



Jacob L. Steenwyk

Ph.D. Candidate
Evolutionary genomics
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EDUCATION

Present	Graduate Student Biological Sciences Advisor: Antonis Rokas GPA: 3.97	Vanderbilt University
2016	M.S. Biochemistry and Molecular Biology Advisor: John G. Gibbons GPA: 3.98	Clark University
2015	B.A. Biochemistry and Molecular Biology Advisor: Denis Larochelle Cumulative GPA: 3.84 Science GPA: 3.84	Clark University

AWARDS

2019	Ann Bernard Martin Award for Excellence in Graduate Research, Vanderbilt University
2019	Ruth L. Kirschstein National Research Service Award, National Institutes of Health
2019	Ford Foundation Predoctoral Fellowship, Ford Foundation
2019	Graduate student travel grant, Vanderbilt University
2019	Curb Center Fellow, ArtLab, Vanderbilt University
2018	<i>GENETICS</i> Peer Review Training Program, Genetics Society of America
2018	Best poster award, Cellular and Molecular Fungal Biology, Gordon Research Seminar
2018	Best poster award, Cellular and Molecular Fungal Biology, Gordon Research Conference
2018	Best poster award, Department of Biological Sciences, Vanderbilt University
2018	T-shirt design contest winner, Department of Biological Sciences, Vanderbilt University
2017	Graduate student travel grant, Vanderbilt University
2016	Graduate student council travel awards, Clark University
2015	Summa cum laude, Clark University
2014	Summer research scholar, Bridging the gaps, University of Southern California Keck School of Medicine
2013	Global environmental microbiology scholar, Center for dark energy biosphere investigations, University of Southern California
2011	Jonas Clark Scholar, Clark University

RESEARCH INTERESTS

- DNA damage and repair
- Gene and genome evolution
- Evolution of technologically and medically significant fungi
- Phylogenetics and phylogenomics

SOCIETIES

Genetics Society of America, American Society for Microbiology, Mycological Society of America, Society for the Advancement of Chicanos/Hispanics and Native Americans in Science

FUNDING

National Institutes of Health	Principal investigator, 08/19-08/22, Examining the loss of diverse DNA repair genes and long-term hypermutation in a lineage of budding yeasts, Ruth L. Kirschstein National Research Service Award, Individual Predoctoral Fellowship (Parent F31), \$88,128
Ford Foundation Predoctoral Fellow	Principal investigator, 08/19-08/22, The consequences of aberrant cell cycle and DNA repair processes in budding yeast, \$72,000 (declined)
Curb Center ArtLab Fellow	Principal investigator, 12/18-04/19, Bridging the gap between artist and scientist, \$300

INVITED TALKS

2019	<i>Extensive loss of cell cycle and DNA repair genes in an ancient lineage of bipolar budding yeast.</i> Gordon Research Conference, Molecular Mechanisms in Evolution, Easton, MA
2019	<i>Extensive loss of cell cycle and DNA repair genes in an ancient lineage of bipolar budding yeast.</i> Gordon Research Seminar, Molecular Mechanisms in Evolution, Easton, MA (declined)
2019	<i>Letting go of control.</i> Focal Point, ArtLab, Vanderbilt University, Nashville, TN
2019	<i>Extensive loss of cell cycle and DNA repair genes in an ancient lineage of bipolar budding yeast.</i> 30 th Fungal Genetics Conference at Asilomar, Pacific Grove, CA
2019	<i>The yeast with the least,</i> Hanseniaspora. Phylogenomics and Evolution Group, North Carolina State University, Raleigh, NC
2018	<i>The flow of influences shaping the current.</i> ArtLab Seminar Series, Vanderbilt University, Nashville, TN
2015	<i>Instinct and Intelligence.</i> TedXClarkUniversity, Clark University, Worcester, MA

CONTRIBUTED TALKS

2019	<i>The yeast with the least,</i> Hanseniaspora. Biological Sciences Annual Retreat, Vanderbilt University, Nashville, TN
2019	<i>Microbes and our food.</i> Science club at the library, Nashville Public Library, Nashville, TN
2018	<i>From bread to beer: Out unwitting domestication of yeast.</i> Nashville Science Club, Jackalope Brewing Company, Nashville, TN
2017	<i>Extensive copy number variation in fermentation-related genes among Saccharomyces cerevisiae wine strains.</i> Mycological Society of America, University of Georgia, Athens, GA
2016	<i>Population structure and copy number variation in the fungal pathogen Cryptococcus gattii.</i> Mycological Society of America, University of California Berkeley, Berkeley, CA
2016	<i>Population structure and copy number variation in the fungal pathogen Cryptococcus gattii.</i> Graduate Student Multidisciplinary Conference, Clark University, Worcester, MA

UNDERGRADUATE ADVISING

Current	Olivia Zheng
Current	Megan A. Phillips
2019	Benjamin Buckman
2018	Devin G. Arrants

WORKSHOP TEACHING

- 2019** Founder and instructor of ‘A beginner’s guide to making figures in R’, Vanderbilt University, Nashville, TN
- 2019** Instructor, Workshop on Phylogenomics, Evolution and Genomics, Český Krumlov, Czech Republic
- 2019** Instructor, Workshop on Genomics, Evolution and Genomics, Český Krumlov, Czech Republic

TEACHING EXPERIENCE

- 2017-2019** Teaching Assistant, Introductory Biology Lab, Vanderbilt University, Nashville, TN
- 2016** Teaching Assistant, Introduction to Biostatistics, Clark University, Worcester, MA
- 2014-2015** Teaching Assistant, Cell Biology, Clark University, Worcester, MA

POSTER PRESENTATIONS

- 2019** 30th Fungal Genetics Conference at Asilomar, Pacific Grove, CA
- 2019** Asperfest pre-meeting at 30th Fungal Genetics Conference at Asilomar, Pacific Grove, CA
- 2018** Cellular and Molecular Fungal Biology, Gordon Research Conference, Holderness, NH
- 2018** Cellular and Molecular Fungal Biology, Gordon Research Seminar, Holderness, NH
- 2018** Department of Biological Sciences Annual Retreat, Vanderbilt University, Nashville, TN
- 2015** Bumpus Symposium, Clark University, Worcester, MA
- 2015** Traina Scholars Presentation, Clark University, Worcester, MA
- 2015** Summer Research Presentation, Clark University, Worcester, MA

RESEARCH EXPERIENCE

- 2016-Pres.** Antonis Rokas Lab at Vanderbilt University, Nashville, TN. Doctoral Research. Evolution of medically and technologically significant fungi.
- 2015-2016** John Gibbons Lab at Clark University, Worcester, MA. Undergraduate and Master’s Research. Copy number variation in the human pathogen, *Cryptococcus gattii*.
- 2015-2016** Robert Drewell Lab at Clark University, Worcester, MA. Undergraduate and Master’s Research. Genome-wide methylation patterns in the social amoeba, *Dictyostelium discoideum*.
- 2014** Ite A. Laird-Offringa Lab at University of Southern California, Los Angeles, CA. Bridging the Gaps Summer Scholar. Mapping the autoimmune triggering epitope of *ELAVL4* in small cell lung cancer.
- 2013** John Heidelberg and Eric Webb Labs at University of Southern California, Los Angeles, CA. Global Environmental Microbiology Summer Scholar. Fresh and marine water microbial diversity.

SERVICE

- 2019-Pres.** Co-chair, MEGAMicrobe, Vanderbilt Institute for Infections, Immunology and Inflammation, Nashville, TN
- 2018-Pres.** Vice President, Inclusivity in Biosciences Association, Vanderbilt University, Nashville, TN
- 2018-Pres.** Vice President, Graduate Student Association, Department of Biological Sciences, Vanderbilt University, Nashville, TN
- 2018-Pres.** Member, American Society of Microbiology Vanderbilt University Chapter
- 2017-Pres.** Educational outreach booth design and execution, MEGAMicrobe, Nashville, TN
- 2017-Pres.** Communications chair, Inclusivity in Biosciences Association, Vanderbilt University, Nashville, TN

- 2017-Pres.** Member of the Dean of Graduate Student's survey quantitative analysis subgroup, Graduate Diversity and Inclusion Committee, Vanderbilt University, Nashville, TN
- 2017-Pres.** Judge, Middle Tennessee Science and Engineering Fair, Belmont University, Nashville, TN
- 2013-Pres.** Administrator and Owner, Molecular Biology and Biochemistry for Researchers and Students Group, LinkedIn
- 2019** Peer review workshop leader, 30th Fungal Genetics Conference at Asilomar, Pacific Grove, CA
- 2018-2019** Vice co-chair, MEGAMicrobe, Vanderbilt Institute for Infections, Immunology and Inflammation, Nashville, TN
- 2017-2018** Secretary, Graduate Student Association, Department of Biological Sciences, Vanderbilt University, Nashville, TN
- 2017-2018** Scientific consultant, Little Harpeth Brewing, Nashville, TN
- 2017** Vanderbilt Student Volunteers for Science, Volunteer Science Teacher, West End Middle School, Nashville, TN
- 2014-2015** Undergraduate Subcommittee for Department of Chemistry, Biochemistry and Molecular Biology Faculty Search Committee, Clark University, Worcester, MA
- 2014-2015** Science Education Outreach Blogger, C-DEBI Sci-Curious Blog

ART SHOWS

- 2019** Focal point, ArtLab, Vanderbilt University, Nashville, TN
- 2019** Connecting the Dots, ArtLab, Vanderbilt University, Nashville, TN
- 2018** ArtLab opening reception, ArtLab, Vanderbilt University, Nashville, TN
- 2018** The Intersection between Art and Science, ArtLab, Vanderbilt University, Nashville, TN

MANUSCRIPT REVIEWER

Systematic Biology; BMC Genomics; G3: Genes | Genomes | Genetics; PLoS One; Molecular Genetics and Genomics; Young Scientists Journal; Scholarly Undergraduate Research Journal

POPULAR SCIENCE ARTICLES

- (1) An outlaw yeast thrives with genetic chaos – and could provide clues for understanding cancer growth, *The Conversation*, May 21, 2019. [Article Link](#)

PUBLICATIONS

* Equal contributors; ^ Senior authors; P/S preprint/submitted

- P/S: **Steenwyk, J.L.** & A. Rokas (2019). treehouse: a user-friendly application to obtain subtrees from large phylogenies. Submitted.
- P/S: Labella, A.L., D.A. Opulente, **J.L. Steenwyk**, C.T. Hittinger, & A. Rokas (2019). Variation and selection on codon usage bias across an entire subphylum. bioRxiv: doi: 10.1101/608042
- P/S: Bodinakku, I., J. Shaffer, A.B. Connors, **J.L. Steenwyk**, E. Kastman, A. Rokas, A. Robbat, B. Wolfe (2019). Rapid phenotypic and metabolomics domestication of wild *Penicillium* molds on cheese. Submitted.
- P/S: **Steenwyk, J.L.**, X.-X. Shen, A.L. Lind, G.G. Goldman, & A. Rokas (2018). A robust phylogenomic timetree for biotechnologically and medically important fungi in the genera *Aspergillus* and *Penicillium*. bioRxiv. doi: 10.1101/370429.
- P/S: **Steenwyk, J.**, J. St. Denis, J. Dresch, D. Larochele, & R. Drewell (2017). Whole genome bisulfite sequencing reveals a sparse, but robust pattern of DNA methylation in the *Dictyostelium discoideum* genome. bioRxiv. doi: 10.1101/166033

- (10) **Steenwyk, J.L.**, D. Opulente, J. Kominek, X.-X. Shen, X. Zhou, A.L. LaBella, N.P. Bradley, B.F. Eichman, N. Čadež, D. Libkind, J. DeVirgilio, A.B. Hulfachor, C.P. Kurtzman, C.T. Hittinger[^], & A. Rokas[^] (2019). Extensive loss of cell cycle and DNA repair genes in an ancient lineage of bipolar budding yeasts. *PLoS Biology*: doi: 10.1371/journal.pbio.3000255
- (9) Ries, L.N.A., **J.L. Steenwyk**, P.A. de Castro, P.B.A. de Lima, F. Almeida, L.J. de Assis, A.O. Manfiolli, A. Takahashi-Nakaguchi, Y. Kusuya, D. Hagiwara, H. Takahashi, X. Wang, J. Obar, A. Rokas, & G.H. Goldman (2019). Nutritional heterogeneity among *Aspergillus fumigatus* strains has consequences for virulence in a strain- and host-dependent manner. *Frontiers in Microbiology*. doi: 10.3389/fmicb.2019.00854
- (8) Mead M.E., S.L. Knowles, H.A. Raja, S.R. Beattie, C.H. Kowalski, **J.L. Steenwyk**, L.P. Silva, J. Chiaratto, L.N.A. Ries, G.G. Goldman, R.A. Cramer, N.H. Oberlies, & A. Rokas (2019). Characterizing the pathogenic, genomic, and chemical traits of *Aspergillus fischeri*, the closest sequenced relative of the major human fungal pathogen *Aspergillus fumigatus*. *mSphere*. doi: 10.1128/mSphere.00018-19
- (7) Knowles, S.L., H.A. Raja, A.J. Wright, A.M.L. Lee, L.K. Caesar, N.B. Cech, M.E. Mead, **J.L. Steenwyk**, L.N.A. Ries, G.H. Goldman, A. Rokas, & N.H. Oberlies (2019). Mapping the Fungal Battlefield: Using *in situ* Chemistry and Deletion Mutants to Monitor Interspecific Chemical Interactions between Fungi. *Frontiers in Microbiology*: doi: 10.3389/fmicb.2019.00285
- (6) Eidem, H.R., **J.L. Steenwyk**, J. Wisecaver, J.A. Capra, P. Abbot, & A. Rokas (2018). integRATE: a desirability-based data integration framework for the prioritization of candidate genes across heterogeneous ‘omics and its application to preterm birth. *BMC Medical Genomics*. doi: 10.1186/s12920-018-0426-y
- (5) Shen, X.-X.* , D.A. Opulente*, J. Kominek*, X. Zhou*, **J.L. Steenwyk**, K.V. Buh, M.A.B. Haase, J.H. Wisecaver, M. Wang, D.T. Doering, J.T. Boudouris, R.M. Schneider, Q.K. Langdon, M. Ohkuma, R. Endoh, M. Takashima, R. Manabe, N. Čadež, D. Libkind, C.A. Rosa, J. DeVirgilio, A.B. Hulfachor, M. Groenewald, C.P. Kurtzman[^], C.T. Hittinger[^] & A. Rokas[^] (2018). Tempo and mode of genome evolution in the budding yeast subphylum. *Cell*. doi: 10.1016/j.cell.2018.10.023
- (4) Segal, E.S., V. Gritsenko, A. Levitan, B. Yadav, N. Dror, **J.L. Steenwyk**, Y. Silberberg, K. Mielich, A. Rokas, N.A.R. Gow, R. Kunze, R. Sharan, & J. Berman (2018). Gene Essentiality Analyzed by In Vivo Transposon Mutagenesis and Machine Learning in a Stable Haploid Isolate of *Candida albicans*. *mBio*. doi: 10.1128/mBio.02048-18
- (3) **Steenwyk, J.L.** & A. Rokas (2018). Copy number variation in fungi and its implications for wine yeast genetic diversity and adaptation. *Frontiers in Microbiology*. doi: 10.3389/fmicb.2018.00288
- (2) **Steenwyk, J.** & A. Rokas (2017). Extensive Copy number variation in fermentation-related genes among *Saccharomyces cerevisiae* wine strains. *G3: Genes | Genomes | Genetics*. doi: 10.1534/g3.117.040105
- (1) **Steenwyk J.L.**, J.S. Soghigian, J.R. Perfect, & J.G. Gibbons (2016). Copy number variation contributes to cryptic genetic variation in outbreak lineages of *Cryptococcus gattii* from the North American Pacific Northwest. *BMC Genomics*. doi: 10.1186/s12864-016-3044-0