

Erich Marquard Schwarz

Department of Molecular Biology and Genetics

Biotechnology 407

Cornell University

Ithaca, NY 14853-2703

Phone: 626-394-7078

E-mail: ems394@cornell.edu

ORCID ID: 0000-0003-3151-4381

Google Scholar ranking: h-index, 35; i10-index, 46.

<http://scholar.google.com/citations?user=VllBDvcAAAAJ>

Education

A.B. in Biochemical Sciences *cum laude*, 1986. Harvard University, Cambridge, MA.

Ph.D. in Molecular Biology, 1995. California Institute of Technology, Pasadena, CA.

Thesis: *Calx*, a sodium-calcium exchanger of *Drosophila melanogaster*. Advisor: Seymour Benzer.

Wellcome Genome Campus Advanced Course, June 19-24, 2016. Hinxton, UK.

Topic: Practical aspects of small molecule discovery: at the interface of biology, chemistry, and pharmacology.

Research experience

2017-present Assistant Research Professor.

2016-2017 Research Scientist.

2012-2016 Senior Research Associate.

Cornell University, Department of Molecular Biology and Genetics, Ithaca, NY.

2000-2012 Associate Biologist (with Dr. Paul Sternberg).

California Institute of Technology, Division of Biology, Pasadena, CA.

1995-2000 Postdoctoral fellow (with Dr. Martin Chalfie).

Columbia University, Department of Biological Sciences, New York, NY.

1986-1995 Graduate student (with Dr. Seymour Benzer).

California Institute of Technology, Division of Biology, Pasadena, CA.

1985-1986 Honors undergraduate thesis (with Dr. Matthew Meselson).

Harvard University, Dept. of Biochemistry and Molecular Biology, Cambridge, MA.

1982-1983 Research assistant (with Dr. David Eisenberg).

University of California Los Angeles, Molecular Biology Institute, Los Angeles, CA.

Grants, past or ongoing

10. NIH R01 R01AI150866, \$25,900 (subcontractor with Prof. R.V. Aroian, U. Massachusetts, Worcester). Automated high throughput compound screening for broadly active anti-parasitic nematode drugs.
9. NSF EDGE FGT 2128266, \$88,381 (subcontractor with Prof. Adler Dillman, U. California, Riverside). 8/2021-7/2025. Functional genomic tools for parasitic nematodes and their bacterial symbionts.
8. NIH/NIAID R21 R21AI142121, \$32,522 (subcontractor with Prof. Adler Dillman, U. California, Riverside). 2/2021-10/2021. Genetic determinants of parasitic nematode tissue tropism and immune sensing.
7. NIH/NICHD R01 HD099072, \$152,208 (co-investigator with Prof. R.V. Aroian, U. Massachusetts, Worcester). 7/2019-6/2024. A dual-purpose vaccine targeting blood-feeding nematode parasites of sheep and humans.
6. Cornell Feline Health Center 2019 #02, \$21,000 (co-PI with Prof. Dwight Bowman, Cornell University. College of Veterinary Medicine). 7/2019-6/2020. Genomic/transcriptomic analysis of Toxocara cati, the most common parasitic nematode of cats.
5. ARC DP180102049, \$30,000 (chief investigator with Prof. Aaron Jex, U. Melbourne/WEHI). 1/2018-12/2022. Chemosensation in Ascaris infection.
4. NIH/NIAID R21 R21AI111173, \$149,484 (co-PI with Prof. R.V. Aroian, U. Massachusetts, Worcester). 5/2015-10/2017. Harnessing transcriptomics to identify and test novel hookworm vaccine targets.
3. NIH/NIGMS P40 5P40OD010440, \$38,750 (subcontract from Prof. A. Rougvie, U. Minnesota, Minneapolis). 2/2016-5/2016. Caenorhabditis Genome Center.
2. Moore Foundation Grant No. 4551, \$100,000 (subcontract from Prof. C.T. Brown, U. California, Davis). 11/2014-12/2015. Infrastructure for data intensive biology.
1. NIH/NIAID R01 7R01AI056189-11, \$12,950 (subcontract from Prof. R.V. Aroian, U. Massachusetts, Worcester). 1/2015-5/2015. B. thurigiensis crystal proteins as powerful next-generation anthelmintics.

Fellowships and academic honors

Honorary Senior Fellow, Faculty of Veterinary Biosciences, University of Melbourne, 2019-present.
Honorary Fellow, Faculty of Veterinary Biosciences, University of Melbourne, 2011-2019.
American Cancer Society Postdoctoral Fellowship, 1995-1998.
Beckman Institute Research Grant, 1992-1993.
National Research Service Award Predoctoral Fellowship, 1986-1990.
Lucille P. Markey Charitable Trust Fellowship, 1986-1990.
Harvard College Scholarship, Harvard College, 1985.
Chancellor's and Regent's Scholarships, University of California, 1980.

Provisional patent application

Schwarz, E.M., Aroian, R.V., Homan, E.J., and Ostroff, G.R. (2025). US Provisional Patent Application, filed January 30, 2025. Immunogenic composition against hookworms. Application No. 63/751,498.

Research articles

37. Schwarz, E.M.^{††}, Noon, J.B., Chicca, J.D., Garceau, C., Li, H., Antoshechkin, I., Ilík, V., Pafčo, B., Weeks, A.M., Homan, E.J., Ostroff, G.R., and Aroian, R.V.^{††} (2025). Hookworm genes encoding intestinal excreted-secreted proteins are transcriptionally upregulated in response to the host's immune system. bioRxiv 2025.02.01.636063; doi: <https://doi.org/10.1101/2025.02.01.636063>. [[Web](#)]

36. Schwarz, E.M.^{*}, Baniya, A.^{*}, Heppert, J.K., Schwartz, H.T., Tan, C.-H., Antoshechkin, I., Sternberg, P.W., Goodrich-Blair, H., and Dillman, A.R. (2025). Genomes of the entomopathogenic nematode *Steinernema hermaphroditum* and its associated bacteria. bioRxiv 2025.01.09.632278; doi: <https://doi.org/10.1101/2025.01.09.632278>. [[Web](#)]

35. Harbin, J.P., Shen, Y., Lin, S.-Y., Kemper, K., Haag, E.S., Schwarz, E.M., and Ellis, R.E. (2024). Robust sex determination in the *Caenorhabditis nigoni* germ line. Genetics iyae207; doi: <https://doi.org/10.1093/genetics/iyae207>. [[PubMed](#)] [[Web](#)]

34. Ichikawa, K., Shoura, M.J., Artiles, K.L., Jeong, D.-E., Owa, C., Kobayashi, H., Suzuki, Y., Kanamori, M., Toyoshima, Y., Iino, Y., Rougvie, A.E., Wahba, L., Fire, A.Z.^{††}, Schwarz, E.M.^{††}, and Morishita, S.^{††}. (2024). CGC1, a new reference genome for *Caenorhabditis elegans*. bioRxiv 2024.12.04.626850; doi: <https://doi.org/10.1101/2024.12.04.626850>. [[PubMed](#)] [[Web](#)]

33. Vadde, B.V.L., Russell, N.J., Bagde, S.R., Askey, B., Saint-Antoine, M.M., Brownfield, B.A., Mughal, S., Apprill, L.E., Khosla, A., Clark, F.K., Schwarz, E.M., Alseekh, S., Fernie, A.R., Singh, A., Schrick, K., Fromme, J.C., Skiryecz, A., Formosa-Jordan, P., and Roeder, A.H.K. (2024). The transcription factor ATML1 maintains giant cell identity by inducing synthesis of its own (very) long-chain fatty acid-containing ligands. bioRxiv 2024.03.14.584694; doi: <https://doi.org/10.1101/2024.03.14.584694>. [[Web](#)]

32. Ferguson, A.A., Inclan-Rico, J.M., Lu, D., Bobardt, S.D., Hung, L., Gouil, Q., Baker, L., Ritchie, M.E., Jex, A.R., Schwarz, E.M., Rossi, H.L., Nair, M.G., Dillman, A.R., and Herbert, D.R. (2023). Hookworms dynamically respond to loss of Type 2 immune pressure. PLoS Pathog. 19, e1011797. [[PubMed](#)] [[Web](#)]

31. Lin, H.-C., Vidal-Diez de Ulzurrun, G., Chen, S.-A., Yang, C.-T., Tay, R.J., Iizuka, T., Huang, T.-Y., Kuo, C.-Y., Gonçalves, A.P., Lin, S.-Y., Chang, Y.-C., Stajich, J.E., Schwarz, E.M., and Hsueh, Y.-P. (2023). Key processes required for the different stages of fungal carnivory by a nematode-trapping fungus. PLoS Biol. 21, e3002400. [[PubMed](#)] [[Web](#)]

30. Ilík, V., Kreisinger, J., Modrý, D., Schwarz, E.M., Tagg, N., Mbohli, D., Nkombou, I.C., Petrželková, K.J., and Pafčo, B. (2023). High diversity and sharing of stronglylid nematodes in humans and great apes co-habiting an unprotected area in Cameroon. *PLoS Negl. Trop. Dis.* *17*, e0011499. [[PubMed](#)] [[Web](#)]
29. Reilly, D.K.* , Schwarz, E.M.*, Muirhead, C.S., Robidoux, A.N., Antoshechkin, I., Narayan, A., Doma, M.K., Sternberg, P.W., and Srinivasan, J. (2023). Transcriptomic profiling of sex-specific olfactory neurons reveals subset-specific receptor expression in *Caenorhabditis elegans*. *Genetics*, *223*, iyad026. [[PubMed](#)] [[Web](#)]
28. Reiter, T.E., Pierce-Ward, N.T., Irber, L., Schwarz, E.M., and Brown, C.T. (2022). Charcoal: filtering contamination in metagenome-assembled genome bins and other genomes. Manubot, generated from *taylorreiter/2022-paper-charcoal@e8621d1* on June 22, 2022. [[Web](#)]
27. Lee, Y.-Y., Vidal-Diez de Ulzurrun, G., Schwarz, E.M., Stajich, J.E., and Hsueh, Y.-P. (2021). Genome sequence of the oyster mushroom *Pleurotus ostreatus* strain PC9. *G3*, *11*, jkaa008. [[PubMed](#)] [[Web](#)]
26. Vidal-Diez de Ulzurrun, G., Lee, Y.-Y., Stajich, J.E., Schwarz, E.M.††, and Hsueh, Y.-P.†† (2021). Genomic analyses of two Italian oyster mushroom *Pleurotus pulmonarius* strains. *G3*, *11*, jkaa007. [[PubMed](#)] [[Web](#)]
25. Zhu, M., Chen, W., Mirabet, V., Hong, L., Bovio, S., Strauss, S., Schwarz, E.M., Tsugawa, S., Wang, Z., Smith, R.S., Li, C.-B., Hamant, O., Boudaoud, A., and Roeder, A.H.K. (2020). Robust organ size requires robust timing of initiation orchestrated by focused auxin and cytokinin signaling. *Nature Plants*, *6*, 686–698. [[PubMed](#)] [[Web](#)]
24. Yoshimura, J., Ichikawa, K., Shoura, M.J., Artiles, K.L., Gabdank, I., Wahba, L., Smith, C.L., Edgley, M.L., Rougvie, A.E., Fire, A.Z.††, Morishita, S.††, and Schwarz, E.M.†† (2019). Recompleting the *Caenorhabditis elegans* genome. *Genome Res.* *29*, 1009-1022. [[PubMed](#)] [[Web](#)]
23. Kiontke, K.C., Herrera, R.A., Vuong, E., Luo, J., Schwarz, E.M., Fitch, D.H.A., and Portman, D.S. (2019). The long non-coding RNA *lep-5* promotes the juvenile-to-adult transition by destabilizing LIN-28. *Dev. Cell* *49*, 542-555. [[PubMed](#)] [[Web](#)]
22. Noon, J.B., Schwarz, E.M., Ostroff, G., and Aroian, R.V. (2019). A highly expressed intestinal cysteine protease of *Ancylostoma ceylanicum* protects vaccinated hamsters from hookworm infection. *PLoS Negl. Trop. Dis.* *13*, e0007345. [[PubMed](#)] [[Web](#)]
21. Yin, D., Schwarz, E.M.††, Thomas, C.G., Felde, R.L., Korf, I.F., Cutter, A.D., Schartner, C.M., Ralston, E.J., Meyer, B.J., and Haag, E.S.†† (2018). Rapid genome shrinkage in a self-fertile nematode reveals sperm competition proteins. *Science* *359*, 55-61. [[PubMed](#)] [[Web](#)]

20. Hsueh, Y.P., Gronquist, M.R., Schwarz, E.M., Nath, R.D., Lee, C.H., Gharib, S., Schroeder, F.C., and Sternberg, P.W. (2017). Nematophagous fungus *Arthrobotrys oligospora* mimics olfactory cues of sex and food to lure its nematode prey. *eLife* 6, e20023. [[PubMed](#)] [[Web](#)]
19. Wang, H., Liu, J., Gharib, S., Chai, C.M., Schwarz, E.M., Pokala N., and Sternberg, P.W. (2017). cGAL, a temperature-robust GAL4-UAS system for *Caenorhabditis elegans*. *Nat. Methods* 14, 145-148. [[PubMed](#)] [[Web](#)]
18. Schwarz, E.M. and Roeder, A.H.K. (2016). Transcriptomic effects of the cell cycle regulator LGO in *Arabidopsis* sepals. *Front. Plant Sci.* 7, 1744. [[PubMed](#)] [[Web](#)]
17. Lockhead, D., Schwarz, E.M., O'Hagan, R., Bellotti, S., Krieg, M., Barr, M.M., Dunn, A.R., Sternberg, P.W., and Goodman, M.B. (2016). The tubulin repertoire of *Caenorhabditis elegans* sensory neurons and its context-dependent role in process outgrowth. *Mol. Biol. Cell* 27, 3717-3728. [[PubMed](#)] [[Web](#)]
16. Nath, R.D., Chow, E.S., Wang, H., Schwarz, E.M., and Sternberg, P.W. (2016). *C. elegans* stress-induced sleep emerges from the collective action of multiple neuropeptides. *Curr. Biol.* 26, 2446-2455. [[PubMed](#)] [[Web](#)]
15. Liu, Z., Shi, H., Szymczak, L.C., Aydin, T., Yun, S., Conostas, K., Schaeffer, A., Ranjan, S., Kubba, S., Alam, E., McMahon, D.E., He, J., Shwartz, N., Tian, C., Plavskin, Y., Lindy, A., Dad, N.A., Sheth, S., Amin, N.M., Zimmerman, S., Liu, D., Schwarz, E.M., Smith, H., Krause, M.W., and Liu, J. (2015). Promotion of bone morphogenetic protein signaling by tetraspanins and glycosphingolipids. *PLoS Genet.* 11, e1005221. [[PubMed](#)] [[Web](#)]
14. Schwarz, E.M.[†], Hu, Y., Antoshechkin, I., Miller, M.M., Sternberg, P.W., and Aroian, R.V. (2015). The genome and transcriptome of the zoonotic hookworm *Ancylostoma ceylanicum* identify infection-specific gene families. *Nat. Genet.* 47, 416-422. [[PubMed](#)] [[Web](#)]
13. Jex, A.R., Nejsum, P., Schwarz, E.M., Hu, L., Young, N.D., Hall, R.S., Korhonen, P.K., Liao, S., Thamsborg, S., Xia, J., Xu, P., Wang, S., Scheerlinck, J.-P.Y., Hofmann, A., Sternberg, P.W., Wang, J., and Gasser, R.B. (2014). Genome and transcriptome of the porcine whipworm *Trichuris suis*. *Nat. Genet.* 46, 701-706. [[PubMed](#)] [[Web](#)]
12. Schwarz, E.M.^{*}, Korhonen, P.K.^{*}, Campbell, B.E.^{*}, Young, N.D.^{*}, Jex, A.R., Jabbar, A., Hall, R.S., Mondal, A., Howe, A.C., Pell, J., Hofmann, A., Boag, P.R., Zhu, X.Q., Gregory, T.R., Loukas, A., Williams, B.A., Antoshechkin, I., Brown, C.T., Sternberg, P.W., and Gasser, R.B. (2013). The genome and developmental transcriptome of the strongylid nematode *Haemonchus contortus*. *Genome Biol.* 14, R89. [[PubMed](#)] [[Web](#)]
11. Puckett Robinson, C., Schwarz, E.M., and Sternberg, P.W. (2013). Identification of DVA interneuron regulatory sequences in *Caenorhabditis elegans*. *PLoS ONE* 8, e54971. [[PubMed](#)] [[Web](#)]

10. Schwarz, E.M.*, Kato, M.*, and Sternberg, P.W. (2012). Functional transcriptomics of a migrating cell in *Caenorhabditis elegans*. Proc. Natl. Acad. Sci. U.S.A., *109*, 16246-16251. [[PubMed](#)] [[Web](#)]
9. Jex, A.R., Liu, S., Li, B., Young, N.D., Hall, R.S., Li, Y., Yang, L., Zeng, N., Xu, X., Xiong, Z., Chen, F., Wu, X., Zhang, G., Fang, X., Kang, Y., Anderson, G.A., Harris, T.W., Campbell, B.E., Vlamincck, J., Wang, T., Cantacessi, C., Schwarz, E.M., Ranganathan, S., Geldhof, P., Nejsum, P., Sternberg, P.W., Yang, H., Wang, J., Wang, J., and Gasser, R.B. (2011). *Ascaris suum* draft genome. Nature, *479*, 529-533. [[PubMed](#)] [[Web](#)]
8. Mortazavi, A.*, Schwarz, E.M.*, Williams, B., Schaeffer, L., Wold, B.J., and Sternberg, P.W. (2010). Scaffolding a *Caenorhabditis* nematode genome with RNA-seq. Genome Res., *20*, 1740-1747. [[PubMed](#)] [[Web](#)]
7. Kuntz, S.G., Schwarz, E.M., DeModena, J.A., De Buysscher, T., Trout, D., Shizuya, H., Sternberg, P.W., and Wold, B.J. (2008). Multigenome DNA sequence conservation identifies Hox cis-regulatory elements. Genome Res. *18*, 1955-1968. [[PubMed](#)] [[Web](#)]
6. Locke, C.J., Williams, S.N., Schwarz, E.M., Caldwell, G.A., and Caldwell, K.A. (2006). Genetic interactions among cortical malformation genes that influence susceptibility to convulsions in *C. elegans*. Brain Res. *1120*, 23-34. [[PubMed](#)] [[Web](#)]
5. Graciet, E., Hu, R.-G., Piatkov, K., Rhee, J.H., Schwarz, E.M., and Varshavsky, A. (2006). Aminoacyl-transferases and the N-end rule pathway of prokaryotic/eukaryotic specificity in a human pathogen. Proc. Natl. Acad. Sci. U.S.A. *103*, 3078-3083. [[PubMed](#)] [[Web](#)]
4. Schwarz, E.M. and Benzer, S. (1997). *Calx*, a Na-Ca exchanger gene of *Drosophila melanogaster*. Proc. Natl. Acad. Sci. U.S.A. *94*, 10249-10254. [[PubMed](#)] [[Web](#)]
3. Hryshko, L.V., Matsuoka, S., Nicoll, D.A., Weiss, J.N., Schwarz, E.M., Benzer, S., and Philipson, K.D. (1996). Anomalous regulation of the *Drosophila* Na⁺-Ca²⁺ exchanger by Ca²⁺. J. Gen. Physiol. *108*, 67-74. [[PubMed](#)] [[Web](#)]
2. Rutledge, B.J., Mortin, M.A., Schwarz, E., Thierry-Mieg, D., and Meselson, M. (1988). Genetic interactions of modifier genes and modifiable alleles in *Drosophila melanogaster*. Genetics *119*, 391-397. [[PubMed](#)] [[Web](#)]
1. Eisenberg, D., Schwarz, E., Komaromy, M., and Wall, R. (1984). Analysis of membrane and surface protein sequences with the hydrophobic moment plot. J. Mol. Biol. *179*, 125-142. [[PubMed](#)] [[Web](#)]

†Corresponding author. ††Co-corresponding author. *Equal contribution.

Review articles, database articles, commentaries, and book chapters

21. Ilík, V., [Schwarz, E.M.](#), Nosková, E., and Pafčo, B. (2024). Hookworm genomics: dusk or dawn? *Trends Parasitol.* *40*, 452-465. [[PubMed](#)] [[Web](#)]
20. Jex, A.R., Gasser, R.B., and [Schwarz, E.M.](#) (2019). Transcriptomic resources for parasitic nematodes of veterinary importance. *Trends Parasitol.* *35*, 72-84. [[PubMed](#)] [[Web](#)]
19. [Schwarz, E.M.](#) (2017). Evolution: a parthenogenetic nematode shows how animals become sexless. *Curr. Biol.* *27*, R1064-R1066. [[PubMed](#)] [[Web](#)]
18. Gasser, R.B., [Schwarz, E.M.](#), Korhonen, P.K., and Young, N.D. (2016). Understanding *Haemonchus contortus* better through genomics and transcriptomics. *Adv. Parasitol.* *93*, 519-567. [[PubMed](#)] [[Web](#)]
17. Albertin, C.B., Bonnaud, L., Brown, C.T., Crookes-Goodson, W.J., da Fonseca, R.R., et al. (2012). Cephalopod genomics: a plan of strategies and organization. *Stand. Genomic Sci.*, *7*, 175-188. [[PubMed](#)] [[Web](#)]
16. Yook, K., Harris, T.W., Bieri, T., Cabunoc, A., Chan, J., et al. (2012). WormBase 2012: more genomes, more data, new website. *Nucleic Acids Res.* *40*, D735-D741. [[PubMed](#)] [[Web](#)]
15. Harris, T.W., Antoshechkin, I., Bieri, T., Blasiar, D., Chan, J., et al. (2010). WormBase: a comprehensive resource for nematode research. *Nucleic Acids Res.* *38*, D463-D467. [[PubMed](#)] [[Web](#)]
14. Rogers, A., Antoshechkin, I., Bieri, T., Blasiar, D., Bastiani, C., et al. (2008). WormBase 2007. *Nucleic Acids Res.* *36*, D612-D617. [[PubMed](#)] [[Web](#)]
13. Gene Ontology Consortium (2008). The Gene Ontology project in 2008. *Nucleic Acids Res.* *36*, D440- D444. [[PubMed](#)] [[Web](#)]
12. Bieri, T., Blasiar, D., Ozersky, P., Antoshechkin, I., Bastiani C., et al. (2007). WormBase: new content and better access. *Nucleic Acids Res.* *35*, D506-D510. [[PubMed](#)] [[Web](#)]
11. [Schwarz, E.M.](#), Antoshechkin, I., Bastiani, C., Bieri, T., Blasiar, D., et al. (2006). WormBase: better software, richer content. *Nucleic Acids Res.* *34*, D475-D478. [[PubMed](#)] [[Web](#)]
10. [Schwarz, E.M.](#) and Sternberg, P.W. (2006). Searching WormBase for information about *Caenorhabditis elegans*. *Current Protocols in Bioinformatics*, Unit 1.8. [[PubMed](#)] [[Web](#)]
9. [Schwarz, E.M.](#) (2005). Genomic classification of protein-coding gene families. *WormBook*, ed. The *C. elegans* Research Community. <<http://dx.doi.org/10.1895/wormbook.1.29.1>>. [[PubMed](#)] [[Web](#)]

8. Chen, N., Harris, T.W., Antoshechkin, I., Bastiani, C., Bieri, T., et al. (2005). WormBase: a comprehensive data resource for *Caenorhabditis* biology and genomics. *Nucleic Acids Res.* 33, D383-D389. [[PubMed](#)] [[Web](#)]
7. Harris, M.A., Clark, J., Ireland, A., Lomax, J., Ashburner, M., et al. (2004). The Gene Ontology (GO) database and informatics resource. *Nucleic Acids Res.* 32, D258-D261. [[PubMed](#)] [[Web](#)]
6. Harris, T.W., Chen, N., Cunningham, F., Tello-Ruiz, M., Antoshechkin, I., et al. (2004). WormBase: a multi-species resource for nematode biology and genomics. *Nucleic Acids Res.* 32, D411-D417. [[PubMed](#)] [[Web](#)]
5. Harris, T.W., Lee, R., Schwarz, E., Bradnam, K., Lawson, D., et al. (2003). WormBase: a cross-species database for comparative genomics. *Nucleic Acids Res.* 31, 133-137. [[PubMed](#)] [[Web](#)]
4. Goodman, M.B. and Schwarz, E.M. (2003). Transducing touch in *Caenorhabditis elegans*. *Annu. Rev. Physiol.* 65, 429-452. [[PubMed](#)] [[Web](#)]
3. Schwarz, E.M., Stein, L.D., and Sternberg, P.W. (2002). *Caenorhabditis elegans* databases. *Current Genomics* 3, 111-119. [[Web](#)]
2. Stein, L., Mangone, M., Schwarz, E., Durbin, R., Thierry-Mieg, J., Spieth, J., and Sternberg (2001). WormBase: network access to the genome and biology of *Caenorhabditis elegans*. *Nucleic Acids Res.* 29, 82-86. (Author list corrected in <http://dx.doi.org/10.1093/nar/29.4.0>.) [[PubMed](#)] [[Web](#)]
1. Schwarz, E. and Benzer, S. (1999). The recently reported NI β domain is already known as the Calx- β motif. *Trends Biochem. Sci.* 24, 260. [[PubMed](#)] [[Web](#)]

Peer review

Refereed manuscripts for: *Acta Parasitologica*; *ACS Chemical Neuroscience*; *American Journal of Tropical Medicine and Hygiene*; *Bioinformatics*; *Biology (MDPI)*; *Biotechnology Advances*; *BMC Biology*; *BMC Evolutionary Biology*; *BMC Genetics*; *BMC Genomics*; *Cell Reports*; *Communications Biology*; *Computational and Structural Biotechnology Journal*; *Current Biology*; *DNA Research*; *eLife*; *Experimental Parasitology*; *Frontiers in Genetics*; *Fungal Biology*; *G3*; *Genes*; *Genetics*; *Genome Biology*; *Genome Biology and Evolution*; *Genome Research*; *Genomics*; *International Journal for Parasitology*; *Infection, Genetics, and Evolution*; *International Journal of Molecular Sciences*; *iScience*; *Journal of Helminthology*; *Journal of Nematology*; *JoVE*; *Microbial Pathogenesis*; *microPublications*; *Molecular Biology and Evolution*; *Molecular and Cellular Probes*; *Molecular Ecology Resources*; *NAR Genomics and Bioinformatics*; *Nature Communications*; *Nature Genetics*; *Nucleic Acids Research*; *Parasite*; *Parasites and Vectors*; *PLoS Computational Biology*; *PLoS Neglected Tropical Diseases*; *PLoS ONE*; *RNA*; *Scientific Data*; *Scientific Reports*; *Transboundary and Emerging Diseases*; *Trends in Genetics*; and *Wellcome Open Research*.

Science Officer for microPublication Biology (April 2024-present).
Early career reviewer for NIH grant applications in the Pathogenic Eukaryotes (PTHE) study section, (October 2022).
Reviewer for a BBSRC research grant application (May 2022).
External reviewer for internal research grant applications at Academia Sinica (February 2020) and Hong Kong Baptist University (February 2022).
Academic Editor for PeerJ (April 2017-June 2018).

Invited talks

11. Schwarz, E.M. (2024). Genomics of hookworm virulence factors. *Zapworms* (<https://www.zapworms.org>), July 11, 2024. Virtual seminar.
10. Schwarz, E.M. (2022). Hookworms: from genomes to vaccines and parasitic biology. Central European Institute of Technology, Masaryk University (CEITEC MU), August 30, 2022. Brno, Czechia.
- 8-9. Schwarz, E.M. (2021). Analysis of parasitic and pseudo-parasitic nematode genomes. [1] Department of Botany and Zoology, May 6, 2021. Masaryk University, Brno, Czechia. [2] Institute for Integrative Genome Biology, May 7, 2021. University of California, Riverside. Virtual seminars.
7. Schwarz, E.M. (2018). Recent advances in post-genomic research of important parasitic helminths. 14th International Congress of Parasitology (ICOPA), August 19-24, 2018. Daegu, South Korea.
6. Schwarz, E.M. (2017). Assembling and biologically interpreting nematode genomes. Institute of Molecular Biology, September 26, 2017. Academia Sinica, Taipei, Taiwan.
- 4-5. Schwarz, E.M. (2016). Using nematode genomics to decipher parasitism and conserved unknown genes. [1] Department of Nematology, January 7, 2016. University of California, Riverside. [2] Department of Biology and Biotechnology, November 8, 2016. Worcester Polytechnic Institute, Worcester, Massachusetts.
- 2-3. Schwarz, E.M. (2011). Next-generation worm transcriptomes and genomes. [1] Weill Institute, Cornell University, April 20, 2011. [2] University of California, San Diego, May 5, 2011.
1. Schwarz, E.M. (2008). Genomes and transcriptomes of *Caenorhabditis*. Department of Microbiology and Molecular Genetics, November 11, 2008. Michigan State University, East Lansing, Michigan.

Platform talks

34. Ilík, V., Petrželková, K.J., Pardy, F., Niatou-Singa, F.S., Gouil, Q., Baker, L., Ritchie, M.E., Jex, A.R., Gazzola, D., Li, H., Fujiwara, R.T., Zhan, B., Aroian, R.V., Pařčo, B., and Schwarz, E.M. (2023). New reference and wild isolate genomes for the human hookworm *Necator americanus* and a sibling *Necator* species. 24th International *C. elegans* Meeting, June 24-28, 2023. Glasgow, Scotland.

33. Schwarz, E.M., Noon, J.B., Chicca, J., Garceau, C., Antoshechkin, I., Ilik, V., Pafčo, P., Weeks, A.M., Ostroff, G.R., and Aroian, R.V. (2022). Hookworm genes encoding excreted-secreted proteins are transcriptionally upregulated by the host's immune system. 15th International Congress of Parasitology (ICOPA), August 21-26, 2022. Copenhagen, Denmark.
32. Cao, M., Schwartz, H.T., Tan, C.-H., Heppert, J.K., Antoshechkin, I., Schwarz, E.M., Baniya, A., Dillman, A.R., Goodrich-Blair, H., and Sternberg, P.W. (2022). *Steinernema* nematodes as genetic models of mutualistic and parasitic symbiosis. Evolutionary Biology of *Caenorhabditis* and Other Nematodes, June 20-June 23, 2022. McMaster University, Hamilton, Ontario, Canada.
31. Xu, J., Gouil, Q., Baker, L., Ritchie, M.E., Jex, A.R., and Schwarz, E.M. (2020). Genomic analysis of *Rhabditella axei*, a model for the evolution of heat resistance in nematodes. Evolutionary Biology of *Caenorhabditis* and Other Nematodes, June 24-25, 2020. Virtual seminar.
30. Schwarz, E.M., Anderson, E.C., Schartner, C.M., Ralston, E.J., Yin, D., Koutsovoulos, G., Stevens, L., Chandrasekar, S., Blaxter, M., Haag, E.S., and Meyer, B.J. (2019). Deciphering the unusually small genomes of male-female *C. wallacei* versus hermaphroditic *C. tropicalis* with whole-chromosome genome assemblies. 22nd International *C. elegans* Meeting, June 20-24, 2019. University of California, Los Angeles.
29. Schwarz, E.M., Yoshimura, J., Ichikawa, K., Shoura, M.J., Artiles, K.L., Gabdank, I., Wahba, L., Smith, C.L., Edgley, M.L., Rougvie, A.E., Fire, A.Z., and Morishita, S. (2019). Recompleting the *Caenorhabditis elegans* genome. 22nd International *C. elegans* Meeting, June 20-24, 2019. University of California, Los Angeles.
28. Schwarz, E.M., Yoshimura, J., Ichikawa, K., Shoura, M., Artiles, K.L., Gabdank, I., Wahba, L., Smith, C.L., Edgley, M.L., Rougvie, A.E., Fire, A.Z., and Morishita, S. (2017). De-completing the *C. elegans* genome. 21st International *C. elegans* Meeting, June 21-25, 2017. University of California, Los Angeles.
27. Schwarz, E.M. (2017). PacBio-based *Caenorhabditis* genomes. 21st International *C. elegans* Meeting, June 21-25, 2017. University of California, Los Angeles.
26. Schwarz, E.M., Yin, D., Schartner, C.M., Ralston, E.J., Koutsovoulos, G., Stevens, L., Chandrasekar, S., Blaxter, M., Sternberg, P.W., Meyer, B.J., and Haag, E.S. (2016). Characterizing genome shrinkage in hermaphroditic *Caenorhabditis* with third-generation genome sequences having near-chromosomal contiguity. Evolution of *Caenorhabditis* and Other Nematodes, March 30-April 2, 2016. Cold Spring Harbor Laboratory.
- 23-25. Schwarz, E.M., Kim, S.J., Huang, X., Nath, R.D., Ghosh, S., and Sternberg, P.W. (2015-2016). Using *C. elegans* to discover functions of conserved unknown human genes. [1] BEACON Congress, August 15-18, 2015. Michigan State University, East Lansing, Michigan. [2] Genome Center, September 17, 2015. University of California, Davis. [3] Paul W. Sternberg Symposium, August 25, 2016.

California Institute of Technology, Pasadena, California.

22. Schwarz, E.M. (2015). Improving *Caenorhabditis* genome assembly with long read data. 20th International *C. elegans* Meeting, June 24-28, 2015. University of California, Los Angeles. Cited by M. Blaxter in GSA Genes to Genomes blog, "Guest post: The new genomic world of wild worms", August 13, 2015.
21. Schwarz, E.M., Hu, Y., Antoshechkin, I., Miller, M.M., Sternberg, P.W., and Aroian, R.V. (2015). The genome of *Ancylostoma ceylanicum*: distinguishing possible immunological decoys from possible drug and vaccine targets in a model hookworm. 20th International *C. elegans* Meeting, June 24-28, 2015. University of California, Los Angeles.
20. Schwarz, E.M. (2015). Genomics of nematode parasites of pigs, sheep, and other animals: towards understanding human immune modulation. Plant and Animal Genome XXIII Conference, January 10-14, 2015, San Diego, California.
- 17-19. Schwarz, E.M., Hu, Y., Antoshechkin, I., Miller, M.M., Aroian, R.V., and Sternberg, P.W. (2013-2014). Genome and transcriptome of the zoonotic hookworm *Ancylostoma ceylanicum*. [1] Infectious Disease Genomics & Global Health, October 16-18, 2013. Wellcome Trust Genome Campus, Hinxton, Cambridge, United Kingdom. [2] Evolutionary Biology of *Caenorhabditis* and other Nematodes, June 14-17, 2014. Wellcome Trust Genome Campus, Hinxton, Cambridge, United Kingdom. [3] American Society of Tropical Medicine and Hygiene, 63rd Annual Meeting, November 2-6, 2014. New Orleans, Louisiana.
16. Schwarz, E.M., Campbell, B.E., Young, N.D., Howe, A., Pell, J., Hall, R.S., Wang, J., Wang, J., Yang, H., Brown, C.T., Gasser, R.B., and Sternberg, P.W. (2012). Characterizing the genome of *Haemonchus contortus* through pre-filtering reads on graph structure. Evolution of *Caenorhabditis* and Other Nematodes, April 3-6, 2012. Cold Spring Harbor Laboratory.
15. Schwarz, E.M. (2011). The genomes of gonochoristic versus hermaphroditic *Caenorhabditis* species. 18th International *C. elegans* Meeting, June 22-26, 2011. University of California, Los Angeles.
14. Schwarz, E.M., Gasser, R.B., Mortazavi, A., Williams, B.A., Antoshechkin, I., Campbell, B.E., Young, N.D., Jex, A.R., Cantacessi, C., Hall, R.S., and Sternberg, P.W. (2010). Next-generation genome and transcriptome of *Haemonchus contortus*. XIIth International Congress of Parasitology (ICOPA), August 15-20, 2010. Melbourne, Australia.
13. Schwarz, E.M. (2010). Using WormBase to decipher parasitic nematode genomes. XIIth International Congress of Parasitology (ICOPA), August 15-20, 2010. Melbourne, Australia.
12. Schwarz, E.M., Mortazavi, A., Williams, B., Schaeffer, L., Antoshechkin, I., Wold, B.J., and Sternberg, P.W. (2010). Scaffolding a de novo genome of *Caenorhabditis* sp. 3 PS1010 with RNA-seq.

Evolutionary Biology of *Caenorhabditis* and Other Nematodes, June 5-8, 2010. Wellcome Trust Genome Campus, Hinxton, Cambridge, United Kingdom.

11. Schwarz, E.M., Kato, M., and Sternberg, P.W. (2010). A transcriptome of the migrating postembryonic *C. elegans* linker cell. The Biology of Genomes, May 11-15, 2010. Cold Spring Harbor Laboratory.

10. Schwarz, E.M. and *Caenorhabditis* Genome Analysis Consortium (2009). The genomes of gonochoristic versus hermaphroditic *Caenorhabditis* species. 17th International *C. elegans* Meeting, June 24-28, 2009. University of California, Los Angeles.

9. Schwarz, E.M., Mortazavi, A., Kuntz, S.G., Saldanha, A.J., Shapiro, B.E., Wold, B.J., and Sternberg, P.W. (2007). Cis-regulatory analysis of four *Caenorhabditis* genomes. 16th International *C. elegans* Meeting, June 27-July 1, 2007. University of California, Los Angeles.

8. Schwarz, E.M. (2006). WormBase: meeting specific biological needs with general bioinformatics tools. American Phytopathological Society, August 1, 2006. Quebec City, Canada.

6-7. Schwarz, E.M., Mortazavi, A., Kuntz, S.G., Saldanha, A.J., DeModena, J.A., Fu, D., De Buysscher, T., Shizuya, H., Roden, J.C., Wold, B.J., and Sternberg, P.W. (2006). Cis-regulatory analysis of three *Caenorhabditis* genomes. [1] The Biology of Genomes, May 10-14, 2006. Cold Spring Harbor Laboratory. [2] EMBO Workshop on the Study of Evolutionary Biology With *Caenorhabditis elegans* and Related Species, May 23-26, 2006. Instituto Gulbenkian de Ciencia, Oeiras, Portugal.

4-5. Schwarz, E.M. (2006). WormBase: how we (try to) support biology and genomics for an entire (small) animal. [1] Department of Biological Sciences, February 3, 2006. California State Polytechnic University, Pomona. [2] Department of Biology, April 14, 2006. California State University, San Bernardino.

3. Schwarz, E.M. and WormBase Consortium (2005). WormBase, a comprehensive resource for *C. elegans* bioinformatics. 15th International *C. elegans* Meeting, June 25-29, 2005. University of California, Los Angeles.

2. Schwarz, E.M., Sternberg, P.W., and WormBase Consortium (2004). The state of the WormBase: 2004. West Coast *C. elegans* Meeting, August 21-24, 2004. University of California, Santa Barbara.

1. Schwarz, E.M., DeModena, J.A., Moon, E., De Buysscher, T., Mullaney, N., Shizuya, H., Wold, B.J., and Sternberg, P.W. (2003). Comparative analysis of cis-regulatory sequences using four *Caenorhabditis* species. 14th International *C. elegans* Meeting, June 29-July 3, 2003. University of California, Los Angeles.

Workshops and discussion sections

Ran the following workshops and discussion sections at *C. elegans* meetings:

Bioinformatics, 2002 and 2004 West Coast meetings (UC San Diego and UC Santa Barbara);
WormBase, 2005, 2007, and 2009 International meetings (UC Los Angeles);
Evolution and Genomics [co-chair], 2009 International meeting (UC Los Angeles);
N-Genomes, 2013 International meeting (UC Los Angeles).

Ran a discussion section on analysis of multiple *Caenorhabditis* genomes at the CSHL Evolution of *Caenorhabditis* and Other Nematodes meeting, 2012.

Mentoring and teaching experience

Faculty mentor for Vladislav Ilík, visiting graduate student from Masaryk University, Brno, Czechia. February 2021-October 2021. Supported by the Fulbright Commission (IIE identification no. PS00299111).

Reviewer for a Cornell undergraduate biology honors thesis, May 2021.

Faculty mentor for Jing Xu, visiting graduate student from Sichuan Agricultural University, Chengdu, China. March 2019-April 2020. Supported by the China Scholarship Council (scholarship no. 201806910031).

Guest lecturer, July 2017-2019. Analyzing Next-Generation Sequencing Data course (<http://angus.readthedocs.org>), University of California Davis. Described second- and third-generation sequencing of hookworm and *Caenorhabditis* genomes (*C. elegans*, *C. nigoni*, *C. tropicalis*, and *C. wallacei*), with future prospects for genome analysis.

Panelist, Summer Undergraduate Workshop on Responsible Conduct of Research, June 2019. Cornell University. Panel discussion, with questions and answers, about issues of ethical conduct for summer undergraduates working in Cornell research laboratories.

Faculty mentor for Guillermo Vidal-Diez de Ulzurru, visiting postdoctoral fellow from Academia Sinica, Taipei, Taiwan. May-June 2018.

Lecturer, "Orientation Lectures in Molecular Biology and Genetics" (BIOMG 1320), February 2018. Cornell University. Voluntary (not-for-credit) course intended to show Cornell freshmen the work of six different MBG faculty (including a brief summary of how they became scientists, their current work, and their prospective work in the future).

Guest lecturer, June 2011-2013 and August 2015. Analyzing Next-Generation Sequencing Data course (<http://angus.readthedocs.org>), Kellogg Biological Station, Michigan State University, MI. Described next-generation sequencing of *Caenorhabditis angaria* PS1010, *Haemonchus contortus*, and *Ancylostoma ceylanicum*, transcriptomics of migrating linker cells in *Caenorhabditis elegans*, and future prospects for genome analysis.

Lecturer, "Molecular and Cellular Bases of Host-Microbes Interactions: Genomics and Sequencing", May 26-29, 2014. Institute of Molecular Biology, National Academy of Sciences, Yerevan, Armenia. Described introductory Unix, and discussed next-generation genomics analyses of two mammalian-parasitic nematodes (the hookworm *Ancylostoma ceylanicum* and the African eye worm *Loa loa*).

Guest lecturer, "Advanced Genetics", Spring 2001. California Institute of Technology, Pasadena, CA. Summarized the state of bioinformatics for advanced undergraduates.

Teaching assistant, "Behavioral Biology". Winters of 1990-1992. California Institute of Technology, Pasadena, CA. Wrote and graded examinations for the course.

Teaching assistant, "Introduction to Molecular Biology". Winters of 1988-1989. Partially graded all final examinations; ran and graded a student laboratory; prepared materials for the molecular biology section of all student laboratories.

Teaching assistant, "Organismic Biology". Winter 1987. Ran and graded a student laboratory.

Outreach

Reviewer for the International Journal of High School Research, July 2021.

ENVISION 2020, January 15, 2021. Judged four research proposals by female high school students submitted to the ENVISION Proposal-Writing Competition via the Women in STEM initiative.

Career Day, March 4, 2008. "Molecular biology: how and why (or why not) to work in it." Loyola High School, Los Angeles, CA.

NIH Minority Outreach Program, April 15, 2005. "WormBase: how we (try to) support biology and genomics for an entire (small) animal." University of New Mexico, Albuquerque, New Mexico.

Media

Razib Khan's Unsupervised Learning podcast, January 18, 2024. "Erich Schwarz: in the beginning was the worm (*C. elegans*). Model organisms in genetic research: past and future." [[Substack](#)] [[YouTube](#)]

New York Times Science Trilobites, by Steph Yin, January 8, 2018. "This worm evolved self-fertilization and lost a quarter of its DNA." [[Web](#)]