

CHARLES FREDERICK BAER
Curriculum Vitae (updated November 19, 2021)

Charles F. Baer
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Education:

Ph.D, Florida State University, 1998. Biological Science.
M.A., University of Texas at Austin, 1992. Biological Science.
B.A., University of Texas at Austin, 1982. Biological Science.

Current Employment:

June 2020 – present; Professor, Department of Biology, University of Florida, Gainesville, FL, USA
August 2010 - present; Associate Professor, Department of Biology, UF
August 2003 - 2010; Assistant Professor, Department of Biology, UF

Prior Employment:

July 1999-July 2003. **Postdoctoral Research Associate**, Department of Biology, University of Oregon and Department of Biology, Indiana University (Michael Lynch, supervisor).
August 1998-July 1999. **Postdoctoral Research Associate**, Department of Biology, Colorado State University (Michael Antolin, supervisor).
August 1987-August 1989, summer 1990,1991,1992. Self-employed **carpenter**, Austin, TX and Minneapolis, MN.
April, 1983-August 1987. **Carpenter** for several construction companies in the Austin, TX area.
February 1984-March 1986, Dennis Crumpton Construction, Johnson City, TX
April, 1986-August 1987, Reed Construction and Design, Austin, TX
June 1982-April 1983. **Lab Technician**, City of College Station, TX sewage treatment facility.

Research Interests:

I am a comparative evolutionary geneticist whose research is motivated by theoretical population genetics. My primary research interest is in the factors responsible for the generation and maintenance of genetic variation - "understanding variation in genetic variation". I am especially interested in the evolution of mutation rate, and in the distribution of fitness effects of new mutations. There is considerable variation in the rate and cumulative effects of new mutations, even among genotypes within species. I begin

from the premise that the rate and effects of mutation are themselves evolvable phenotypes which are subject to optimizing selection, and which may evolve in predictable ways. My research program has two primary objectives: (1) elucidate the various factors that underlie variation in the rate, molecular spectra and phenotypic effects of spontaneous mutations, and (2) determine the extent to which variation in mutational properties explains variation among taxa in standing genetic variation at the phenotypic and molecular level. Our studies of mutational variation have led me to become interested in the evolution of phenotypic robustness and epigenetic variation.

We use rhabditid nematodes as our experimental organism, and employ a variety of phenotypic and molecular methods to address the questions of interest. Additional research interests include the evolution of genetic architecture (i.e., genetic covariance), and selection experiments in any way, shape, or form. Recently, I have become involved in collaborative work with chemical engineers and cell biologists to employ experimental evolution to characterize the phenotypic and molecular effects of substrate rigidity on cultured mammalian cells.

Teaching:

For a detailed description of courses I teach and have taught at UF, please see my web page: http://people.biology.ufl.edu/cbaer/Baer_lab/Teaching.html

A. Courses Offered

Undergraduate Lecture Courses

Evolution (PCB 4674)

Integrated Principles of Biology (BSC 2010, Genetics section and Evolution section)

Graduate/Advanced Undergraduate Lecture Courses

Population Genetics (PCB6685/4553, four credits)

Graduate/Advanced Undergraduate Seminar Courses

Special Topics in Evolutionary Biology (ZOO 6927/4926, one credit) - Past topics include: Evolution of Sex (Fall 2004), Evolution of Transposable Elements (Spring 2005), Special Topics in Population Genetics (Spring 2007), Origins of Genome Architecture (Fall 2007), Genetics of Adaptation (Spring 2008, w/ M. L. Wayne), Coalescent Theory (Fall 2008), Evolution of Genetic Systems (Spring 2010), Early Life (Spring 2012), Evolutionary Systems Biology (Spring 2015); Ontogeny and Phylogeny (Spring 2017, w/ M. J. Cohn)

Integrative Principles of Biology (ZOO 6005; 3-week module: Neutral Processes in Biology)

Integrative Principles of Biology II. Grant Writing in Biology (ZOO 6005, two credits; Spring 2011)

B. Invited Teaching

Guest Lecturer, Santa Fe College, Gainesville, FL. "Introduction to Research" (Apr. 10, 2018)

Instructor, short course in Experimental Evolution, International Graduate Program in Life Sciences and the Interdisciplinary Master in Life Sciences, Institut de Biologie de l'École Normale Supérieure ENS, Paris (Nov. 2015, Nov. 2016).

Instructor, short course in Evolutionary Biology, Instituto Gulbenkian de Ciência, Oeiras, Portugal (Oct. 2008).

Honors/Awards:

NIH/NIGMS National Research Service Award Postdoctoral Fellowship 1 F32 GM20887-01, Indiana University, 2001-2003. *Comparative Mutation Accumulation in Rhabditid Nematodes*.

Margaret Menzel Award, Outstanding Graduate Student in Biological Science, Florida State University, 1998

Florida State University Dissertation Fellowship, 1997-1998

Grants:

A. Current Support

NIH/NIGMS R01GM127433. *100K spontaneous mutations: the foundation for an evolutionary systems biology of C. elegans*. PI: **Baer**, co-PI Vaishali Katju (Texas A&M), co-investigator Erik Andersen (Northwestern University). \$1,297,113 total award. 2018-2022.

B. Past Awards

NSF EF 1838316. *RoL:FELS:EAGER Rules for cellular adaptation to the mechanical properties of their environment*. \$300,000 total award. PI: Tanmay Lele (Texas A&M University Dept. of Chemical Engineering), co-PIs **Baer**, Srikar Chamala (UF ICBR). 2018-2020.

NIH/NIGMS 1R01GM107227-01A1. *Direct determination of the distribution of fitness effects of spontaneous mutations in Caenorhabditis elegans*. \$1,114,122 total award. PI: **Baer**, co-investigators Erik Andersen (Northwestern University), José Miguel Ponciano (UF), 2014-2020, no-cost extension.

University of Florida Genetics Institute Pilot Grant. *Spontaneous mutational variation in metabolic enzyme activity in Caenorhabditis elegans*. \$50,000. PI: **Baer**, co-PI D. A. Hahn (UF Dept. of Entomology and Nematology). 2016-2017.

NIH/NIGMS 1 R01GM072639-01A2. *Evolutionary Causes and Consequences of Variation in the Rate of Mutation*. \$1,543,400. PI: **Baer**, subcontract to Dee R. Denver (Oregon State University), 2006-2015.

NIH 1S1010OD012006-01A1. (Shared Instrumentation Grant). *Union Biometrica BIOSORTER PRO large-particle flow cytometer*. PI: **Baer** (with 17 others). \$599,953, 2013-2014.

NSF DEB-0822772. REU Supplement to NSF DEB-0717167, *Self-dependent Mutation Rate*. \$6000, 2008.

NSF DEB-0717167. *Self-dependent Mutation Rate*. \$486,664. PI: **Baer**, 2007-2010.

B1. Awarded to Postdoctoral Supervisees

NIH/NCI 1 F32 CA130377-01A2. Ruth L. Kirschstein National Research Service Award to Dr. Joanna Joyner-Matos. *Reactive oxygen species and the rate and spectrum of mutations in Caenorhabditis*. Sponsor: **C. F. Baer**; co-sponsor: Christiaan Leeuwenburgh, University of Florida. Awarded but declined August 2008.

UF Claude D. Pepper Older Americans Independence Center pilot study program. *Reactive oxygen species and mutational decay in fitness in Caenorhabditis*. \$18,940. Awarded to Joanna Joyner-Matos (Baer lab postdoc), December, 2007.

B2. Awarded to Graduate Student Supervisees

NSF DEB 1011475. Doctoral Dissertation Improvement Grant. *The influence of short indel heterozygosity on local nucleotide mutation rate*. Sponsor: **C. F. Baer**. \$14,896. Awarded to Matthew P. Salomon, April, 2010.

C. Pending

NIH/NIGMS 1 R01 GM146775-01. *Evolution of the (epi)mutation rate in C. elegans*. PI: **Baer**, co-PI, V. Katju (Texas A&M).

D. Submitted, funding declined (last five years)

NSF MCB 2052536. *RoL: Cellular adaptation to the stiffness of the microenvironment*. PI: T. Lele (Texas A&M University), co-PIs **Baer**, Brock (University of Texas at Austin), Dixit (UF). Submitted September, 2020.

NIH/NIAID 1 R21 AI159976-01. *Do antihelminthic drugs increase helminth mutation rate?* PI **Baer**. Submitted June, 2020.

NIH/NIGMS 1 R01 GM135756-01. *Cellular evolution on a soft biomaterial*. PI: T. Lele (Texas A&M University), MPIs S. Payton (UMass), A. Brock (UT Austin), co-PIs **Baer**, Chamala (UF). Submitted November, 2019.

NIH/NIGMS 1 R01 GM138706. *Eat, breathe, mutate: The influence of the dietary microbiome on the mutational spectrum of C. elegans*. PI: **Baer**, co-investigator E. C. Andersen (Northwestern). Submitted October, 2019.

NIH/NIGMS R01GM131002. *"Robustness vs. plasticity in gene expression: which is more important, and when?"*. PI: **Baer**, co-investigator I. Yanai. Submitted: Feb., 2018.

NIH GRANT12499957 (R21 submission), *"Cellular mechano-evolution on biomaterials: a new strategy for cell engineering"*. PI: T. Lele, co-investigator, **Baer**. Submitted October, 2017. Administratively withdrawn.

NSF DEB 1732199. Preliminary Proposal: *The transcriptional consequences of relaxed selection in Caenorhabditis*. PI: **Baer**, co-investigator I. Yanai. Submitted January, 2017.

NIH 1 R01 GM124328-01. *Evolutionary systems biology of the C. elegans metabolome*. PI: **Baer**, co-PI A. S. Edison, co-investigators F. Fernandez, F. Zou. Submitted Oct. 2016.

Service for the profession:

A. Grant Reviewer (last five years):

Panelist: NIH F35 (MIRA) study section, March 2021; NIH F08 fellowship study section, June 2020, June 2019; NIH IMST 15/19 study section, November 2019; NIH Genetic Variation and Evolution study section (*ad hoc* panelist), February 2019; NIH special emphasis study section, Shared Instrumentation Grants for Flow Cytometers, Sept. 2017; NSF DEB Pre-proposal panel, April 2015

Ad Hoc reviewer:

Year Agency

- 2021 Deutsche Forschungsgemeinschaft (German Research Foundation)
2020 NIH K99/R00 Review panel; Israel Science Foundation
2019 Deutsche Forschungsgemeinschaft (German Research Foundation)
2018 NIH/NIGMS K99/R00 Review panel; NSF MCB
National Science Centre of Poland (Narodowe Centrum Nauki – NCN);
2017 Natural Environment Research Council (UK); BBSRC (UK); NSF DEB; Agence
Nationale de la Recherche (France)
2016 NSF MCB, DEB; German Research Foundation (DFG); Netherlands Organization for
Scientific Research (NWO, Netherlands); Vienna Science and Technology Fund
(WWTF, Austria); University of Florida Claude D. Pepper Older American's
Independence Center
2015 NSF DEB Evolutionary Genetics panel, NSF MCB

B. Editorial Service

Associate Editor:

- Genome Biology and Evolution*, 2015-present
Peer Community International, Evolutionary Biology ("Recommender", same role as a
journal's AE), 2017-present
The American Naturalist, 2008-2018
Genetica, 2007-2015

C. Journal Reviewer (last five years)

Year Journal

- 2020 *American Naturalist; Evolution; Genetics; Genome Research; Heredity; Journal of
Nematology; Marine Life Science and Technology; Molecular Biology and Evolution;
Nature Communications; Nucleic Acids Research; PLoS Genetics; PLoS One; PNAS;
Proceedings of the Royal Society B; Science Advances; Scientific Reports*
2019 *Current Biology; Evolution; G3|Genes, Genomes, Genetics; Nature Communications*
2018 *Advances in Agricultural Science; BMC Ecology; Evolution; G3|Genes, Genomes,
Genetics; Molecular Biology and Evolution; Nature Communications; PLoS One*
2017 *Development, Genes, and Evolution; eLIFE; Evolution; G3|Genes, Genomes, Genetics;
mBIO; Molecular Biology and Evolution; Nature Communications; Proceedings of the
Royal Society B; Royal Society Open Science*
2016 *Developmental Cell, PLoS Genetics, BMC Genomics, PLoS One*

D. Professional Meetings Organized

- 36th Annual Southeastern Population Ecology and Evolutionary Genetics meeting, Madison, FL,
October 2010 (co-organizer, w/ M. L. Wayne).
42nd Annual Southeastern Population Ecology and Evolutionary Genetics meeting, Madison,
FL, October 2016 (co-organizer, w/ S. McDaniel).

E. Other Professional Service

- Member, Faculty of 1000Prime (2013 - present)
Member, Genetics Society of America Publications Committee (2013 - 2017)

Nominee for Treasurer, American Society of Naturalists (Fall 2016, not elected)

Service for the Department, College, and University:

A. Committee memberships (last five years):

College of Liberal Arts and Sciences Bylaws Review committee, Fall 2021-present
University Curriculum Committee, Fall 2017-Spring 2021
College of Liberal Arts and Sciences Faculty Council, interim member, Fall 2020
UF Genetics Institute Genetics and Genomics graduate admissions committee, Fall 2020-present
Dept. of Biology Bylaws committee, 2020-2021 (Chair)
Dept. of Biology. Merit Pay Committee, 2018-2019 academic year (elected by faculty)
Dept. of Biology, Biology Majors Executive Committee, Fall 2018-present
Dept. of Biology, Molecular Organismal Biology search committee, Fall 2017/Spring 2018.
Dept. of Biology, Graduate Admissions Committee (Fall 2015-2018; Chair 2016-2017).
Dept. of Biology, Strategic Planning Committee, Fall 2015-2016 (Chair)
Dept of Biology, Recruitment Committee, Fall 2013-Fall 2016
Dept. of Biology, Space Committee, Fall 2014-2018

B. Other service:

Faculty mentor for two high school juniors at Jacksonville Episcopal High School local science fair (Fall 2009-Spring 2010).
Faculty Sponsor, UF Trap and Skeet club, 2008-2010.
Faculty mentor in the UF (high school) Student Science Training Program (SSTP); summer 2006-2008, 2010, 2012, 2014-2019.

Professional Presentations

NOTE: Superscript ^U indicates undergraduate advisee, ^G indicates graduate advisee, ^P indicates postdoctoral advisee.

A. Invited Presentations:

Institut für Populationsgenetik, Vetmeduni Vienna, Vienna, Austria. May 2019. *Mutation as a lens on Natural Selection in C. elegans.*
Georgia Tech University, Dept. of Biology. Atlanta, GA, April 2019. *Mutation as a lens on Natural Selection in C. elegans.*
Emory University, Dept. of Biology. Atlanta, GA, April 2019. *Mutation as a lens on Natural Selection in C. elegans.*
"Answering fundamental questions of evolution with *C. elegans*" workshop, Roscoff, France, December 2018. *Mutation in C. elegans.*
Florida Genetics Symposium 2018. Gainesville, FL, November 2018. *Mutation as a lens on Natural Selection in C. elegans.*
Ecology, Evolution and Genomics of *C. elegans* and Other Nematodes 2018. Hinxton, UK, July 2018. *Mutation as a lens on Natural Selection in C. elegans.*
University of Toronto, Mississauga, Department of Biology, Toronto, CA, February, 2018. *Mutation as a Lens on Natural Selection in C. elegans.*
University of Southern California, Dept. of Molecular and Computational Biology, Los Angeles, CA, February 2017. *Input and Output of Mutational Variance in C. elegans.*

- University of Florida, Dept. of Animal Science, January 2017. *Input and Output of Mutational Variance in C. elegans*.
- Daytona State College, Daytona Beach, FL, April 2016. *Consistency and Idiosyncrasy in the Mutational Process of C. elegans*.
- Clemson University, Clemson SC, September 2015. *Variation in Mutation Explains a Lot and it Accumulates Pretty Fast*.
- Fondation de Treille, Le Treille, France, August 2014. Symposium: Revisiting the role of phenotypic plasticity in evolution. *Deleterious Mutation, Environmental Variation and Environmental Variance*.
- University of Houston, Network Group Seminar, Houston, TX, November 2013. *Quantifying the de-canalizing effects of spontaneous mutations in rhabditid nematodes*.
- McMaster University, Ecology, Evolution, and Behavior Seminar, Hamilton, ON, CA, March 2013. *Exploring the Mutational Landscape of Caenorhabditis*.
- 46th Annual UK Population Genetics Group, Glasgow, Scotland, UK, December 2012 (plenary speaker). *Exploring the Mutational Landscape of Caenorhabditis*.
- Molecular Evolution in the Genomic Era, University of Roma Tre, Rome, Italy, Sept. 2011. *The mutational landscape of Caenorhabditis*. (invited, presentation cancelled due to family illness).
- University of Toronto, Dept. of Ecology and Evolutionary Biology, December 2010. *Quantifying the de-canalizing effects of spontaneous mutations in rhabditid nematodes*.
- University of Georgia, Dept. of Genetics, Athens, GA, August 2010. *Understanding variation in genetic variation in Caenorhabditis*.
- University of Kentucky, Dept. of Biology, Lexington, KY, December 2009. *Understanding variation in genetic variation*.
- Oregon State University, Dept. of Zoology, Corvallis, OR, April 2009. *Quantifying the de-canalizing effects of spontaneous mutations in rhabditid nematodes*.
- University of Texas, Section of Integrative Biology, Austin, TX, February, 2009. *Quantifying the de-canalizing effects of spontaneous mutations in rhabditid nematodes*.

B. Contributed Presentations (last five years; presenting author underlined):

- Society for Molecular Biology and Evolution, Annual Meeting, Manchester, UK, July 2019. Evolution of the rate of copy-number and structural variant mutations under relaxed selection in *Caenorhabditis elegans* (selected talk). Saxena, A. S.^G, Salomon, M. P.^G, Matsuba, C.^P, and **C. F. Baer**.
- 5th Annual Florida Worm Meeting, Melbourne, FL, May 2019. The *C. elegans* mutational spectrum (contributed talk). Saxena, A. S.^G, Salomon, M. P.^G, Matsuba, C.^P, Yeh, S-D.^P, and **C. F. Baer**.
- 2nd Population, Evolutionary and Quantitative Genetics Conference, Madison, WI, May 2018. Tempo, Mode, and Fitness Effects of Mutation in *C. elegans* over 400 Generations of Minimal Selection (contributed poster). Saxena, A. S.^G, Salomon, M. P.^G, Matsuba, C.^P, Yeh, S-D.^P, and **C. F. Baer**.
- Mutation Rate Evolution workshop, Arizona State University, Tempe, AZ, March 2018 (selected talk). Does the mutational process depend on the underlying mutation load? **C. F. Baer**
- 21st Annual *C. elegans* meeting, Los Angeles, CA (June 2017). Tempo, Mode, and Fitness Effects of Mutation in *C. elegans* over 400 Generations of Minimal Selection (contributed poster). Saxena, A. S., Salomon, M. P., Matsuba, C., Yeh, S-D., and **C. F. Baer**.
- 43rd Annual Southeastern Population Ecology and Evolutionary Genetics meeting, Laurel Hill, NC, October 2017 (contributed talk). *Network architecture and the cumulative effects of spontaneous mutations on the C. elegans metabolome*. Johnson, L. M.^G, Chandler, L.^G, and **C. F. Baer**.

- The Allied Genetics Conference (Genetics Society of America), Orlando, FL, July, 2016 (selected talk). The Mutational Structure of Metabolism in *Caenorhabditis elegans*. Davies, S. K., A. M. Leroi, A. Burt, J. G. Bundy, and **C. F. Baer**.
- Society for the Study of Evolution, Annual Meeting, Austin, TX, June, 2016 (contributed talk). Idiosyncrasy and Consistency in the *C. elegans* Mutational Process. Farhadifar, R., J. M. Ponciano, E. C. Andersen, D. J. Needleman, and **C. F. Baer**.
- Society for the Study of Evolution, Annual Meeting, Raleigh, NC, June 2014 (contributed talk). The Red Death Meets the Abdominal Bristle: Polygenic Mutation for Susceptibility to a Bacterial Pathogen in *Caenorhabditis elegans*. Etienne, V.^G, E. C. Andersen, J. M. Ponciano, **C. F. Baer**.

D. Public Outreach

- Lecture (w/ Discussion) to the Summer Science Institute: Advanced Topics in Evolution (for secondary school educators in Florida public schools), June 2014.
- Guest "scientific expert" on two episodes of a radio program titled "Cryptozoology" hosted by Susan McNally on <http://liveparanormal.com/>, August and Sept. 2012 (*ed. note*: this was probably the highlight of my career in academic science).
- Lecture (w/ Discussion) to the Gainesville, FL chapter of Hadassah, "*The Theory of Evolution*", December 2007.
- Lecture (w/ Discussion) to the Houston, TX Gator Club, "*Why We Mutate*". March 2006.

Professional Affiliations:

United Faculty of Florida (faculty union; member since 2003); Society for the Study of Evolution (member since 1992); Genetics Society of America (member since 1995); Society for Molecular Biology and Evolution (member since 2015)

Publications:

NOTE: Superscript ^U indicates undergraduate advisee, ^G indicates graduate advisee, ^P indicates postdoctoral advisee; corresponding author(s) on multiple-author papers is underlined.

A. Primary Literature

1. Gilbert, K. J., S. Zdraljevic, D. E. Cook, A. D. Cutter, E. C. Andersen, and **C. F. Baer**. 2021. The distribution of mutational effects on fitness in *Caenorhabditis elegans* inferred from standing genetic variation. *Genetics*. <https://doi.org/10.1093/genetics/iyab166>. PMID: 34791202.
2. Rajaei, M.^G, A. S. Saxena^G, L. M. Johnson^G, M. C. Snyder, T. A. Crombie^P, R. E. Tanny, E. C. Andersen, J. Joyner-Matos, and **C. F. Baer**. 2021. Mutability of mononucleotide repeats, not oxidative stress, explains the discrepancy between laboratory-accumulated mutations and the natural allele-frequency spectrum in *C. elegans*. *Genome Research*. <https://www.genome.org/cgi/doi/10.1101/gr.275372.121>. PMID: 34404692.
3. Purkayastha, P., K. Pendyala, A. S. Saxena^G, H. Hakimjavadi, S. Chamala, **C. F. Baer**, and T. P. Lele. 2021. Reverse plasticity underlies rapid evolution by clonal selection within populations of fibroblasts propagated on a novel soft substrate. *Molecular Biology and Evolution* 38: 3279–3293. <https://doi.org/10.1093/molbev/msab102>. PMID: 33871606.

4. Johnson, L. M.^G, O. J. Smith^U, D. A. Hahn, and **C. F. Baer**. 2020. Short-term heritable variation overwhelms 200 generations of mutational variance for metabolic traits in *Caenorhabditis elegans*. *Evolution* 74: 2451–2464. [PMID: 32989734](#).
5. Saxena, A. S.^G, M. P. Salomon^G, C. Matsuba^P, S-D. Yeh^P, and **C. F. Baer**. 2019. Evolution of the mutational process under relaxed selection in *Caenorhabditis elegans*. *Molecular Biology and Evolution* 36:239–251. PMID: 30445510.
6. Crombie, T. A.^P, S. Saber, A. S.^G Saxena^G, R. Egan^U, and **C. F. Baer**. 2018. Head-to-head comparison of three experimental methods of quantifying competitive fitness in *C. elegans*. *PLoS ONE* 13(10): e0201507. <https://doi.org/10.1371/journal.pone.0201507>. PMID: 30339672.
7. Johnson, L. M.^G, L. M. Chandler^G, S. K. Davies, and **C. F. Baer**. 2018. Network architecture and mutational sensitivity of the *C. elegans* metabolome. *Frontiers in Molecular Biosciences – Metabolomics*, 5: 69. doi: 10.3389/fmolb.2018.00069. Invited contribution. PMID: 30109234.
8. Yeh, S-D.^P, A. S. Saxena^G, T. A. Crombie^P, D. Feistel, L. M. Johnson^G, I. Lam^U, J. Lam^U, S. Saber^G, and **C. F. Baer**. 2017. The mutational decay of male and hermaphrodite competitive fitness in the androdioecious nematode *C. elegans*, in which males are naturally rare. *Heredity*, 120:1-12. PMID: 29234171.
9. H. Teotónio, S. Estes, P. C. Phillips and **C. F. Baer**. 2017. Experimental evolution with *Caenorhabditis* nematodes. *Genetics*, 206: 691–716. Invited contribution to Wormbook. PMID: 28592504.
10. Reed, L. R., **C. F. Baer**, and A. S. Edison. 2017. Considerations when choosing a genetic model organism for metabolomics studies. *Current Opinion in Chemical Biology*, 36:7–14. Invited contribution. PMID: 28025166.
11. Davies, S. K., A. Leroi, A. Burt, J. G. Bundy, and **C. F. Baer**. 2016. The mutational structure of metabolism in *Caenorhabditis elegans*. *Evolution*, 70: 2239–2246. PMID: 27465022.
12. Farhadifar, R., J. M. Ponciano, E. C. Andersen, D. J. Needleman, and **C. F. Baer**. 2016. Mutation is a sufficient and robust predictor of genetic variation for mitotic spindle traits in *C. elegans*. *Genetics* 203: 1859-1870. PMID: 27334268.
13. Andrew, J. R., M. M. Dossey, V. Garza, M. Keller, **C. F. Baer**, and J. Joyner-Matos. 2015. Stressful environmental conditions do not decrease the relative fitness of deleterious alleles. *Heredity*, 115: 503-508; doi:10.1038/hdy.2015.51. PMID: 26103946.
14. Farhadifar, R., **C. F. Baer**, E. C. Andersen, A-C. Valfort, T. Müller-Reichert, M. Delattre, and D. J. Needleman. 2015. Scaling, selection, and evolutionary dynamics of the mitotic spindle. *Current Biology* 25: 1-9. PMID: 25683802. [Faculty of 1000 selection](#).
15. Etienne, V.^G, E. C. Andersen, J. M. Ponciano, D. Blanton^U, A. Cadavid^U, J. Joyner-Matos^P, C. Matsuba^P, B. Tabman^U, and **C. F. Baer**. 2015. The Red Death meets the abdominal bristle: polygenic mutation for susceptibility to a bacterial pathogen in *Caenorhabditis elegans*. *Evolution* 69: 508–519. PMID: 25495240.
16. Joyner-Matos, J.^P, K. A. Hicks, D. Cousins, M. Keller, D. R. Denver, **C. F. Baer**, and S. Estes. 2013. Evolution of a higher intracellular oxidizing environment in *Caenorhabditis elegans* under relaxed selection. *PLoS One* 8: e65604. PMID: 23776511.
17. Matsuba, C.^P, D. G. Ostrow^P, M. P. Salomon^G, A. Tolani^U, and **C. F. Baer**. 2013. Temperature, stress, and spontaneous mutation in *Caenorhabditis briggsae* and *C. elegans*. *Biology Letters*, 9: 20120334. PMID: 22875817 (invited contribution).
18. Matsuba, C.^P, S. Lewis^U, D. G. Ostrow^P, M. P. Salomon^G, L. Sylvestre^U, J. Ungvari-Martin^U, and **C. F. Baer**. 2012. Invariance (?) of mutational parameters for relative fitness over 400 generations of mutation accumulation in *Caenorhabditis elegans*. *G3|Genes, Genomes, Genetics* 2:1497-1503. PMID: 23275873.

19. Denver, D. R., L. J. Wilhelm, D. K. Howe, K. Gafner, P. C. Dolan, and **C. F. Baer**. 2012. Variation in base-substitution mutation in experimental and natural lineages of *Caenorhabditis* nematodes. *Genome Biology and Evolution* 4: 513-522. PMID: 22436997.
20. Joyner-Matos, J., L. C. Bean, H. L. Richardson, T. Sammeli, and **C. F. Baer**. 2011. No evidence of elevated germline mutation accumulation under oxidative stress in *Caenorhabditis elegans*. *Genetics* 189: 1439–1447. PMID: 21979932.
21. Shaw, F. H. and **C. F. Baer**. 2011. Evolutionary consequences of fitness-dependent mutation rate in finite populations. *Journal of Evolutionary Biology* 24: 1677–1684. PMID: 21635607.
22. **Baer, C. F.**, J. Joyner-Matos^P, D. Ostrow^P, V. Grigaltchik^U, M. P. Salomon^G, and A. Upadhyay^U. 2010. Rapid decline in fitness of mutation accumulation lines of gonochoristic (outcrossing) *Caenorhabditis* nematodes. *Evolution* 64: 3242–3253. PMID: 20649813.
23. Braendle, C., **C. F. Baer**, and M-A Félix. 2010. Bias and evolution of the mutationally accessible phenotypic space in a developmental system. *PLoS Genetics* 6(3): e1000877. PMID: 20300655. [Faculty of 1000 selection](#).
24. Howe, D. K., **C. F. Baer**, and D. R. Denver. 2010. High rate of large deletions and natural variation in *Caenorhabditis briggsae* mitochondrial genome mutation processes. *Genome Biology and Evolution* 1: 29–38. PMID: 20333220.
25. **Baer, C. F.** and D. R. Denver. 2010. Spontaneous mutations decrease sensitivity of gene expression to random environmental variation in *Caenorhabditis elegans*. *PLoS One* 5(1): e8750. doi:10.1371/journal.pone.0008750. PMID: 20090917.
26. Denver, D. R., P. C. Dolan, L. J. Wilhelm, W. Sung, J. I. Lucas-Lledó, D. K. Howe, S. C. Lewis, K. Okamoto, M. Lynch, W. K. Thomas, and **C. F. Baer**. 2009. Mutational bias in *Caenorhabditis elegans* nuclear genomes. *Proc. Natl. Acad. Sci. USA* 106: 16310–16314. [Faculty of 1000 selection](#).
27. Salomon, M. P.^G, D. Ostrow^P, N. Phillips^P, D. Blanton^U, W. Bour^U, T. Keller^U, L. Levy^U, T. Sylvestre^U, A. Upadhyay^U, and **C. F. Baer**. 2009. Comparing mutational and standing genetic variability for fitness and size in *Caenorhabditis briggsae* and *C. elegans*. *Genetics* 183: 1-8.
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37. **Baer, C. F.**, and M. Lynch. 2003. Correlated evolution of life-history with size at maturity in *Daphnia pulicaria*: patterns within and between populations. *Genetical Research* 81: 123-132.
38. **W. C. Black IV**, **C. F. Baer**, M. F. Antolin, and N. DuTeau. 2001. Population genomics: procedures for the genome-wide sampling of insect populations. *Annual Review of Entomology* 46: 441-469.
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43. **Baer, C. F.** 1998. Species-wide population structure in a southeastern US freshwater fish, *Heterandria formosa*: gene flow and biogeography. *Evolution* 52: 183-193.
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B. Invited Commentary Articles:

46. **Baer, C. F.** 2019. Evolution: Environmental dependence of the mutational process. *Current Biology* 29, R415–R417. PMID: 31163145.
47. **Baer, C. F.** 2008. Does the mutation rate depend on itself? *PLoS Biology* 6: 233-235. PMID: 18303954.
48. **Baer, C. F.** 2007. Divining God's mutation rate. *Cellscience Reviews* 3(4). ISSN 1742-8130.

C. Book Chapters:

49. **Baer, C. F.** 2020. Mutation Rate and Spectrum. In: *Oxford Bibliographies in Evolutionary Biology*. D. Futuyma, ed. Oxford University Press, New York. Invited submission. Forthcoming.
50. Travis, J. and **C. F. Baer**. 2016. A Brief History of Evolutionary Genetics. Pp. 48-55 in: *The Encyclopedia of Evolutionary Biology*. R. Kliman, ed. Academic Press, Waltham, MA. Invited submission
51. **Baer, C. F.** 2013. Mutation. Pp. 315-320 in: *The Princeton Guide to Evolution*. Losos, J., D. Baum, D. Futuyma, H. Hoekstra, R. Lenski, A. Moore, D. Schluter, and M. Whitlock, eds. Princeton University Press, Princeton, NJ. Invited submission.

D. Submitted Manuscripts:

1. Mallard, F., L. Noble, T. Guzella, B. Alfonso, **C. F. Baer**, and H. Teotónio. 2021. Selection and genetic drift determine phenotypic stasis with genetic divergence. *bioRxiv* 778282. doi: <https://doi.org/10.1101/778282>.
2. Johnson, L. M.^G, S. Saber^G, Md. M. I. Rifat^G, S. Rouse^U, and **C. F. Baer**. 2021. Mutation, selection, and quantitative genetic architecture of susceptibility to bacterial pathogens in *C. elegans*. *bioRxiv* 2021. doi: <https://doi.org/10.1101/2021.09.07.459309>

Graduate students supervised:

Md Monjurul Islam Rifat, 8/20-present
Moein Rajaei, 8/16-present
Sayran Saber, 1/15-present
Lindsay M. Johnson, 8/14-4/20, Ph.D Spring 2020, currently Project Manager, Resilience Biotechnologies, Inc., Alachua, FL.
Ayush S. Saxena, 8/13-4/20, Ph.D Spring 2020, currently Bioinformatics Specialist, Regeneron Pharmaceuticals, Inc., Tarrytown, NY.
Veronique Etienne, 8/11-7/14, MS Summer 2014, currently Ph.D student in the College of Veterinary Medicine, UF.
Matthew P. Salomon, 6/05-7/11; Ph.D Summer 2011, currently Research Assistant Professor in the Dept. of Medicine, University of Southern California, Los Angeles, CA.
Jonathan Saunders 6/07-6/10; MS Summer, 2010, currently research scientist in the UF Dept. of Horticultural Sciences.
Michael W. Perry, 6/04- 8/06. MS Summer 2006, Ph.D, UC Berkeley 2011, currently Assistant Professor in the Division of Biological Sciences, University of California, San Diego.

Postdoctoral Associates Supervised:

Timothy A. Crombie. 1/16 – 7/17. Currently postdoc, Dept. of Molecular Biosciences, Northwestern University
Shu-Dan Yeh. 10/14-7/15. Currently Assistant Professor, Department of Life Sciences, National Central University, Taiwan.
Chikako Matsuba, 2/08 - 4/13; currently Research Scientist at the John Wayne Cancer Center, Los Angeles, CA..
Dejerianne G. Ostrow, 10/08-5/11; currently Operations Supervisor, Molecular Pathology/Genomics Core, Children's Hospital Los Angeles, CA.
Joanna Joyner-Matos, 5/07 - 8/08; currently Professor at the University of Eastern Washington, Cheney, WA.
Andrew Custer, 7/05 - 8/06; graduated UF College of Law, 2009, patent attorney with Lathrop and Gage LLP, Boston, MA.
Naomi Phillips, 1/04 - 8/05; currently Professor and former Chair, Dept. of Biology, Arcadia University, Philadelphia, PA.

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Dembek, Daniel Dixon, Sarah Eaton, Robyn Egan*, Kunjal Gandhi, Thomas Gilton, Charlotte Gleeson, Salome Gogoberdize, Joshua Gordon, Jillian Green, Veronica Grigaltchik*, Li He, Helen Ho, Joseph Hong, Samon Imtiaz, Khyzer Izhar, Lena Jacques, Paul Jensen, Ling Jin, Sara Khan, Lindsay Keegan, Thomas Keller*, Anne Laird, Isabel Lam*, Jennifer Lam*, Quang Le, Laura Levy*, Suzanna Lewis*, Siyang Lu, Devon Marks, Nick Martinez, Shannon McKernan, Julian Mendoza, Justin Merritt, Ed Mezerhane*, Andy Mills, Patricia Moline, Shelley Moore, Devon Myers, Bree Nastav, Kaitlyn Neller, Mohamad Okab, Ramon Piñeda, Maja Radic, Zarah Rahman, Mary Raines, Kerry Regan, Matthew Ribacoff, Andre Rickard, Rose Roberts, Rayshard Rogers, Jeffery Rosenbloom*, Lindsay Roth, Sydney Rouse*, Daniela Sanchez, Eric Salaices, Shannon Sawtell, Kate Schert, Kayla Schwartz, Charlie Shaw, Matthew Sines, Olivia Smith*, Michael Snyder, Daniel St. Clair, Laurence Sylvestre*, Thamar Sylvestre*, Brandon Tabman*, Maria Tartakovsky, Gloria Tavera, Alex Thanh, Rebecca Theobald, Amit Tolani*, Michael Underwood, Judit Ungvari-Martin*, Ambuj Upadhyay*, Matt Vasquez, Carly Wilson, Josh Weinberg, Jennifer Yackey, Zachary Zeller.

High School students mentored:

Bridget Anderson, Lauren Becker, Caroline Carreras, Mikyle Crockett, Devshri Doshi, Kristin Huyghue, Lauren Johnston, Breeanne Nastav, Brooklynn Nelson, Derrick Rodney, Shannon Sawtell, Daniel Sloan, Sandra Suarez, Carlie Taylor, Jalea Turner

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