CHARLES FREDERICK BAER
Curriculum Vitae (updated April 3, 2026)

Charles F. Baer
Department of Biology /
University of Florida Genetics Institute
621 Bartram Hall
P. O. Box 118525
University of Florida
Gainesville, FL 32611-8525 USA

Phone: 352-392-3550
Fax: 352-392-3704
Email: cbaer@ufl.edu
Web: http://people.clas.ufl.edu/cbaer/about/
ORCID: https://orcid.org/0000-0002-0140-5814

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, Gainsville, FL, USA
August 2010 – June 2020; 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. **Technician**, City of College Station, TX sewage treatment facility.

Research Interests:

I am a comparative evolutionary biologist 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 individuals 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 and Evolution sections)

Graduate/Advanced Undergraduate Lecture Courses

Population Genetics (PCB6685/4553, four credits)

Graduate/Advanced Undergraduate Seminar Courses

Principles of Graduate Training (ZOO 6927/BOT 6935, two credits)
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)
Molecular Evolution (ZOO6930)

B. Invited Teaching

Guest Lecturer, National Central University, Taoyuan City, Taiwan. Nov. 7, 2025.
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

NSF DEB 2437876. STAR: *Deconstructing Theta: Quantifying the rate and spectrum of mutation in non-model Caenorhabditis nematodes*. PI: **Baer**, co-PI Erik Andersen (Johns Hopkins University). $273,556 total award. 01/15/2025 – 01/14/2027.

B. Pending

NIH 1R01CA305395-01A1. *Heritable clonal selection by ECM stiffness in cancer*. PI: T. Lele (Texas A&M); co-investigators **Baer**, Gaharwar (TAMU). $ 2,204,478 Total award. 2026-2030.

C. Past Awards

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. 2018-2023.
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.

C1. 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.

C2. 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.

D. Submitted, funding declined (last five years)

NIH/NIEHS R21 PRO00065810. *Developing the nematode C. elegans as a model system to quantify the heritable genomic effects of environmental nanoplastics*. PI: Baer; co-invesigator S. Jung (UF). $419,375 total award. Status: Pending review. Start date: 12/01/2025 – 11/30/2027.
NIH/NCI 1R01CA305395-01. *The role of ECM Stiffness in the evolution of tumor cell populations*. PI: Tanmay Lele (Texas A&M University); co-investigators **Baer**, Gaharwar (TAMU). $1,856,534 total award. Status: Scored, declined. Start date 07/01/2025 – 06/30/2029.
NIH/NIGMS 1R01GM157471-01. *Hierarchical evolutionary genetics of a high dimensional phenotype: parsing the selective chicken and the mutational egg*. PI: **Baer** , co-investigators W. B. Barbazuk (UF) and J. Zhou (UF). Submitted February 2023.
NSF DEB/MCB 2401091. SG: *Quantifying the rate and spectrum of mutation in Caenorhabditis briggsae and C. brenneri: building a platform for comparative evolutionary genomics*. PI: **Baer**, co-PI E. C. Andersen (Johns Hopkins University). Submitted October, 2022.
NIH/NCI 1 R01 CA281299-01. *Reverse plasticity in cellular response to ECM stiffness*. PI: Lele (Texas A&M University), co-investigators **Baer**, Brock (University of Texas at Austin). Submitted August, **2022**.
NIH/NIGMS 1 R01 GM149621-01. *Evolutionary genetics of epimutation in C. elegans*. PI: **Baer**, co-investigator Salomon (University of Southern California). Submitted July, 2022.
NIH/NIGMS 1 R01 GM146775-01. *Evolution of the (epi)mutation rate in C. elegans*. PI: **Baer**, co-PI, V. Katju (Texas A&M). Submitted October, 2021.

Service for the profession:

A. Grant Reviewer (last five years):

2025 - Oak Ridge Associated Universities Ralph E. Powe Junior Faculty Enhancement Awards Program

- NSF/NIH Enabling Discovery through GEnomics (EDGE) Complex Multigenic Traits (CMT) Proposal Review Panel, June 2025

2024 - NIH Genetic Variation and Evolution study section (*ad hoc* panelist), November 2024;
- Deutsche Forschungsgemeinschaft (German Research Foundation);
- NSF Division of Enviromental Biology

2023 - NIH 2024/05 NIH Director's New Innovator Award Program (DP2; Stage 1)

2022 - NIH/NIAID U19 - Systems Biology for Infectious Diseases study section (*ad hoc* panelist), July 2022;
- NSF/NIH Enabling Discovery through GEnomics (EDGE) Complex Multigenic Traits (CMT) Proposal Review Panel, June 2022

2021 - NIH F35 (MIRA) study section March 2021
- Deutsche Forschungsgemeinschaft (German Research Foundation)

B. Editorial Service (last five years)

Associate Editor:

- *Evolution, 2022-present*
- *Genome Biology and Evolution*, 2015-present
- *Peer Community International, Evolutionary Biology* ("Recommender", same role as a journal's AE), 2017-present

C. Journal Reviewer (last five years)

Year	*Journal*
2025	*American Journal of Physical Anthropology; G3|Genes, Genomes, Genetics; Genetics; Genome Biology; Genome Biology and Evolution; Life Sciences in Space Research; mBIO; Molecular Biology and Evolution, Nature Communications, PLoS Genetics; Proceedings of the National Academy of Sciences USA; Science Advances*
2024	*BMC Ecology and Evolution, Genome Biology and Evolution, Mitochodrion, Molecular Biology and Evolution, PCI Evolutionary Biology, Proceedings of the National Academy of Sciences USA, Science of the Total Environment*
2023	*Molecular Biology and Evolution, Evolution Letters, Ecology and Evolution, Genome Biology and Evolution, Proceedings of the Royal Society B, BMC Biology, The American Naturalist, Evolution, BMC Evolutionary Biology, PLoS One*
2022	*The American Naturalist; Molecular Biology and Evolution; Evolution Letters; G3|Genes, Genomes, Genetics; Genome Biology and Evolution; Genome Research; Marine Life Science and Technology; Nature Communications; Theory in Biosciences*
2021	*BMC Biology; Evolutionary Ecology; Genetics; Genome; Molecular Biology and Evolution; Nature Communications; PLoS Genetics; Proceedings of the Royal Society B; Trends in Genetics*

D. Professional Meetings Organized

51st Annual Southeastern Population Ecology and Evolutionary Genetics meeting, Tremont, TN, November 2025 (co-organizer, w/ B. Fitzpatrick, UT Knoxville).

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

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

E. Other Professional Service

Member, Faculty Opinions (formerly 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):

University Curriculum Committee, Fall 2017-Spring 2021
College of Liberal Arts and Sciences Graduate Committee, Fall 2022-Spring 2025
College of Liberal Arts and Sciences Bylaws Review committee, 2021-2022
UF Genetics Institute Genetics and Genomics graduate admissions committee, 2020-2021
Dept. of Biology Cell Biologist search committee (Fall 2024)
Dept. of Biology. Merit Pay Committee, 2023-2024 academic year (elected by faculty)
Dept. of Biology Graduate Coordinator, Fall 2022- Spring 2025
Dept. of Biology, Graduate Admissions Committee (Fall 2022-present).
Dept. of Biology Advisory Committee (Fall 2022-2025, *ex oficio*)
Dept. of Biology Bylaws committee, 2020-2021 (Chair)
Dept. of Biology, Biology Majors Executive Committee, Fall 2018-2022

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.
Faculty mentor, UF Water Polo club, 2025-present.

Professional Presentations

A. Invited Presentations:

7th Multiomics and Precision Medicine Joint Conference 2025, Taipei City, Taiwan. November 2025. *Excursions along the Drift Barrier: Evolution of the rate, spectrum, and fitness effects of mutation under minimal selection in C. elegans*.
Institut für Populationsgenetik, Vetmeduni Vienna, Vienna, Austria. June 2024. *Exploring heritable variation in mammalian cells*.
Florida Genetics Symposium 2021. Gainesville, FL, November 2021. *Exploring heritable variation in mammalian cells and worms*.
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). *NOTE: Superscript ^{U} indicates undergraduate advisee, ^{G} indicates graduate advisee, ^{P} indicates postdoctoral advisee.* presenting author underlined.

Society for Molecular Biology and Evolution, Annual Meeting, Puerto Vallarta, Mexico, July 2024. Spontaneous mutation rate for and strength of purifying selection against structural variants in the *C. elegans* genome (contributed poster). A. S. Saxena^{G}, M. Snyder, and **C. F. Baer**.
EvoWorm 2024: Evolutionary Biology of Caenorhabditis and Other Nematodes. Vienna, Austria, June 2024. Spontaneous mutation rate for and strength of purifying selection against structural variants in the *C. elegans* genome (contributed poster). A. S. Saxena^{G}, M. Snyder, and **C. F. Baer**.

8th Annual Florida Worm Meeting, Melbourne, FL, June 2024. High rate of introduction and efficient removal of structural variants from natural populations of *C. elegans* (selected talk). A. S. Saxena[G], M. Snyder, and **C. F. Baer**.

Society for Molecular Biology and Evolution, Annual Meeting, Ferrara, Italy, July 2023. Rapid evolution by clonal selection within populations of mammalian cells propagated on a novel substrate (contributed poster). T-C. Wang, **C. F. Baer**, and T. Lele.

24th International *C. elegans* Conference, Glasgow, Scotland, June 2023. COSMIC signature and transcriptional (a)symmetry of spontaneous mutations in *C. elegans* (contributed poster). M. Rajaei[G] and **C. F. Baer**.

24th International *C. elegans* Conference, Glasgow, Scotland, June 2023. Direct inference of the distribution of fitness effects (DFE) of spontaneous mutations from recombinant inbred *C. elegans* mutation accumulation lines (contributed poster). T. A. Crombie[P], M. Rajae[G], A. S. Saxena[G], L. M. Johnson[G], S. Saber[G], R. E. Tanny, E. C. Andersen, J. M. Ponciano, and **C. F. Baer**.

Mechanisms of Cellular Evolution Annual Symposium, Tempe, AZ, November 2022. Tumor evolution through selection by ECM stiffness (contributed poster). T.-C. Wang, **C. F. Baer**, and T. Lele.

Ecology and Evolution of *Caenorhabditis* and other nematodes, biannual meeting, Hamilton, Ontario, Canada, June 2022. CeSMAR – the *C. elegans* Spontaneous Mutation Accumulation Resource (selected talk). **C. F. Baer** and V. Katju.

Ecology and Evolution of *Caenorhabditis* and other nematodes, biannual meeting, Hamilton, Ontario, Canada, June 2022. Mutation, selection, and the prevalence of the *C. elegans* mortal germline phenotype (selected talk). S. Saber[G], M. Snyder, M. Rajaei[G], and **C. F. Baer**.

Society for Molecular Biology and Evolution, Annual Meeting (online due to Covid), June 2021. Direct inference of the distribution of fitness effects (DFE) of spontaneous mutations in *C. elegans* (contributed poster). T. A. Crombie[P], M. Rajae[G], A. S. Saxena[G], L. M. Johnson[G], S. Saber[G], R. E. Tanny, E. C. Andersen, J. M. Ponciano, and **C. F. Baer**.

22th International *C. elegans* Conference (online due to Covid), June 2021. Direct inference of the distribution of fitness effects (DFE) of spontaneous mutations in *C. elegans* (contributed poster). T. A. Crombie[P], M. Rajae[G], A. S. Saxena[G], L. M. Johnson[G], S. Saber[G], R. E. Tanny, E. C. Andersen, J. M. Ponciano, and **C. F. Baer**.

D. Public Outreach

Lecture (w/ Discussion) at the Oak Hammock retirement community, Gainesville, FL, April **2023**.

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 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. Submitted Manuscripts

1. Saxena, A. S.[G] and **C. F. Baer**. 2026. High rate of mutation and efficient removal by selection of structural variants from natural populations of *Caenorhabditis elegans*. *bioRxiv* 2025.03.22.644739. In review.
2. Chen, T-A, T-C Wang, P. Venugopal, A. Atkins, S. Chakraborty, **C. F. Baer**, and T. P. Lele. 2026. Cell shape is a heritable, fitness-linked trait in somatic evolution. Submitted.
3. Feerst, K.[G], **C. F. Baer**, and J. F. Ryan. 2025. Revisiting ancestral states of spiral cleavage. In revision.

B. Primary Literature

1. Saber, S.[G], Md. M. I. Rifat[G], F. Rahimi, M. Snyder, A. Singh, B. Eickwort[U], Y. Newhall[U], M. Rajaei, A. S. Saxena, R. E. Tanny, V. Katju, E. C. Andersen, J. Zhou, and **C. F. Baer**. **2026**. Evolution of the rate, molecular spectrum, and fitness effects of mutation under minimal selection in *Caenorhabditis elegans*. *Genetics.* DOI: https://doi.org/10.1093/genetics/iyag085. PMID: 41885616.
2. Saber, S.[G], L. M. Johnson[G], Md. M. I. Rifat[G], S. Rouse[U], and **C. F. Baer**. **2025**. Cumulative effects of mutation and selection on susceptibility to bacterial pathogens in *Caenorhabditis elegans*. *Evolution.* DOI: 10.1093/evolut/qpaf132. PMID: 40515768.
3. Teterina, A. A., J. H. Willis, **C. F. Baer**, and P. C. Phillips. **2025**. Pervasive conservation of intron number and other genetic elements revealed by a chromosome-level genomic assembly of the hyper-polymorphic nematode *Caenorhabditis brenneri*. *Genome Biology and Evolution*. DOI: https://doi.org/10.1093/gbe/evaf037. PMID: 40037811.
4. Wang, T-C., S. Sawney, D. Morgan, R. L. Bennett, R. Rashmi, M. R. Estecio, A. Brock, I. Singh, **C. F. Baer**, J. D. Licht, and T. P. Lele. **2024**. Genomic heterogeneity drives mechanical adaptation in human tumor cells. *Proc. Natl. Acad. Sci. USA* 121: https://doi.org/10.1073/pnas.2403062121. PMID: 39302966.
5. Crombie, T. A.[P], M. Rajaei[G], A. S. Saxena[G], L. M. Johnson[G], S. Saber[G], R. Tanny, J. M. Ponciano, E. C. Andersen, J. Zhou, and **C. F. Baer**. **2024**. Direct inference of the distribution of fitness effects of spontaneous mutations from recombinant inbred *C. elegans* mutation accumulation lines. 2024. *Genetics*, https://doi.org/10.1093/genetics/iyae136. PMID: 39139098.
6. Mallard, F., L. Noble, T. Guzella, B. Alfonso, **C. F. Baer**, and H. Teotónio. **2023**. Phenotypic stasis with genetic divergence. *Peer Community Journal*, Volume 3 (2023), article no. e119. doi : 10.24072/pcjournal.349. https://peercommunityjournal.org/articles/10.24072/pcjournal.349/.
7. Mallard, F., L. Noble, **C. F. Baer**, and H. Teotónio. **2022**. Variation in mutational (co)variances. *G3:Genes|Genomes|Genetics*, DOI: 10.1093/g3journal/jkac335. PMID: 36548954.
8. Saber, S.[G], M. Snyder, M. Rajaei[G], and **C. F. Baer**. **2022**. Mutation, selection, and the prevalence of the *C. elegans* heat-sensitive mortal germline phenotype. *G3:Genes|Genomes|Genetics*. https://doi.org/10.1093/g3journal/jkac063. PMID: 35311992.

9. 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.
10. 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* 31: 1602-1613. PMID: 34404692.
11. 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.
12. 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.
13. 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.
14. 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.
15. 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.
16. 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.
17. 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.
18. 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.
19. 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.
20. 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.
21. 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.
22. 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.

23. 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.
24. 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.
25. 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).
26. 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.
27. 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.
28. 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.
29. 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.
30. **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.
31. 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.
32. 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.
33. **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.
34. Denver, D. R., P. C. Dolan, L. J. Wilhelm, W. Sung, J. I. Lucas-Lledó, D. K. Howe, S. C. Lewis, K. Okamoto, W. K. Thomas, M. Lynch, and **C. F. Baer**. 2009. A genome-wide view of Caenorhabditis elegans base-substitution mutation processes. *Proc. Natl. Acad. Sci. USA* 106: 16310-16314. PMID: 19805298. Faculty of 1000 selection.
35. 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. PMID: 19667133.
36. Joyner-Matos, J.[P], A. Upadhyay[U], M. P. Salomon[G], V. Grigaltchik[U], and **C. F. Baer**. 2009. Genetic (co)variation for life span in rhabditid nematodes: Role of mutation, selection, and history. *Journal of Gerontology A: Biological Sciences* 64: 1134–1145. PMID: 19671885.
37. Phillips, N.[P], M. Salomon[G], A. Custer[P], D. Ostrow[P], and **C. F. Baer**. 2009. Spontaneous mutational and standing genetic (Co)variation at dinucleotide microsatellites in

Caenorhabditis briggsae and *C. elegans*. *Molecular Biology and Evolution* 26: 659–669. PMID: 19109257.

38. **Baer, C. F.** 2008. Quantifying the de-canalizing effects of spontaneous mutations in rhabditid nematodes. *American Naturalist* 172: 272–281. PMID: 18582167.
39. **Baer, C. F.**, M. M. Miyamoto, and D. R. Denver. 2007. Mutation rate variation in multicellular eukaryotes: causes and consequences. *Nature Reviews Genetics* 8: 619-631. PMID: 17637734.
40. Ostrow, D. G., N. Phillips[P], A. Avalos[U], D. Blanton[U], A. Boggs[U], T. Keller[U], L. Levy[U], J. Rosenbloom[U], and **C. F. Baer**. 2007. Mutational bias for body size in Rhabditid nematodes. *Genetics* 176: 1653–1661. PMID: 17483403.
41. **Baer, C. F.**, N. Phillips[P], D. Ostrow, A. Avalos[U], D. Blanton[U], A. Boggs[U], T. Keller[U], L. Levy[U], and E. Mezerhane[U]. 2006. Cumulative effects of spontaneous mutations for fitness in Caenorhabditis: role of genotype, environment and stress. *Genetics* 174: 1387-1395. PMID: 16888328.
42. Fuller, R. C., **C. F. Baer**, and J. Travis. 2005. How and when selection experiments might actually be useful. *Integr. Comp. Biol*. 45: 391-404. PMID: 21676785.
43. **Baer, C. F.**, F. Shaw, C. Steding[U], M. Baumgartner[U], A. Hawkins[U], A. Houppert[U], N. Mason[U], M. Reed[U], K. Simonelic[U], W. Woodard[U], and M. Lynch. 2005. Comparative evolutionary genetics of spontaneous mutations affecting fitness in rhabditid nematodes. *Proc. Natl. Acad. Sci. USA* 102: 5785-5790. PMID: 15809433. Faculty of 1000 selection.
44. **Baer, C. F.**, D. Tripp, T. Bjorksten, and M. F. Antolin. 2004. Phylogeography and the evolution of host use in a parasitoid wasp, *Diarietiella rapae*. *Molecular Ecology* 13: 1859-1869. PMID: 15189209.
45. **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. PMID: 12872914.
46. 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. PMID: 11112176.
47. **Baer, C. F.**, J. Travis, and K. Higgins. 2000. Experimental evolution in *Heterandria formosa*, a livebearing fish: group selection on population size. *Genetical Research* 76: 169-178. PMID: 11132410.
48. **Baer, C. F.**, and J. Travis. 2000. Direct and correlated responses to artificial selection on acute thermal stress tolerance in a livebearing fish. *Evolution* 54: 238-244. PMID: 10937200.
49. **Baer, C. F.** 1999. Among-locus variation in F_{st}: Fish, allozymes, and the Lewontin-Krakauer test revisited. *Genetics* 152: 653-659. PMID: 10353907.
50. Travis, J., M. G. McManus, and **C. F. Baer**. 1999. Sources of variation in physiological phenotypes and their evolutionary significance. *American Zoologist* 39: 422-433.
51. **Baer, C. F.** 1998. Species-wide population structure in a southeastern US freshwater fish, *Heterandria formosa*: gene flow and biogeography. *Evolution* 52: 183-193. PMID: 28568144.
52. **Baer, C. F.** 1998. Population structure in a south-eastern US freshwater fish, *Heterandria formosa*. II. Gene flow and biogeography within the St. Johns River drainage. *Heredity* 81: 404-411.
53. **Baer, C. F.**, M. Dantzker, and M. J. Ryan. 1995. Schooling behavior in a color polymorphic Poeciliid fish: laboratory study. *Environmental Biology of Fishes* 43: 207-212.

C. Invited Commentary Articles:

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

D. Book Chapters:

57. **Baer, C. F.**, J. Travis, and H. Teotónio. **2025**. Evolutionary Genetics, History of. In: *The Encyclopedia of Evolutionary Biology*. R. Kliman, ed. Academic Press, Waltham, MA. Invited revision of Travis and Baer 2016. https://doi.org/10.1016/B978-0-12-800049-6.00011-1.
58. **Baer, C. F**. 2020. Mutation Rate and Spectrum. In: *Oxford Bibliographies in Evolutionary Biology*. D. Futuyma, ed. Oxford University Press, New York. Invited submission.
59. 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
60. **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.

Graduate students supervised

Malaweera Arachchige Sandaru (co-advised with W. B. Barbazuk), **1/26-present**
Shambadeb Basu, **8/22-present**
Md Monjurul Islam Rifat, **8/20-present**
Kathyrn Feerst, 8/2022-12/2024, MS Fall 2024; currently enrolled in MS of Library Science program at Drexel University.
Moein Rajaei, 8/16-4/22, Ph.D Spring 2022. Currently postdoc, Yale University.
Sayran Saber, 1/15-4/22, Ph.D Spring 2022. Currently postdoc, Florida Int'l University.
Lindsay M. Johnson, 8/14-4/20, Ph.D Spring 2020, currently Associate Director of Analytical Development, Dyne Therapeutics, Waltham, MA.
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 Assistant Professor, Keck School 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

Sayran Saber. 5/22 – 12/22. Currently postdoc, Florida International University.
Timothy A. Crombie. 1/16 – 7/17. Currently Assistant Professor, Dept. of Biology, Florida Institute of Technology.
Shu-Dan Yeh. 10/14-7/15. Currently Associate Professor, Department of Life Sciences, National Central University, Taiwan.

Chikako Matsuba, 2/08 - 4/13; currently Research Scientist, Keck School of Medicine, University of Southern California, 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.

Undergraduates supervised (* indicates co-authorship on a publication):

Naeyma Ahmed, Quinton Allen, David Appel, Jamie Aron, Arián Avalos*, Heather Babb, Katy Black, Dustin Blanton*, Ashley Boggs*, Whitney Bour*, Jasmine Brown, Elin Brugge, Annie Cadavid*, Felipe Cadavid, Nicole Carita, Helmut Carter, Joanna Chan, Veronica Chik, Myrnelle Damas, Kathryn DeLuca, Joanna Dembek, Daniel Dixon, Sarah Eaton, Robyn Egan*, Ben Eickwort*, Sharanya Gande, 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, Yell Newhall*, 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

Professional Collaborators (last five years):

Andersen, Erik C. (Northwestern University); Chamala, Srikar (UF); Cutter, Asher D. (U of Toronto); Dixit, Purushottam (UF); Gilbert, Kimberly J. (U of Bern); Joyner-Matos, Joanna (Eastern Washington University); Katju, Vaishali (Uppsala University); Lele, Tanmay (Texas A&M); Ponciano, José Miguel (UF); Teotónio, Henrique (Institute of Biology of the Ecole Normale Supérieure (IBENS); Yeh, Shu-Dan (National Central University, Taiwan); Zhou, Juannan (UF)