Erik C. Andersen

Assistant Professor
Northwestern University
Department of Molecular Biosciences

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Major Professional Interests:

Understanding the genetic basis of complex traits and genome evolution using high-throughput phenotyping, molecular genetics, and computational tools

Education:

2000-2008 Ph.D. in Biology
Massachusetts Institute of Technology (MIT), Cambridge, MA
Advisor: Dr. H. Robert Horvitz
Dissertation: The synthetic Multivulva genes and their suppressors regulate opposing cell fates through chromatin remodeling

1996-2000 B.S. in Biological Sciences with departmental honors
Stanford University, Stanford, CA
Advisor: Dr. Matthew P. Scott
Dissertation: *in vivo* analysis of *Drosophila* heart-tube formation

Pre-doctoral Awards, Honors, and Fellowships:

2005 - 2006	Anna Fuller Cancer Graduate Research Fellowship
2000	Firestone Medal for Excellence in Undergrad. Research (top Biological Sciences researcher)
1999, 1998	Howard Hughes Medical Institute Summer Research Fellowship
1998	Stanford University Undergraduate research small grant recipient
1996-1998	Robert C. Byrd Honors Scholarship recipient

Post-doctoral Recognitions:

2015 - 2019	American Cancer Society Research Scholar
2015 - 2017	March of Dimes Basil O'Connor Research Scholar
2014 - 2018	Pew Scholar in the Biomedical Sciences
2012 - 2013	Howard Hughes Medical Institute Post-doctoral Fellow
2011 - 2012	National Cancer Institute Post-doctoral Fellow
2009 - 2011	Ruth L. Kirschstein National Research Service Award Recipient

Employment:

2014 - Member of Northwestern Institute on Complex Systems (NICO)
2013 - Assistant Professor of Molecular Biosciences, Northwestern University
Full Member of the Robert H. Lurie Comprehensive Cancer Center
Member of the Chemistry of Life Processes Institute (CLP)
Preceptor for the Interdisciplinary Biological Sciences Graduate Program (IBiS)
Preceptor for the Northwestern Univ. Interdepartmental Neuroscience Grad. Program (NUIN)
2008 - 2013 Post-doctoral fellow, Princeton University, Princeton, NJ, Advisor: Dr. Leonid Kruglyak
2000 - 2008 Graduate student in Biology Department at Massachusetts Institute of Technology (MIT), Cambridge, MA, Advisor: Dr. H. Robert Horvitz

Research Support:

Past:

2013 - 2014 American Cancer Society, Institutional Research Grant [93-037-18]
Elucidating the genetic causes of variation in chemotherapy-based toxicity
PI ($30,000)

2013 - 2014 Chemistry of Life Processes, Chairman's Innovation Award
Using perturbations of heavy metal homeostasis to treat nematode-borne neglected tropical diseases
Co-PI ($28,000) with Dr. Thomas O'Halloran (Northwestern)

Present:

2015 - 2019 American Cancer Society Research Scholar Grant
Elucidating the genetic causes of variation in chemotherapy-based toxicity
PI ($787,658)

2015 - 2017 March of Dimes Basil O'Connor Starter Research Grant
Identification of hookworm anthelmintic resistance genes to ameliorate maternal and infant anemia
PI ($150,000)

2014 - 2018 National Institutes of Health [1 R01 GM107227]
Direct determination of the distribution of fitness effects of spontaneous mutations
consortium PI ($360,000) with PI Dr. Charlie Baer (University of Florida)

2014 - 2018 Pew Charitable Trust, Scholars Program in the Biomedical Sciences
Elucidating the genetics of anthelmintic resistance in nematode-borne neglected tropical diseases
PI ($240,000)

2014 - 2016 Chicago Biomedical Consortium, Catalyst Grant
Uncovering "missing heritability" in an experimentally tractable model organism
Co-PI ($120,000) with Dr. Ilya Ruvinsky (University of Chicago)

Pending:

2016 - 2018 National Institutes of Heath - National Institute of Aging R21
High-throughput multi-modal analysis of natural variation in C. elegans *lifespan*
Co-PI ($275,000) with Dr. Christopher Fang-Yen (University of Pennsylvania)

2016 - 2018 National Institutes of Heath - National Institute of Allergy and Infectious Disease R21
Discovery and validation of avermectin resistance loci in free-living and parasitic nematodes
Co-PI ($275,000) with Dr. Michael Kimber (Iowa State University)

2016 - 2021 National Institutes of Heath - National Institute of General Medical Sciences R35
Maximizing Investigator Research Award (MIRA)
Defining the molecular mechanisms of complex traits
PI ($1,500,000)

Publications *undergraduate co-authors in italics*, corresponding authors underlined:
h-index=12 (all and since 2010), i10-index=12 (all and since 2010)

1. Sterken MG, Snoek LB, Kammenga JE, **Andersen EC**. (2015)
The laboratory domestication of *C. elegans.*
Trends in Genetics Mar; 31(5) 224-231

2. Thompson OA, Snoek LB, Nijveen H, Sterken MG, Volkers RJM, Brenchley R, van't Hof A, Bevers RPJ, Cossins AR, Yanai I, Hajnal A, Schmid T, Perkins JD, Spencer D, Kruglyak L, **Andersen EC**, Moerman DG, Hillier LW, Kammenga JE, Waterston RH. (2015)
Remarkably divergent regions punctuate the genome assembly of the *Caenorhabditis elegans* Hawaiian strain CB4856.
Genetics May 19; 200(3) 975-989

3. **Andersen EC**, *Shimko TC*, Crissman JR, Ghosh R, Gerke JP, Seidel HS, Kruglyak L. (2015)
A powerful new quantitative genetics platform combining *Caenorhabditis elegans* high-throughput fitness assays with a large collection of recombinant strains.
G3 Mar 13; 5(5) 911-920

4. Farhadifar R, Baer CF, Valfort AC, **Andersen EC**, Muller-Reichert T, Delattre M, Needleman DJ. (2015)
Scaling, Selection, and Evolutionary Dynamics of the Mitotic Spindle.
Current Biology Mar 16; 25(6) 732-740

5. Balla K, **Andersen EC**, Kruglyak L, Troemel E. (2015)
A wild *C. elegans* strain has enhanced epithelial immunity to a natural microsporidian parasite.
PLoS Pathogens Feb 13; 11(2)e1004583

6. Etienne V*, **Andersen EC***, Ponciano JM, Blanton D, Cadavid A, Joyner-Matos J, Matsuba C, Tabman B, Baer CF. (2015)
The Red Death Meets the Abdominal Bristle: Polygenic Mutation for Susceptibility to a Bacterial Pathogen in *Caenorhabditis elegans*. *Evolution* Feb; 69(2) 508-519
*equal contribution

7. *Shimko TC*, **Andersen EC**. (2014)
COPASutils: an R package for reading, processing, and visualizing data from COPAS large-particle flow cytometers. *PLoS One* Oct 20; 9(10):e111090

8. **Andersen EC**, Bloom JS, Gerke JP, Kruglyak L. (2014)
The neuropeptide receptor *npr-1* is a major determinant of *Caenorhabditis elegans* growth and physiology. *PLoS Genetics* Feb; 10(2):e1004156

9. Felix MA, Jovelin R, Ferrari C, Han S, Cho YR, **Andersen EC**, Cutter AD, Braendle C. (2013) Species richness, distribution and genetic diversity of *Caenorhabditis* nematodes in a remote tropical rainforest. *BMC Evolutionary Biology* 13(1), 10

10. Ghosh R, **Andersen EC**, Shapiro JA, Gerke JP, Kruglyak L. (2012) Natural variation in a chloride channel subunit confers avermectin resistance in *C. elegans. Science* 335(6068): 574-578.

11. **Andersen EC*,** Gerke JP*, Shapiro JA*, Crissman JR, Ghosh R, Bloom JS, Felix MA, Kruglyak L. (2012) Chromosome-scale selective sweeps shape *Caenorhabditis elegans* genomic diversity *Nature Genetics* 44(3): 285-290. *equal contribution
12. **Andersen EC**. (2011) PCR-directed *in vivo* plasmid construction using homologous recombination in baker's yeast. *Molecular Methods for Evolutionary Genetics*, 772; 409-421. *Invited book chapter

13. Raj A, Rifkin SA, **Andersen EC**, van Oudenaarden A. (2010) Variability in gene expression underlies incomplete penetrance. *Nature* 463(7283): 913-918.
14. Bessler JB, **Andersen EC**, Villeneuve AB. (2010) Differential localization and independent acquisition of the H3K9me2 and H3K9me3 chromatin modifications in the *Caenorhabditis elegans* adult germ line. *PLoS Genetics* 6(1): e1000830.

15. Reddy KC*, **Andersen EC***, Kruglyak L, and Kim DH. (2009) A polymorphism in *npr-1* is a behavioral determinant of pathogen susceptibility in *C. elegans*. *Science* 323(5912): 382-384. *equal contribution
16. **Andersen EC**, Saffer AM, and Horvitz HR. (2008) Multiple levels of redundant processes inhibit *Caenorhabditis elegans* vulval cell fates. *Genetics* 179(4): 2001-2012.

17. **Andersen EC** and Horvitz HR. (2007) Two *C. elegans* histone methyltransferases repress *lin-3* EGF transcription to inhibit vulval development. *Development* 134(16): 2991-2999.

18. Reddien PW, **Andersen EC**, *Huang M*, and Horvitz HR. (2007) DPL-1 DP, LIN-35 Rb, and EFL-1 E2F act with the MCD-1 Zinc-finger protein to promote programmed cell death in *C. elegans. Genetics* 175(4): 1719-1733.

19. **Andersen EC**, Lu X, and Horvitz HR. (2006) *C. elegans* ISWI and NURF301 antagonize an Rb-like pathway in the determination of multiple cell fates. *Development* 133(14): 2695-2704.

20. Furlong EE, ***Andersen EC***, Null B, White KP, and Scott MP. (2001) Patterns of gene expression during *Drosophila* mesoderm development. *Science* 293(5535): 1629-1633.

Professional talks:

Departmental seminars and invited conference presentations:

2016 Molecular and Cellular Biology of Helminth Parasites X, Hydra, Greece
Evolutionary Biology of *Caenorhabditis* and other nematodes, CSHL, Cold Spring Harbor, NY
Department of Genetics, University of Utah, Salt Lake City, UT
Department of Biology, University of Iowa, Iowa City, IA

Department of Biomedical Sciences, Iowa State University, Ames, IA
Anthelmintics: Discovery to Resistance II, San Diego, CA
2015 Program in Systems Biology, University of Massachusetts Medical School, Worcester, MA
Evolution seminar series, University of Wisconsin, Madison, WI
Biotechnology Training Program, Northwestern University, Evanston, IL
Department of Biology, Johns Hopkins University, Baltimore, MD
Department of Biology, University of Maryland, College Park, MD
Department of Pharmacology, Feinberg School of Medicine, Northwestern University, Chicago, IL
Midwest Neglected Infectious Disease Meeting, Notre Dame University, South Bend, IN
Quantitative genetics workshop, 20th International *C. elegans* meeting, UCLA, Los Angeles, CA
Michigan Area Worm Meeting, van Andel Institute, Grand Rapids, MI
2014 Northwestern Institute on Complex systems, Northwestern University, Evanston, IL
Fondation de Treilles: Revisiting the roles of phenotypic plasticity in evolution, Provence, France
Biology Department, Marquette University, Milwaukee, WI
Pharmacogenomics group, University of Chicago, Chicago, IL
2013 Quantitative genetics workshop, 19th International *C. elegans* meeting, UCLA, Los Angeles, CA
2012 Molecular Bioscience Department, Northwestern University, Evanston, IL
Program in Systems Biology, University of Massachusetts Medical School, Worcester, MA
Biology Department, Dartmouth University, Hanover, NH
Human Genetics Department and Life Sciences Institute, University of Michigan, Ann Arbor, MI
2012 Genetics Department, University of Georgia, Athens, GA
Biology Department, Case Western Reserve University, Cleveland, OH
Biology Department and BioDesign Institute, Arizona State University, Phoenix, AZ
Center for Computational and Integrated Biology, Rutgers University, Camden, NJ
Biology Department, University of Florida, Gainesville, FL
2011 Evolution workshop, 18th International *C. elegans* meeting, UCLA, Los Angeles, CA
Laboratory of Toxicology, NIEHS, Research Triangle Park, NC
2010 Institute for Evolutionary Biology Department, University of Edinburgh, Edinburgh, UK
2008 Featured talk at *C. elegans* Aging, Stress, and Pathogenesis meeting, Madison, WI
2000 Undergraduate research symposium, Stanford University, Stanford, CA

Contributed presentations: (*selected for oral presentation)
2015 *Midwest Neglected Infectious Disease meeting, U. of Notre Dame, Notre Dame, IN
2015 *Bridging the divide, 20th International *C. elegans* meeting, UCLA, Los Angeles, CA
2013 *19th International *C. elegans* meeting, UCLA, Los Angeles, CA
Society for Molecular Biology of Evolution, Chicago, IL
2012 *Evolutionary biology of *Caenorhabditis* and other nematodes meeting, CSHL, NY
2011 *18th International *C. elegans* meeting, UCLA, Los Angeles, CA
18th International *C. elegans* meeting (poster), UCLA, Los Angeles, CA
2010 *Evolutionary biology of *Caenorhabditis* and other nematodes meeting, Hinxton, UK
Evolutionary biology of *Caenorhabditis* and other nematodes meeting (poster), Hinxton, UK
Cold Spring Harbor Labs Automated Imaging and High-throughput Phenotyping, CSHL, NY
2009 *17th International *C. elegans* meeting, UCLA, Los Angeles, CA
Gordon Research Conference on Quantitative Genetics and Genomics, Galveston, TX
2007 Department of Biology Annual Retreat, MIT, ** poster prize winner
2006 *C. elegans* Evolution and Development meeting, Univ. of Wisconsin, Madison, WI
2005 *15th International *C. elegans* meeting, UCLA, Los Angeles, CA
Chromatin Structure and Function meeting, Nassau, Bahamas
2004 East Coast *C. elegans* meeting, Yale, New Haven, CT
2003 *14th International *C. elegans* meeting, UCLA, Los Angeles, CA
2002 East Coast *C. elegans* meeting, University of New Hampshire, Durham, NH

Peer review and related activities:

Editorial board:
Trends in Genetics

Reviewing activity: Academic Journals
Biological Journal of the Linnean Society, *BMC Evolutionary Biology*, *BMC Genetics*, *BMC Genomics*, *Cell*, *Development*, *EMBO*, *Genes and Development*, *G3*, *Genetics*, *Genome Research*, *Heredity*, *Nature*, *Nature Scientific Reports*, *Nature Genetics*, *PLoS Genetics*, *PLoS ONE*, *PNAS*, *Science*, *Trends in Genetics*

Reviewing activity: Grants and fellowships
2014 *Ad hoc* reviewer for Human Frontiers Science Program
2014 *Ad hoc* reviewer for National Science Foundation CREST Awards

Professional affiliations and service:

Membership in Professional Societies:
Genetics Society of America, member
Society of Molecular Biology and Evolution, member

Professional service:
2015 Organizing committee for the 20th International *C. elegans* meeting
Poster judge, 20th International *C. elegans* meeting - Evolution and Genomics section
Genetics Soc. of America Mentor Lunch, *Postdoc search*, 20th International *C. elegans* meeting
2014 Panelist, NUIN Post-doc Association, *Interviews and Start-up packages*
Poster judge, Northwestern Undergraduate Research Symposium
Panelist, Pathways to the Professoriate, *How to prepare for a job interview?*
2013 Poster judge, Northwestern Undergraduate Research Symposium
Panelist, Bioscientist Freshman seminar; *How to find a research lab?*
Poster judge, 19th International *C. elegans* meeting - Evolution and Genomics section

Teaching and advising:

Undergraduate teaching:
2015 *Guest Lecture:* University of Wisconsin-Madison Biology 675 - *Evolution seminar*
(fall, 8 students)
Biological Sciences 393: *Genetic Analysis*
(spring, 12 students) - **new course**
Biological Sciences 398: *Tutorial in Biology* (spring, Lautaro Cilenti)
Biological Sciences 399: *Independent Research* (spring, Kreena Patel)
Biological Sciences 399: *Independent Research* (spring, Hillary Tsang)
Biological Sciences 399: *Independent Research* (winter, Kreena Patel)
Biological Sciences 399: *Independent Research* (winter, Hillary Tsang)
2014 Biological Sciences 398: *Tutorial in Biology* (fall, Mazeed Aro-Lambo)
Biological Sciences 398: *Tutorial in Biology* (fall, Kreena Patel)
Biological Sciences 398: *Tutorial in Biology* (fall, Hillary Tsang)

Graduate teaching:

2015 Interdisciplinary Biological Sciences 402: *Eukaryotic Molecular Biology*
(fall, guest lecture, 22 students)
Interdisciplinary Biological Sciences: *Graduate Computational Biology Bootcamp*
(fall, 22 students) - www.GitHub.com/AndersenLab/IBiS-Bootcamp
Interdisciplinary Biological Sciences 423: *Ethics of peer review*
(spring, guest lecture, 41 students)

2014 Interdisciplinary Biological Sciences 402: *Eukaryotic Molecular Biology*
(fall, guest lecture, 16 students)
Interdisciplinary Biological Sciences: *Graduate Computational Biology Bootcamp*
(fall, 16 students) - www.GitHub.com/AndersenLab/IBiS-Bootcamp - **new course**
Interdisciplinary Biological Sciences 423: *Ethics of peer review*
(spring, guest lecture, 42 students)

2013 Interdisciplinary Biological Sciences 402: *Eukaryotic Molecular Biology*
(fall, guest lecture, 24 students)

K-12 advising:

Caitlin Westerfield, Evanston Township High School (2015-2016 academic year)
Matteo di Bernardo, Evanston Township High School (2015-2016 academic year)
Lauren Mann, Oak Park and River Forest High School (2014-2015 academic year)
Jacob Cruger, Latin School of Chicago (summers 2013, 2014)
Gina Liu, Illinois Math and Science Academy (2013-2014 academic year)

Undergraduate advising:

Nicholas Irons (2015 - , Class of 2018), Biological Sciences Major
2015 Summer URG recipient

Annika Zhang (2014 - , Class of 2018), Biological Sciences Major
2015 Weinberg College Summer Grant recipient

Tyler Shimko (summers 2012, 2013, 2014, 2015, University of Utah Class of 2015), Biology Major
Barry Goldwater Scholarship, *Myriad Academic Scholarship*,*Thomas Verender Hanks Scholarship*
National Science Foundation Graduate Research Fellowship Recipient
Department of Energy Computational Science Graduate Fellowship Honorable Mention

Mazeed Aro-Lambo (2014, Class of 2017), Biological Sciences Major
2014 NU Bioscientist Summer Grant recipient

Stevie Hippleheuser (2014 - , Class of 2017), Biological Sciences Major
2015 Summer URG recipient
2014 Weinberg College Summer Grant recipient

Hillary Tsang (2013 - , Class of 2016), Biological Sciences Major
2015 Weinberg College Summer Grant recipient
2014 Summer URG recipient, 2014 Academic URG recipient

Lautaro Clienti (2013 - 2015, Class of 2017), Mechanical Engineering Major
2014 Academic URG recipient

Kreena Patel (2013 - 2015, Class of 2015), Biological Sciences and Psychology Double Major
2014 Academic URG recipient, *2015 Emmanuel Margoliash Prize for Basic Research*,
Winfred Hill Award, *James Alton James Scholar*, *Ellen Taus Scholarship*, *J.G. Nolan Scholarship*

Zifan Xiang (2014 - 2015, Class of 2015), Biomedical Engineering Major

Stephen Chan (2013 - 2014, Class of 2014), Computer Science Major
2013 Summer URG recipient

Masters student advising:
Lucie Bastin-Heline (2014), Master's exchange student, Ecole Normale Superior, Paris, France
Kristen Larrichia (advisor, Nyree Zerega – Program in Plant Biology and Conservation), 2014 - 2015
Nick Timkovich (advisor, Luis Amaral) 2015

Graduate student and post-doctoral advising:

Graduate PhD candidates:
Shannon Brady (2015 -), Ph.D. student, Interdisciplinary Biological Sciences Program
Funded by the Biotechnology NIH Training grant
Daniel Cook (2014 -), Ph.D. student, Driskill Graduate Program
Funded by a National Science Foundation Pre-doctoral Fellowship
Stefan Zdraljvic (2014 -), Ph.D. student, Interdisciplinary Biological Sciences Program
Funded by the Cell and Molecular Basis of Disease NIH Training grant

Additional graduate rotation students:
Bryan Eder (Winter, 2016), IBiS
Kathryn Evans (Fall, 2015), IBiS
Ryan Abdella (Winter, 2015), IBiS
Erin Baker (Fall, 2014), IBiS
Alex Karge (Spring, 2014), IBiS
Saiorse McSharry (Winter, 2014), IBiS
Amy Nilles (Fall, 2013), IBiS
Ian Wolff (Summer, 2013), IBiS

Ph.D. Thesis committee memberships:
Adam Hockenberry (advisors, Luis Amaral and Michael Jewitt) 2015 -
Rachel Bakker (advisor, Rich Carthew) 2015 -
Joseph Muldoon (advisors, Neda Bagheri and Josh Leonard) 2015 -
Sarah Stainbrook (advisor, Keith Tyo) 2015 -
Timothy Toby (advisor, Neil Kelleher) 2015 -
Rose Njoroge (advisor, Sarki Abdulkadir – Driskill Graduate Prog., Feinberg School of Medicine), 2014 -
Keila Torre-Santiago (advisor, Sadie Wignall) 2014 -
Aaron Sue (advisor, Thomas O'Halloran), 2014 -
Arianne Rodriguez (advisor, Yun Wang), 2014 (Transferred to DGP)
Ritika Giri (advisor, Richard Carthew), 2013 -
Lilien Voong (advisor, Alec Wang), 2013 -

Post-doctoral:
Mostafa Zamanian (2014 -), Ph.D. from Iowa State University, advisor Dr. Timothy Day
Funded by the Bill and Melinda Gates Foundation
Bryn Gaertner (2014), Ph.D. from University of Oregon, advisor Dr. Patrick Phillips

Departmental, college, and university service:

2016	Departmental Strategic Planning committee
2015	Faculty search committee for genomics
	IBiS Retreat committee, Co-chair
	Qualifying examination committee (Rachel Bakker, Carthew lab)
	Qualifying examination committee, Chair (Joseph Muldoon, Bagheri and Leonard labs)
	Qualifying examination committee (Sarah Stainbrook, Tyo lab)
	Qualifying examination committee (Timothy Toby, Kelleher lab)
2014	Departmental Program Review committee
	IBiS Graduate Admissions committee
	IBiS Retreat committee, Co-chair
	Qualifying examination committee (Aaron Sue, Morimoto lab)
	Qualifying examination committee (Arianne Rodriguez, Wang lab)
	Qualifying examination committee (Rose Njoroge, Abdulkadir lab)
	Masters thesis examination committee (Kristen Larrichia, Zerega lab)
2013	IBiS Graduate Admissions committee
	Qualifying examination committee (Lilien Voong, Wang lab)
	Qualifying examination committee (Ritika Giri, Carthew lab)

Community work:

2014 -	Gave lecture on *C. elegans* genetics to the Latin School of Chicago advanced biology class
2015 - 2016	Mentored Caitlin Westerfield from Evanston Township High School on pathway evolution
2015 - 2016	Mentored Ainsley Tran from Oak Park and River Forest High School on iron sensitivity
2015 - 2016	American Youth Soccer Organization (AYSO) U8 Head Coach
2015	Hosted 80 5th grade students from Lincolnwood Elementary School for a day of science
2015 - 2016	Mentored Matteo di Bernardo from Evanston Township High School on anthelmintic sensitivity
2014	Mentored Lauren Mann from Oak Park and River Forest High School on iodine sensitivity
2014	Co-organized with Jacob Cruger nematode collections with the Punahou School, Hawaii
2013, 2014	Mentored Jacob Cruger from Latin School of Chicago
2009	Organized nematode collections with Vassalboro Community School, Maine