark@yale.edu
phone: (203) 432-0750

Education

Harvard University, Cambridge, MA, 2002-2007. PhD in Physics, 2007. A.M. in Physics, 2004.
Dissertation Title: "Biophysical Analysis of Thermotactic Behavior in *C. elegans*"

Princeton University, Princeton, NJ, 1997-2001. A.B. in Physics, with a Certificate (minor) in
Biophysics. (Highest Honors)

Marine Biological Laboratory, Woods Hole, MA, Summer 2006. Neural Systems and Behavior
Summer Course.

Research and Employment

- Jan. 2013 – present Assistant Professor, Yale University Department of Molecular, Cellular, and Developmental Biology. My lab studies how networks of neurons compute, using visual processing and behaviors in *Drosophila* as a model system.
- Feb. 2008 – Oct. 2012 Postdoctoral Fellow, Stanford University School of Medicine, Department of Neurobiology. Working in Prof. Tom Clandinin's lab, I dissected visual motion processing in walking *Drosophila*.
- Sep. 2007 – Dec. 2007 Associate Researcher CNRS, Ecole Normale Supérieure (Paris, France), Physics Department. Working with Prof. Rava da Silveira, I numerically and analytically modeled dynamic adaptation in photoreceptors.
- Jan. 2004 – Aug. 2007 Dissertation research, Harvard University, Department of Physics. Working with Prof. Aravinthan Samuel, I studied how the nematode neural circuit encodes temperature sensing behavioral algorithms.
- June 2001 – June 2002 Princeton-in-Africa Fellow for the International Rescue Committee (IRC), Somaliland (Somalia). I was responsible for writing project reports and proposals; as Project Coordinator for a UN-funded project, I collected, analyzed, and presented data assessing returning refugees in Hargeisa, Somaliland.
- Jan. 2000 – May 2001 Undergraduate research, Princeton University, Department of Molecular Biology. Working with Prof. Samuel Wang, I investigated the evolution of mammalian brain architecture through a broad comparison of brain structure volumes.

Awards and Honors

Alfred P. Sloan Research Fellow in Neuroscience, 2015-2017
Searle Scholar Award, 2014
Smith Family Award for Excellence in Biomedical Research, 2013
NIH Vision Training Program Postdoctoral Fellowship, Stanford University, 2011-2012
Jane Coffin Childs Postdoctoral Fellowship, 2008-2011
NSF Graduate Research Fellowship, Physics, 2002-2005
Department of Defense Graduate Research Fellowship, Physics, Declined, 2001
Shenstone Prize in Physics, Princeton University, 2001
Phi Beta Kappa Honor Society, Princeton University, 2001
Sigma Xi Science Research Honor Society, Princeton University, 2001
Kusaka Physics Prize, Princeton University, 2000

Publications (reverse chronological order)

- 1) Mano, O., **Clark, D. A.** (2017) “Graphics Processing Unit-accelerated Code for Computing Second-order Wiener Kernels and Spike-triggered Covariance”, *PLOS ONE* 12(1): e0169842.
- 2) **Clark, D. A.**, Demb J. B. (2016) “Parallel computations in insect and mammalian visual motion processing”, *Current Biology* 26: R1062–R1072.
- 3) Salazar-Gatzimas, E., Chen J. Y., Creamer, M. S., Mano, O., Mandel, H. B., Matulis, C. A., Pottackal, J., **Clark, D. A.** (2016) “Direct measurement of correlation responses in *Drosophila* elementary motion detectors reveals fast timescale tuning”, *Neuron* 92(1): 227-239.
- 4) Fitzgerald, J. E., **Clark, D. A.** (2015) “Nonlinear circuits for naturalistic visual motion estimation”, *eLife*: e09123.
- 5) Szikra, T., Trenholm, S., Drinnenberg, A., Juettner, J., Raics, Z, Farrow, K., Biel, M, Awatramani, G., **Clark, D. A.**, Sahel, J., da Silveira, R. A., Roska, B. (2014) “Rods in daylight act as relay cells for cone-driven horizontal cell-mediated surround inhibition”, *Nature Neuroscience* 17: 1728–1735.
- 6) Behnia, R., **Clark, D. A.**, Carter, A. G., Clandinin, T. R., Desplan, C. (2014), “Processing properties of ON and OFF pathways for *Drosophila* motion detection”, *Nature* 512: 427-430.
- 7) **Clark, D. A.***, Fitzgerald, J. E.*, Ales, J. M.*, Gohl, D. M., Silies, M. A., Norcia, A. M., Clandinin, T. R. (2014), “Flies and humans share a motion estimation strategy that exploits natural scene statistics”, *Nature Neuroscience* 17:296-303. (*Equal contributions.)
- 8) Velez, M. M., Wernet, M. F., **Clark, D. A.**, Clandinin, T. R. (2014), “Walking *Drosophila* align with the e-vector of linearly polarized light through directed modulation of angular acceleration”, *Journal of Comparative Physiology A* 200: 603-614.
- 9) **Clark, D. A.**, Benichou, R., Meister, M., da Silveira, R. A. (2013), “Dynamical adaptation in photoreceptors”, *PLoS Computational Biology* 9(11): e1003289.
- 10) Silies, M.*, Gohl, D. M.*, Fisher, Y. E., Freifeld, L., **Clark, D. A.**, Clandinin, T. R. (2013), “Modular use of peripheral input channels tunes motion-detecting circuitry”, *Neuron* 79(1): 111-127. (*Equal contributions.)
- 11) Freifeld, L., **Clark, D. A.**, Schnitzer, M. J., Horowitz, M. A., Clandinin, T. R. (2013), “GABAergic lateral interactions tune the early stages of visual processing in *Drosophila*”, *Neuron* 78: 1075–1089.

- 12) **Clark, D. A.**, Freifeld, L., Clandinin, T. R. (2013), “Mapping and cracking sensorimotor circuits in genetic model organisms” (Perspective), *Neuron* **78**: 583-595.
- 13) Omura, D. T., **Clark, D. A.**, Samuel, A. D. T., Horvitz, H. R. (2012), “Dopamine signaling is essential for precise rates of locomotion by *C. elegans*”, *PLoS ONE* **7**(6): e38649.
- 14) Wernet, M. F., Velez, M. M., **Clark, D. A.**, Baumann-Klausener, F., Brown, J. R., Klovstad, M., Labhart, T., Clandinin, T. R. (2012), “Genetic Dissection Reveals Two Separate Retinal Substrates for Polarization Vision in *Drosophila*”, *Current Biology* **22**(1): 12-20.
- 15) **Clark, D. A.**, Burzdyn, L., Horowitz, M., Schnitzer, M., Clandinin T. R. (2011) “Defining the computational structure of the motion detector in *Drosophila*”, *Neuron* **70**(6): 1165-1177.
- 16) **Clark, D. A.**, de Vries, S. J., Clandinin T. R. (2010), “Watching the fly brain in action” (News and Views), *Nature Methods* **7**: 505-506.
- 17) Srivastava, N., **Clark, D. A.**, Samuel, A. D. T. (2009), “Temporal analysis of stochastic turning behavior of swimming *C. elegans*”, *J. Neurophys.* **102**: 1172-1179.
- 18) **Clark, D. A.**, Gabel, C. V., Gabel, H., Samuel, A. D. T. (2007) “Temporal activity patterns in thermosensory neurons of freely moving *C. elegans* encode spatial thermal gradients”, *J. Neuroscience* **27**(23): 6083-6090.
- 19) **Clark, D. A.***, Gabel, C. V.*, Lee, T. M., Samuel, A. D. T. (2007) “Short-term adaptation and temporal processing in the cryophilic response of *Caenorhabditis elegans*”, *J. Neurophys.* **97**(3): 1903-1910. (*Equal contributions)
- 20) Chi, C. A.*, **Clark, D. A.***, Lee, S.*, Biron, D., Luo, L., Gabel, C. V., Brown, J., Sengupta, P., Samuel, A. D. T. (2007) “Temperature and food mediate long-term thermotactic behavioral plasticity by association-independent mechanisms in *C. elegans*”, *J. Exp. Biol.* **210**: 4043-4052. (*Equal contributions)
- 21) Korta, J., **Clark, D. A.**, Gabel, C. V., Mahadevan, L., Samuel, A. D. T. (2007) “Mechanosensation and mechanical load modulate the locomotory gait of swimming *C. elegans*”, *J. Exp. Biol.* **210**: 2383-2389.
- 22) Gabel, C. V., Gabel, H., Pavlichin, D., Kao, A., **Clark, D. A.**, Samuel, A. D. T. (2007) “Neural circuits mediate electrosensory behavior in *Caenorhabditis elegans*”, *J. Neuroscience* **27**(28): 7586-7596.
- 23) Luo, L.*, **Clark, D. A.***, Biron, D., Mahadevan, L., Samuel, A. D. T. (2006) “Sensorimotor control during isothermal tracking in *Caenorhabditis elegans*”, *J. Exp. Biol.* **209**: 4652-4662. (*Equal contributions)
- 24) **Clark, D. A.**, Biron, D., Sengupta, P., Samuel, A. D. T. (2006) “The AFD sensory neurons encode multiple functions underlying thermotactic behavior in *C. elegans*”, *J. Neuroscience* **26**(28): 7444 –7451.
- 25) Chung, S. H.*, **Clark, D. A.***, Gabel, C. V., Mazur, E., Samuel, A. D. T. (2006) “The role of the AFD neuron in *C. elegans* thermotaxis analyzed using femtosecond laser ablation”, *BMC Neuroscience* **7**:30. (*Equal contributions)
- 26) Biron, D., Shibuya, M., Gabel, C. V., Wasserman, S. M., **Clark, D. A.**, Brown, A., Sengupta P., Samuel A. D. T. (2006) “A diacylglycerol kinase acts in the AFD sensory neurons to modulate longterm thermotactic behavioral plasticity in *C. elegans*”, *Nature Neuro.* **9**(12): 1499-1505.

- 27) **Clark, D. A.**, Grant, L. C. (2005) “The bacterial chemotactic response reflects a compromise between transient and steady state behavior”, *Proc. Nat. Acad. Sci. USA* **102**(26): 9150-9155.
- 28) Wang, S. S.-H., Mitra, P. P., **Clark, D. A.** (2002) “How do brains evolve?” (Communications Arising), *Nature* **415**: 135.
- 29) Ng, K. K.-S., Kolatkar A. R., Park-Snyder, S., Feinberg, H., **Clark, D. A.**, Drickamer, K., Weis, W. I. (2002) “Orientation of bound ligands in mannose-binding proteins”, *J. Biol. Chem.* **277**(18): 16088-16095.
- 30) **Clark, D. A.**, Mitra, P. P., Wang, S. S.-H. (2001) “Scalable architecture in mammalian brains”, *Nature* **411**: 189-193.