

DAMON A. CLARK, PHD

Associate Professor, Department of Molecular, Cellular, and Developmental Biology
Secondary Appointment, Departments of Physics and Neuroscience
Yale University
(Updated October 1, 2021)

Department of MCDB
Yale Science Building, Room C148
New Haven, CT 06511

damon.clark@yale.edu
+1 (203) 432-0750
<http://clarklab.yale.edu>

Education

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

Princeton University, Princeton, NJ, 1997-2001. A.B. in Physics, *summa cum laude*, with a
Certificate (minor) in Biophysics.

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

Princeton-in-Beijing, 8-week intensive Mandarin program, Beijing, China. Summer 1999.

Research and Employment

2020 – present	Associate Professor with tenure, Yale University, Department of Molecular, Cellular, and Developmental Biology.
2018 – 2020	Associate Professor on term, Yale University, Department of Molecular, Cellular, and Developmental Biology.
2013 – 2018	Assistant Professor, Yale University, Department of Molecular, Cellular, and Developmental Biology.
2008 – 2012	Postdoctoral Fellow, Stanford University School of Medicine, Department of Neurobiology, working with Prof. Thomas Clandinin.
2007 (Sep. – Dec.)	Associate Researcher CNRS, Ecole Normale Supérieure (Paris, France), Department of Physics, working with Prof. Rava da Silveira.
2004 – 2007	Dissertation research, Harvard University, Department of Physics, working with Prof. Aravinthan Samuel.
2001 – 2002	Princeton-in-Africa Fellow for the International Rescue Committee (IRC), Somaliland (Somalia).
2000 – 2001	Undergraduate research, Princeton University, Department of Molecular Biology, working with Prof. Samuel Wang.

Awards and Honors

Alfred P. Sloan Research Fellow in Neuroscience, 2015-2019
Searle Scholar Award, 2014-2018
Smith Family Award for Excellence in Biomedical Research, 2013-2017
NIH Vision Training Program Postdoctoral Fellowship, Stanford University, 2011-2012
International Consortium for Adaptive Materials (ICAM) travel grant recipient, June 2011
Jane Coffin Childs Postdoctoral Fellowship, 2008-2011
NSF Graduate Research Fellowship, Physics, 2002-2005

Department of Defense Graduate Research Fellowship, Physics, Declined, 2001
 Graduated *summa cum laude*, Princeton University, 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
 Robert C. Byrd Scholar (California), 1997-2001
 National Merit Scholar, 1997

Publications

Google Scholar: <http://scholar.google.com/citations?user=2LITUJQAAAAJ&hl=en>

Pubmed: <https://www.ncbi.nlm.nih.gov/myncbi/damon.clark.1/bibliography/public/>

Published

- 46) Liu, W., Feke, A., Leung, C. C., Tarte, D., Yuan, W., Vanderwall, M., Sager, G. C., Wu, X., Schear, A., **Clark, D. A.**, Thines, B.C., Gendron, J. G. (2021) “A metabolic coincidence mechanism controls winter photoperiodism in plants.” *Accepted, Developmental Cell*.
- 45) Mano, O., Creamer, M. S., Badwan, B. A., **Clark, D. A.** (2021) “Predicting individual neural responses with anatomically constrained task optimization.” *Current Biology* **31**: 1-14.
- 44) Demir, M.*, Kadakia, N.*, Anderson H. D., **Clark, D. A.**, Emonet, T. (2020) “Using whiff timing to navigate intermittent odor plumes”, *eLife* **9**: e57524. (* Equal contributions)
- 43) Agrochao, M.*, Tanaka, R.*, Salazar-Gatzimas, E., **Clark, D. A.** (2020) “Mechanism for analogous illusory motion perception in flies and humans”, *Proceedings of the National Academy of Sciences* **117**(37): 23044-23053. (* Equal contributions)
- 42) Tanaka, R. & **Clark, D. A.** (2020) “Object displacement-sensitive visual neurons drive freezing in *Drosophila*”, *Current Biology* **30**(13): 2532-2550.
- 41) DeAngelis, B. D.*, Zavatore-Veth, J. A.*, Gonzalez-Suarez A. D., **Clark, D. A.** (2020) “Spatiotemporally precise optogenetic activation of sensory neurons in freely walking *Drosophila*”, *eLife*, **9**:e54183. (* Equal contributions.)
- 40) Shook, B. A., Wasko, R. R., Mano, O., Rutenberg-Schoenberg, M., Rudolph, M. C., Zirak, B., Rivera-Gonzalez, G. C., López-Giráldez, F., Zarini, S., Rezza, A., **Clark, D. A.**, Rendl, M., Rosenblum, M. D., Gerstein, M. B., Horsley, V. (2020) “Dermal Adipocyte Lipolysis and Myofibroblast Conversion Are Required for Efficient Skin Repair”, *Cell Stem Cell* **26**(6): 880-895.e6.
- 39) Zavatore-Veth, J. A., Badwan, B. A., **Clark, D. A.** (2020) “A minimal synaptic model for direction selective neurons in *Drosophila*”, *Journal of Vision*, **22**(2): 1-22.
- 38) Matulis, C. A., Chen, J., Gonzalez-Suarez, A. D., Behnia, R., **Clark, D. A.** (2020) “Heterogeneous temporal contrast adaptation in *Drosophila* direction-selective circuits”, *Current Biology* **30**: 222-236.e6.
- 37) Mano, O., Creamer, M. S., Matulis, C. A., Salazar-Gatzimas, E., Chen, J., Zavatore-Veth, J. A., **Clark, D. A.** (2019) “Using slow frame rate imaging to extract fast receptive fields”, *Nature Communications* **10**:4979.
- 36) Chen, J., Mandel, H. M., Fitzgerald, J. E.*, **Clark, D. A.*** (2019) “Asymmetric ON-OFF processing of visual motion cancels variability induced by the structure of natural scenes”, *eLife* **8**:e47579. (* Corresponding authors)

- 35) Badwan, B. A., Creamer, M. S., Zavatore-Veth, J. A., **Clark, D. A.** (2019) “Dynamic nonlinearities enable direction-opponency in *Drosophila* elementary motion detectors”, *Nature Neuroscience* **22**: 1318-1326.
- 34) DeAngelis, B. D. *, Zavatore-Veth, J. A. *, **Clark, D. A.** (2019) “The manifold structure of limb coordination in walking *Drosophila*”, *eLife* **8**:e46409. (* Equal contributions)
- 33) Creamer, M. S., Mano, O., Tanaka, R., **Clark, D. A.** (2019) “A flexible geometry for panoramic visual and optogenetic stimulation during behavior and physiology”, *Journal of Neuroscience Methods* **323**: 48-55.
- 32) Shook, B. A., Wasko, R. R., Rivera-Gonzalez, G. C., Salazar-Gatzimas, E., López-Giráldez, F., Dash, B. C., Munoz-Rojas, A. R., Aultman, K. D., Zwick, R. K., Lei, V., Arbiser, J. L., Miller-Jensen, K., **Clark, D. A.**, Hsia, H. C., Horsley, V. (2018) “Myofibroblast proliferation and heterogeneity are supported by macrophages during skin repair”, *Science* **362**(6417), eaar2971.
- 31) Salazar-Gatzimas, E., Agrochao, M., Fitzgerald, J. E., **Clark, D. A.** (2018) “The neuronal basis of an illusory motion percept is explained by decorrelation of parallel motion pathways”, *Current Biology* **28**: 3748-3762.
- 30) Creamer, M. S., Mano, M., **Clark, D. A.** (2018) “Visual control of walking speed in *Drosophila*”, *Neuron* **100**: 1460-1473.
- 29) Astigarraga, S., Douthit, J., Tarnogorska, D., Creamer, M. S., Mano, O., **Clark, D. A.**, Meinertzhagen, I., Treisman, J. E. (2018) “Sidekick is required to establish the circuitry for visual motion detection in *Drosophila*”, *Development*: dev.158246.
- 28) Gorur-Shandilya, S., Demir, M., Long, J., **Clark, D. A.** *, Emonet, T. * (2017) “Olfactory receptor neurons use gain control and complementary kinetics to encode intermittent odorant stimuli”, *eLife*: e27670. (* Corresponding authors.)
- 27) 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.
- 26) 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. (* Equal contributions)
- 25) Fitzgerald, J. E. *, **Clark, D. A.** * (2015) “Nonlinear circuits for naturalistic visual motion estimation”, *eLife*: e09123. (* Corresponding authors)
- 24) 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.
- 23) 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. (* Corresponding authors)
- 22) **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, corresponding authors)
- 21) 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.

- 20) **Clark, D. A.**, Benichou, R., Meister, M., da Silveira, R. A. (2013), “Dynamical adaptation in photoreceptors”, *PLoS Computational Biology* **9**(11): e1003289.
- 19) 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)
- 18) 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.

Research published prior to arrival at Yale

- 17) 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.
- 16) 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.**, Burzryn, L., Horowitz, M., Schnitzer, M., Clandinin T. R. (2011) “Defining the computational structure of the motion detector in *Drosophila*”, *Neuron* **70**(6): 1165-1177.
- 14) Srivastava, N., **Clark, D. A.**, Samuel, A. D. T. (2009), “Temporal analysis of stochastic turning behavior of swimming *C. elegans*”, *J. Neurophysiology* **102**: 1172-1179.
- 13) **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.
- 12) **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. Neurophysiology* **97**(3): 1903-1910. (*Equal contributions)
- 11) 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. Experimental Biology* **210**: 4043-4052. (*Equal contributions)
- 10) 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. Experimental Biology* **210**: 2383-2389.
- 9) 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.
- 8) Luo, L.*, **Clark, D. A.***, Biron, D., Mahadevan, L., Samuel, A. D. T. (2006) “Sensorimotor control during isothermal tracking in *Caenorhabditis elegans*”, *J. Experimental Biology* **209**: 4652-4662. (*Equal contributions)
- 7) **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.
- 6) 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)
- 5) 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 Neuroscience* **9**(12): 1499-1505.

- 4) **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. (* Corresponding authors)
- 3) Wang, S. S.-H., Mitra, P. P., **Clark, D. A.** (2002) “How do brains evolve?” (Communications Arising), *Nature* **415**: 135.
- 2) 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. Biological Chemistry* **277**(18): 16088-16095.
- 1) **Clark, D. A.**, Mitra, P. P., Wang, S. S.-H. (2001) “Scalable architecture in mammalian brains”, *Nature* **411**: 189-193.

Reviews and commentary

- 4) Demb, J. B., **Clark, D. A.** (2017) “These retinas are made for walkin’” (News & Views), *Nature* **546**: 476-477.
- 3) **Clark, D. A.**, Demb J. B. (2016) “Parallel computations in insect and mammalian visual motion processing”, *Current Biology* **26**: R1062–R1072.
- 2) **Clark, D. A.**, Freifeld, L., Clandinin, T. R. (2013), “Mapping and cracking sensorimotor circuits in genetic model organisms” (Perspective), *Neuron* **78**: 583-595.
- 1) **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.